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A F - M E R C A D O S E M I

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## **POWER SECTOR OPERATIONS AND IMPACT ON STATE FINANCES**

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### **VOLUME I : ALL INDIA SUMMARY OF KEY ASPECTS OF POWER SECTOR**

**PREPARED FOR:**

**THE FOURTEENTH FINANCE COMMISSION**

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## ABBREVIATIONS

<b>ACS</b>	Average Cost of Supply
<b>AER</b>	Australian Energy Regulator
<b>AMI</b>	Advanced Metering Infrastructure
<b>AMR</b>	Automatic Metering
<b>APDRP</b>	Accelerated Power Development and Reform Program
<b>APTEL</b>	Appellate Tribunal
<b>ARR</b>	Average Revenue Realized
<b>AT&amp;C</b>	Aggregate Technical and Commercial losses
<b>BSEB</b>	Bihar State Electricity Board
<b>CAG</b>	Comptroller and Auditor General
<b>CAGR</b>	Compound Annual Growth Rate
<b>CAT</b>	Consumers Analysis Tool
<b>CEA</b>	Central Electricity Authority
<b>CERC</b>	Central Electricity Regulatory Commission
<b>CGRF</b>	Consumer Grievance Redressal Forum
<b>COAG</b>	Council of Australian Governments
<b>CPDCL</b>	Central Power Distribution Company Limited
<b>CPUC</b>	California Public Utilities Commissions
<b>Discom</b>	Distribution Company
<b>DTR</b>	Digital Transformer Ratio meter
<b>EA 2003</b>	Electricity Act 2003
<b>EPDCL</b>	Eastern Power Distribution Company Limited
<b>ERC</b>	Energy Regulatory Commission
<b>FERC</b>	Federal Energy Regulatory Commission
<b>FFC</b>	Fourteenth Finance Commission
<b>FRP</b>	Financial Restructuring Plan
<b>FSA</b>	Fuel Supply Agreement
<b>GIS</b>	Geographic Information System
<b>GOI</b>	Government of India
<b>GSDP</b>	Gross State Domestic Product
<b>HERC</b>	Haryana Electricity Regulatory Commission
<b>HR</b>	Human Resource
<b>IP</b>	Irrigation Pump

<b>IT</b>	Information Technology
<b>JSEB</b>	Jharkhand State Electricity Board
<b>Kcal</b>	Kilocalorie
<b>KPI</b>	Key Performance Indicators
<b>KWh</b>	Kilowatt Hour
<b>MERC</b>	Maharashtra Electricity Regulatory Commission
<b>MoP</b>	Ministry of Power
<b>MPSC</b>	Maryland Public Service Commissions
<b>MRI</b>	Meter Reading Instrument
<b>MSEDCL</b>	Maharashtra State Electricity Distribution Company
<b>MU</b>	Million Units
<b>MW</b>	Megawatts
<b>MYT</b>	Multi Year Tariff
<b>NEP</b>	National Electricity Policy
<b>NPDCL</b>	Northern Power Distribution Company Limited
<b>Ofgem</b>	Office of Gas and Electricity Markets
<b>OMS</b>	Outage Management System
<b>P&amp;L A/c</b>	Profit and Loss Account
<b>PAA</b>	Private Accounting Agencies
<b>PLF</b>	Plant Load Factor
<b>PPA</b>	Power Purchase Agreement
<b>R-APDRP</b>	Restructured - Accelerated Power Development and Reform Program
<b>RGVY</b>	Rajiv Gandhi Grameen Vidyutikaran Yojana
<b>RIMS</b>	Regulatory Information Management System
<b>SCER</b>	Standing Council on Energy and Resources
<b>SEBs</b>	State Electricity Boards
<b>SERC</b>	State Electricity Regulatory Commission
<b>SHR</b>	Station Heat Rate
<b>SLDC</b>	State Load Dispatch Centre
<b>SoP</b>	Standard of Performance
<b>SPDCL</b>	Southern Power Distribution Company Limited
<b>STL</b>	Short Term Liabilities
<b>STU</b>	State Transmission Company
<b>T&amp;D</b>	Transmission and Distribution

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<b>TANGEDCO</b>	Tamil Nadu Generation and Distribution Corporation Limited
<b>TANTRANSCO</b>	Tamil Nadu Transmission Corporation Limited
<b>TISM</b>	Transformer Information Management system
<b>UI</b>	Unscheduled Interchange

# I EXECUTIVE SUMMARY

## INTRODUCTION

The power sector operations in India have undergone a dynamic change after the enactment of the Electricity Act, 2003. With the enactment of the Electricity Act, the sector has shifted from regulated business to competitive business. This is mostly true for generation and increasingly for transmission. However, competition in the power distribution segment is still not prevalent. Power distribution segment has been the weakest link in the entire value chain. The distribution segment, has also long faced questions of financial sustainability on account of below-cost tariffs to different consumer groups; supply of un-metered, free electricity to agriculture; and high Aggregate Technical and Commercial (AT&C) losses. These factors have weakened the finances of state utilities, lowering the ability to attract private investment in the sector and resulting in heavy reliance upon government support for both investment and working capital. The aggregate losses (without accounting for subsidy) for all the utilities increased by from Rs. 64,463 Crore in the year 2009-10 to Rs.74,291 Crore in 2010-11 and to Rs. 92,845 Crore in 2011-12.

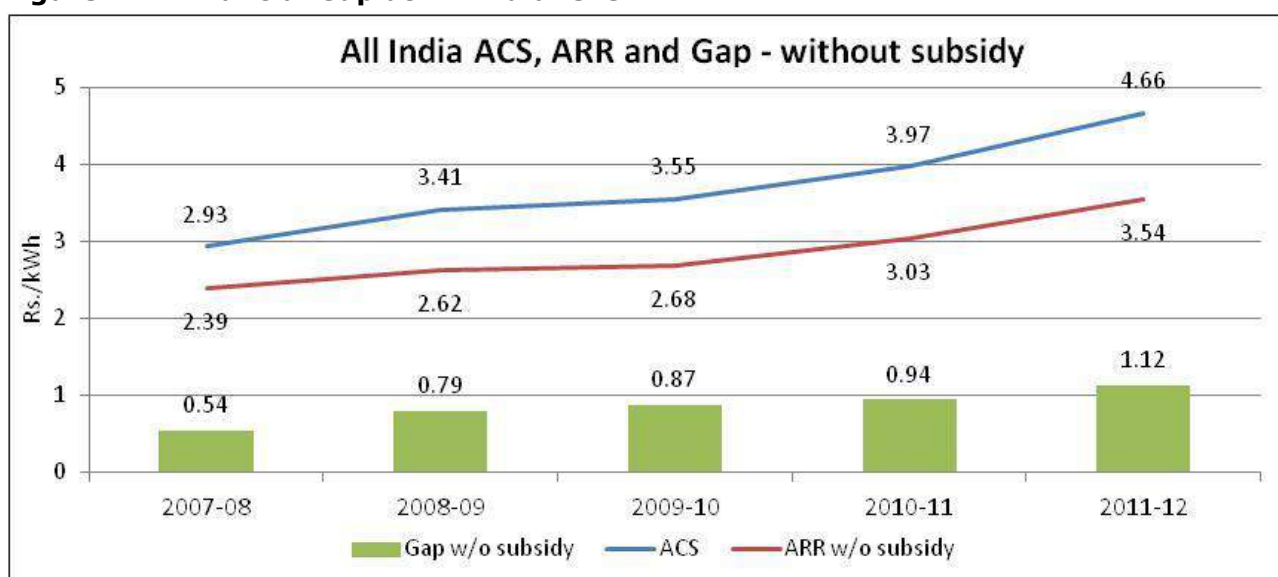
**The State governments being the sole owners of an overwhelming majority of the distribution utilities, the impact of the utility finance directly and indirectly devolves on the respective states.** From the perspective of the Fourteenth Finance Commission (FFC), it was essential to evaluate the impact of all these factors in aggregate on the State Finances and in disaggregate form to understand the root causes of weak performance. It was also important to identify the areas of concern on the future operations of the distribution utilities and the sector as a whole, and the potential implications of the same on state finances. This is particularly relevant in the context of the Financial Restructuring Plan (FRP) supported by GoI that is currently underway. Default by the utilities on the FRP measures and targets would effectively devolve on the respective state governments.

## OBJECTIVE

With the above in view, the objective of this study was to review and assess the power sector operations and its impact on state finances.

## ALL-INDIA FINANCIAL PERFORMANCE OF DISTRIBUTION COMPANIES IN INDIA

The figure below presents the trend of Average Cost of Supply (ACS), Average Revenue Realized (ARR), and Gap on a per-unit basis at an All-India level.

**Figure I-1: Financial Gap at All India level**

Source: PFC report on utility finances 2007-08 to 2011-12

It can be observed that the **Financial Gap** has consistently increased over the last few years primarily due to the increase in **ACS** without commensurate increase in tariff. Even on subsidy received basis, the financial gap in 2011-12 reduces from Rs.1.12/kWh to **Rs. 0.76/kWh**.

The Financial gap can be segregated into two parts: one related to inadequate tariff increases and other related to inefficiencies on part of the distribution utilities i.e. collection inefficiency and technical losses.

Assuming 15% transmission and distribution losses as unavoidable, difference between ACS (with 15% T&D losses) and ARR (with collection efficiency of 100%) reflects the tariff inadequacies in the states.

It can be observed that inefficiencies accounts for 52.5% of the total financial gap on all India basis. Gap reduces by Rs. 0.59/kWh if one considers improvement in efficiencies. The financial gap reduces from Rs.1.12/kWh to Rs.0.54/kWh after improvement of efficiencies with gap of Rs. 0.54/kWh due to inadequate increase in tariff. The following table presents the breakup of ACS-ARR Gap as a result of inefficiency and tariff inadequacy for 2011-12.

**Table I-1: Break-up of ACS-ARR Gap per unit at all India Level – 2011-12**

	Units	ARR	ACS	Gap
<b>Actuals</b>	Rs./kWh	<b>3.54</b>	4.66	<b>1.12</b>
<b>With efficiency Improvement (ARR-100% Collection efficiency; ACS- 10% T&amp;D losses)</b>	Rs./kWh	<b>3.95</b>	4.49	<b>0.54</b>

Source: PFC and AF-Mercados EMI Analysis

In light of the above, the Ministry of Power (MoP) requested the Appellate Tribunal to take appropriate action by issuing necessary directions to all the State Commissions to revise the tariff periodically, if required by suo moto action, in the interest of improving the long term viability of the electricity sector in general and distribution utilities in particular. The Appellate Tribunal for Energy Judgement on OP1 of 2011 played a significant role in driving SERC's to undertake periodic tariff revisions thereby enabling financial discipline in the

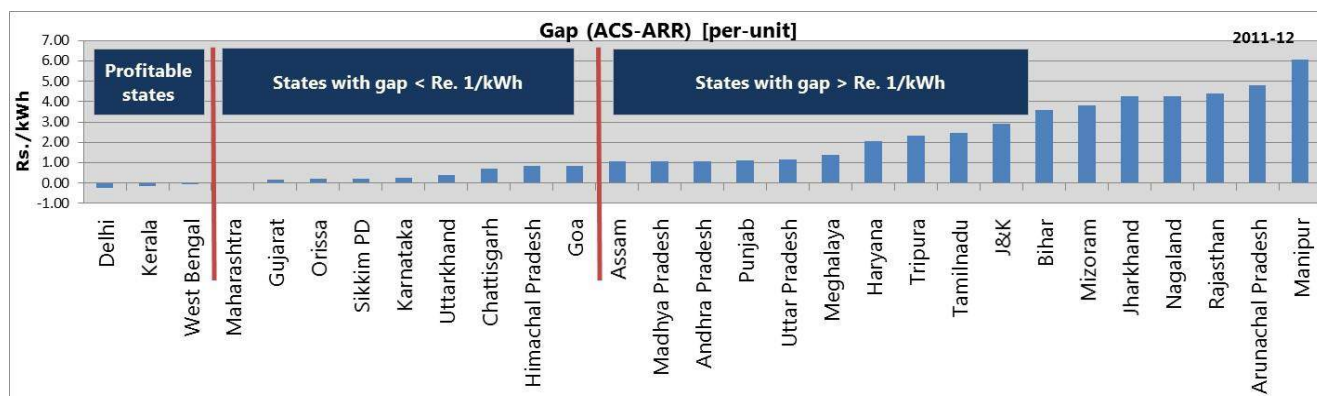


sector. In line with the directions of the APTEL, more than 20 states revised their tariffs in 2012-13 and 2013-14.

## STATE-LEVEL FINANCIAL PERFORMANCE

This section presents state-level financial performance of the distribution sector for all the states. The Financial Gap per unit for all states (without subsidy) in 2011-12 is shown in the figure below.

**Figure I-2: Financial Gap per Unit (without subsidy)**

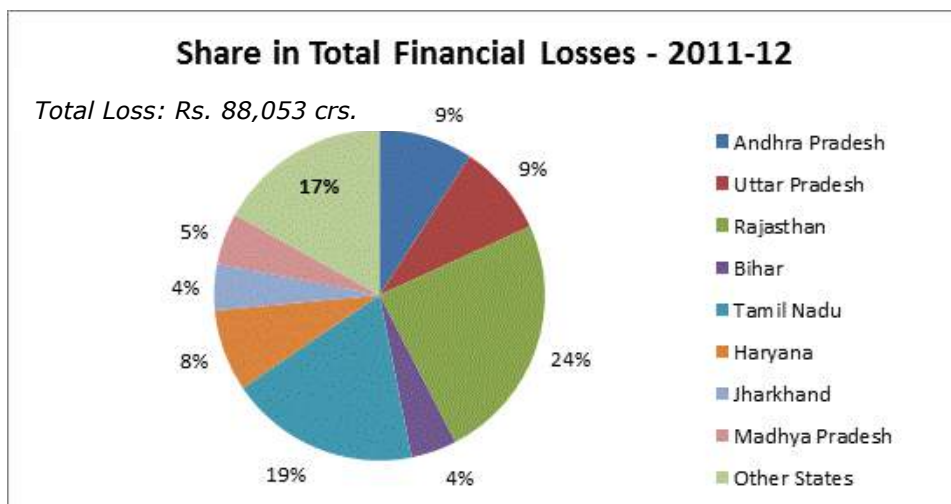


Source: PFC report on utility finances

It can be observed that

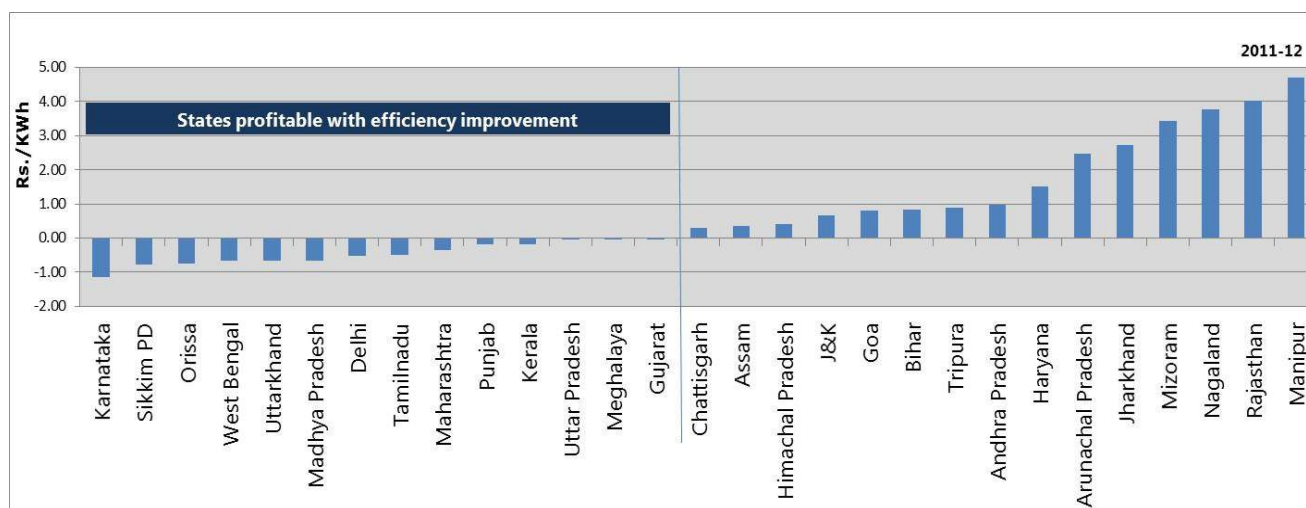
- States like Delhi, Kerala and West Bengal have recorded profits in the year 2011-12, without state government subsidies.
- Few states like Maharashtra, Gujarat, Orissa, Sikkim, Karnataka, Uttarakhand, Chhattisgarh, Himachal Pradesh and Goa have a gap of less than Re. 1 per-unit.
- The remaining states have a gap of more than Re. 1 per-unit.

In terms of financial losses in 2011-12 it can be observed that 8 states constitute 83% of the total losses in the distribution sector and 2 states, namely Rajasthan and Tamil Nadu constitute around 43% of the total losses of the power sector in India. The figure below presents the share of major states in the total financial losses in the power sector of the country.

**Figure I-3: Share in the total financial losses without subsidy in 2011-12**

Source: PFC report on utility finances, 2011-12

In order to understand the constituents of financial gap in 2011-12, gap related to inadequate tariff increases and gap related to inefficiencies on part of the distribution utilities have been segregated. The figure below presents the Financial Gap in 2011-12 with efficiency improvements.

**Figure I-4: ACS-ARR Gap with efficiency improvement per unit – 2011-12**

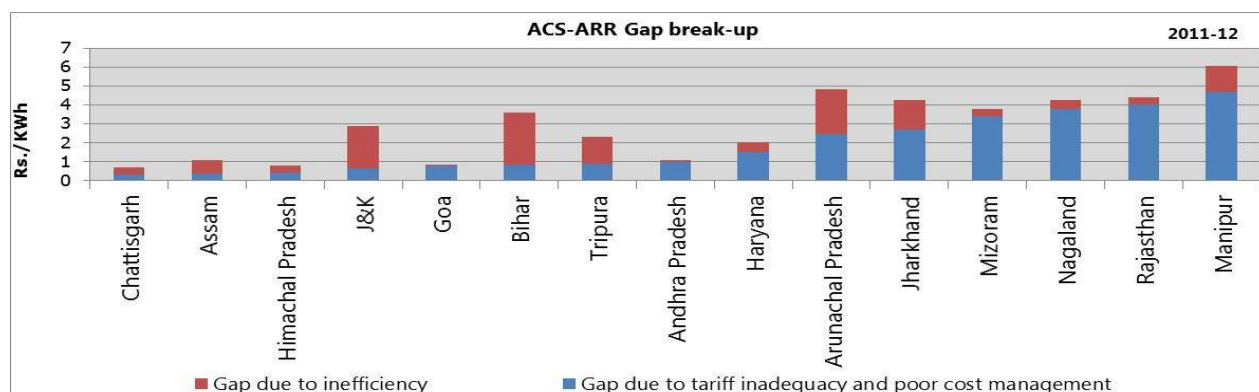
Source: PFC and AF-Mercados EMI Analysis

#### Following can be observed from the above:

- In 2011-12, a large number of states would turn profitable by improving efficiency. For example, in large power consuming states such as Uttar Pradesh and Madhya Pradesh, the entire Gap can be removed by efficiency improvement.
- The states which are already profitable can optimize their operations and further improve their financial position. For example, in West Bengal, the level of available efficiency improvement is close to Re. 1 per unit.
- In actual scenario, only three states, namely, Delhi, Kerala and West Bengal have recorded profit without subsidies in 2011-12. While in efficiency improvement scenario, this number would increase to 14 states.
- In other states, it can be observed that even after improving efficiency levels to the extent possible, financial gap would remain reflecting the inadequacies in tariff levels in those states.

The figure below presents the break-up of financial gap into the inefficiency gap and tariff inadequacy gap.

**Figure I-5: Break-up of Financial Gap per unit into the inefficiency gap and tariff inadequacy gap – 2011-12**



Source: PFC and AF-Mercados EMI Analysis

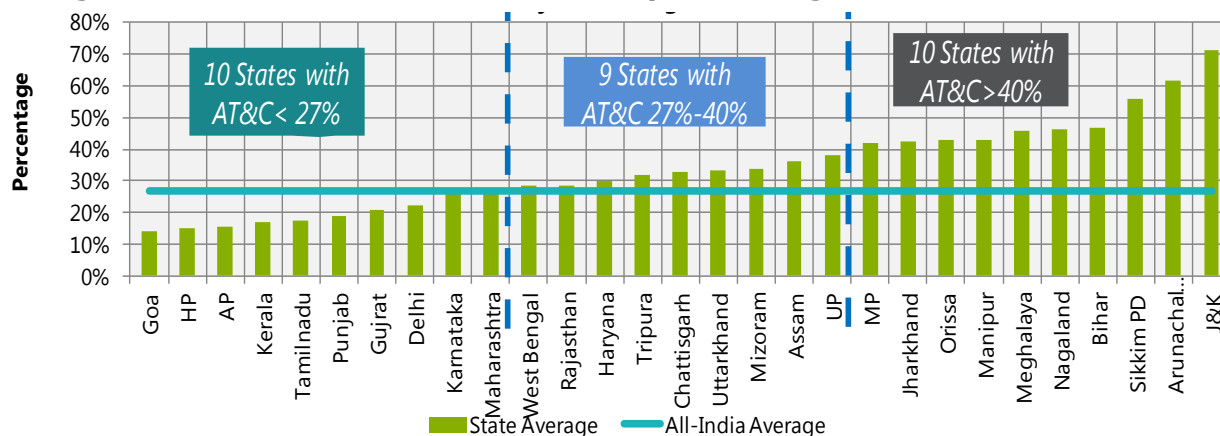
**Following can be observed from the above:**

- In few states such as Bihar, J&K, Assam, Tripura and Jharkhand, apart from tariff inadequacy, a large part of the gap is a result of inefficiency. For example, Bihar can reduce its financial gap by close to Rs 3 per-unit through efficiency improvement. However, the remaining gap of around Re 1 per-unit need to be eliminated through tariff hikes.
- In other states like Rajasthan, Haryana, Andhra Pradesh, Mizoram and Manipur, more than inefficiency, tariff revisions have been inadequate and constitute a large part of the gap.

## ROOT-CAUSE ANALYSIS FOR POOR PERFORMANCE OF STATE DISCOMS

The key root-causes for the poor performance of the state Discoms are as follows:

- **Lack of efficiency improvement:** In 2011-12, AT&C losses at an All-India level were around 27%. The figure below presents that average (5 year) AT&C losses for different states. As observed in the figure below, states with high unmetered agricultural consumption, including Andhra Pradesh, Tamil Nadu, and Punjab have low AT&C losses. On the other hand, states with a low agricultural share in total consumption have high ATC losses.

**Figure I-6: State-level AT&C Losses – 5 year Average**

Source: PFC report on utility finances – 2007-08 to 2011-12

Bihar, Jharkhand, Uttar Pradesh, Rajasthan, J&K, and north-eastern states have high AT&C losses due to power thefts. Also, big power consuming states such as Uttar Pradesh, Rajasthan, Madhya Pradesh etc. have AT&C losses higher than the All India average.

Further, it can be observed the AT&C losses in few states have been continuously high, despite high level of annual capital expenditures. For example, the cumulative capital expenditure from 2008-09 till 2011-12 of Discoms in Uttar Pradesh and Rajasthan was Rs. 7361 Cr. and Rs. 10117 Cr. respectively. Yet, the level of AT&C losses has been more or less constant during the same period. Similarly, cumulative capital expenditure of Bihar (BSEB) utilities was Rs.3456 Cr. with AT&C losses averaging around 45% during the same period. Increase in capital expenditure has not led to a corresponding reduction in AT&C losses highlighting infructuous capital investments and resultant financial gap.

- **Metering levels:** Even after 10 years of the enactment of the Electricity Act 100% metering in most of the states is still not achieved. Only few of the states such as Assam, Himachal Pradesh, Kerala, Orissa, Delhi, Goa, Tripura, Uttarakhand have been able to achieve almost 100% metering. None of the states have been able to meter 100% of the agricultural consumers in the country. Agricultural states such as Punjab and Tamil Nadu are completely unmetered.
- **Inadequate and infrequent tariff hikes:** The cost of power purchase has increased over the years but the tariff increase has not been commensurate with the increase in cost of supply. Most of the states which have a positive financial gap have not increased tariffs for several years. Further, states such as Andhra Pradesh, Tamil Nadu, Rajasthan and Haryana where the tariffs were not revised for 7, 7, 6 and 8 years respectively.
- **Lack of Power Purchase Optimization by states:** Since power purchase costs constitute around 75-80% of the total cost of distribution utilities, escalating power procurement rates is a matter of serious concern for the utilities. Either the load forecasting (demand and supply) capabilities are inefficient or they do not exist at all in most of the states. In some cases, this has led to an over-reliance on the spot market which has increased the costs. Without superior optimization practices on part of the utilities, identification of shortages and surpluses has been difficult for the utilities. Hence, there is need for states to invest in forecasting capabilities.

**As highlighted earlier, Energy Judgement on OP1 of 2011 by APTEL has been a landmark judgement with over 20 states revised tariffs in 2012-13 and 2013-**

**14. Significant tariff hikes have been undertaken in the last few years in states such as Tamil Nadu, Rajasthan, Bihar, Haryana etc.**

**Table I-2: Tariff hikes in different states in last few years**

States	2011-12	2012-13	2013-14
Goa	0%	10%	2%
Kerala	0%	28%	2%
Maharashtra	3%	18%	0%
Orissa	20%	36%	9%
Karnataka	7%	3%	0%
Uttarakhand	6%	6%	0%
Andhra Pradesh	24%	-	29%
Madhya Pradesh	6%	7%	1%
Punjab	9%	12%	9%
Uttar Pradesh	-	9%	16%
Haryana	0%	19%	13%
Tamil Nadu	9%	37%	4%
Bihar	21%	11%	6%
Rajasthan	24%	19%	14%

Also, tariff hikes have been across consumer categories including agriculture. Majority of the states have revised tariffs for the agriculture category, reflecting the need to improve realization from agriculture.

- In 2011-12, Tamil Nadu increased tariff for agriculture from Rs.250/HP/annum to Rs.2500/HP/annum
- In 2013-14, Rajasthan increased agriculture tariffs (general category) from Rs 2.25/kWh to Rs 3.93/kWh. Also, tariffs for unmetered agri. consumers were hiked by an even higher percentage, in order to incentivize shift to metered category
- In Andhra Pradesh, tariffs for agriculture have been hiked in the last 2 years

**Significant tariff hikes in the last few years now provides limited opportunity for further tariff revisions unless coupled with efficiency improvements. As discussed earlier, it is important to improve efficiency and optimize costs of the utilities. Cost reflective tariffs can only be achieved if costs are optimum going forward.**

## FINANCIAL RESTRUCTURING PLAN

To ensure improved financial performance, while simultaneously providing incentives to improve efficiency, GoI approved the Financial Restructuring Plan in order to restructure Rs. 1.9 lakh Crore debt of Discoms. The plan is now under implementation in seven of the poorly performing states namely Andhra Pradesh, Tamil Nadu, Rajasthan, Haryana, Bihar, Jharkhand and Uttar Pradesh. The re-schedulement of loans is to be accompanied by measurable actions to improve the operational performance of the distribution utilities. It focuses on tariff rate revisions, supplemented with earning through reduced losses.

With schemes in the FRP such as capital incentives for 50% short term liability (STL) to be taken over by state government by issuance of special securities to lenders, along with

other finance mechanisms, the liquidity position of Discoms is expected to witness an immediate improvement. However, the restructuring plan is a short term measure of improving the financial health of utilities and hence, it would be difficult to ascertain if this would also lead to a structural change in the financial health of Discoms in a sustainable manner over the coming years. As a result, efficiency becomes the key point of importance for long term sustenance which would largely depend upon the commitment of utilities and regulators to the performance linked measures. The short-term, which in turn will benefit other participants in the power supply value chain. Also, several critical parameters under the FRP are stated to be 'under-progress' in most of the states availing the scheme. To achieve long term financial viability of Discoms, achieving respective targets for these parameters becomes very critical. If these key parameters are neglected, the very goals of the scheme will be at risk. For example, privatization initiatives are very tepid at this time. For most participant states, the road-map for implementation is either being finalized or being discussed with the state government. Two of the states, Uttar Pradesh (in Agra and Noida) and Jharkhand (Ranchi and Jamshedpur) have started the process.

## STATE EXPOSURE TO POWER SECTOR

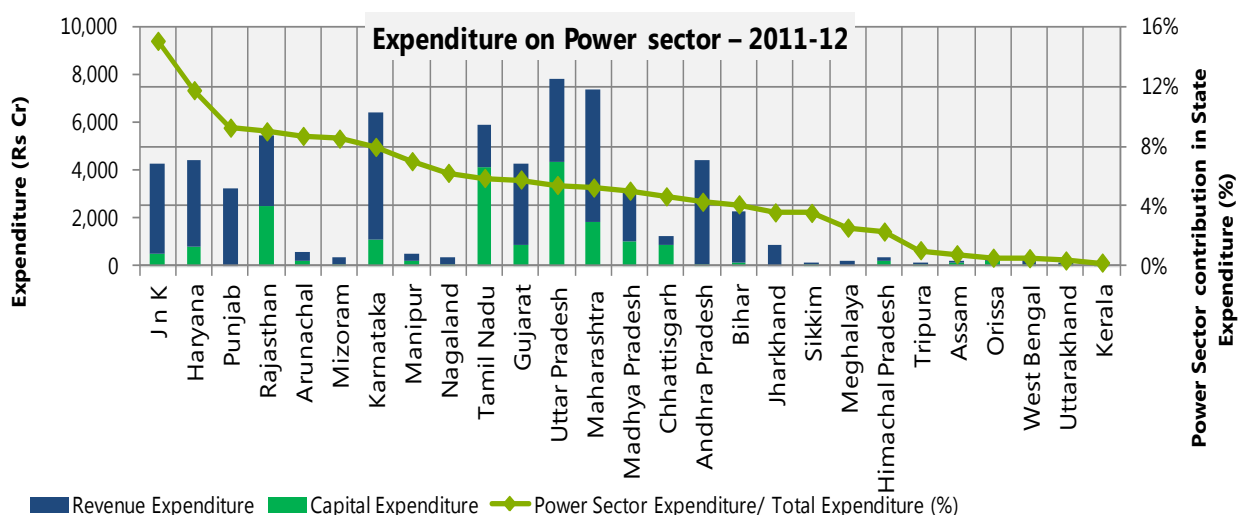
Even today, State Governments are the sole owners of a majority of the distribution utilities, and as such, the impact of utility finance directly or indirectly devolves on the respective states.

In 2001, to clear outstanding overdues of state electricity boards to the central public sector undertakings (CPSUs), Power Bonds aggregating Rs 31,581 Cr. were issued by the state governments to clear dues of CPSU's. As of 2011-12, Power Bonds aggregating to Rs. 11540 Cr. were outstanding. Existing Power Bonds will be redeemed completely by 2016-17. However, the overall repayment pressure for the states participating in FRP is expected to be aggravated from 2018-19.

As per the FRP, the state governments will take over a total of approx. Rs. 60,000 Cr. (50% of Discoms' STL) in 2-5 years. The governments will redeem these from 2018-19 onwards in annual instalments in next 10 years.

The all India expenditure on power sector, including capital and revenue expenditure for the year 2011-12 has been Rs 64,437 Cr. The following graph represents the state wise expenditure on power sector for 2011-12.

**Figure I-7: State Expenditure on Power Sector 2011-12**



Source: State Government annual accounts from CAG 2011-12

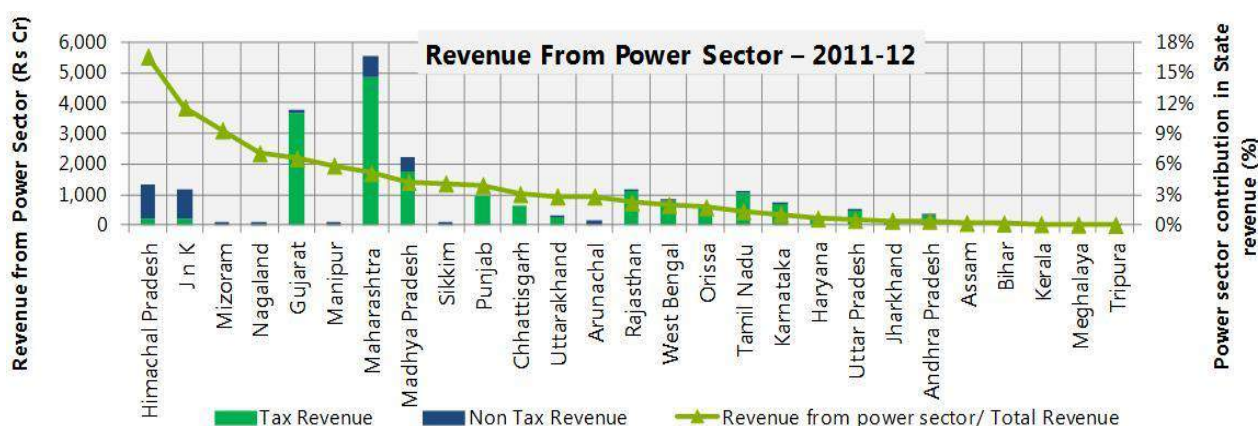
It can be observed that:

- Around 78% of the total expenditure on power sector in 2011-12 is towards 9 states, namely Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Rajasthan, Haryana, Jammu and Kashmir, Gujarat and Andhra Pradesh

The power sector expenditure as a percentage of total state expenditure has been highest for states like J&K and Haryana with 15% and 12% respectively and lowest for Uttarakhand and Kerala with 0.08% and 0.15% respectively.

The respective government also generates revenue from power sector through tax in form of state electricity duty and non-tax sources like dividends, share of free power etc. The following figure presents the revenue from power sector for 2011-12:

**Figure I-8: State Revenue from Power Sector 2011-12**



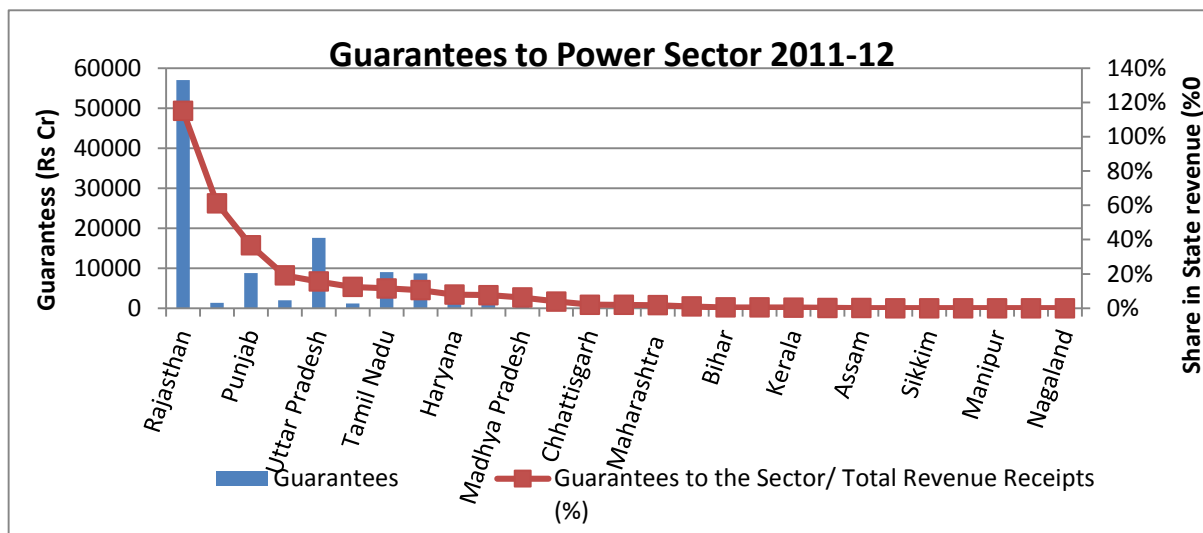
Source: State Government annual accounts from CAG 2011-12

It can be observed that:

- Tax Revenue (Power Sector) is the highest in Gujarat and Maharashtra. The major source of Non – Tax Revenue is free Hydropower sale, Rural Electrification etc. In Himachal Pradesh and Maharashtra, ~100% of the Non- Tax Revenue from Power Sector came from Hydel-Generation.
- The states which make a net contribution from the power sector, i.e., states in which revenue generation from power sector is higher than the revenue expenditure are Maharashtra, Madhya Pradesh, Gujarat, Chhattisgarh, West Bengal, Himachal Pradesh, Orissa and Uttarakhand.
- The states with lowest revenue generating ability calling for external assistance are Uttar Pradesh, Tamil Nadu, Rajasthan, Bihar, Haryana and Andhra Pradesh. In these states, the amount of expenditure far exceeds the revenue.

## STATE GOVERNMENT GUARANTEES TO THE POWER SECTOR

In 2011-12, the guarantee provided to the utilities was highest in Rajasthan. The guarantee provided to the utilities relative to revenue receipts of the states was the highest in Rajasthan followed by Meghalaya and Punjab. In majority of states, the guarantee provision to the state utilities was relatively low, both in quantum and as a percentage of revenue, as presented below.

**Figure I-9: Guarantees to Power Sector 2011-12**

Source: State Government annual accounts from CAG (2011-12)

## GOVERNANCE

Apart from the need to make efficiency improvements by state utilities, Regulatory Governance also has a very important role in achieving efficiency in service delivery and overall financial sustenance of the distribution segment. The effectiveness of regulatory practices can be observed on following parameters.

- **Financial Independence** – Many of the SERCs are still dependent upon the state governments for meeting their expenditures. Most states governments have not established SERC funds, limiting the financial autonomy of regulators.
- **Staffing** – Inadequacy in technical staff and vacant positions has led to weak institutional memory and internal capabilities
- **Performance Monitoring and Public Disclosure** – There is a need to strengthen the accountability framework. Performance monitoring is an important aspect in this regard. Although performance monitoring is undertaken for different state utilities but no such mechanism exists for the SERC's.
- **Frequency and adequacy of tariff revisions** - Limited tariff hikes were observed during 2005-2011 while the revenue gap significantly increased. In line with the directions of the APTEL in OP1 of 2011, more than 20 states revised their tariffs in 2012-13 and 2013-14. In principle, tariffs should reflect the cost of supply and thus it is important that studies related to cost of supply for different consumer categories to be undertaken by SERC's. In addition to studies related to cost of supply it is equally important that optimum cost should be determined by the SERC's as consumers should not be made liable to pay for the inefficiency of the power utilities. As discussed earlier, it can be observed that in most of the states if efficiency of Discoms is improved, there would be minimal requirement for tariff increase. Study of aspects related to distribution impact of tariff on various consumer categories also needs to be carefully understood while undertaking tariff revisions.



- **Consumer Protection** - Public participation in the regulatory process (discussion papers/ public hearings) has been limited. Bulk of the consumers especially rural and domestic consumers are not even aware of such options. Even after 10 years of the Electricity Act 2003, Quality of supply has not much improved and is not adequately monitored by the utilities. To ensure good quality of supply to consumers, it is important that quality of supply being linked with tariffs and tariffs be revised in accordance with the improvement in quality.

Lack of proper governance and accountability has also been acknowledged in the High Level Panel report on "financial position of Distribution Utilities – 2011", chaired by Shri V.K. Shunglu.

As for the utilities, most of them comply with the basic requirements of the Companies Act. However, there is a definite need to follow certain corporate governance requirements, some of which may not necessarily apply to the utilities. Following good practices pertaining to Board composition, Board functioning, Audit Committee, Government-board relationship and disclosure, etc. has shown to directly correlate with better financial performance over the long run. Currently, only a few utilities are following these good practices.

## RECOMMENDATIONS

The following are the key recommendations for improving power sector operations and state finances.

### Structural

- Unbundling of utilities should not be deferred any further. Unbundling of the distribution segment further into wires and retail business is equally important.
- Rural Franchisees should be promoted to ensure payment security/better management in rural areas
- Distribution franchising in high load – high loss areas
- Encouragement of Open Access
- Independent reporting of Discoms to Regulators

### Regulatory

- Optimum cost reflective tariffs to bridge the Revenue Gap.
- Estimation of agricultural consumption and real loss reduction
- Improved information measurement/monitoring systems such as forecasting tools, procurement planning/portfolio optimization, reliability of power supply, etc.

### System/Process

- Business Process Re-engineering to improve efficiency and bring best practices (material procurement, inventory management, energy accounting, etc.)
- Power purchase cost optimization through better load forecasting, managing generation from own sources, banking arrangements, etc.
- Improved customer focus through better service levels and IT linked tracking and redressal mechanism
- Initiation of metering at different levels of the power system for proper performance measurement on various parameters

### Human Resource

- Strengthening the role of HR function in power utilities and regulatory bodies
- Introduction of Power Management Systems to improve productivity at all levels
- Regular and targeted recruitments
- Capacity and skill development of staff of utilities

## II ASSIGNMENT CONTEXT

### 1. BACKGROUND

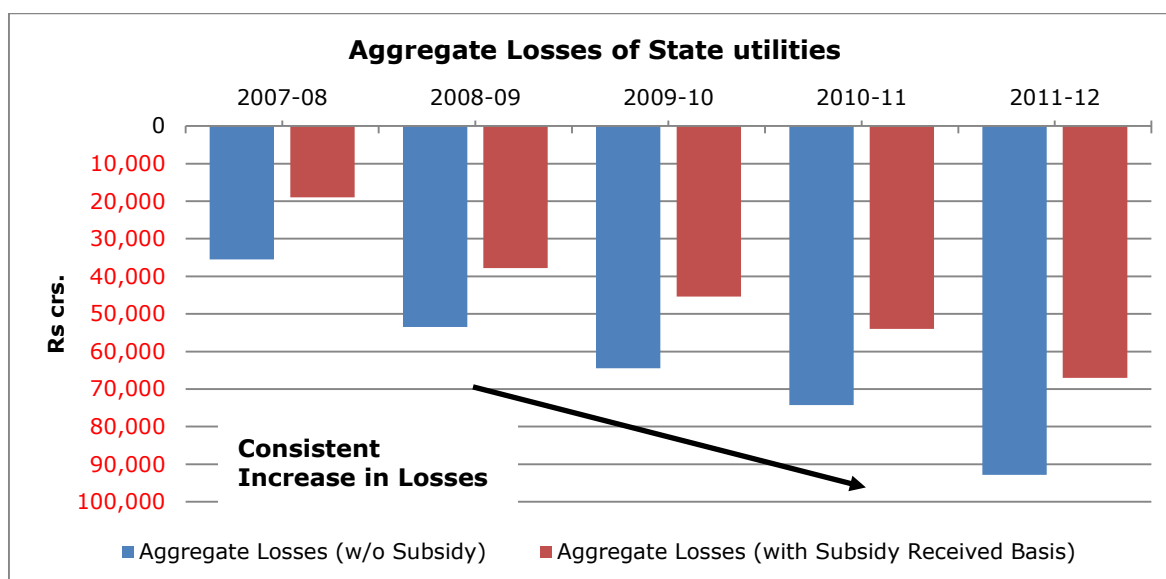
The power sector is a prime mover and an effective engine of economic growth. It has also been a significant and persistent source of concern for the policy makers on account of the large scale inefficiencies and financial losses. The sector - and particularly the distribution segment that is the greatest source of concern - is dominated by state owned enterprises. Thus the respective governments ultimately bear the responsibility and the consequences of such performance.

India's power sector dynamics has significantly changed over a decade, after the enactment of the Electricity Act, 2003. On several aspects, the sector from being regulated regime has shifted towards competitive regime. This is true for generation and increasingly for transmission. Further establishment of power markets have led to transparent operations and price signals. Simultaneously, efforts have been made at institutional reforms in the sector. Utility unbundling has been mandated in the Electricity Act, 2003 along with independent regulation of licensees and generating companies selling to licensees. Competition has been promoted through legislative and policy interventions. Competitive power markets have been evolving at a fast pace, signalling new capacity additions by developers.

Given the existing and projected power shortages and the importance of power to the country's growth agenda, significant new investment is required in all segments of the sector. While the sector has witnessed a few success stories in the last 8-10 years, there are various challenges that needs to be addressed which result from the gaps that exist between what is planned versus what the power sector has been able to deliver.

**The sector, and particularly the distribution segment, has also long faced questions of financial sustainability on account of below-cost tariffs to different consumer groups; supply of un-metered, free electricity to agriculture; and high Aggregate Technical and Commercial (AT&C) losses. These factors have weakened the finances of state utilities, lowering the ability to attract private investment in the sector and resulting in heavy reliance upon government support for both investment and working capital.**

The aggregate losses (without accounting for subsidy) for all the utilities increased by from Rs. 64,463 Crs. in the year 2009-10 to Rs.74,291 Crs. in 2010-11and to Rs. 92,845 Crs in 2011-12.

**Figure II-1: Aggregate Losses of State Utilities**

Source: PFC report on utility finances

Distribution is the weakest link in the chain of power supply in India. Currently, the sector is in a state of crisis. The utility finances have worsened considerably to the level that has been characterized at times as “India’s sub-prime” crisis. Some of the key issues plaguing the sector are:-

- Uncovered costs
- High level of uncovered subsidies
- Cross Subsidization
- High Technical and Distribution (T&D) losses etc.

Distribution reforms have been identified as the key area to bring about the efficiency and improvement in the financial health of the power sector. Various initiatives have been undertaken in the past for bringing improvement in the distribution sector. **Government of India (GoI) has attempted to promote distribution network improvements through the Accelerated Power Development and Reform Program (APDRP) - subsequently redesigned and rechristened as R-APDRP - to reflect upgrades made to the scheme.** The programme focused on reduction of AT&C losses and an overall strengthening of the sub-transmission and distribution level. In case of Rajiv Gandhi Grameen Viduyutikaran Yojana (RGGVY) that is intended for improving access and supply quality/reliability in rural areas, the outcomes has been mixed.

Distribution segment is at the “bottom of the pyramid” in power supply economics that impacts the power sector as a whole. If the Discoms lose their paying capacity, the generation and transmission segment would not be able to sustain their businesses. This is indeed happening and leading to a perilous situation. The resultant financial stress will cascade into failure of the sector to attract the much-needed investments for its development.

**As mentioned previously, the State governments being the sole owners of an overwhelming majority of the distribution utilities, the impact of the utility finance directly and indirectly devolves on the respective states.** From the perspective of the Fourteenth Finance Commission (FFC), it is essential to evaluate the impact of all these factors in aggregate on the State Finances and in disaggregate form to understand the root causes of weak performance. It is also important to identify the areas

of concern on the future operations of the utilities and the sector as a whole, and the potential implications of the same on state finances. This is particularly relevant in the context of the Financial Restructuring Plan (FRP) supported by GoI that is currently underway. Default by the utilities on the FRP measures and targets would effectively devolve on the respective state governments. The report specifically focuses on these aspects.

## 2. STRUCTURE OF THE REPORT

In view of the overall objectives of the assignment, the main purpose of this report is to present a detailed analysis on the performance of states across various key parameters pertaining to power companies and also the respective state governments.

The report has been divided into two volumes.

*Volume I* provides the All-India summary of the key aspects of power sector in India;

*Volume II* presents the state-wise details of the utility operations and finances.

The Scope of Work has been covered across chapters in Volume I as follows<sup>1</sup>.

**Chapter II** outlines the performance of the distribution business in India over the last five years, along with the primary reasons behind the performance

**Chapter III** focuses on the state government's exposure to the power sector.

**Chapter IV** presents the details of the recent Financial Restructuring Plan introduced by the GoI. This chapter also presents FRP outlook for different states' distribution utilities.

**Chapter V** provides the analysis of the regulatory effectiveness of state regulators in the country

**Chapter VI** presents open access details and state-wise status of the same

**Chapter VII** presents the different approaches adopted by states to measure agricultural consumption

**Chapter VIII** focuses on the best practices in the distribution sector in India

**Chapter IX** lists out recommendations for consideration of the Fourteenth Finance Commission.

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<sup>1</sup> The terms of reference for the assignment along with the coverage of the report have been provided in Annexure I

### III ASSESSMENT OF OPERATIONAL AND FINANCIAL PERFORMANCE OF THE POWER SECTOR

#### 1. PERFORMANCE OF POWER UTILITIES IN THE CONTEXT OF A DECADE OF SECTOR REFORMS

Utility performance analysis over the past decade presents a mixed bag of results. Generation capacity in the country has been strong in the past decade, largely driven by the Electricity Act 2003 that significantly improved investor perception on the investment climate in the business. While the Act made **generation** a de-licensed activity, the introduction of competitive bidding framework made the criterion of selection of projects more transparent and efficient. Even in regulated projects (i.e., those whose tariffs are determined by regulation and not through competitive bidding) the operational norms for thermal based power plants have improved over the years. CERC has been consistently tightening the operational norms in the generation sector. The tables below present some of the key operational norms including SHR, Auxiliary Consumption, and PLF for different control periods.

**Table III-1: Operational Norms for Coal Based Power Plants**

Operational Norms for Coal Based Power Plants				
Tariff Policy	Normative SHR (Kcal/kWh) Existing Plants	Normative SHR (Kcal/kWh) Future Plants	Auxiliary Consumption	Normative PLF
2004-09	2500 to 2450	NA	7% to 8.5%	80%
2009-14	2500 to 2425	1.065 X Design Heat Rate,	6% to 8.5%	85%
2014-19	2450 to 2375	1.045 X Design Heat Rate,	5.25% to 8.5%	85%

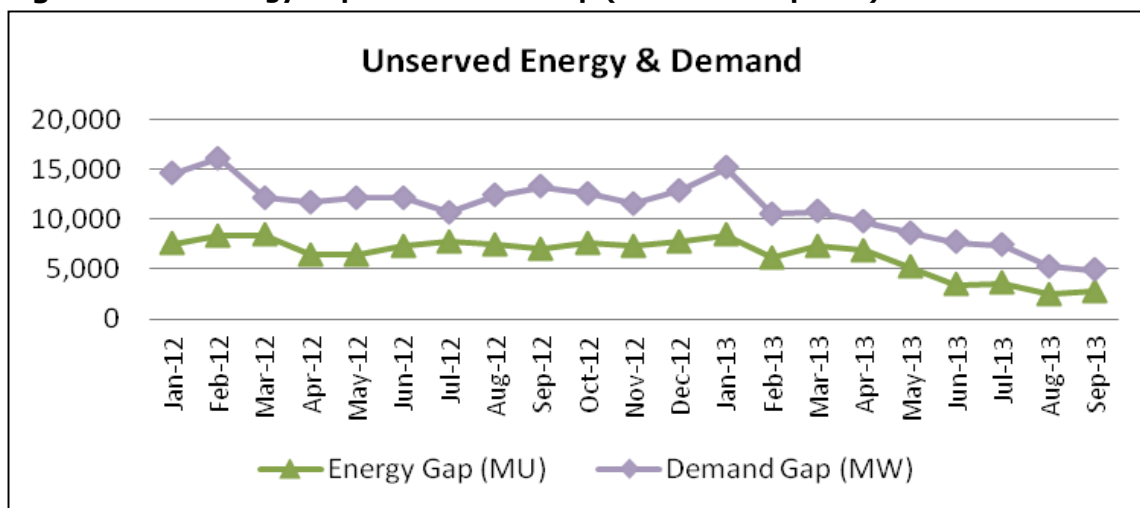
Source: CERC regulations for different control periods

**Table III-2: Operational Norms – Gas Plants**

Operational Norms for Gas Based Power Plants					
Tariff Policy	Normative SHR (Kcal/kWh) Cycle	SHR Open	Normative SHR (Kcal/kWh) Combined Cycle	Auxiliary Consumption	Normative PLF
2004-09	2685 -2830		1850-1950	3% to 1%	80%
2009-14	Plant Specific		1.05 X Design Heat Rate,	3% to 1%	85%
2014-19	Plant Specific		1.05 X Design Heat Rate,	2.5% to 1%	85%

Source: CERC regulations for different control periods

Further, there have been significant increases in the share of private sector in power generation in the country. The private sector installed capacity has increased from 17112 MW in 2007 to 82715 MW as of 2014. As a result of these changes over the years, the deficits between demand and supply have fallen significantly in recent periods<sup>2</sup>, as is shown in the chart below.

**Figure III-1: Energy Gap and Demand Gap (Jan' 12 to Sept '13)**

Source: CEA

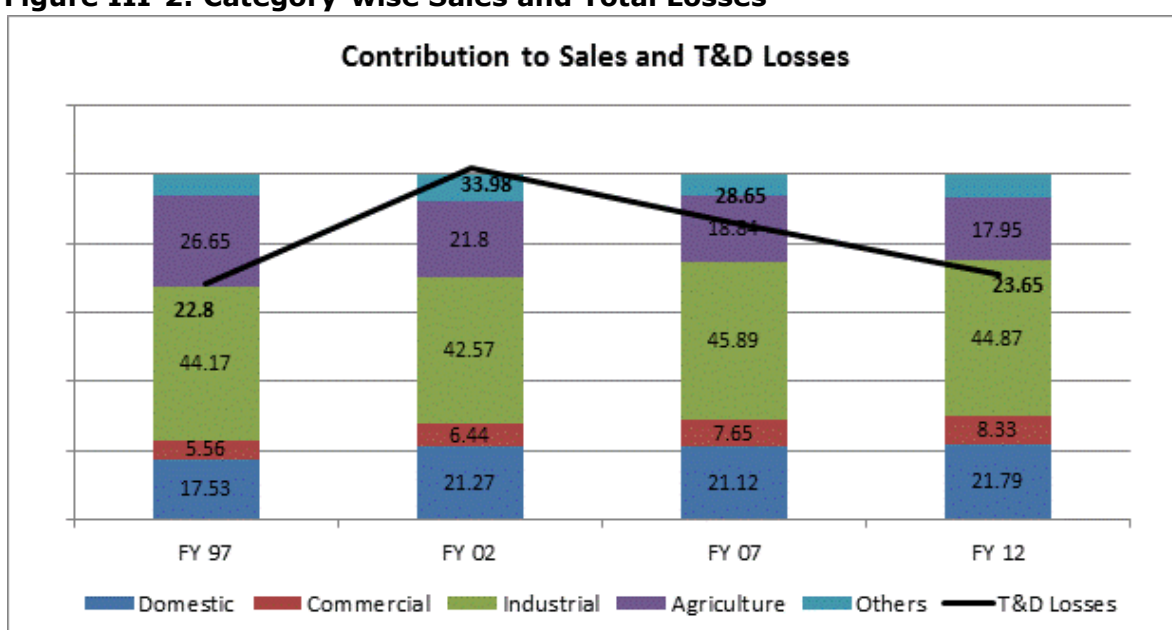
While the **transmission** segment of the sector continues to be largely under the public sector monopoly structure, several developments have resulted in increased investments and better efficiencies in this segment. GoI guidelines for tariff-based competitive bidding for transmission services have encouraged private investments. The rapid increase in inter-regional capacity has caused a change in the nature of inter-state transmission system

<sup>2</sup> The lowering of the gap has also been significantly aided by the low demand growth in the past few years due to a combination of reduced economic growth and also the price signaling by the power markets that has aided more efficient consumption.

(ISTS) in a short span of time. The integrated national system is expected to harness natural resources optimally, evolve deep competitive markets, and also to add robustness to the power system. In addition, the Electricity Act has provided for better monitoring, scheduling, and dispatch of power in the form of Load Dispatch Centres, besides setting up standards for grid operation in the form of the Grid Code. These have been followed up by regulations by CERC where more efficient development and pricing mechanisms for transmission have been instituted. However the momentum has not carried over to state level policies and regulations on transmission and in particular the inconsistencies in open access to state level networks remain a serious concern

The **Distribution** segment of the electricity sector remains the only segment that is yet to see radical improvements in efficiency. Despite several efforts, it is still mired in problems and the overall performance of this segment remains inadequate. While the network losses have reduced in the past decade, they remain much above acceptable norms.

**Figure III-2: Category-wise Sales and Total Losses**



Source: PFC report

The level of access has also improved, but remains inadequate. Most importantly, supply quality remains very erratic and inconsistent across the state owned distribution companies, and no state owned distribution utility attempts to meet the service standards and the obligations cast on them to serve load.

**Table III-3: Access Levels**

Category	Access Levels
Urban HH	93%
Rural HH	55%
Average	67%

Source: Statistical Handbook, GoI, 2014

As discussed above, it can be observed that the generation and transmission segments have become more competitive and efficient; it is the distribution sector which needs to be improved. This has negated most of the structural and market reforms in the country, and has seriously brought into question the efficacy of the present framework of ownership and

operations in the distribution sector. Therefore, this report attempts to look at this segment in detail, both on the operational and financial fronts.

## 2. DISTRIBUTION UTILITY PERFORMANCE

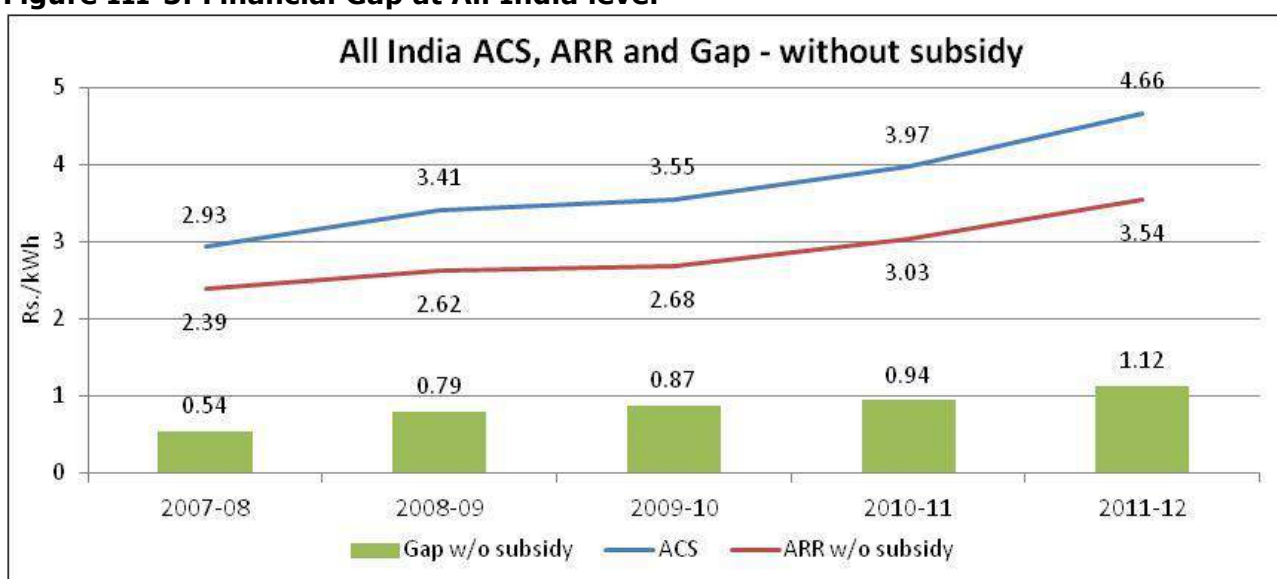
The distribution sector continues to be characterised with poor financial and operating efficiencies primarily due to unmetered supply to consumers, high T&D/AT&C losses, free electricity to agriculture consumers, inadequate tariff hikes and low realization of subsidies from state government. These factors have resulted in deteriorating the financial performance of state utilities and reduced their ability to attract private investment. This has resulted in heavy reliance upon government support for both investment and working capital requirements.

This section first presents the overall assessment of key performance parameters of distribution utilities in India and then presents an overall state wise break-up of the key performance parameters along with reasons for such performance.

### i. All-India Financial Performance of Distribution Companies in India

In order to assess the financial performance of the country, the figure below presents the trend of ACS, ARR, and revenue Gap on a per-unit basis at an All-India level.

**Figure III-3: Financial Gap at All India level\***

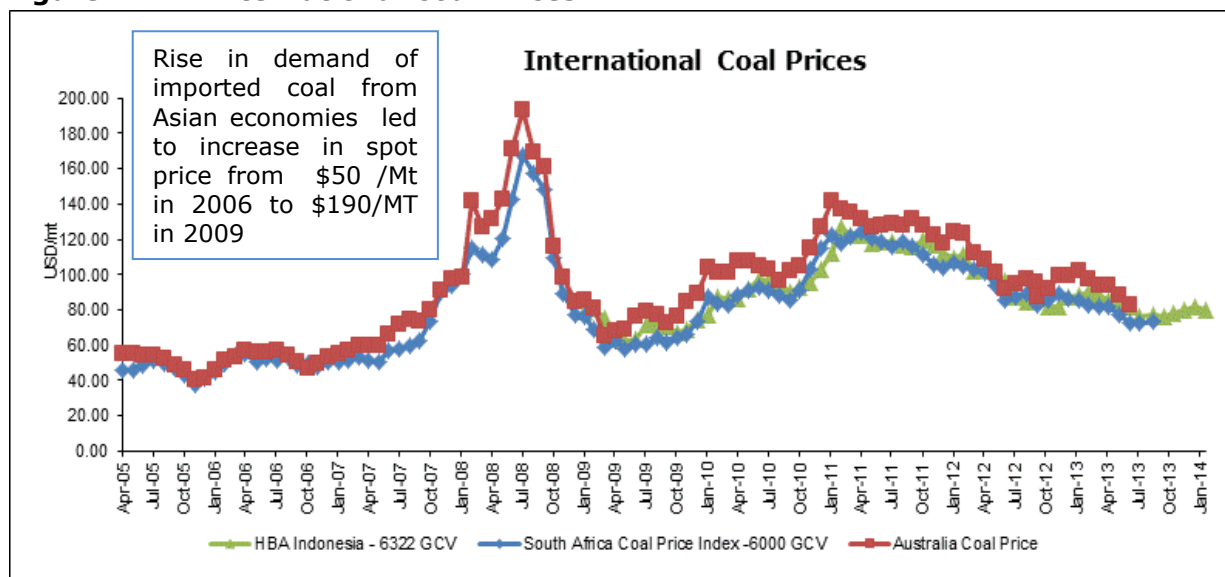


Source: PFC report on utility finances 2007-08 to 2011-12

\* ACS – Average Cost of Supply, ARR – Average Revenue Realized

The steep increase in **ACS** over the last few years has been primarily due to increase in power purchase costs, which form close to 80% of the total cost of Discoms. Power purchase costs increased by over 16% in 2008-09, the year in which international coal prices went up significantly, and thereafter have remained high as compared to the price levels of 2007-08 (Refer to the figure below).



**Figure III-4: International Coal Prices**

Source: Coal spot.com

On the revenue front, the tariff increase has not been commensurate with the increase in ACS. While the **ARR** has been increasing in the last 2 years (FY10 and FY11), the tariffs were not revised in many of the states for number of years. The lack of cost coverage has forced the Discoms to borrow heavily from banks and FIs, which has increased their interest burden over the years.

Thus, **Financial Gap** has consistently increased over the last few years and has reached unsustainable levels at present. As of 2011-12, over one rupee is lost on every unit of power purchased and sold by the distribution companies in India. In absolute terms, the aggregate losses (without accounting for subsidy) in 2011-12 were **Rs. 88,053 Crs.**

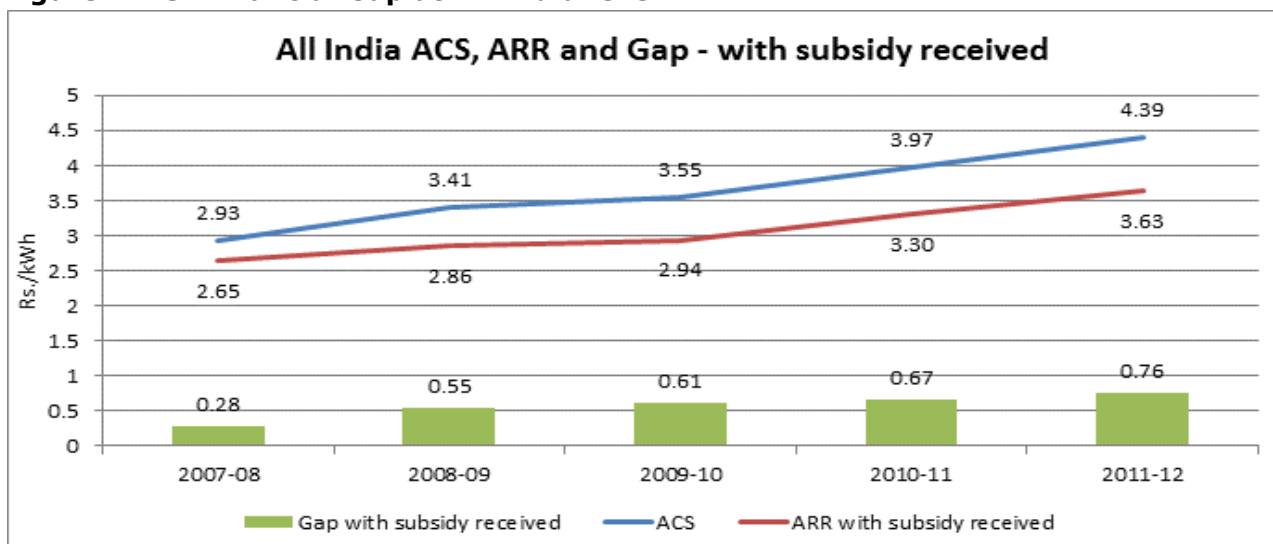
The total subsidy booked by distribution companies in 2011-12 was **Rs. 30,242 Crs.** However, not this entire subsidy is actually received by the Discoms. As a result, the book losses underestimate the actual loss levels and do not provide a clear picture of the financial health of Discoms. The table below shows the impact of subsidies (booked and received) on the aggregate losses of Discoms.

**Table III-4: Aggregate losses of all utilities**

(In Rs. Cr)	2009-10	2010-11	2011-12
Aggregate Book losses (subsidy booked basis)	28,548	49,235	57,811
Aggregate losses (subsidy received basis)	43,488	51,606	62,221
Aggregate losses (w/o subsidy)	62,563	71,901	88,053

Source: PFC report on utility finances

After including the subsidy received by utilities in their total revenue, the financial gap goes down by over 25 paise per unit in each of the years under review. (Refer figure below)

**Figure III-5: Financial Gap at All India level**

Source: PFC report on utility finances

Even after including the actual cash subsidies received, the graph indicates that the All-India financial gap is considerable. In 2011-12, the financial gap was **Rs. 0.76/kWh**.

As highlighted before, inadequate tariff hikes was one of the factors behind the continuous increase in revenue gap over the years. In light of the deteriorating financial health of utilities, the Ministry of Power (MoP) requested the Appellate Tribunal to take appropriate action by issuing necessary directions to all the State Commissions to revise the tariff periodically, if required by suo moto action, in the interest of improving the long term viability of the electricity sector in general and distribution utilities in particular. The Appellate Tribunal for Energy Judgement on OP1 of 2011 played a significant role in driving SERC's to undertake periodic tariff revisions thereby enabling financial discipline in the sector. In line with the directions of the APTEL, more than 20 states revised their tariffs in 2012-13 and 2013-14.

The summary of Appellate Tribunal for Energy Judgement on OP1 of 2011 is given in Box below:

#### **Box III-1: Summary of Appellate Tribunal for Energy Judgement on OP1 of 2011**

The full bench of the Tribunal, after necessary proceedings directed State Commissions that:

1. Every State Commission has to ensure that Annual Performance Review, true-up of past expenses and Annual Revenue Requirement and tariff determination is conducted year to year basis as per the time schedule specified in the Regulations.
2. It should be the endeavor of every State Commission to ensure that the tariff for the financial year is decided before 1st April of the tariff year.
3. In the event of delay in filing of the ARR, true-up and Annual Performance Review, one month beyond the scheduled date of submission of the petition, the State Commission must initiate suo-moto proceedings for tariff determination in accordance with Section 64 of the Act read with clause 8.1 (7) of the Tariff Policy.
4. In determination of ARR/tariff, the revenue gaps ought not to be left and Regulatory Asset should not be created as a matter of course except where it is justifiable, in accordance with the Tariff Policy and the Regulations. The recovery of the Regulatory Asset should be time bound and within a period not exceeding three years at the most

and preferably within Control Period. Carrying cost of the Regulatory Asset should be allowed to the utilities in the ARR of the year in which the Regulatory Assets are created to avoid problem of cash flow to the distribution licensee.

5. Truing up should be carried out regularly and preferably every year. For example, truing up for the financial year 2009-10 should be carried out along with the ARR and tariff determination for the financial year 2011-12.
6. Fuel and Power Purchase cost is a major expense of the distribution company which is uncontrollable. Every State Commission must have in place a mechanism for Fuel and Power Purchase cost in terms of Section 62 (4) of the Act. Any State Commission which does not already have such formula/mechanism in place must within 6 months of the date of this order must put in place such formula/ mechanism.

The Tribunal directed all the State Commissions to follow these directions scrupulously, and send the periodical reports by 1st June of the relevant financial year about the compliance of these directions to the Secretary, Forum of Regulators, who in turn will send the status report to this Tribunal and also place it on its website.

## ii. State-level Financial Performance

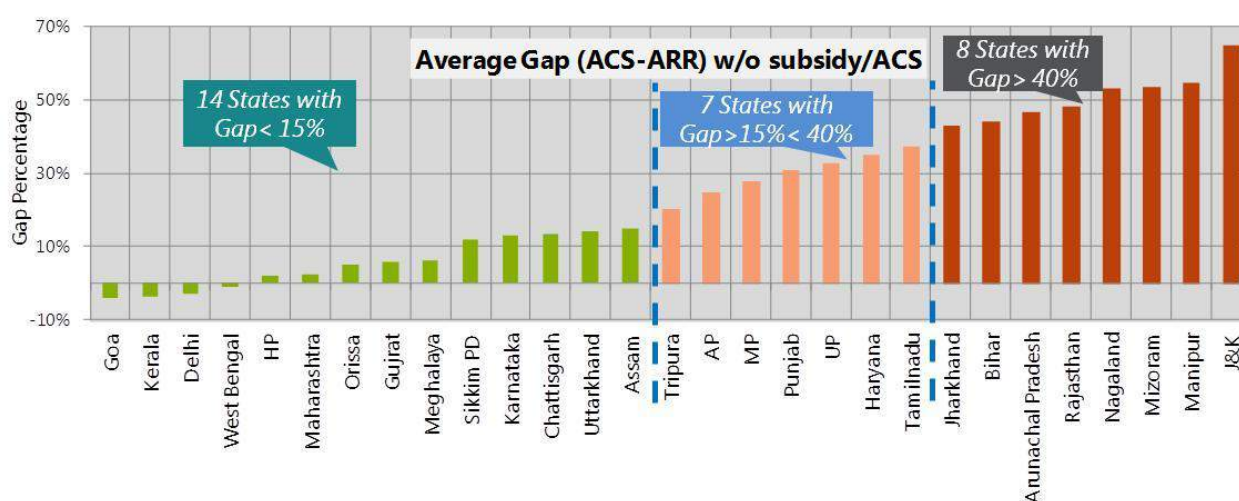
This section presents state-level financial performance of the distribution sector for all the states.

### a. Financial Performance till 2011-12

The figure below presents the 5-year average (ACS-ARR) gap percentage (without subsidy) for all the Discoms. The performance of different Discoms can be categorized into three groups.

- i. States having financial gap less than 15%
- ii. States having financial gap in the range of 15-40%
- iii. States having financial gap greater than 40%

**Figure III-6: Financial Gap Percentage (without subsidy basis) – 5 year Average<sup>3</sup>**



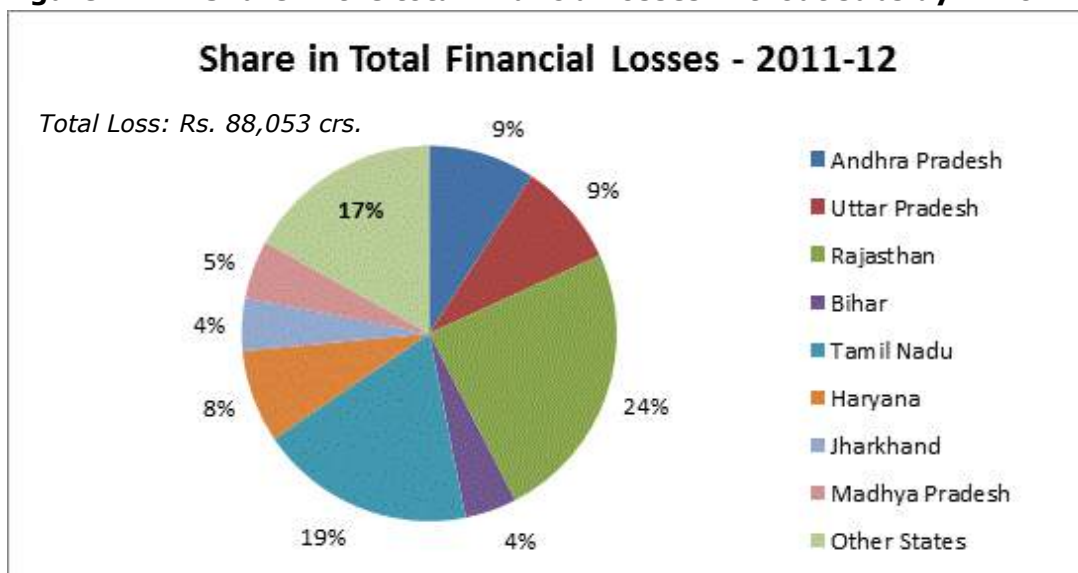
<sup>3</sup> Trend analysis for each state is provided in the individual state reports.

Source: PFC report on utility finances – 2007-08 to 2011-12

It can be observed that 14 states have an average Financial Gap below 15%. This includes big power consuming states such as Maharashtra and Gujarat. Also, four states i.e. Goa, Delhi, West Bengal, Kerala have a negative gap implying profits for the utility. States such as Andhra Pradesh, Tamil Nadu, Uttar Pradesh etc. lie in the second category. This is the most significant category as most of the big power consuming states are part of this category. States such as Jharkhand, Bihar, Rajasthan, J&K, and some of the north-eastern states are part of the third group.

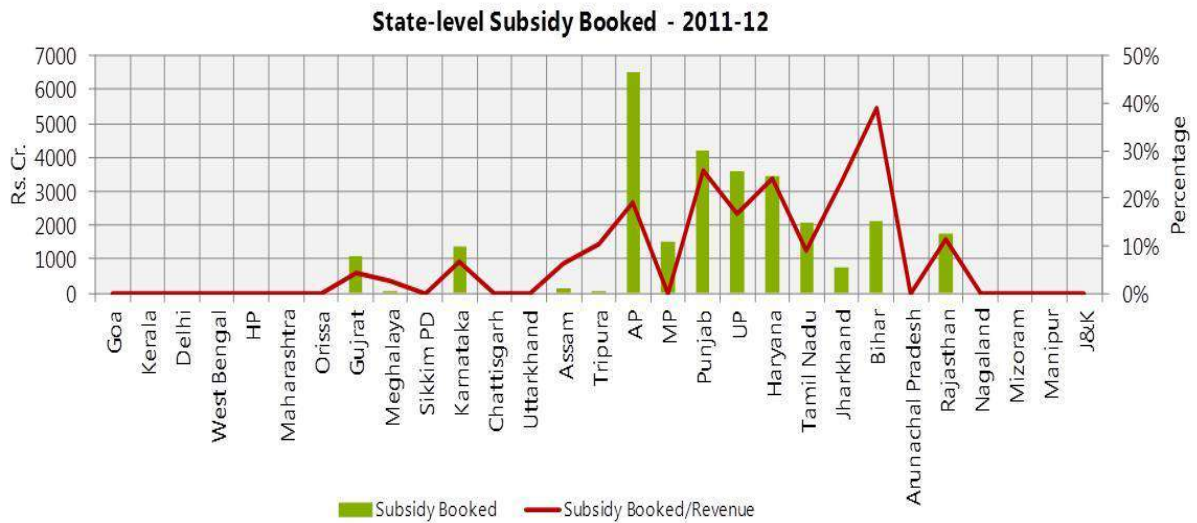
The figure below presents the share of major states in the total financial losses in the power sector of the country. It can be observed that 8 states constitute 83% of the total losses in the distribution sector and 2 states, namely Rajasthan and Tamil Nadu constitute around 43% of the total losses of the power sector in India.

**Figure III-7: Share in the total financial losses without subsidy in 2011-12**



Source: PFC report on utility finances, 2011-12

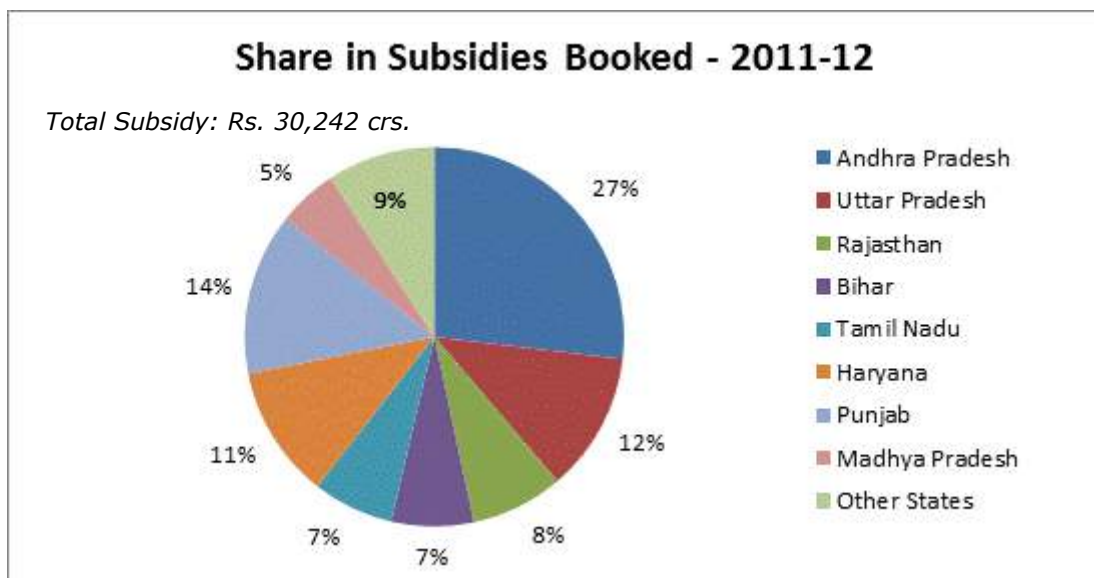
As mentioned earlier, subsidies have a significant impact on the revenue and the financial gap. A large number of state owned distribution utilities in India are partly dependent on annual subsidies from the respective state governments. The figure below presents the quantum of subsidies booked and their share in total revenues in 2011-12 for all the states in the country.

**Figure III-8: State-level Subsidy Booked in 2011-12**

Source: PFC report on utility finances, 2011-12

It can be observed that the financially well performing states with a Gap < 15% have zero or low level of subsidies i.e. Kerala, West Bengal, Maharashtra, Gujarat etc. Loss making states such as Andhra Pradesh, Uttar Pradesh, Rajasthan, and Tamil Nadu are heavily dependent on state-level subsidies. In terms of subsidies booked as a percentage of revenue, it can be observed that the subsidies account for over 40% of the total revenue in the state of Bihar. In Punjab and Haryana, subsidies as a percentage of revenue are 25% and 22% respectively.

The figure below presents that around 90% of the total subsidies were booked in 8 states in 2011-12.

**Figure III-9: Share in Total Subsidy Booked in 2011-12**

Source: PFC report on utility finances

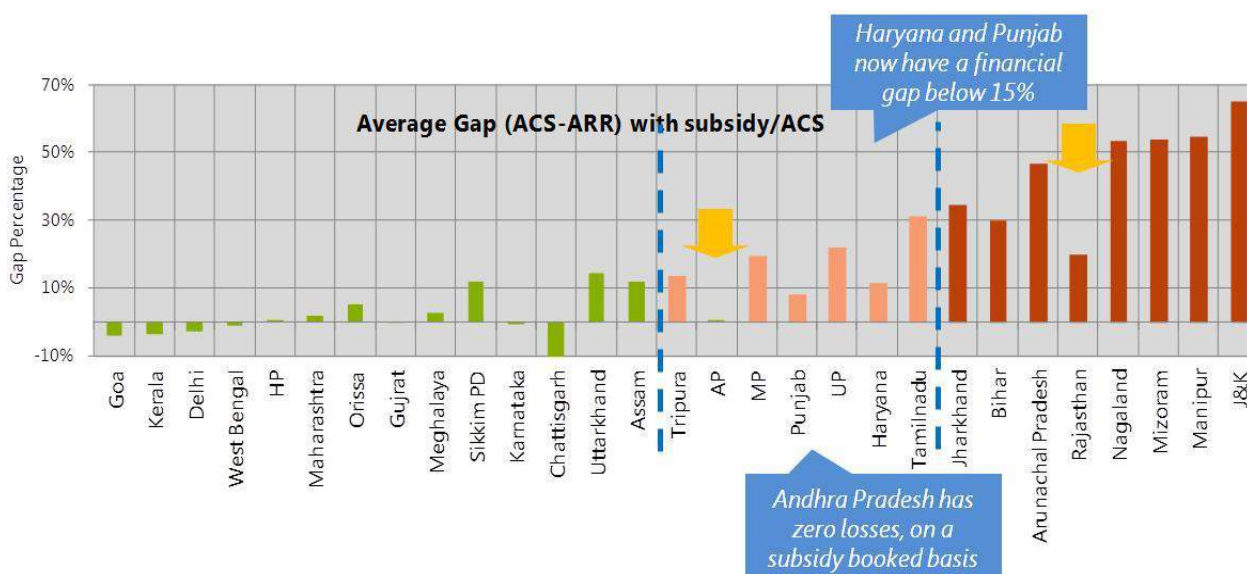
It can be observed that Andhra Pradesh accounts for over one-fourth of the total subsidies followed by Punjab, Uttar Pradesh, and Haryana.

After considering the booked subsidies by the state Discoms, financial gap for certain utilities decreases significantly. The performance of the utilities in the 3 categories is now as follows.

- i. **States with Financial Gap <15%** - It can be observed that 18 states now have an average Financial Gap below 15%. On subsidy booked basis, Andhra Pradesh has zero losses and Chhattisgarh has become profitable. Haryana and Punjab both move from the second category to the first, when subsidies are included.
- ii. **States with Financial Gap in the range of 15-40%** - Jharkhand, Tamil Nadu, Bihar, Uttar Pradesh etc., all lie in the second category.
- iii. **States with Financial Gap > 40%** - There are now 5 states in this group, comprising of J&K along with some north-east states.

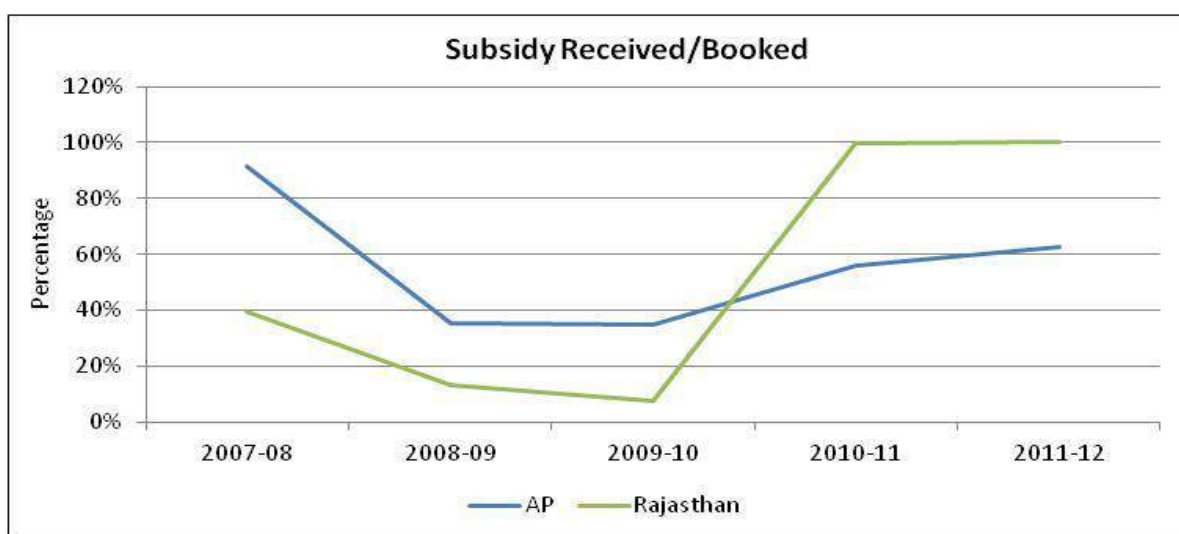
The financial gap percentage with subsidy booked is given in the figure below.

**Figure III-10: Financial Gap Percentage (with subsidy booked) – 5 year Average**



Source: PFC report on utility finances – 2007-08 to 2011-12

Most of the states discussed above have a subsidies received-to-booked ratio of 95%-100% during the last five years, i.e. a majority of the subsidies booked have been realized. Only three states have a lower ratio across the last few years – Andhra Pradesh, Karnataka, and Rajasthan. The ratios for these three states have been presented in the figure below.

**Figure III-11: Subsidy Received Percentage – Select States**

Source: PFC report on utility finances – 2007-08 to 2011-12

Rajasthan has booked massive amount of subsidy on its P&L account relative to the amount actually disbursed by the government during those years. This hides the actual financial loss levels in the P&L statement, building up a huge subsidy receivable amount in the balance sheet. However, in the last two years, the state Discoms in Rajasthan have booked lower amounts (almost one-tenth of the amount booked in 2009-10), all of which has been received. The past years' unpaid subsidy amount has been recognized as bed debt in the P&L in 2010-11. This has led to a huge increase in financial losses of Rajasthan. In Andhra Pradesh, wherein the subsidies booked cover the entire financial gap, the realized subsidy is only about 60% at present. On a subsidy realized basis, the financial gap in the State is 12% in 2011-12. This is in sharp contrast to a decade ago where after the initial round of reforms the State had managed to turn a sector around and the Discoms in aggregate returned a profit. In the intervening ten years the state made agricultural supply free and tariff revisions were inadequate and inconsistent.

#### **b. Root-cause analysis for poor performance of State Discoms**

This section identifies the key root-causes for the poor performance of the state Discoms. The key reasons are as follows:

##### **i. Inadequate and infrequent tariff hikes**

As discussed earlier, the cost of power purchase has increased over the years but the tariff increase has not been commensurate with the increase in cost of supply.

Most of the states which have a positive financial gap have not increased tariffs for several years. Further, states such as Andhra Pradesh, Tamil Nadu, Rajasthan and Haryana where the tariffs were not revised for 7, 7, 6 and 8 years respectively.

A snapshot of tariff hikes for different states as per the financial gap categories is presented in the table below.

**Table III-5: Tariff Hikes**

States	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<i>STATES WITH FINANCIAL GAP &lt;15%</i>						
GOA	0%	0%	0%	0%	10%	2%
KERALA	0%	0%	0%	0%	28%	2%
DELHI	0%	0%	0%	12%	0%	2%
MAHARASHTRA	2%	0%	1%	3%	18%	0%
ORISSA	-3%	0.3%	22%	20%	36%	9%
GUJARAT <sup>4</sup>	-	-	2%	-	-	-
KARNATAKA	0%	0%	4%	7%	3%	0%
UTTARAKHAND	14%	17%	0%	6%	6%	0%
ASSAM <sup>5</sup>	0%	5%	-	-	10%	-
<p>Since the financial gap in the states above has been below 15%, the tariffs hikes have not been frequent. The financial loss levels have gone down consistently over the last 5 years in most of these states. However, tariff hikes will be required in the near future for states in which losses are beginning to increase. For example, in Assam, the financial gap has gone up from 4% in 2007-08 to 20% in 2011-12.</p>						
<i>STATES WITH FINANCIAL GAP B/W 15% AND 35%</i>						
ANDHRA PRADESH	0%	0%	13%	24%	-	29%
MADHYA PRADESH	0%	4%	11%	6%	7%	1%
PUNJAB	2%	11%	7%	9%	12%	9%
UTTAR PRADESH	20%	19%	-	-	9%	16%
HARYANA	0%	0%	19%	0%	19%	13%
<p>In the above category, none of the states have shown a noticeable improvement in its financial position over the last five years. Lack of revision in tariffs for past several years led to further deterioration in the financial position of these states. Some of these states have also adopted the GoI's Financial Restructuring Plan.</p>						
<i>STATES WITH FINANCIAL GAP &gt;35%</i>						
TAMIL NADU	0%	0%	9%	9%	37%	4%
JHARKHAND	-	-	-	Yes	-	-
BIHAR	3%	-	0%	21%	11%	6%

<sup>4</sup> Gujarat adopted MYT framework for FY 09 to FY 11 and FY 12 to FY 16.

<sup>5</sup> The revenue estimation is as per the MYT order for FY 11 to FY 13.



States	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>RAJASTHAN</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>24%</b>	<b>19%</b>	<b>14%</b>

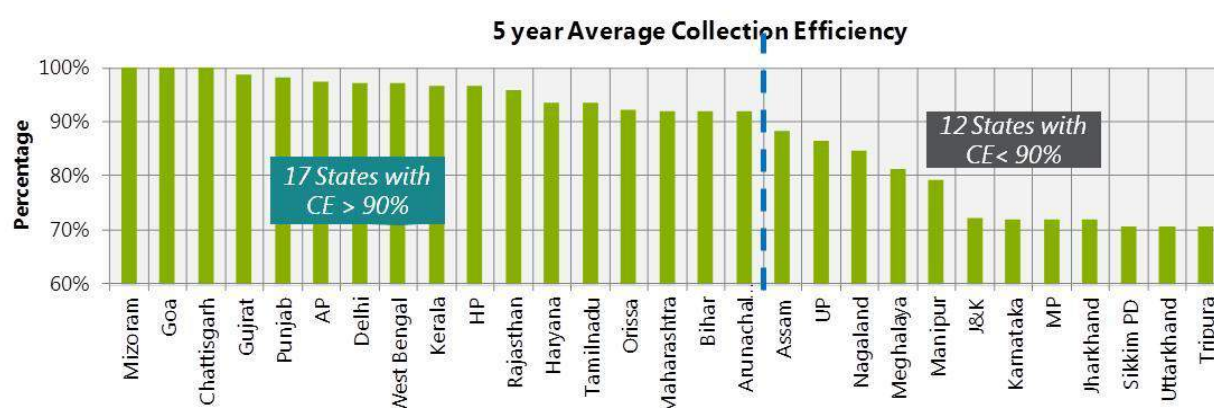
After a period of no tariff hikes, the states in this group have increased tariffs by significant levels in the last 2-3 years. In Tamil Nadu and Rajasthan, the tariffs were not hiked for a continuous period of over 7 and 5 years respectively. These states are also part of the GoI's Financial Restructuring Plan wherein consistent tariff hike is required to bridge the financial gap.

Source: ARR Orders

## ii. Poor Operational Efficiency - High AT&C Losses

The efficiency in the distribution system is measured by the extent of aggregate technical and commercial (AT&C) losses. These losses capture technical as well as commercial losses in the network. In 2011-12, AT&C losses at an All-India level were close to about 27%. Before looking at states' AT&C loss figures, the commercial component of these losses is presented in the figure below. The All-India average collection efficiency level is close to 90%.

**Figure III-12: State-level Collection Efficiency –5 year Average**



Source: PFC report on utility finances

It can be observed that the collection efficiency for most of the states is above 90%, which is surely a positive sign. State like Uttarakhand, Madhya Pradesh, and Jharkhand have low collection efficiency (below 80%).

The technical component of total losses in India is much more than acceptable international standards. The main reason behind the high rate of T&D losses is the lack of sufficient investment made in the T&D sector, especially in the sub-transmission and distribution. Additionally, power thefts continue to plague the distribution system in states. Further, improper load management and poor quality of distribution transformers used are also responsible for high technical losses. The figure below presents that average (5 year) AT&C losses for different states. As observed in the figure below, states with high unmetered agricultural consumption, including Andhra Pradesh, Tamil Nadu, and Punjab have low AT&C losses. On the other hand, states with a low agricultural share in total consumption have high ATC losses.<sup>6</sup>

<sup>6</sup> State-wise Methodology to calculate sales towards unmetered categories is given in annexure II.

**Figure III-13: State-level AT&C Losses – 5 year Average**

Source: PFC report on utility finances – 2007-08 to 2011-12

Bihar, Jharkhand, Uttar Pradesh, Rajasthan, J&K, and north-eastern states have high AT&C losses due to power thefts. The high loss average in Orissa is due to inaccurate reporting of baseline commercial loss levels. However, it is important to note that in spite of the high AT&C losses, the financial loss in Orissa is still low due to the regular tariff hikes approved by the regulator in the last few years. Given below is a matrix presenting the AT&C loss reduction by different states categorized under average financial gap during the last five years.

**Figure III-14: Reported Performance Changes in last 5 years**

<b>AT&amp;C Loss Reduction</b>	High (>50% of base year value)	<b>Delhi</b>	<b>Nagaland</b>	
	Moderate (20-50% of base year value)	<b>Kerala, Himachal Pradesh, Maharashtra, Karnataka, Uttarakhand</b>	<b>Jharkhand, Rajasthan, Manipur</b>	
	Low (<20% of base year value)	<b>Goa, West Bengal, Gujarat, Orissa, Meghalaya, Sikkim, Chhattisgarh, Assam</b>	<b>Tripura, Andhra Pradesh, Madhya Pradesh, Punjab, Uttar Pradesh, Haryana</b>	
		Low (<15%)	Moderate (15-35%)	High (>35%)
		<b>Average Financial Gap</b>		

Source: PFC report on utility finances

As seen in the table above, a majority of the states have improved their AT&C losses by below 20% during the last 5 years. Amongst the states with average financial gap below 15%, states including Maharashtra, Karnataka, and Kerala have reduced their AT&C losses in the range of 20-50%. Out of the poorly performing states, Rajasthan and Jharkhand have reduced AT&C losses considerably during the period under review. Only Delhi and Nagaland have reduced AT&C losses by over 50%.

The Financial gap can be segregated into two parts: one related to inadequate tariff increases and other related to inefficiencies on part of the distribution utilities i.e. collection inefficiency and technical losses.

Assuming 15% transmission and distribution losses as unavoidable, difference between ACS (with 15% T&D losses) and ARR (with collection efficiency of 100%) reflects the tariff inadequacies in the states.

It can be observed that inefficiencies accounts for 52.5% of the total financial gap on all India basis. Gap reduces by Rs. 0.58/kWh if one considers improvement in efficiencies. The financial gap reduces from Rs.1.12/kWh to Rs.0.54/kWh after improvement of efficiencies with gap of Rs. 0.54/kWh due to inadequate increase in tariff. The following table presents the breakup of ACS-ARR Gap as a result of inefficiency and tariff inadequacy for 2011-12.

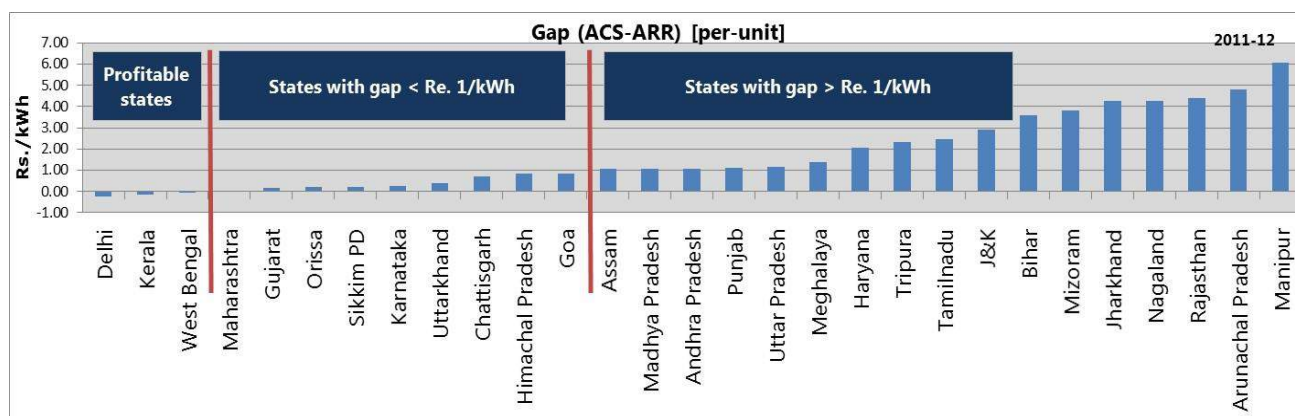
**Table III-6:** Break-up of ACS-ARR Gap per unit at all India Level – 2011-12

	Units	ARR	ACS	Gap
<b>Actuals</b>	Rs./kWh	<b>3.54</b>	4.66	<b>1.12</b>
<b>With efficiency Improvement (ARR-100% Collection efficiency; ACS- 10% T&amp;D losses)</b>	Rs./kWh	<b>3.95</b>	4.49	<b>0.54</b>

Source: PFC and AF-Mercados EMI Analysis

The Financial Gap per unit for all states (without subsidy) in 2011-12 is shown in the figure below.

**Figure III-15: Financial Gap per Unit (without subsidy)**



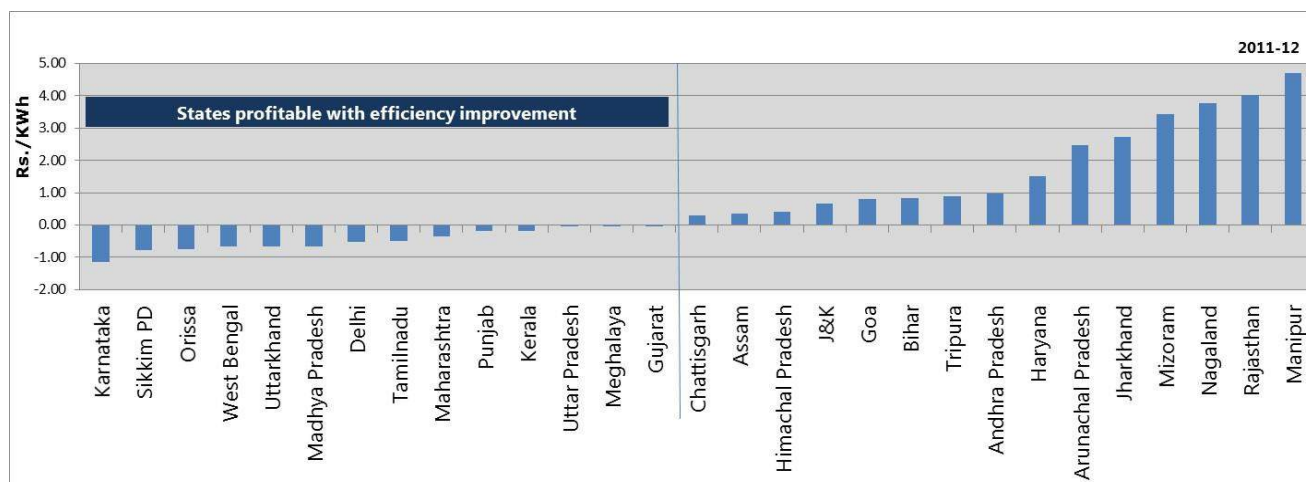
Source: PFC report on utility finances

It can be observed that

- States like Delhi, Kerala and West Bengal have recorded profits in the year 2011-12, without state government subsidies.
- Few states like Maharashtra, Gujarat, Orissa, Sikkim, Karnataka, Uttarakhand, Chhattisgarh, Himachal Pradesh and Goa have a gap of less than Re. 1 per-unit.
- The remaining states have a gap of more than Re. 1 per-unit.

In order to understand the constituents of financial gap in 2011-12, gap related to inadequate tariff increases and gap related to inefficiencies on part of the distribution utilities have been segregated. The figure below presents the Financial Gap in 2011-12 with efficiency improvements.

**Figure III-16: ACS-ARR Gap with efficiency improvement per unit – 2011-12**



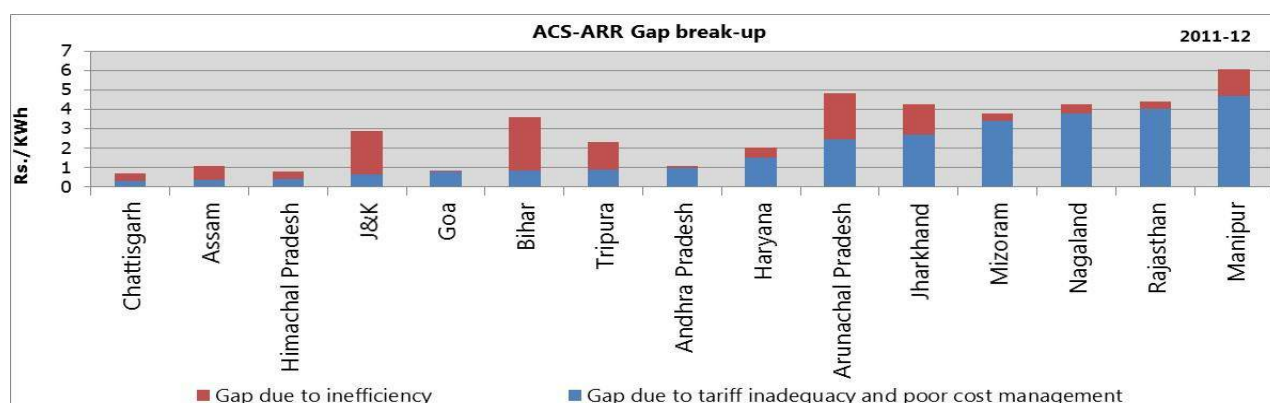
Source: PFC and AF-Mercados EMI Analysis

**Following can be observed from the above:**

- In 2011-12, a large number of states would turn profitable by improving efficiency. For example, in large power consuming states such as Uttar Pradesh and Madhya Pradesh, the entire Gap can be removed by efficiency improvement.
- The states which are already profitable can optimize their operations and further improve their financial position. For example, in West Bengal, the level of available efficiency improvement is close to Re. 1 per unit.
- In actual scenario, only three states, namely, Delhi, Kerala and West Bengal have recorded profit without subsidies in 2011-12. While in efficiency improvement scenario, this number would increase to 14 states.
- In other states, it can be observed that even after improving efficiency levels to the extent possible, financial gap would remain reflecting the inadequacies in tariff levels in those states.

The figure below presents the break-up of financial gap into the inefficiency gap and tariff inadequacy gap.

**Figure III-17: Break-up of Financial Gap per unit into the inefficiency gap and tariff inadequacy gap – 2011-12**



Source: PFC and AF-Mercados EMI Analysis

**Following can be observed from the above:**

- In few states such as Bihar, J&K, Assam, Tripura and Jharkhand, apart from tariff inadequacy, a large part of the gap is a result of inefficiency. For example, Bihar can reduce its financial gap by close to Rs 3 per-unit through efficiency improvement. However, the remaining gap of around Re 1 per-unit need to be eliminated through tariff hikes.
- In other states like Rajasthan, Haryana, Andhra Pradesh, Mizoram and Manipur, more than inefficiency, tariff revisions have been inadequate and constitute a large part of the gap.

**iii. Low revenue realization from Agriculture Consumers**

In addition to infrequent and inadequate tariff hikes, low revenue realization from agriculture is also one of the major reasons for poor performance of some of the large agricultural states. Discoms that have not been able to increase tariffs for agricultural consumers are observed to have poor financials.

This is important as going forward as cross-subsidy levels needs to be reduced. Section 61(g) of the 2003 Act stipulates that the tariff should progressively reflect the cost of supply and cross subsidies should be reduced within the time period specified by the State Commission. The Tariff Policy stipulates the target for achieving this objective latest by the end of year 2010-11, such that the tariffs are within  $\pm 20\%$  of the average cost of supply.

The table below presents the key operational and financial parameters of agriculture dominated states in India. These 9 states together comprise 92% of the total agricultural sales in India in 2011-12.

**Table III-7: States with significant Agriculture Consumption – 2011-12**

States	Agri. Sales (MU)	Share in All-India Agri. Sales (%)	Agri. Share in Total State Sales (%)	Share in Total State Sales Revenue (%)	ARR from Agri. (Rs./kWh)	AT&C Losses (%)	Metering Level in Agri.	Subsidy Quantum (Rs. Cr)	Subsidy Realization (%)
<b>Tamil Nadu</b>	10124	7%	19%	0%	0	20%	0%	2084	100%
<b>Andhra Pradesh</b>	20191	15%	28%	1%	0.11	15%	High Level of Un-metered Sales	6515	62%
<b>Rajasthan</b>	15352	11%	40%	18%	1.24	25%	50%	1760	100%
<b>Gujarat</b>	13948	10%	25%	13%	2.07	19%	43%	1100	100%
<b>Madhya Pradesh</b>	9451	7%	33%	14%	1.65	38%	High Level of Un-metered Sales	1538	100%
<b>Karnataka</b>	15816	12%	37%	21%	2.42	25%	24%	1352	88%
<b>Haryana</b>	9044	7%	31%	3%	0.33	28%	56%	3429	99%
<b>Punjab</b>	10249	7%	29%	0%	0	21%	0%	4182	100%
<b>Maharashtra</b>	21612	16%	27%	12%	2.15	22%	-	0	-

Source: PFC report on utility finances

Color Key:

	Financial Gap > 35%
	Financial Gap b/w 15-35%
	Financial Gap < 15%

It can be observed that the revenue realization from agricultural consumers in Gujarat, Maharashtra, and Karnataka is much higher than that of the other states. This means more

sales revenues despite the fact that share of un-metered agriculture sales are high in these states. Also the quantum of subsidies given to these states is among the lowest compared to other states.

States including Andhra Pradesh, Haryana, Punjab and Tamil Nadu have very low revenue realization from the agricultural sector. In fact, Tamil Nadu and Punjab have no revenue realisation from agricultural consumers. These states have a significant financial gap that is between 15% and 35%.

Madhya Pradesh has an average revenue realisation of Rs 1.65/kWh from agriculture. However, its AT&C losses are as high as 38% which is one of the reasons for its poor financial performance. Add to that, there are no subsidies have been given in the state which has further aggravated the condition. Rajasthan has very low revenue realisation from agriculture compared to other states. Also, the state government subsidy provided to bridge the cost-revenue gap of the agriculture segment is less when compared to other states.

#### iv. Low revenue realization from Domestic Consumers

Low revenue realization from domestic consumers coupled with high AT&C losses is another important reason for poor performance of some of the states.

The table below presents the key operational and financial parameters of domestic consumption dominated states in India. These 8 states together comprise 47% of the total agricultural sales in India in 2011-12.

**Table III-8: States with significant Domestic Consumption – 2011-12**

States	Dom. Sales (MU)	Share in Total State Sales (%)	Share in All-India Dom. Sales (%)	ARR from Dom. (Rs./kWh)	AT&C Losses (%)
<b>Bihar</b>	2368	35%	2%	3.19	65%
<b>Jharkhand</b>	2483	38%	2%	1.21	43%
<b>Punjab</b>	8636	25%	6%	3.85	21%
<b>Uttar Pradesh</b>	14231	36%	10%	3.28	45%
<b>Kerala</b>	7706	48%	5%	1.99	12%
<b>Haryana</b>	5569	19%	4%	3.40	28%
<b>Tamil Nadu</b>	18114	33%	13%	1.67	20%
<b>Karnataka</b>	8743	21%	6%	3.86	25%

Source: PFC report on utility finances

Karnataka has the highest revenue realized from the domestic segment and Kerala, though low on revenue realised has the lowest AT&C losses. This is one of the reasons for these two states are having a low financial gap.

In case of Bihar and Uttar Pradesh, AT&C losses are observed to be high despite high revenue realization. Jharkhand has the lowest revenue realised and high level of AT&C losses. This is one of the reasons for poor performance of these two states.

#### v. Lack of Power Purchase Optimization by states

Since power purchase costs constitute around 75-80% of the total cost of distribution utilities, escalating power procurement rates is a matter of serious concern for the utilities. Either the load forecasting (demand and supply) capabilities are inefficient or they do not exist at all in most of the states. In some cases, this has led to an over-reliance on the spot market which has increased the costs. Without superior optimization practices on part of the utilities, identification of shortages and surpluses has been difficult for the utilities. Hence, there is need for states to invest in forecasting capabilities.

Given below is the total energy procurement by a few states along with their procurement in the short term. In percentage terms, Bihar and Punjab have the highest short term procurement (20% and 18% respectively).

**Table III-9: State Energy Procurement – 2012-13**

State	Total Energy Consumed in 2012-13	Procured from Bilateral and Px (MU)	UI based net procurement (MU)
Rajasthan	53868	7417	1096
Uttar Pradesh	76446	6341	2751
Maharashtra	119972	6386	6
Punjab	46119	9111	888
Andhra Pradesh	82171	7012	261
Haryana	38209	4617	953
Bihar	12835	2207	-398
Karnataka	57044	53	-152
Tamil Nadu	76161	3853	54

Source: CEA Monthly Power Supply Position

To sum up, it can be observed that while many of the states have performed well over the last few years, a few of them have performed poorly. States such as Rajasthan, Tamil Nadu, Bihar, Uttar Pradesh, Andhra Pradesh, Jharkhand, Haryana, etc. account for a majority of the financial losses of Discoms.

In order to alleviate the poor state of finances of the utilities while simultaneously providing incentives to improve efficiency, GoI approved a Financial Restructuring Plan in 2012 to restructure Rs 1.9 lakh crore debt of Discoms. The plan is now under implementation in some of the poorly performing states.



## vi. Regulatory and Utility Governance:

Apart from the need to make efficiency improvements by state utilities, Regulatory Governance also has a very important role in achieving efficiency in service delivery and overall financial sustenance of the distribution segment. The effectiveness of regulatory practices can be observed on following parameters.

- **Financial Independence** – Many of the SERCs are still dependent upon the state governments for meeting their expenditures. Most states governments have not established SERC funds, limiting the financial autonomy of regulators.
- **Staffing** – Inadequacy in technical staff and vacant positions has led to weak institutional memory and internal capabilities
- **Performance Monitoring and Public Disclosure** – There is a need to strengthen the accountability framework. Performance monitoring is an important aspect in this regard. Although performance monitoring is undertaken for different state utilities but no such mechanism exists for the SERC's.
- **Frequency and adequacy of tariff revisions** - Limited tariff hikes were observed during 2005-2011 while the revenue gap significantly increased. In line with the directions of the APTEL in OP1 of 2011, more than 20 states revised their tariffs in 2012-13 and 2013-14. In principle, tariffs should reflect the cost of supply and thus it is important that studies related to cost of supply for different consumer categories to be undertaken by SERC's. In addition to studies related to cost of supply it is equally important that optimum cost should be determined by the SERC's as consumers should not be made liable to pay for the inefficiency of the power utilities. As discussed earlier, it can be observed that in most of the states if efficiency of Discoms is improved, there would be minimal requirement for tariff increase. Study of aspects related to distribution impact of tariff on various consumer categories also needs to be carefully understood while undertaking tariff revisions.
- **Regulatory asset:** A mechanism used by some SERCs to defer the tariff hike has been resulting in the creation of regulatory assets. "Regulatory asset refers to specific costs (or revenues) that the regulatory agency permits a utility to defer to its balance sheet. These amounts would otherwise be required to appear on the company's income statement and would be charged against current expenses (or revenues)."<sup>7</sup> Details of the states with regulatory asset are given in table below:

**Table III-10: Total Regulatory asset across different state Discoms**

S. No	States	Discoms	Regulatory Assets (Rs Cr)		Remark
			FY2012-13	FY2013-14	
1	Bihar	BSEB	157.26	354.48	The regulatory assets as per Tariff Order for 2015-16 is Rs. 103 Crores which will be adjusted by the Regulator at the time of True-up. <sup>8</sup>

<sup>7</sup> Investopedia

<sup>8</sup> Information submitted by Bihar Power Department to the FFC as per letter dated 1/8/2014

S. No	States	Discoms	Regulatory Assets (Rs Cr)		Remark
			FY2012-13	FY2013-14	
2	West Bengal	WBSEDCL		2174.82	-
3	Delhi	BSES Rajdhani		5205.52	Net Revenue Gap after adjusting outstanding dues for all the 3 DISCOMs was Rs. 11431.12 Crore as of FY 2013-14
4		BSES Yamuna		2855.03	
5		NDPL		3,370.56	
6	Haryana	DHBVNL		316.39	HERC has allowed recovery of 45% of regulatory asset implemented through tariff order 2013-14. Regulatory Asset to be recovered within a period of 3 years. <sup>9</sup>
7		UHBVNL		2,027.16	
8	Chhattisgarh	CSPDCL	828		
9	Tamil Nadu	TANGEDCO		24,611	Accumulated revenue gap from 2010-11 to 2013-14 accounted for Rs. 22,407 Cr. Regulatory assets of Rs. 24611 Cr. was approved after considering the amortized Rs 1033 Cr in FY2013-14.

Source: Tariff Orders

In addition to the above table:

- Uttar Pradesh Electricity Regulatory Commission has accepted the regulatory assets of Rs. 2488 Crores against the true-up petitions for the period from 2000-01 to 2007-08. Regulatory surcharges at the rate of 3.71% was approved in the Tariff Order 2013-14 and 2.84% has been allowed for the FY 2014-15 and 2015-16. This surcharge will continue until the full recovery of Regulatory asset is made. For remaining years, the true-up petitions have been filed with the regulatory commission and necessary orders are expected with the Tariff Order of 2014-15.<sup>10</sup>
- Rajasthan Electricity Regulatory Commission, in its tariff order FY14 has approved unfunded gap of Rs 16,033 Cr as regulatory asset for the period 2009-10 to 2012-13. However, the Regulatory Commission did not consider amortization of this gap in the above mentioned order, instead allowed carrying cost on the entire un-funded gap while approving revenue requirement for FY 2013-14. The Commission opined that considering the present level of Regulatory Asset, amortizing the regulatory asset in three years will result in a tariff shock. Accordingly, Discoms plan to liquidate the regulatory assets

<sup>9</sup> Information submitted by Government of Haryana to the FFC as per letter dated 18/7/2014

<sup>10</sup> Information submitted by Govt. of Uttar Pradesh to the FFC as per letter dated 21/7/2014

including approved unfunded gap after FY 2016-17, when the Rajasthan Discoms are expected to achieve turnaround.<sup>11</sup>

- **Consumer Protection** - Public participation in the regulatory process (discussion papers/ public hearings) has been limited. Bulk of the consumers especially rural and domestic consumers are not even aware of such options. Even after 10 years of the Electricity Act 2003, Quality of supply has not much improved and is not adequately monitored by the utilities. To ensure good quality of supply to consumers, it is important that quality of supply being linked with tariffs and tariffs be revised in accordance with the improvement in quality.

Lack of proper governance and accountability has also been acknowledged in the High Level Panel report on "financial position of Distribution Utilities – 2011", chaired by Shri V.K. Shunglu

As for the utilities, most of them comply with the basic requirements of the Companies Act. However, there is a definite need to follow certain corporate governance requirements, some of which may not necessarily apply to the utilities. Following good practices pertaining to Board composition, Board functioning, Audit Committee, Government-board relationship and disclosure, etc. has shown to directly correlate with better financial performance over the long run. Currently, only a few utilities are following these good practices.

### c. Utility Performance in 2012-13

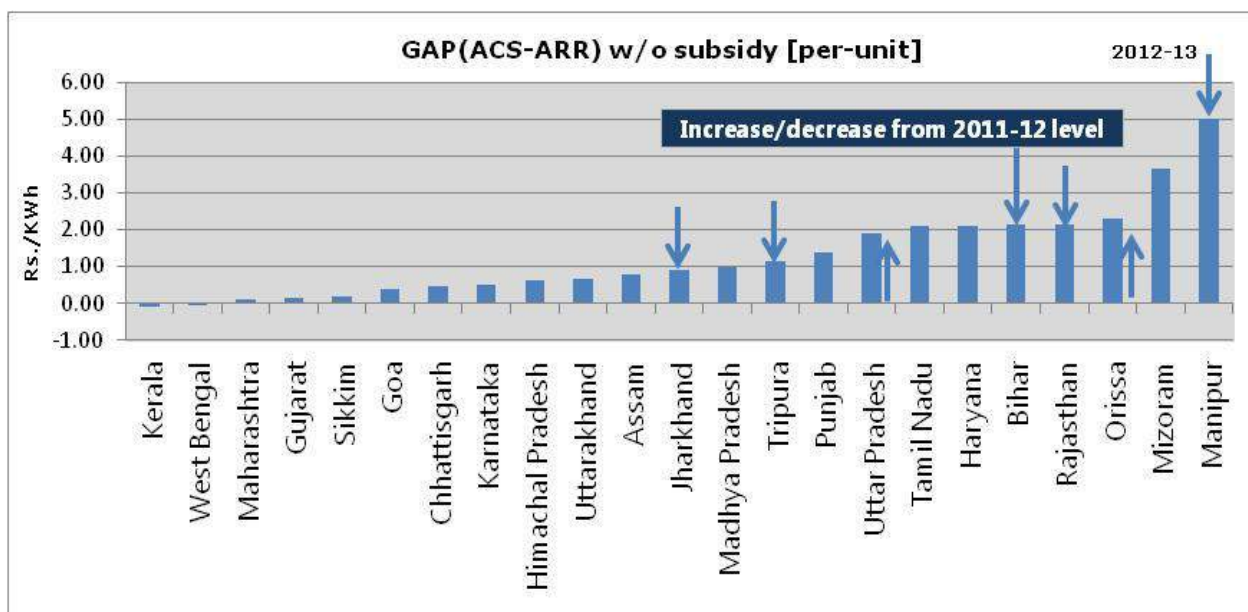
This section presents the performance of state utilities in 2012-13. **However, it is important to mention that in order to undertake analysis for 2012-13 data provided by the states to FFC has been used. Since data source for 2012-13 is different with respect to previous years, wherein PFC data was used, the results may be inconsistent.**

Further, due to the paucity of data only key financial parameters are being analysed under this section.

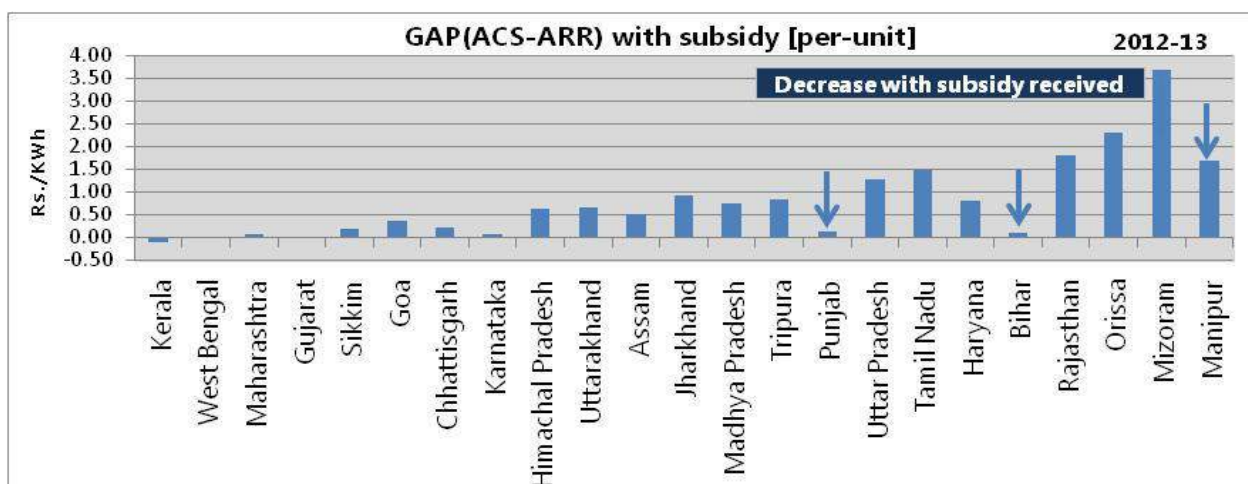
This includes state level comparison of the financial gap (ACS-ARR) with and without subsidies for 2012-13 vis-a-vis 2011-12.

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<sup>11</sup> Information submitted by Govt. of Rajasthan to FFC as per letter dated 22<sup>nd</sup> July, 2014.

**Figure III-18: ACS-ARR Gap per unit without subsidy – 2012-13**

Source: Data provided by states to the FFC

**Figure III-19: ACS-ARR Gap per unit with subsidy– 2012-13**

Source: Data provided by states to the FFC

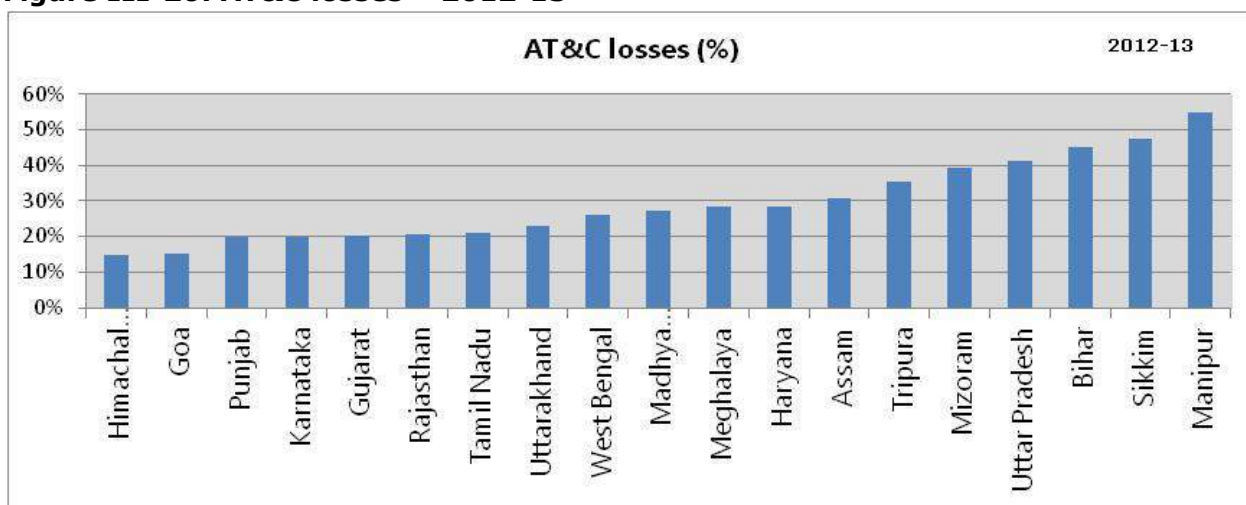
In 2012-13, the following changes have been observed in the gap per unit without subsidies vis-a-vis 2011-12:

- **Increase in gap:** Orissa by Rs. 2 per unit and Uttar Pradesh by Rs. 0.90 per unit approximately.
- **Decrease in gap:** Manipur and Tripura by Re, 1 per unit, Jharkhand by Rs. 3.4 per unit, Bihar by Rs. 1.2 per unit and Rajasthan by Rs. 2 per unit approximately.

This increase/decrease in ACS-ARR gap is due to efficiency improvement and increase in tariff. For example, the decrease in gap for Bihar is related to the decrease in its AT&C loss (%) level from 64.5% in 2011-12 to 45%\_in 2012-13. Similarly, AT&C losses in Rajasthan decreased from 25% to 20%. Also, tariff increase in 2011-12 for Bihar and Rajasthan were to the tune of 21% and 24% respectively.

The following figure presents the level of AT&C losses for 2012-13:

**Figure III-20: AT&C losses – 2012-13**



Source: Data provided by states to the FFC

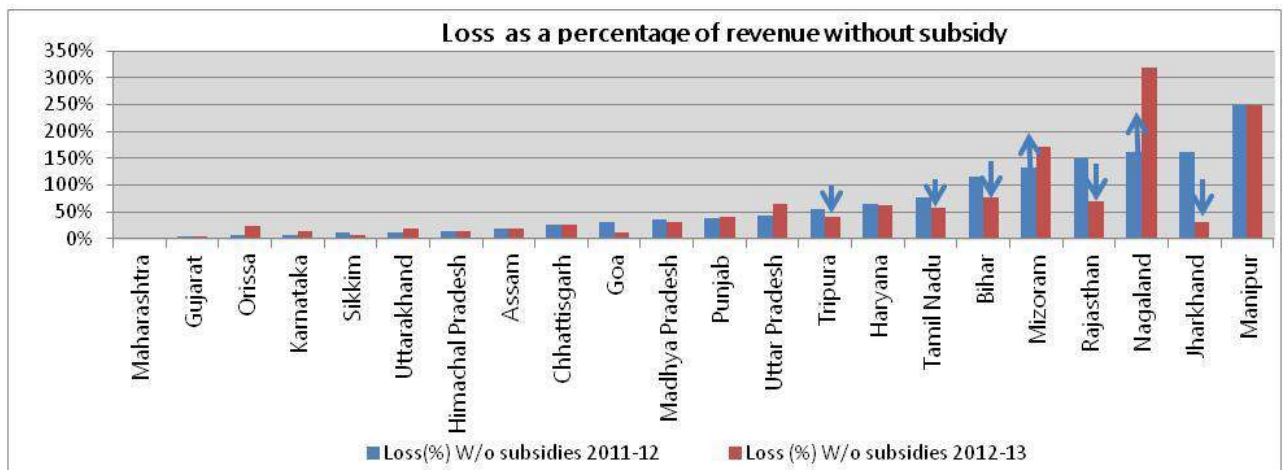
In 2012-13, the following changes have been observed in AT&C losses vis-a-vis 2011-12:

**Decrease in loss percentage:** Apart from Bihar and Rajasthan mentioned above, other states like Karnataka witnessed a decrease from 25% to 20%, Madhya Pradesh from 38% to 27%, Meghalaya from 45% to 28%, Uttarakhand from 31% to 23% and West Bengal from 33% to 26%

**Increase in loss percentage:** Loss level of few states increased further in the year 2012-13, with states like Manipur and Assam recording the highest increase from 45% to 55% and 29% to 31% respectively.

The overall financial scenario has witnessed an improvement in 2012-13, with the financial losses as a percentage of revenues without subsidies going down for most of the states. The following figure presents the same:

**Figure III-21: Financial losses as a percentage of revenues without subsidies – 2011-12 and 2012-13**



Source: Data provided by states to the FFC and PFC report on utility finances

It can be observed that majority of the states have witnessed a decrease in loss percentage in 2012-13 without subsidies. Major loss making states such as Tamil Nadu, Bihar and Rajasthan have witnessed an improvement in performance in 2012-13 while few states such as Assam, Uttar Pradesh, Nagaland and Mizoram have witnessed a higher loss level in 2012-13 compared to 2011-12.

## IV STATE EXPOSURE TO POWER SECTOR

### 1. STATE INCOME AND EXPENDITURE ON POWER SECTOR

State governments being the sole owners of an overwhelming majority of the distribution utilities, the impact of the utility finance directly and indirectly devolves on the respective states. Therefore, to understand the impact of power sector operations on the state finances, it is important to first understand the expenditure and liabilities of the state with respect to the power sector such as provision of direct subsidy, liabilities on account of guarantees against loans, emergency financial assistance etc.

Similar to the expenditure commitments of the states, the state also receives revenues from the power sector in the form of Electricity Duty, Interest on State government loans, dividend payouts by the state utilities and Sale of surplus power in the state etc.

#### 1.1. EXPENDITURE ON POWER SECTOR

##### Assessment of Capital and Revenue Expenditure on Power Sector

##### i. Capital Expenditure

States provide investment assistance to state utilities through provision of equity and debt to create the necessary infrastructure related to generation, transmission and distribution. It is expected that higher the investment assistance, higher will be the earning capacity of the utilities in future. Therefore, it is important to examine the state investments in the power sector over the years.

##### ii. Revenue Expenditure

State government assists certain categories of consumers such as agriculture and domestic to meet its social obligations. In this regard, it is important to assess the level of subsidy, grants in aid etc., which forms the revenue expenditure towards the sector, provided by the state.

Given below is the capital and revenue expenditure of all the states.

**Table IV-1: Total Expenditure on Power Sector -2011-12<sup>12</sup>**

State	Capital Expenditure	Revenue Expenditure	Total Expenditure on Power Sector	Total State Expenditure	Power Sector Expenditure/ Total Expenditure (%)
<i>In Rs Cr.</i>					
Jammu & Kashmir	534	3,768	4,302	28,579	15%
Haryana	802	3,591	4,393	37,387	12%
Punjab	0	3,201	3,201	34,643	9%
Rajasthan	2,459	3,006	5,465	60,773	9%

<sup>12</sup> 2011-12 annual accounts are not available for West Bengal, hence for the entire section 2010-11 data has been taken for the state.

State	Capital Expenditure	Revenue Expenditure	Total Expenditure on Power Sector	Total State Expenditure	Power Sector Expenditure/ Total Expenditure (%)
Arunachal Pradesh	204	359	563	6,484	9%
Mizoram	76	289	365	4,298	9%
Karnataka	1,082	5,326	6,408	80,621	8%
Manipur	195	273	469	6,702	7%
Nagaland	86	294	380	6,125	6%
Tamil Nadu	4,100	1,776	5,876	1,00,174	6%
Gujarat	880	3,359	4,239	73,556	6%
Uttar Pradesh	4,314	3,536	7,850	1,45,459	5%
Maharashtra	1,862	5,527	7,389	1,41,434	5%
Madhya Pradesh	1,026	2,071	3,097	61,749	5%
Chhattisgarh	900	337	1,237	26,684	5%
Andhra Pradesh	33	4,416	4,449	1,04,137	4%
Bihar	102	2,168	2,270	55,351	4%
Jharkhand	0	860	860	24,151	4%
Sikkim	38	98	136	3,846	4%
Meghalaya	0	166	166	6,545	3%
Himachal Pradesh	207	151	357	15,708	2%
Tripura	22	42	64	6,206	1%
Assam	117	102	219	29,035	1%
Orissa	181	24	205	39,156	1%
West Bengal	45	283	328	66,764	0%
Uttarakhand	42	10	52	15,292	0%
Kerala	0	98	98	49,898	0%
<b>India (Total)</b>	<b>19,306</b>	<b>45,132</b>	<b>64,437</b>	<b>12,30,758</b>	<b>5%</b>

Source: State Government annual accounts from CAG (2011-12)

As indicated by the table, the share of Power sector in the total state expenditure is highest in Jammu and Kashmir followed by Haryana, Punjab and Rajasthan. The share is lowest in Kerala, West Bengal and Uttarakhand. Considering the share in all India level expenditure



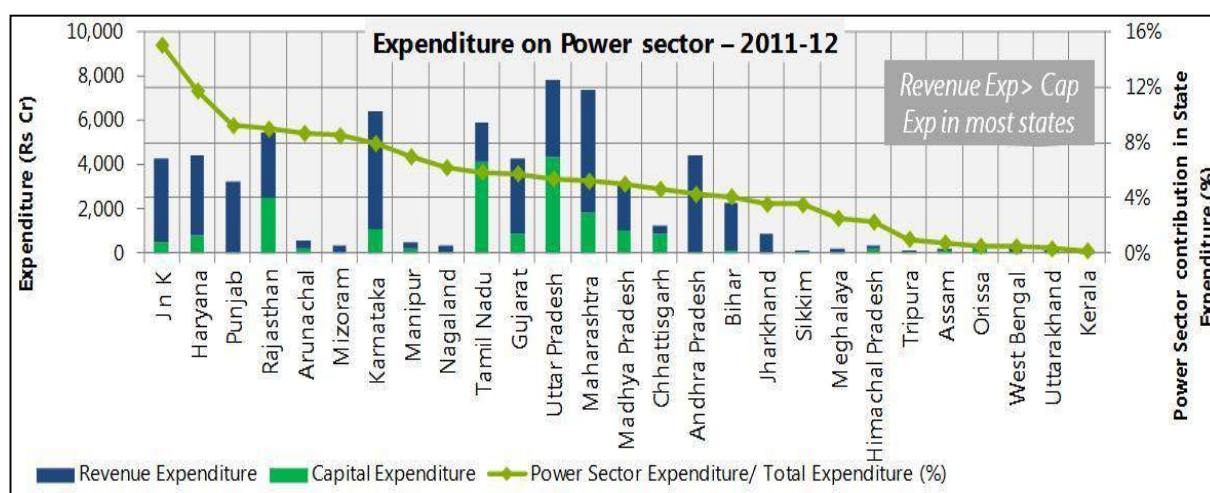
on Power Sector, the major share goes to states of Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu and Rajasthan. 78% of the total expenditure on power sector is towards 9 states, namely Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Rajasthan, Haryana, Jammu and Kashmir, Gujarat and Andhra Pradesh.

At the all India level, Revenue expenditure far exceeds the Capital Expenditure. The consolidated revenue expenditure is Rs 45132 Cr, i.e. ~70% of total consolidated expenditure of sector, whereas the capital expenditure is Rs 19306 Cr. (30% of the total amount). Hence, a significant amount is driven towards assistance to sector in the form of grants or subsidy in most of the states in India.

The states with higher capital expenditure on power sector than revenue expenditure are Tamil Nadu, Uttar Pradesh, Chhattisgarh, Maharashtra, Himachal Pradesh, Assam, Uttarakhand, and Orissa. This implies that a significant portion of expenditure in these states is made towards investments in building and strengthening the power sector infrastructure.

The above data is presented in the figure below.

**Figure IV-1: Total Expenditure on Power Sector -2011-12**



Source: State Government annual accounts from CAG (2011-12)

As per the state government annual accounts,

- The entire capital expenditure in Tamil Nadu is Investment in State Electricity Board.
- In Uttar Pradesh, the major portion capital expenditure is made towards Transmission and Distribution.
- In Rajasthan, major portion of Capital and Revenue Expenditure is made towards Distribution Sector.

## 1.2. INCOME FROM POWER SECTOR

### Assessment of Tax and Non-Tax Revenue from power sector in the state

#### i. Tax Revenue

The tax system in India is mainly a three tier system which is based between the Central, State Governments and the local government organizations. In most cases, these local bodies include the local councils and the municipalities.

The taxes and duties imposed on Power Sector comprises of following:

- Taxes on consumption and sale of Electricity
- Fees Under The Indian Electricity Rules
- Fees For The Electrical Inspection of Cinemas
- Other Receipts

#### ii. Non-Tax Revenue

With majority of the utilities being owned by the state governments, any profit earned and distributed in form of dividend forms part of the revenue of the state government. Since most of these utilities are in losses, the income from dividend is negligible. Further, state government also earns revenue from interest on loans provided to state utilities and also from sale of its share of free power. The non-tax revenue from power sector also comes through Royalty/CESS on water for power generation, free hydro power sale, T&D, Rural Electrification etc.

The table below lists the Tax and Non tax Income from power sector their contribution in the Total Revenue in 2011-12.

**Table IV-2: Tax and Non Tax Revenue from Power Sector**

State	Tax Revenue	Non Tax Revenue	Revenues from Power Sector	Total Revenue	Revenue from power sector/ Total Revenue
<i>In Rs Cr.</i>					
Himachal Pradesh	185	1,146	1,331	8,021	17%
J&K	179	1,007	1,186	10,242	12%
Mizoram	0	110	110	1,174	9%
Nagaland	0	94	94	1,340	7%
Gujarat	3,655	106	3,760	57,309	7%
Manipur	0	107	107	1,834	6%
Maharashtra	4,831	725	5,557	1,09,120	5%
Madhya Pradesh	1,773	456	2,229	52,675	4%
Sikkim	0	80	80	1,950	4%
Punjab	928	0	928	23,794	4%

State	Tax Revenue	Non Tax Revenue	Revenues from Power Sector	Total Revenue	Revenue from power sector/ Total Revenue
Chhattisgarh	638	0	638	21,091	3%
Uttarakhand	229	41	270	9,618	3%
Arunachal	0	145	145	5,215	3%
Rajasthan	1,094	4	1,099	49,529	2%
West Bengal	769	0	769	39,464	2%
Orissa	552	3	555	32,115	2%
Tamil Nadu	1,040	0	1,040	77,916	1%
Karnataka	654	5	660	61,638	1%
Haryana	166	3	170	27,803	1%
Uttar Pradesh	458	77	535	1,13,110	0%
Jharkhand	73	0	73	17,162	0%
Andhra Pradesh	305	38	343	82,729	0%
Assam	37	0	37	19,789	0%
Bihar	55	0	55	41,437	0%
Kerala	21	0	21	34,301	0%
Meghalaya	1	0	1	2,110	0%
Tripura	0	0	0	2,380	0%
<b>India (Total)</b>	<b>17,645</b>	<b>4,148</b>	<b>21,793</b>	<b>9,04,866</b>	<b>0%</b>

Source: State Government annual accounts from CAG (2011-12)

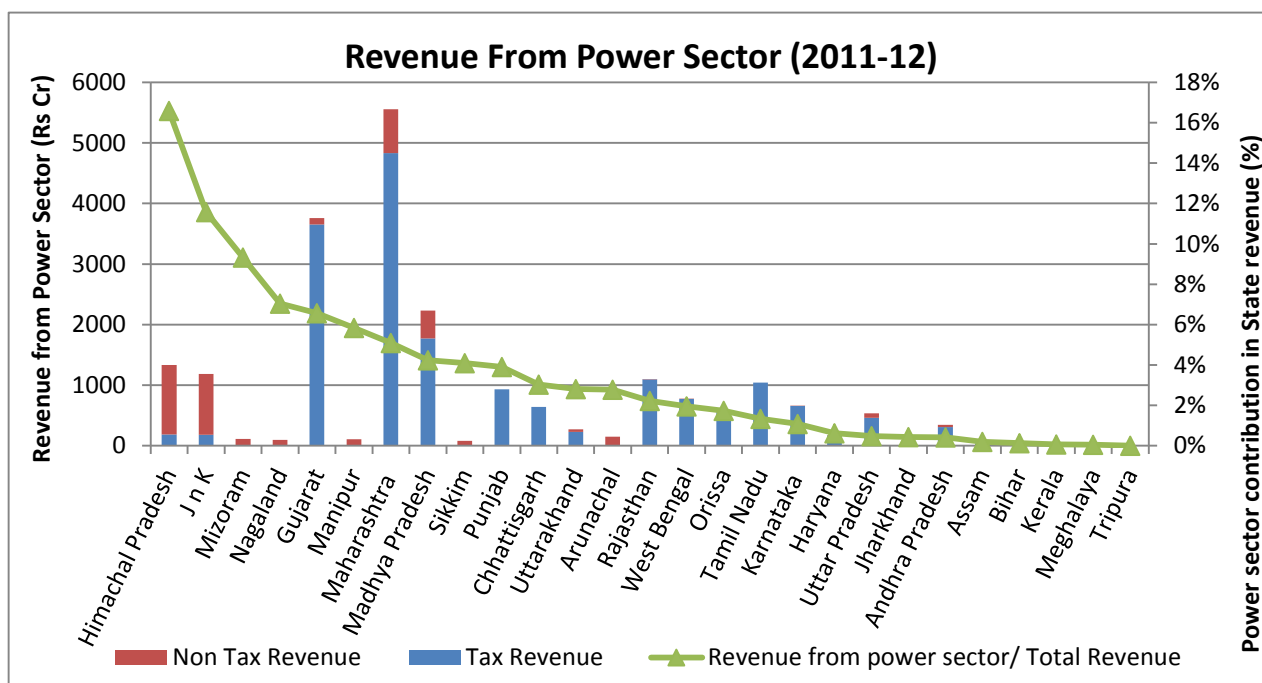
As indicated by the table above,

- The share of revenue from power sector is highest in Himachal Pradesh followed by Jammu and Kashmir, Mizoram etc. The share is lowest in states of Tripura and Meghalaya.
- Utilities in Rajasthan and Tamil Nadu generated ~2% of the state revenue, whereas in states such as Bihar, Jharkhand and Uttar Pradesh, the utilities contributed a relatively smaller amount.
- The states that contribute the most towards All-India power sector revenues are Maharashtra, Madhya Pradesh and Gujarat (53% of the revenues). 77% of the total power sector revenues come from eight states namely Maharashtra, Madhya Pradesh, Gujarat, Himachal, Jammu and Kashmir, Rajasthan, Punjab and West Bengal.
- In most of the states, the major revenue source for the sector is tax revenue. At the all India level, tax revenue from the sector accounts for 81% of the total revenue and remaining is derived from non-tax revenue.

- States with the major revenue source of the sector as non-tax income are Himachal Pradesh, Jammu and Kashmir, Mizoram, Nagaland, Manipur, Sikkim and Arunachal Pradesh. The significant amount of non-tax revenue in these states is primarily due to the prevalence of Hydel-Generation and rural electrification, apart from T&D.

The data table above is presented in the chart below:

**Figure IV-2: Tax and Non Tax Revenue from Power Sector – (2011-12)**



Source: State Government annual accounts from CAG (2011-12)

The major source of Tax Revenue (Power Sector) is Taxes on consumption and sale of electricity. As evident, it is the highest in Gujarat and Maharashtra. The major source of Non – Tax Revenue is free Hydropower sale, Rural Electrification etc. In Himachal Pradesh and Maharashtra, ~100% of the Non- Tax Revenue from Power Sector came from Hydel-Generation. In Uttar Pradesh and Jammu and Kashmir, a significant proportion of the Non-Tax Revenue from Power Sector, is accounted for by Rural Electrification

## 2. POWER SECTOR SUFFICIENCY

The table below lists the Total Revenue and Expenditure of Power Sector, Difference between Total revenue from the sector and revenue expenditure, Difference between total revenue from the sector and total expenditure in 2011-12.

**Difference of Power sector total revenue and total expenditure:** It is estimated as the difference between Revenue generated from the sector and Total expenditure made on the sector. It suggests the extent of sector's ability to finance the investments and other assistance.

**Difference of Power Sector total revenue and revenue expenditure:** It is estimated as the difference between Revenue generated from the sector and revenue expenditure made on the sector. It suggests the ability of the sector to meet the expenses with no assistance from the state.

**Table IV-3: Total Revenue and Expenditure on Power Sector, Difference of Power sector total revenue and total expenditure, Difference of Power Sector total revenue and revenue expenditure, 2011-12.**

State	Total Revenue	Capital Expenditure	Revenue Expenditure	Total revenue – Revenue Expenditure	Total Revenue – Total Expenditure
<i>In Rs Cr</i>					
Tripura	0	22	42	-42	-64
Meghalaya	1	0	166	-165	-165
Bihar	55	102	2,168	-2,113	-2,216
Haryana	170	802	3,591	-3,422	-4,223
Andhra Pradesh	343	33	4,416	-4,072	-4,105
Jharkhand	73	0	860	-787	-787
Karnataka	660	1,082	5,326	-4,667	-5,748
Uttar Pradesh	535	4,314	3,536	-3,000	-7,315
Kerala	21	0	98	-77	-77
Punjab	928	0	3,201	-2,273	-2,273
J&K	1,186	534	3,768	-2,582	-3,116
Nagaland	94	86	294	-200	-286
Assam	37	117	102	-65	-182
Rajasthan	1,099	2,459	3,006	-1,907	-4,366
Mizoram	110	76	289	-180	-256
Manipur	107	195	273	-166	-362
Arunachal	145	204	359	-214	-418
Tamil Nadu	1,040	4,100	1,776	-736	-4,836
Sikkim	80	38	98	-18	-56
Maharashtra	5,557	1,862	5,527	30	-1,832
Madhya Pradesh	2,229	1,026	2,071	158	-867
Gujarat	3,760	880	3,359	402	-479
Chhattisgarh	638	900	337	301	-599
West Bengal	769	45	283	486	441
Himachal Pradesh	1,331	207	151	1,180	974
Orissa	555	181	24	531	350

State	Total Revenue	Capital Expenditure	Revenue Expenditure	Total revenue – Revenue Expenditure	Total Revenue – Total Expenditure
Uttarakhand	270	42	10	260	219
<b>India (Total)</b>	<b>21,793</b>	<b>19,306</b>	<b>45,132</b>	<b>-23,339</b>	<b>-42,645</b>

Source: State Government annual accounts from CAG (2011-12)

As indicated by the table above,

- The states in which revenue generation from power sector is higher than the revenue expenditure are Maharashtra, Madhya Pradesh, Gujarat, Chhattisgarh, West Bengal, Himachal Pradesh, Orissa and Uttarakhand. This suggests that the revenue generated from the sector is significant to meet the present assistance requirement. Maharashtra is the state with second highest expenditure along with highest revenue generation from the sector. In Maharashtra, Gujarat and Madhya Pradesh the major expenditure is in the form of state assistance. Taking into account the efficiency in revenue generation, investments in capacity creation will help enable high productivity level in the state.
- Considering the total expenditure on the sector, the revenue generated is sufficient to meet both the present requirement of assistance and investments in the sector only in the states of West Bengal, Himachal Pradesh, and Orissa. However, in West Bengal, Orissa and Chhattisgarh the overall magnitude of revenues generation and state expenditure on the sector is comparatively low.
- In other states like Kerala, Jharkhand, Meghalaya, Sikkim, Tripura, and Assam etc, both revenue generated and state expenditure are relatively low with total expenditure exceeding the revenues. Thus the challenge for these states (except Kerala, due to positive financial gap) is to fund the sectors' revenue expenses, build infrastructure and also take steps to enhance the productivity of the sector.
- Given the revenue generating ability, the degree of external assistance requirement is relatively high in states like Uttar Pradesh, Tamil Nadu, Rajasthan, Bihar, Haryana, Andhra Pradesh, etc. where the amount of expenditure far exceeds the revenue. The severity of dependence on state finances, based on the nature of state financing, is higher in case of Andhra Pradesh, Bihar, Jharkhand, Karnataka considering the fact that the substantial expenditure on sector is majorly in the form of assistance and not investments. Similarly based on the magnitude of dependence, the severity of dependence is relatively high for the states like Uttar Pradesh, Tamil Nadu and Rajasthan.

### 3. GUARANTEES TO THE POWER SECTOR

In several states a significant part of the loans taken by the power sector utilities of the states have been provided with guarantees by the state governments. In the event that utilities are not able to meet their commitments, servicing of these loans can potentially devolve on the state governments.

In this context it is important to assess the size of guarantees in relation to the state budget (even if the guarantees are high in absolute terms, if this is a relatively smaller proportion of the revenue receipts, then the ability of the states to withstand such devolvement will be higher).

The table given below lists the states' Guarantees towards the sector in 2011-12

**Table IV-4: Guarantees to the Power Sector – 2011-12**

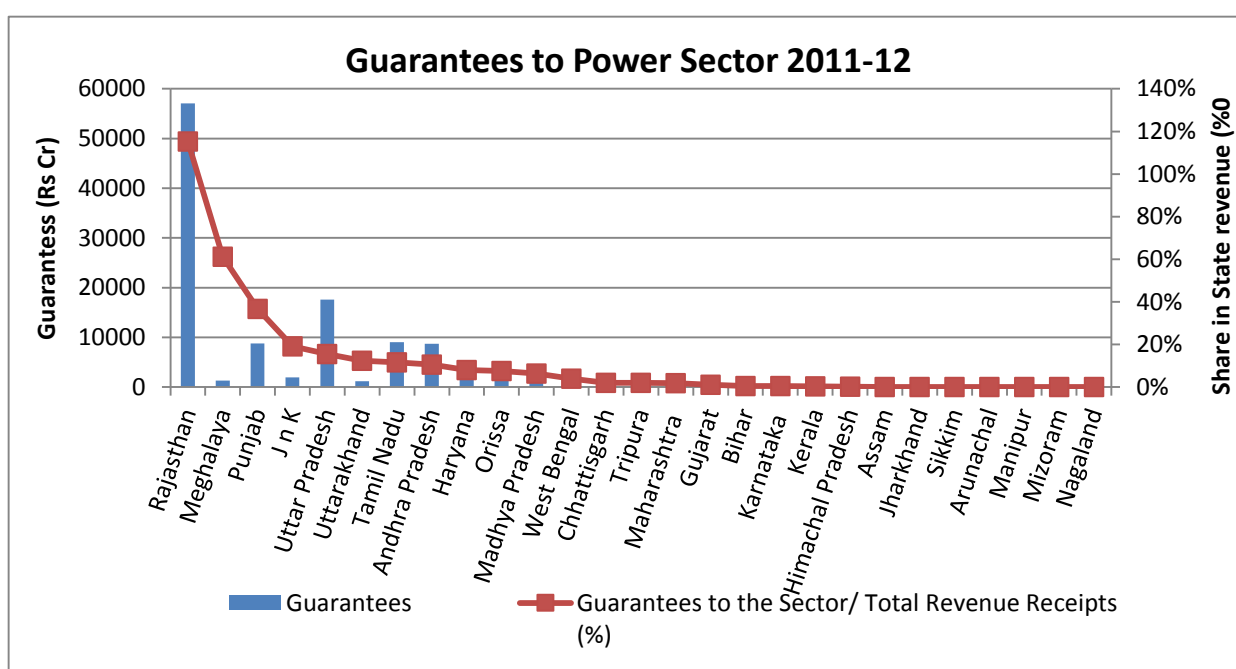
State	Guarantees	Guarantees to the Sector/ Total Revenue Receipts (%)
<i>In Rs Cr</i>		
Rajasthan	57,081	115%
Meghalaya	1,292	61%
Punjab	8,736	37%
J&K	1,956	19%
Uttar Pradesh	17,608	16%
Himachal Pradesh	1060	13%
Uttarakhand	1,187	12%
Tamil Nadu	9,024	12%
Andhra Pradesh	8,723	11%
Haryana	2,077	8%
Orissa	2,442	8%
Madhya Pradesh	3,302	6%
West Bengal	1,534	4%
Chhattisgarh	429	2%
Tripura	47	2%
Maharashtra	1,921	2%
Gujarat	576	1%
Bihar	195	0%
Karnataka	260	0%
Kerala	120	0%
Assam	8	0%
Jharkhand	0	0%
Sikkim	0	0%
Arunachal	0	0%
Manipur	0	0%
Mizoram	0	0%

State	Guarantees	Guarantees to the Sector/ Total Revenue Receipts (%)
Nagaland	0	0%

Source: State Government annual accounts from CAG, 2011-12

In 2011-12, the guarantee provided to the utilities was highest in Rajasthan. The guarantee provided to the utilities relative to revenue receipts of the states was the highest in Rajasthan followed by Meghalaya and Punjab. In majority of states, the guarantee provision to the state utilities was relatively low, both in quantum and as a percentage of revenue, as presented in the chart below.

**Figure IV-3: Guarantees to Power Sector 2011-12**



Source: State Government annual accounts from CAG (2011-12)

As observed from the annual accounts of state governments:

- In Rajasthan, 84% of Guarantees given to Power Sector were made towards Distribution sector and 6 % towards Transmission sector.
- In Tamil Nadu, 80% of the Guarantees given to Power Sector were made towards Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and remaining 20% were made towards Tamil Nadu Transmission Corporation Limited (TANTRANSCO)
- In Andhra Pradesh, 58% of the Guarantees, given to Power Sector, were made towards Generation Sector and 34% towards AP Power Finance Corporation.
- In Haryana, 48% Guarantees given to Power Sector were made towards Distribution sector and 38 % towards Transmission sector.

Thus, it can be observed that the majority of the guarantees provided by the state government are towards the distribution sector.



## 4. FINANCIAL BAGGAGE

An expert Group under the Chairmanship of Shri Montek Singh Ahluwalia, the then Member (Energy), Planning Commission recommended a scheme for one-time settlement of dues payable by State Electricity Boards (SEBs) to Central Public Sector Undertakings (CPSUs) and the Railways. The recommendations were accepted by the Government of India. All the 28 State Governments signed the Tripartite Agreement envisaged under the scheme which is between the State Government, Reserve Bank of India and the Government of India. Bonds amounting to Rs. 31581.2676 crore were issued by 27 States. Goa had no outstanding dues. Government of National Capital Territory of Delhi securitized its outstanding dues by converting the dues into long-term advances of Rs. 3376.6960 crore payable to the CPSUs concerned under Bi-partite Agreement as they do not have power to issue Bonds.<sup>13</sup>

The table below provides the value of power bonds issued in 2004-05 and outstanding liability of the state as of 2013-14

**Table IV-5: Value of Power Bonds issued in 2004-05 and outstanding liability of the state as of 2013-14**

States	Value of Power Bonds Issued by the States	Value of Bonds as on March 31 <sup>st</sup> 2012	Value of Bonds as on March 31 <sup>st</sup> 2013	Value of Bonds as on March 31 <sup>st</sup> 2014
	Rs Crore			
Andhra Pradesh	2436.098	970	730	490
Bihar	2075.61	830	620	420
Chhattisgarh	483.22	190	140	100
Goa	0	0	0	0
Gujarat	1628.712	650	490	330
Haryana	2022.29	810	610	400
Jharkhand	2115.3236	850	630	420
Karnataka	550.954	0	0	0
Kerala	1158.252	460	350	230
MP	2663.89	1070	800	530
Maharashtra	1018.594	410	310	200
Orissa	1102.874	440	330	220
Punjab	637.346	250	190	130
Rajasthan	368.782	60	60	60
Tamil Nadu	1962.14	0	0	0
Uttar Pradesh	5871.86	2350	1760	1170
West Bengal	1963.776	790	590	390
Arunachal Pradesh	24.072	10	10	0
Assam	857.534	340	260	170
Himachal Pradesh	70.248	30	20	10
J&K	1590.812	640	480	320

<sup>13</sup> Ministry of Power Annual Report 2005-06

States	Value of Power Bonds Issued by the States	Value of Bonds as on March 31 <sup>st</sup> 2012	Value of Bonds as on March 31 <sup>st</sup> 2013	Value of Bonds as on March 31 <sup>st</sup> 2014
Manipur	157.094	60	50	30
Meghalaya	13.99	10	0	0
Mizoram	45.566	20	10	10
Nagaland	78.92	30	20	20
Sikkim	47.802	20	10	10
Tripura	63.508	30	20	10
Uttarakhand	572	230	170	110
<b>Total</b>	<b>31581.2676</b>	<b>11550</b>	<b>8660</b>	<b>5780</b>

Source: Ministry of Power Annual Report 2005-06 and State Finances: A Study of Budgets of 2013-14, Reserve Bank of India, January 2014

Existing Power Bonds will be redeemed completely by 2016-17. However, as per the FRP, the State Governments will take over **a total of approx. Rs. 60,000 Cr.** (50% of Discoms' STL) in 2-5 years. The State Governments will redeem these from 2018-19 onwards in annual installments in next 10 years. Repayment pressure is expected to increase from 2018-19 for states participating in FRP.

## 5. FINANCING REQUIREMENT

Based on the assessment of state expenditure and income from the power sector, the overall impact of the power sector on state finances has been assessed in this section. This analysis includes the following:

- The Discom losses and Financing Requirement as percentage of Gross State Domestic Product
- The Accumulated Discom losses and Financing Requirement as percentage of Gross State Domestic Product

The sector financing requirement (which includes financing for Generation, Transmission and Distribution) is calculated by taking the total expenditure of the state on sector which includes Capital and Revenue expenditure, Loans and Advances (Net of Receipts) and Public Debt (Net of Receipts).

### 1. Financing Requirement with Discom Losses (with Subsidy realized)

The table below presents the financing requirement (including Discom losses in 2011-12) as a percentage of GSDP.

**Table IV-6: Expenditure on Power Sector, Discom Losses, Sector financing requirement with Discom Losses, GSDP, and Sector Financing Requirement /GSDP 2011-12.**

State	Total Expenditure	Loans and Advances (Net of Recoveries)	Internal Debt (Net of Receipts)	Central Government loan (Net of Receipts)	Discom Losses	Sector Financing Requirement	Gross State Domestic Product	Sector Financing Requirement /GSDP
<i>In Rs Cr</i>								
Kerala	98	0	116	0	241	-27	2,10,107	0%
West Bengal	328	(271)	242	0	95	204	3,18,871	0%
Orissa	205	208	110	7	(423)	953	1,30,669	1%
Assam	219	64	0	0	(407)	690	58,561	1%
Uttarakhand	52	44	57	0	(417)	570	8,05,031	1%
Maharashtra	7,389	4	0	0	(808)	8,201	3,98,884	1%
Gujarat	4,239	17	0	5	134	4,127	80,172	1%
Tripura	64	10	6	0	(156)	236	15,645	2%
Karnataka	6,408	21	0	2	(103)	6,534	2,86,410	2%
Punjab	3,201	0	64	0	(451)	3,716	1,56,454	2%
Andhra Pradesh	4,449	1,440	634	0	(4,022)	10,545	4,05,046	3%
Uttar Pradesh	7,850	0	41	0	(4,332)	12,223	4,23,261	3%
Chhattisgarh	1,237	-98	0	0	(1,310)	2449	84,674	3%
Sikkim	136	0	5	0	(9)	149	5,148	3%
Himachal Pradesh	357	472	0	0	(513)	1,343	41,939	3%
Meghalaya	166	29	1	0	(195)	392	11,085	4%
Bihar	2,270	926	208	0	(1,808)	5,211	1,44,278	4%
Haryana	4,393	127	202	0	(3,674)	8,396	1,79,097	5%
Jharkha	860	165	212	0	(3,21)	4,447	91,421	5%

State	Total Expenditure	Loans and Advances (Net of Recoveries)	Internal Debt (Net of Receipts)	Central Government loan (Net of Receipts)	Discom Losses	Sector Financing Requirement	Gross State Domestic Product	Sector Financing Requirement /GSDP
And					1)			
Tamil Nadu	5,876	1,392	0	0	(14,336)	21,605	4,16,549	5%
Nagaland	380	0	(15)	0	(201)	567	9,379	6%
Madhya Pradesh	3,097	5,954	361	0	(2,870)	12,282	2,01,290	6%
Manipur	469	0	0	0	(307)	776	7535	10%
Mizoram	365	0	5	0	(149)	519	5,017	10%
Rajasthan	5,465	(145)	17	145	(18,911)	24,393	2,27,824	11%
Arunachal	563	0	2	0	(265)	830	5666	15%
J&K	4303	(167)	(25)	0	(3037)	7148	40771	18%
<b>India (Total)</b>	<b>64,437</b>	<b>10,183</b>	<b>2,243</b>	<b>162</b>	<b>-(61,445)</b>	<b>1,38473</b>	<b>47,60,784</b>	<b>3%</b>

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

The financing requirement, which depicts the exposure of state finances to power sector, is highest in Jammu and Kashmir followed by Manipur, Arunachal Pradesh and Rajasthan. In Jammu and Kashmir, Rajasthan, Haryana, Jharkhand the major requirement is in the form of expenditure, whereas in Madhya Pradesh, Bihar, Tamil Nadu, Andhra Pradesh, the liability in terms of Loans and advances also contribute significantly to the financing requirement. In most of the above mentioned states, the major expenditure is in the form of revenue expenditure i.e. assistance to sector. At the all India level, the financing requirement (with Discom losses) is Rs.138473 for 2011-12. The major share in this amount is accounted for by Rajasthan, Tamil Nadu, Uttar Pradesh, and Andhra Pradesh.

## 2. Financing Requirement with Accumulated Discom Losses

The table below presents the financing requirement (including Accumulated Discom losses as on 2011-12) as a percentage of GSDP.

**Table IV-7: Expenditure on Power Sector, Accumulated Discom Losses, Sector Financing requirement with Accumulated Discom Losses, GSDP, and Sector Financing Requirement /GSDP 2011-12**

State	Total Expenditure	Loans and Advances (Net of Recoveries)	Internal Debt (Net of Receipts)	Central Government loan (Net of Receipts)	Accumulated Discom Profit/Losses	Sector Financing Requirement	Gross State Domestic Product	Sector Financing Requirement /GSDP
<i>In Rs. Cr</i>								
Kerala	98	0	116	0	1,968	(1,754)	2,10,107	-1%
West Bengal	328	(271)	242	0	(216)	515	3,18,871	0%
Gujarat	4,239	17	0	5	413	3,848	3,98,884	1%
Maharashtra	7,389	4	0	0	(4,649)	12,042	8,05,031	1%
Andhra Pradesh	4,449	1,440	634	0	145	6,378	4,05,046	2%
Karnataka	6,408	21	0	2	(1,452)	7,883	2,86,410	3%
Orissa	205	208	110	7	(3,716)	4,246	1,30,669	3%
Tripura	64	10	6	0	(517)	597	15,645	4%
Chhattisgarh	1,237	(98)	0	0	(2,187)	3,326	84,674	4%
Uttarakhand	52	44	57	0	(2,365)	2,518	58,561	4%
Himachal Pradesh	357	472	0	0	(1,407)	2,237	41,939	5%
Bihar	2,270	926	208	0	(7,675)	11,078	1,44,278	8%
Haryana	4,393	127	202	0	(10,138)	14,860	1,79,097	8%
Meghalaya	166	29	1	0	(736)	933	11,085	8%
Tamil Nadu	5,876	1,392	0	0	(27,786)	35,055	4,16,549	8%
Uttar Pradesh	7,850	0	41	0	(30,182)	38,073	4,23,261	9%
Jharkhand	860	165	212	0	(9,290)	10,526	91,421	12%

State	Total Expenditure	Loans and Advances (Net of Recoveries)	Internal Debt (Net of Receipts)	Central Government loan (Net of Receipts)	Accumulated Discom Profit/Losses	Sector Financing Requirement	Gross State Domestic Product	Sector Financing Requirement /GSDP
d								
Madhya Pradesh	3,097	5,954	361	0	(14,411)	23,823	2,01,290	12%
J n K	4,302	(167)	(25)	0	(1,677)	5,787	40,771	14%
Nagaland	380	0	(15)	0	(1,131)	1,497	9,379	16%
Rajasthan	5,465	(145)	17	145	(40,941)	46,423	2,27,824	20%
Arunachal Pradesh	563	0	2	0	(1,344)	1,909	5,666	34%
Manipur	469	0	361	0	(1,760)	2,590	7,535	34%
Assam	219	64	0	0	0	0	80,172	0%
Mizoram	365	0	5	0	0	0	5,017	0%
Punjab	3,201	0	64	0	0	0	1,56,454	0%
Sikkim	136	0	5	0	0	0	5,148	0%
<b>India (Total)</b>	<b>64,437</b>	<b>10,193</b>	<b>2,603</b>	<b>145</b>	<b>- 1,61,054</b>	<b>2,38082</b>	<b>47,60,784</b>	<b>5%</b>

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

Considering accumulated Discom losses, some of the states with relatively high financing requirement are Rajasthan, Jammu and Kashmir, Madhya Pradesh, Jharkhand, Tamil Nadu. In comparison to the financing requirement with Discom Losses, the burden on state finances in states like Jharkhand, Uttar Pradesh, Uttarakhand etc. has worsened. In case of Kerala and Punjab, when considering the accumulated losses, the states have a lower financing requirement. The total all India level of financing requirement (with accumulated losses) of Power sector is Rs 238082 Cr for 2011-12. The states that significantly contribute to this amount are namely Rajasthan, Uttar Pradesh, Tamil Nadu and Madhya Pradesh.

## Conclusion

Considering the overall scenario, the exposure of state finances to power sector is highest for the states like Rajasthan, Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Haryana, Karnataka, and Bihar.

- The financing requirement (inclusive of Discom Losses) for the power sector is highest in Rajasthan followed by Tamil Nadu, Uttar Pradesh and Madhya Pradesh.

The four states constitute for 52% of the all India level financing requirement of the state. These states have very high Discom Losses for 2011-12 and accumulated Discom Losses as well. In Rajasthan, the state guarantees towards power sector are as high as 120% of the total state revenue. In Madhya Pradesh, a major financing requirement is in the form of loans and advances. The liability of redeeming the Power bonds is quite substantial in Madhya Pradesh.

- In Andhra Pradesh, Karnataka, Haryana Jharkhand, Punjab, Jammu & Kashmir and Bihar, the financing requirement (inclusive of Discom Losses) for the power sector, constitute more than 30% of the all India level power sector financing requirement. The major components of financing requirement for Andhra Pradesh, J & K, Jharkhand and Haryana are significant state expenditure and Discom losses, for Bihar it is the same along with substantial Loans and advances and for Karnataka and Punjab it is mainly the state expenditure. The liability of redeeming the Power bonds is quite substantial in Haryana, Bihar and Jharkhand.

The exposure of state finances to power sector is considerably low in states like Maharashtra, Gujarat, Kerala, Himachal Pradesh, West Bengal and Orissa.

- The Discom losses, in the above mentioned states are very low. In fact, for Kerala, West Bengal and Gujarat, the Discoms Accounted for Profits (with subsidy realised) Considering the Accumulated Discom losses, Gujarat and Kerala have accounted for profits and in West Bengal and Himachal Pradesh the amount is relatively low.
- The contribution towards all India level revenue from Power sector is highest from Maharashtra followed by Gujarat. The two states contribute 43% in the all India level revenues from the sector.

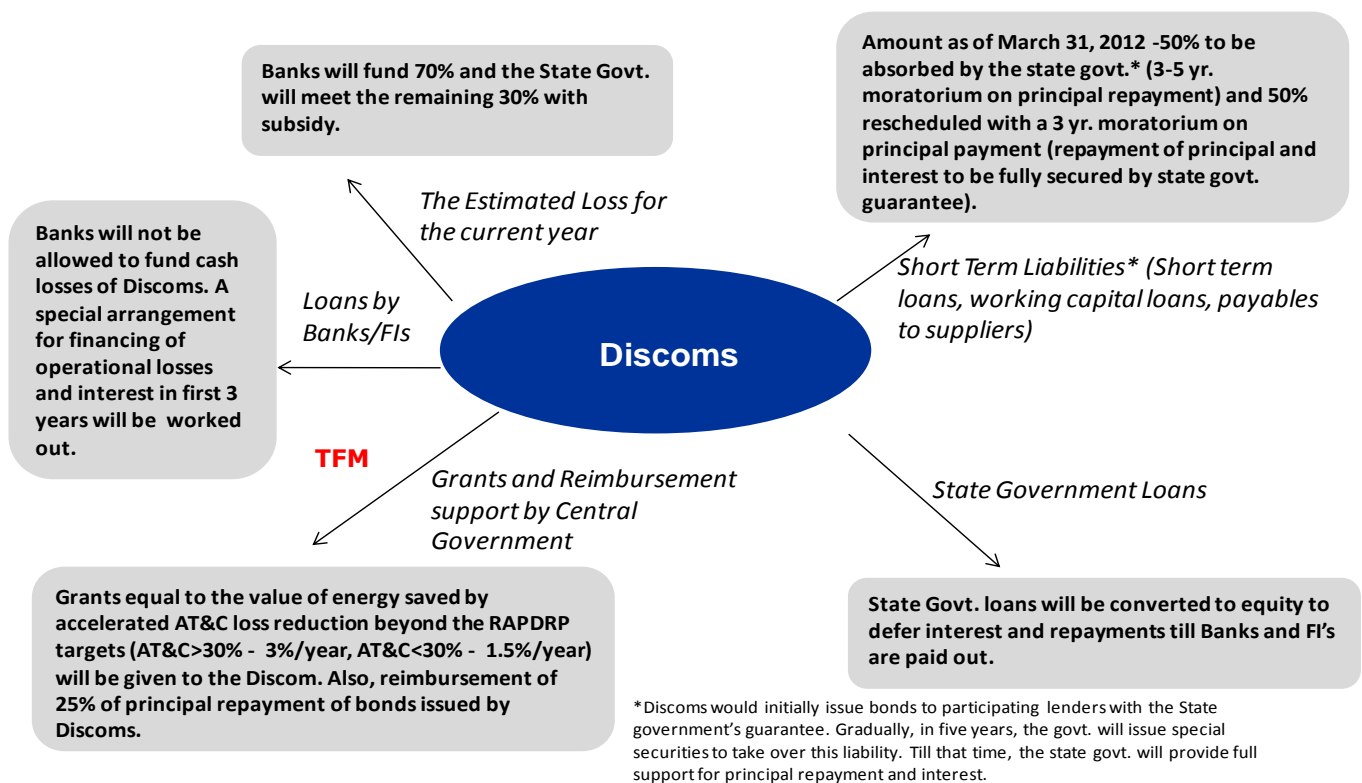
## V FINANCIAL RESTRUCTURING PLAN

### 1. INTRODUCTION

In 2012, to alleviate the poor state of finances of the utilities while simultaneously providing incentives to improve efficiency, GoI approved a *Financial Restructuring Plan* to restructure Rs 1.9 lakh crore debt of Discoms. The plan is now under implementation in some of the poorly performing states. Along with the debt restructuring, the government has proposed tough measures to ensure that it does not meet the same fate as the one time settlement scheme of year 2001. The re-scheduling of loans is to be accompanied by measurable actions to improve the operational performance of the distribution utilities. It focuses on tariff rate revisions, supplemented with earning through reduced losses. For monitoring the progress of turnaround plan, two committees at state and central levels are to be formed.

The schematic description of the plan is provided below:

**Figure V-1: Financial Restructuring Plan (FRP) of GoI**



### 2. TRANSITIONAL FINANCE MECHANISM AND MANDATORY CONDITIONS

Support from the Central Government under the *Transitional Finance Mechanism (TFM)* is available to all Discoms participating in the FRP. The grants support will be provided mainly on two accounts:



### **a. Reducing the AT&C losses beyond the RAPDRP trajectory**

The central government will provide support by way of grant equal to value of additional energy saved as a result of AT&C loss reduction for the next 3 financial years, starting April 1, 2012. The AT&C losses in 2010-11 will be taken as the reference (starting) point. The eligibility of this grant would depend upon the ACS-ARR gap, which is required to be reduced by 25% each year from the 2010-11 levels. The loss reduction targets are mentioned below -

- i. Discoms with AT&C losses > 30% - Reduction by 3% per year
- ii. Discoms with AT&C losses < 30% - Reduction by 1.5% per year

To illustrate, say the AT&C losses for a state are 35% in 2010-11. If the state reduces these losses to 31% in 2012-13, the reduction of 4% (which is 1% more than the 3% target), will make the state eligible for a grant equal to 1% of the total energy sale in 2012-13. However, the state will be eligible for this grant only if the ACS-ARR Gap is reduced by 25% of the Gap level in 2010-11.

### **b. Capital incentives for 50% short term liability (STL) to be taken over by state government by issuance of special securities to lenders.**

A reimbursement support of 25% of principal repayment of bonds/special securities issued by state government will be provided by central government; however, this will be provided only if the state government takes over the entire 50% of STL corresponding to the accumulated losses outstanding on 31.3.2012.

It is important to note that both the forms of support mentioned above are also subject to fulfillment of all mandatory conditions stipulated in the FRP scheme. The key mandatory conditions are mentioned below.

- a. Discoms should eliminate the Gap between ACS and ARR within the moratorium period.
- b. State government and Discoms not to resort to short term loans from Banks/FIs to fund operational losses.
- c. Preparation of road-map to increase private sector participation in distribution through franchisees to be prepared by Discoms within a year and submitted to CEA for approval.
- d. Latest tariff order to be filed for 2012-13 before FRP is approved, and for following years it should be notified by April 30 every year.
- e. Fuel Cost adjustment to be allowed as directed by APTEL to off-set increase in power purchase cost.
- f. APTEL to be approached for recovery of expenditure disallowed by SERC which in the opinion of Discoms should be allowed.
- g. Time bound plan for liquidation of regulatory assets to be submitted and the same to be incorporated in their ARR petitions.
- h. Monitoring Committee at state level to be setup for effective implementation of scheme.
- i. FRP to include targets for progressive reduction in ST power purchase ranging between 5-10%, 2013-14 onwards as against the benchmark of 2010-11.
- j. Release of agriculture subsidy should be based on feeder/distribution transformer meter data.

- k. Prepaid meters to be installed by 31.3.2013 for all government consumers and large consumers (>1 MW) where defaults have occurred.
- l. A time bound plan for metering of all categories of consumers to be put in place and submitted to Central Level Monitoring Committee and State Level Monitoring Committee.
- m. Audited accounts for and up to 2010-11 must be finalized

Considering the above, it can be observed that FRP announced by GoI can potentially have a significant impact on the state finances and improve the financial health of the utilities. Given this context, it is important to look at the following:

- Current status of FRP implementation in states
- FRP Outlook of States

### 3. CURRENT STATUS OF FRP IN STATES<sup>14</sup>

Given below is the state level current status of FRP approval and implementation as of June, 2014.

**Table V-1: Status of FRP in states as of June 2014 (Figures in Rs. Crore)**

States	Accumulated Losses as on 31.3.2012	STL (eligible under the scheme)	Bonds issued by Discoms to participating lenders	Operational losses to be funded (2013-14)	Liquidation of Regulatory Assets
Tamil Nadu	53696	12,765	6353	2887	Commission has arrived at RA of Rs 25,644 Cr. for 2013-14
Rajasthan	40942	36,038	17961	9016	Will start after 2016-17
Haryana	19707	14,764	7366	3209	HERC has allowed recovery of 45% of regulatory asset implemented through tariff order 2013-14. Regulatory Asset to be recovered within a period of 3 years.
Andhra Pradesh	6353	7438	4046	Operational losses are not funded	No Regulatory assets

<sup>14</sup> Himachal Pradesh has also opted for the FRP scheme. However, it has been excluded from our study on FRP states due to lack of data availability

States	Accumulated Losses as on 31.3.2012	STL (eligible under the scheme)	Bonds issued by Discoms to participating lenders	Operational losses to be funded (2013-14)	Liquidation of Regulatory Assets
Telangana	11314	9231	4553	Operational losses are not funded	No Regulatory assets
Uttar Pradesh	33600	31680	15810	5070	Regulatory surcharges at the rate of 3.71% was approved in the Tariff Order 2013-14 and 2.84% has been allowed for the FY 2014-15 and 2015-16.
Bihar	9629*	1782	818	State Govt. has been funding for the resource gap	The regulatory assets as per Tariff Order for 2015-16 is Rs. 103 Crores which will be adjusted by the Regulator at the time of True-up.
Jharkhand	11957	5710	It is proposed that the entire amount of STL will be serviced through debt, which is in deviation from the FRP scheme. The matter is pending with the Ministry of Power for approval.	Discoms decided not to avail operational loss funding.	No regulatory asset

Source: Ministry of Power along with the updated data based on the latest submissions by the States to the FFC

\*Accumulated losses for Bihar is as on 31/10/2012

As shown in the table above, the amount of liabilities that are expected to be restructured through the FRP scheme is extremely significant. This is certain to have a considerable impact on the Discoms' finances in the near term. The liquidity position of the Discoms is bound to improve in the short-term, which in turn will benefit other participants in the power supply value chain. However, several critical parameters under the FRP are stated to be 'under-progress' in most of the states availing the scheme. To achieve long term

financial viability of Discoms, achieving respective targets for these parameters becomes very critical. If these key parameters are neglected, the very goals of the scheme will be at risk. For example, privatization initiatives are very tepid at this time. For most participant states, the road-map for implementation is either being finalized or being discussed with the state government. Two of the states, Uttar Pradesh (in Agra and Noida) and Jharkhand (Ranchi and Jamshedpur) have started the process.

## 4. FRP OUTLOOK

Based on the above discussion, it is important to analyze the historical trends in key parameters on a state-level in order to comment upon the the likeliness of the state to meet certain eligibility conditions set forth by the FRP and extract long-term financial benefit from the scheme.

The color scheme used in the tables for each state in this section, refer to the color key provided here:

	Area of concern
	Can be better
	Good

### 4.1 Tamil Nadu

TANGEDCO reported a financial loss (without subsidy) of Rs.16,420 Cr. in 2011-12, translating into a financial gap of Rs.2.47/kWh. The financial gap has stayed at over Rs. 1.5/kWh for the last four years. In order to rescue TANGEDCO from the existing financial crisis, the Government of Tamil Nadu approved the above mentioned FRP scheme. As per this scheme, the state government would take over Rs.6353 cr. (50% of STL) by issue of bonds by TANGEDCO to participating lenders. The interest burden for the State Government on the bonds would be Rs. 559 Cr. per annum till redemption (5 years). The scheme would also permit TANGEDCO to restructure the remaining 50% of STL backed by government guarantee, with a repayment of principal in 7 years period after moratorium of 3 years. The operational losses of TANGEDCO during the interim period would be funded under the FRP scheme as per the following terms:

**Table V-2: Operating losses funding Schedule – TANGEDCO**

Particulars	Years		
	2012-13	2013-14	2014-15
Cash loss/Operating loss (Rs.Cr.)	8183	3849	2060
Funding by banks	100%	75%	50%
Funding by GoTN	-	25%	50%

Source: Data submitted by the state to the FFC

Some of the key parameters relevant to successful FRP implementation at the state level have been presented for Tamil Nadu in the table below.

**Table V-3: Historical Parameters – Tamil Nadu**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	17%	16%	16%	14%	19%	19%	20%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	9%	9%	37%	4%
<b>Subsidy Received/Booked</b>	100%	100%	100%	86%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	6%	6%	7%	8%	10%	11%	10%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.49	0.44	0.81	1.55	1.77	2.00	2.47	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses in Tamil Nadu have ranged from 15-20% during the period under review. A >1.5% annual reduction in AT&C losses, in order to benefit from the central grants support scheme, will require persistent efforts on part of the Discom. However, it is important to note here that AT&C losses are based on the estimated consumption in the agricultural sector. Agriculture and hut service connections are provided free supply of power and they are entirely unmetered in Tamil Nadu. Hence, it might not be totally appropriate to take the AT&C loss benchmark point of 2010-11 as given in the table above.
- The regulatory commission in Tamil Nadu revised tariffs in 2010-11, after a period of 7 years. In the last 3 financial years, the tariffs have been revised regularly (as much as 37% in 2012-13). In 2011-12, the state revised tariff for agriculture from Rs. 250/HP/annum to Rs. 2500/HP/annum. As part of the FRP, it is critical for the regulator to increase tariffs on a consistent basis in order to eliminate the revenue gap in next 4 years.
- Transparency in disbursement levels, a requirement of the FRP, can be judged on two accounts. The subsidy received-booked ratio has consistently been at 100%, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the complete lack of agricultural metering in the state.
- The share of interest expenses is considerably high in the state. The moratorium on principal repayment of balance loans outstanding will possibly free up funds in the near term that can aid working capital requirements of TANGEDCO.

- The ACS-ARR Gap needs to be reduced by 25% every year (from the 2010-11 benchmark of Rs. 2/kWh) in the moratorium period to be eligible for the central grants incentive. The Discom has brought down the revenue gap to zero<sup>15</sup> in 2012-13, making it eligible for the grants benefit. This is largely due to the significant tariff revision in the same year.

In conclusion, TANGEDCO has revised tariffs and managed to bring down its revenue gap to zero. Lack of agricultural metering is a cause of concern on the revenue front since subsidies will be dependent on that parameter and also on accurate estimation of AT&C Losses. Along with revenue realization, however, power procurement cost optimization will be crucial for the state to keep the power purchase costs under control and achieve its financial gap targets.

## 4.2 Uttar Pradesh

The five Discoms in Uttar Pradesh reported a combined financial loss (without subsidy) of Rs.7,928 Cr. in 2011-12, translating into a financial gap of Rs.1.13/kWh. The financial gap has stayed at over Rs. 1/kWh for the last five years. The financial health of the Discoms is even worse when its short-term liabilities are considered. Due to the existing financial crisis, the Government of Uttar Pradesh has approved the FRP scheme.

As per the scheme, the state government would take over Rs.15,810 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The Discoms had issued bonds for Rs. 15840 Crores, however, the bonds were not fully subscribed by the banks leaving a shortfall of Rs. 29.62 Crores. This liability remains unfunded and shall be discharged by the Discoms from their current revenues.

The bonds will be converted into special securities of the Government in three year time frame starting from 2014-15 till 2016-17 with Rs. 5270.13 Crores converted each year.

The following table highlights the bond repayment schedule and State Government fiscal impact under FRP.

**Table V-4: Bond Repayment Schedule and State Government fiscal impact – Uttar Pradesh (Rs. Crores)**

Particulars	Years								
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Interest @ 9.68%	-	-	1530	1530	1530	1530	1530	1379	9029
Redemption of bonds	-	-	-	-	-	-	1581	1581	3162
Additional subsidy burden	375	461	917	1413	3500	4000	500	0.00	11166
<b>Total</b>	<b>375</b>	<b>461</b>	<b>2447</b>	<b>2943</b>	<b>5030</b>	<b>5530</b>	<b>3611</b>	<b>2960</b>	<b>73319</b>

Source: Data submitted by the state to the FFC

Some of the key parameters relevant to FRP implementation have been shown in the table below for Uttar Pradesh.

<sup>15</sup> As per 'Status of compliance of APTEL order OP No. 1 of 2011: For financial year 2012-13'

**Table V-5: Historical Parameters – Uttar Pradesh**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	44%	44%	35%	35%	34%	40%	45%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	20%	19%	n.a	n.a	9%	16%
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	4%	4%	4%	4%	6%	3%	2%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	1.10	1.02	1.14	1.17	1.27	0.82	1.13	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The Aggregated Technical & Commercial losses (AT&C) for Uttar Pradesh distribution utilities have historically remained high (averaging at 40%) on account of ageing transmission and sub-transmission network. Uttar Pradesh will require a >3% annual reduction in AT&C losses in order to benefit from the central grants scheme. The higher the reduction (over 3%), greater is the potential for receiving the grants from the central government.
- While the state has revised tariffs in last 2 years, the regulator will need to hike tariffs frequently and substantially. In the past, there have been periods of 2-3 years with no tariff revisions at a stretch.
- The subsidies received-booked ratio has continued to be 100% for last 6-7 years. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the existing low level of agricultural metering (9%).
- The share of interest expenses is not very high in Uttar Pradesh. The total debt taken by the Discoms was Rs. 4952 crores and the debt-equity ratio stood at 0.4 in 2011-12. While those figures sound relatively moderate for the loss making Uttar Pradesh Discoms, the payables to suppliers on the Discoms' balance sheet stood at Rs. 39,716 crores in the same year. Clearly, the Discoms have not regularly paid the suppliers. Lack of timely payments will force the suppliers to cut supply, increasing the Discoms' reliance on short term power further.
- The ACS-ARR Gap needs to be reduced annually by 25% from the 2010-11 benchmark value to be eligible for the central grants incentive. The gap will need to be reduced by around 20 paise per year in the next 3-4 years. Assuming the AT&C losses are reduced by 3%, the financial gap will come down by around 15 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same amount of power as in 2011-12. This implies that the technical losses will

need to be brought down by a considerable amount, unless the tariffs are revised to increase the revenue realization.

In conclusion, the huge short term payables in Uttar Pradesh are a matter of concern and the FRP is expected to improve its short term liquidity position. The AT&C losses are significantly high and considerable improvement is required on that front. In order to bring down the ACS-ARR gap, the Discoms will need to revise tariffs adequately and bring down technical/commercial losses.

### 4.3 Rajasthan

The three Discoms in Rajasthan reported a combined financial loss (without subsidy) of Rs.20,671 Cr. in 2011-12, translating into a financial gap of Rs.4.38/kWh. The financial gap in 2010-11 was Rs 2.4/kWh. The sudden increase in the gap is due to a huge figure of subsidy receivables being expensed as bad debt in 2011-12.

As per the FRP scheme, the Rajasthan government would take over Rs.17,961 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The following table highlights the bond repayment schedule and State Government fiscal impact under FRP.

**Table V-6: Bonds re-payment Schedule by the State Government and State fiscal impact – Rajasthan (Rs. Crore)**

Particulars	Years						
	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Bonds taken over schedule	3340	4500	5700	4421	-	-	-
Interest liability (A)	-	-	1787	1787	1787	1698	1519
Cash support from State Govt. (B)*	-	-	3272	3499	3753	4027	4335
Net Repayment liability on bonds taken over by State Govt (C)	-	-	-	-	-	1347	1347
Total (A+B+C)			5059	5286	5540	7072	7201

Source: Data submitted by the state to the FFC

\* Cash support includes interest-free loans from State Govt., Cash support from State Govt., reimbursement of losses, electricity duty retention and interest subsidy on IBRD loan.

Total fiscal impact of the FRP on the State Government finances by the end of FY28 includes net repayment of bonds/special securities of Rs. 13471 (i.e., gross repayment of bonds of Rs. 17961 Cr. less capital reimbursement support from Central Government of 25% of bonds amounting to Rs. 4490 Cr.) and the interest on bonds/special securities amounting to Rs. 16,892 Cr.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Rajasthan.

**Table V-7: Historical Parameters - Rajasthan**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14



<b>AT&amp;C losses</b>	42%	36%	33%	30%	30%	25%	25%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	0%	24%	19%	14%
<b>Subsidy Received/Booked</b>	62%	66%	38%	13%	7%	11%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	7%	8%	8%	9%	12%	18%	16%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.54	0.57	1.10	2.17	2.86	2.40	4.38	n.a	n.a

Source: PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have decreased to 25% in 2011-12. A >1.5% annual reduction in AT&C losses will be required in order to benefit from the central grants support scheme. If the Discoms continue to reduce AT&C losses at the rate they have decreased in the past, the potential grants from the central government will be significant. However, it is important to note that these losses are calculated on the basis of metered agricultural consumers. Agricultural metering is currently at 50% in Rajasthan. Hence, it might not be totally appropriate to consider the 25% loss level in 2010-11 as the benchmark for the state.
- Tariffs were not revised for a continuous period of 5 years in Rajasthan. In the last three years, tariffs have been revised substantially. In 2013-14, Rajasthan increased agriculture tariffs (general category) from Rs 2.25/kWh to Rs 3.93/kWh. Also, tariffs for unmetered agriculture consumers were hiked by an even higher percentage, in order to incentivize them to shift to metered category. With limits on subsidy levels, the regulator will need to revise tariff hikes on a frequent basis in order to bring down the financial gap, which is currently very high.
- Barring 2011-12, the subsidy received-booked ratio has been quite low in Rajasthan. Transparency in subsidy sanction and disbursement is a required condition in the FRP and can possibly be an area of concern.
- The share of Interest expenses has been very high. With 50% of STL being taken over by the state government and a moratorium on principal payments for the remaining 50%, the Discoms' short-term loans, the liquidity position will significantly improve and aid its working capital requirements.
- The ACS-ARR Gap needs to be reduced yearly by 25% of the 2010-11 benchmark level in the moratorium period to be eligible for the central grants incentive. By 2014-15, the financial gap will need to be brought down to around 60 paise/kWh. Assuming the AT&C losses are reduced by 3%, the financial gap will come down by around 18 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same power as in 2010-11<sup>16</sup>. This implies that the technical

<sup>16</sup> In order to estimate gap reduction, 2010-11 data has been taken for Rajasthan because the ACS in 2011-12 is very high due to the bad debt (subsidy receivables) expensed in that year.

losses will need to be brought down by a considerable percentage, unless the tariffs are revised to increase the revenue realization.

In the state of Rajasthan, lack of tariff hikes and inadequate disbursement of subsidies have contributed to the deterioration of financial health of Discoms. The reduction in AT&C loss levels has been significant and similar reduction in the future will allow the state to benefit from central government grants. While the FRP is expected to significantly improve the working capital condition of the state in the short-term, it is important to note that the accumulated financial losses of the Discoms have gone up to Rs 70,000 Cr. even before the scheme has been implemented. This will have severe cash flow implications in spite of the respite provided by the moratorium period on repayment of past loans under FRP.

#### 4.4 Haryana

UHBVNL and DHBVNL reported a combined financial loss (without subsidy) of Rs.7060 Cr. in 2011-12, translating into a financial gap of Rs.2.04/kWh.

As per the FRP scheme, the Haryana government would take over Rs.7382 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. Bonds of Rs. 7367 Cr has been issued by the Discoms as per the sanctions received from the banks. The State government has also provided a budget of Rs. 721.93 Cr. on account of reimbursement of interest to the Discoms for FY 2014-15 on the bonds issued. The scheme would also permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period.

The following table highlight the Financial Implication on account of payment of Principal amount and Interest payment on account of FRP for the period 2015-16 to 2019-20.

**Table V-8: Financial Implication on account of payment of Principal amount and Interest payment – Haryana (Rs. Crores)**

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Principal		-	-	-	737	737
Interest	722	722	722	722	722	650
<b>Total</b>	<b>722</b>	<b>722</b>	<b>722</b>	<b>722</b>	<b>1459</b>	<b>1387</b>

Source: Data submitted by the state to the FFC

Total fiscal impact of FRP on state resources by the end of FY29 will be Rs.14217 Cr. (Rs 7367 Cr as principal and Rs. 6858 Cr as interest)

Some of the key parameters relevant to FRP implementation have been shown in the table below for Haryana

**Table V-9: Historical Parameters - Haryana**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	43%	26%	32%	33%	29%	28%	28%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	19%	0%	19%	13%

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	95%	99%	n.a	n.a
<b>Interest Cost/Total Cost</b>	2%	2%	3%	5%	6%	8%	9%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.73	0.80	1.20	1.58	1.54	1.14	2.04	n.a	n.a

Source: PFC report on utility finances and Discom ARRAs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have come down considerably in the last few years – from over 40% in 2005-06 to 28% in 2011-12. This is in line with reducing agricultural sales. A >1.5% annual reduction in AT&C losses is required in order to benefit from the central grants scheme. If the discoms continue to reduce AT&C losses at the rate they have decreased in the past, the potential grants from the central government will be significant.
- The tariffs were not revised for a period of 8 years. While the tariffs have been revised in the last 2-3 years, the frequency of these hikes will play a key role in determining the financial gap in the future.
- The subsidy received-booked ratio has consistently been close to 100%, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the lack of complete agricultural metering in the state. At present, the agricultural metering is 44%.
- The share of Interest expenses is increasing significantly YoY. With the moratorium on principal repayments on 50% STL and the remaining being taken over by the government, the interest burden will reduce to some extent in the short term.
- The ACS-ARR Gap needs to be reduced annually by 25% of the 2010-11 benchmark level in the moratorium period, in order to be eligible for the central grants incentive. By 2014-15, the Gap will need to be reduced to 28 paise/unit. To reduce the financial gap by that extent, tariff revisions will need to be frequent and substantial.

In Haryana, AT&C losses have improved significantly over the years. However, tariff revisions have not been frequent. Regular tariff revisions in the last 2-3 years point towards the utilities' intent to improve its financial health and meet the requirements set forth by the FRP.

## 4.5 Andhra Pradesh and Telangana

As per the FRP scheme, the Andhra Pradesh government would take 50% of STL by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Andhra Pradesh.

**Table V-10: Historical Parameters – Andhra Pradesh**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	17%	18%	16%	13%	16%	18%	15%	n.a	n.a
<b>Tariff Hikes</b>	-3%	0%	0%	0%	0%	13%	24%	-	29%
<b>Subsidy Received/Booked</b>	63%	69%	64%	21%	42%	62%	50%	n.a	n.a
<b>Interest Cost/Total Cost</b>	5%	4%	3%	3%	5%	5%	6%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy - in Rs./kWh</b>	0.26	0.33	0.44	1.10	0.89	0.77	1.08	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses for Andhra Pradesh distribution utilities have historically remained on a lower side compared to the national average. This, however, is based on the estimated consumption in the agricultural sector (in absence of complete agriculture metering in the state). A >1.5% annual reduction in AT&C losses from 18% reference point in 2010-11, in order to receive central grants support, will require persistent efforts on part of the utilities. However, it is important to note here that AT&C losses are a derived figure in Andhra Pradesh due to lack of metering. Hence, it might not be completely appropriate to take the AT&C loss reference point as given in the table above.
- After a period of no tariff revisions for 4 years, tariffs were hiked in 2010-11 and 2011-12 and then again in 2013-14. Tariffs for agriculture have been hiked in the last 2 years. While the tariff hike has been considerable, frequency of revisions will be crucial in the future.
- Transparency in disbursement levels, a requirement in FRP, can pose an issue for Andhra Pradesh. Only about half of the subsidies booked by the utilities have been actually received in the last 3 years. Also, lack of complete agricultural metering will limit subsidy support levels under the FRP.
- The share of Interest expenses is not very high in the state. The moratorium on principal repayments will further reduce bring down this burden in the coming years.

- The ACS-ARR Gap needs to be reduced by 25% of Rs 0.77/kWh every year in the moratorium period in order to be eligible for the central grants incentive based on the AT&C losses. This will be possible with more frequent tariff hikes, as the state has not received the required subsidies in the past. Also, subsidy support might now be limited due to lack of metering.

In Andhra Pradesh, AT&C losses are already at low levels. Since subsidy support has been limited in the past, the regulator will have to ensure that tariffs are hiked frequently and the ACS-ARR Gap is reduced.

However, post Telangana Bill, there will be changes in implementation of Financial Restructuring Plan for the state of Andhra Pradesh and Telangana. The Andhra Pradesh reorganization bill 2013 states the following:

1. The present DISCOMS would be divided among the successor states on the following basis:
  - NPDCL and CPDCL would be responsible for power distribution in the state of Telangana, with two districts of CPDCL, namely Kurnool and Anantapur shifting to the state of Andhra Pradesh
  - SPDCL and EPDCL would be responsible for power distribution in the state of Andhra Pradesh, with the two districts being reassigned to fall under the coverage area of SPDCL
2. Units of APGENCO shall be divided based on geographical location of power plants.
3. The ratio of power distribution of the Central Generating Stations to the State of Telangana and Semandhara would be based on the actual energy consumption during the last 5 years by the DISCOMS in the respective Successor State.
4. The existing Andhra Pradesh Electricity Regulatory Commission (APEREC) shall function as a joint regulatory body for a period not exceeding six months within which time separate SERCs will be formed in the successor States.
5. Existing Power Purchase Agreements (PPAs) with respective DISCOMS shall continue for both on-going projects and projects under construction

#### **FRP implications of the State Division:**

##### ***Andhra Pradesh:***

FRP details with respect to Andhra Pradesh are given below:

**Table V-11 : FRP scheme state details – Andhra Pradesh**

<b>Particulars</b>	<b>Amount (Rs. Cr).</b>
Accumulated losses as on 31/03/2012	6353
STL eligible under the scheme as on 31/03/2012	7438
Bonds issued by the Government	4046

Source: Data submitted by the state to the FFC

**Table V-12: Interest repayment on bonds by the State Government per year – Andhra Pradesh**

Company	Bonds Issued (Rs. Cr.)	Interest @ 10%(Rs. Cr.)
EPDCL	1806	181
SPDCL	2240	224
Total	4046	404

Source: Data submitted by the state to the FFC

**Telangana:**

FRP details for Telangana are given below:

**Table V-13 : FRP scheme state details – Telangana**

Particulars	Amount (Rs. Cr.)
Accumulated losses as on 31/03/2012	11315
STL eligible under the scheme as on 31/03/2012	9232
Bonds issued by the Government	4554

Source: Data submitted by the state to the FFC

**Table V-14: Interest repayment on bonds by the State Government per year – Telangana**

Company	Bonds Issued (Rs. Cr.)	Interest @ 10%(Rs. Cr.)
CPDCL	2810	281
NPDCCL	1744	174
Total	4554	455

Source: Data submitted by the state to the FFC

**4.6 Jharkhand**

Jharkhand has recently unbundled its operations in March, 2014. The erstwhile JSEB reported a financial loss (without subsidy) of Rs.3211 Cr. in 2011-12, translating into a financial gap of Rs.4.28/kWh.

With reference to the letter number 1544, dated 21<sup>st</sup> July 2014, submitted by the Department of Energy, Government of Jharkhand, to Ministry of Power, the DISCOM has requested for the entire amount of STL of Rs. 5710 Cr to be financed by debt, with Rs. 3000 Cr to be financed by Power Finance Corporation and Rs 2710 by Bank of India in consortium with other banks.

As per the notified scheme, the bonds to be issued by Discoms were to be taken over by the respective State Government. However, in the current scenario, it is proposed that the entire amount will be serviced through debt only, which is in deviation from the FRP scheme. The matter is pending with the Ministry of Power.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Jharkhand

**Table V-15: Historical Parameters – Jharkhand**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	52%	54%	58%	54%	10%	47%	43%	n.a	n.a
<b>Tariff Hikes</b>	-	-	-	-	-	-	Yes	-	n.a
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	14%	20%	17%	19%	21%	12%	8%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.99	1.06	1.82	1.38	1.14	1.30	4.28	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have remained very high over the years due to persisting power thefts, weak distribution infrastructure, and high level of unmetered consumers in the state. A >3% annual reduction in AT&C losses from 47% (2010-11 benchmark value) is required for the utility to benefit from the central grants incentive.
- Before being revised once in 2011-12, tariffs were not revised for a period of more than 8 years. This is one of the biggest areas of concern for JSEB. Without frequent and substantial tariff revisions, the Discom would not be able to benefit from any of the financial incentives that are part of the FRP.
- The subsidy received-booked ratio has been high, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed.
- The share of Interest expenses has been significant. The moratorium on principal repayments of 50% STL will help reduce the interest burden to some extent in the short term.
- The ACS-ARR Gap needs to be reduced to by 25% annually from the Rs. 1.30/kWh 2010-11 in order to be eligible for the central grants incentive. In order to achieve this reduction, both tariff revisions and operational efficiency improvements are essential in Jharkhand. Assuming the AT&C losses are reduced by 3% in a year, the financial gap will come down by around 16 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same power as in 2010-11<sup>17</sup>

Unlike in the past few years, frequent and substantial tariff revisions coupled with consistent reduction in AT&C losses is the only way that Jharkhand can benefit from the FRP scheme and improve its financial health in the long term.

<sup>17</sup> In order to estimate gap reduction, 2010-11 data has been taken for Jharkhand because the ACS in 2011-12 is very high due to a huge increase in 'other cost' component.

## 4.7 Bihar

BSEB reported a financial loss (without subsidy) of Rs.3928 Cr. in 2011-12, translating into a financial gap of Rs.3.64/kWh.

As per the FRP scheme, the Bihar government would take over Rs. 818 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The bonds worth Rs 818 Cr. would be repaid with an interest rate of 10.2% per annum payable semi-annually. The first interest payment is due on 13<sup>th</sup> Sept. 2014, which is after 6 months of the allocation. While, the principle repayment will be due after the moratorium period of three years.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Bihar.

**Table V-16: Historical Parameters - Bihar**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	84%	44%	47%	34%	44%	47%	65%	n.a	n.a
<b>Tariff Hikes</b>	0%	10%	-	3%	-	0%	21%	11%	6%
<b>Subsidy Received/Booked</b>	42%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	22%	27%	26%	25%	23%	23%	20%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	1.34	1.92	2.09	2.21	2.52	2.81	3.64	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- In the state of Bihar, the past record in AT&C losses has been one of the poorest in the country. While the technical and commercial losses have actually gone up in the past due to ageing transmission infrastructure and power thefts, a 3% annual reduction will now be required for Bihar to benefit from central grants support scheme.
- Even on the revenue front, Bihar has performed poorly. The tariff hikes have been insufficient and irregular over the last few years. On the other hand, subsidy received-booked ratios have continued to stay at 100%, which is a positive sign.
- The share of Interest expenses has been over 20% for the last few years. With the moratorium on principal repayments on 50% STL, the liquidity situation is expected to improve in the near term, which is especially important considering the working capital stress in the system.
- The ACS-ARR Gap needs to be reduced by 25% of the 2010-11 benchmark level (Rs. 2.81/kWh) every year in order to avail the central grants incentive scheme. The



Gap will need to be reduced to 54 paise/unit by 2014-15. This will be possible only with even higher tariff hikes as subsidy transparency requirements will limit subsidy support levels. This is an area of concern, especially when the Gap has actually increased considerably in 2011-12.

Like Jharkhand, frequent and substantial tariff revisions coupled with consistent reduction in AT&C losses is possibly the only way for Bihar to benefit from the FRP scheme and improve its financial health, both in short and long term.

## 4.8 Conclusion

To sum up, the restructuring scheme would bring about an immediate improvement in the liquidity position of the participant Discoms. At this stage, however, it would be difficult to ascertain if this will lead to a structural change in the financial health of Discoms. That would be contingent upon the commitment of utilities and regulators to the performance linked measures. Apart from this, timely receipt of subsidies from the state governments along with timely cash collections from government departments will also determine whether the scheme will achieve its goals in the true sense. Also, the ability of the GoI and Lenders to ensure consistent compliance with the restructuring scheme, especially after it has been fully implemented and the funding to the SEBs is resumed, may be restricted given the socio-political scenario at the state level.

Based on the above analysis pertaining to participant states, it can be observed that state utilities are definitely showing intent towards improving their financial position. In the last couple of years, most of the states have undertaken tariff revisions. . However, since tariffs have been revised in most states, the ability for further revisions will be limited, unless coupled with efficiency improvements. Also, the technical/commercial loss reduction targets are stiff and looking at past trajectories, utilities will need to take adequate measures to make improvements. On the subsidy front, most states have maintained a 100% received-booked ratio. However, low metering levels is a potential area of concern on that front. It is important to note that the financial gap and technical/commercial losses have continued to be at significantly high levels in some of the FRP participant states. In order to benefit from the transitional finance mechanism under the FRP by taking advantage of the central grants and reimbursement scheme, it would be critical for these utilities to show considerable improvement on these parameters.

## VI ASSESSMENT OF REGULATORY EFFECTIVENESS

Regulatory Governance has a very important role in achieving efficiency in service delivery and overall financial sustenance of the sector. The Electricity Act 2003 envisaged Regulatory Institutions to be independent institutions responsible for balancing the interest of various stakeholders such as consumers, electricity utilities and society at large and at the same time limiting the interference of the state government in the operations of power sector in the state/country.

However, ten years from the enactment of Electricity Act 2003, it has been observed that the state regulators have not yet been able to achieve true autonomy from the state government defeating the prime objective of regulatory independence as envisaged in Electricity Act 2003. Also, many SERCs appear to lack adequate resources required to completely perform all functions or mandates provided in the Electricity Act 2003. Further, lack of clear accountability mechanism to govern SERCs is also one of the reasons for limited effectiveness of regulatory institutions.

The effectiveness of regulatory practices, has been assessed around the following themes:

- Financial Independence
- Staffing
- Performance Monitoring and Public Disclosures
- Effective Information Availability with the regulators to enable decisions on pricing
- Frequency and adequacy of tariff revisions

All the above aspects are discussed in detail below.

### 1. FINANCIAL INDEPENDENCE/AUTONOMY

The primary source of income for the SERC's include grant from the state government and their own revenue generated through fees for annual license, fees for fling application etc.

The budgetary independence of SERCs provides a reasonable proxy of independence in regulatory decision making.

The table below provides the share of State Government funding as percentage of SERC's income for the states.

**Table VI-1: State Government funding as a percentage of income of SERC's for various states**

S. No.	States	State Government funding as a percentage of income of SERC's
1	Haryana	100%
2	Meghalaya	80%
3	Karnataka	72%
4	Manipur and Mizoram	71%
5	Jharkhand	58%
6	Goa and union territories	52%
7	Tripura	42%

S. No.	States	State Government funding as a percentage of income of SERC's
8	Andhra Pradesh	34%
9	Himachal Pradesh	23%
10	Uttar Pradesh	20%
11	West Bengal	0%
12	Odisha	0%
13	Maharashtra	0%
14	Gujarat	0%
15	Rajasthan	0%

Notes: All states are not provided above as annual accounts of other SERC's or financial details were not available in public domain. Also, annual accounts were available for different years, so latest annual account available for a particular SERC has been considered.

Source: AF Mercados EMI Assessment Based on Annual Accounts of SERC's

It can be observed from the above that SERC's of Gujarat, Maharashtra, West Bengal, Rajasthan, Odisha etc. are not financially dependent on the state government for meeting their expenditure while SERC's of Haryana, Meghalaya, Karnataka, Goa etc. are financially dependent on the state government.

In case of Haryana it is observed that all expenditure of the Commission are charged to the Consolidated Fund of the Haryana State and State Government in its annual budget exercise approves the budget of the Commission. Any unspent amount is required to be deposited back with the State Government. As per the receipt and payment account for the year ending 31<sup>st</sup> March 2012, it can be observed that the state government provided a grant of Rs. 3.4 Crore, receipts of the HERC from fees was around Rs. 2.94 Crore and remittance to Govt. of Haryana was around Rs. 2.99 Crore.

States such as Gujarat and Maharashtra have been able to generate revenue on their own due to the prevalence of detailed fees stipulated for different activities of the Commission such as submission of petitions, review of order, renewal of annual license, etc. The ability to generate large resources is dependent on factors such as large number of licensees, IPP's, open access consumers etc. SERC like MERC has in some cases utilized these funds to undertake specific studies that contribute towards improved regulatory decision making.

Further, in terms of the performance of the utilities it can be observed that where SERC's have the financial autonomy, the state utilities are performing much better than others. For eg: Gujarat, Maharashtra, West Bengal etc. This is demonstrated from low revenue gap and regular tariff changes.

In order to provide financial autonomy to the SERC's, Section 102 of the E Act 2003 provided for establishment of the State Electricity Regulatory Commission fund by the state government to enable SERC to perform their responsibilities as envisaged in the Act. Further, Section 6.2 of National Electricity Policy also provided that *"The appropriate Governments should provide financial autonomy to the Regulatory Commissions. The Act provides that the appropriate Government shall constitute a Fund under section 99 or section 103 of the Act, as the case may be, to be called as Regulatory Commission Fund. The State Governments are advised to establish this Fund expeditiously."*

**Table VI-2: Status of Electricity Regulatory Fund**

S.no.	Name of State	Establishment of Electricity Regulatory Commission Fund	Remarks
1	<b>Andhra Pradesh</b>	No	-
2	<b>Arunachal Pradesh</b>	No	In process
3	<b>Assam</b>	Yes	Rules notified in August, 2005
4	<b>Chhattisgarh</b>	Yes	Chhattisgarh State Electricity Regulatory commission has established their own funds with the help of state Govt. budgetary provisions & other sources.
5	<b>Goa</b>	No	Not applicable to state Government as there is JERC and SERC.
6	<b>Haryana</b>	No	In process
7	<b>Himachal Pradesh</b>	Yes	Notified
8	<b>Jammu and Kashmir</b>	No	-
9	<b>Jharkhand</b>	Yes	Fund rules notified by Govt.
10	<b>Karnataka</b>	No	Under process
11	<b>Kerala</b>	No	-
12	<b>Madhya Pradesh</b>	Yes	Established
13	<b>Nagaland</b>	Yes	W.e.f. 16.9.2009
14	<b>Odisha</b>	Yes	W.e.f. 1.8.1996
15	<b>Sikkim</b>	No	-
16	<b>Tripura</b>	No	-
17	<b>Uttarakhand</b>	Yes	-

Source: CEA

It can be observed that as on 31<sup>st</sup> December 2013, most of the State governments have not established such fund and thus further resulting in lower financial autonomy.

Global experience on the financial independence of the regulatory institutions indicates that in many cases regulators are not dependent on the government budgetary support for discharge of their duties envisaged as per the relevant statues/acts. Source of income is generally through fees and charges levied by the regulatory institutions.

Table below provides a brief description on the international regulatory institutions with respect to their respective areas of regulation, staff strength and sources of income/funding.

**Table VI-3: International experience of different Regulatory Institutions with respect to staff strength and source of income**

S.No.	Name of country	Name of Regulatory commission	Year of establishment	Rule/Act of establishment	Areas of Regulation	Population (In Millions)	Number of staff	Source of income	Performance Metrics
1	United States of America	Federal Energy Regulatory Commission (FERC) <sup>18</sup>	1977	Department of Energy Organization Act	Wholesale electric, natural gas, hydroelectric, and oil pipeline industries	317	Staff Strength of 1500	Annual charges and filing fees assessed on the industries it regulates	Yes
2	USA: California	California Public Utilities Commissions (CPUC) <sup>19</sup>	1912	Public Utilities Act	Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises	38	Staff strength of 940		
3	USA: Maryland	Maryland Public Service Commission <sup>20</sup>	1910	Public Utility Companies Article, Annotated Code of Maryland	Gas, electricity, telecommunication, transportation	5.9	Staff strength of 135	Fees and Charges. Not dependent on Govt. funding	
4	Australia	Australian Energy Regulator <sup>21</sup>	2005	Competition and Consumer Act 2010	Wholesale energy market regulation, Energy networks regulation, Retail energy market regulation	23	Staff strength of 126		Yes
5	United Kingdom	Office of Gas and Electricity Markets (Ofgem) <sup>22</sup>	-	Gas Act 1986, the Electricity Act 1989, the Competition Act 1998, the Utilities Act 2000 and the Energy Acts 2004, 2008, 2010 and 2011, and other	Electricity & Gas	63.7	Staff Strength of 729	Fees and Charges. Not dependent on Govt. funding	Yes

<sup>18</sup> Official website: <http://www.ferc.gov/>; Performance and accountability report, fiscal year 2013: <http://www.ferc.gov/about/strat-docs/2013-audit.pdf>

<sup>19</sup> Official website: <http://www.cpuc.ca.gov/>; CPUC annual report 2012: <http://www.cpuc.ca.gov/NR/rdonlyres/E47E6D16-C37F-446B-B606-924378794A14/0/CPUC2012AnnualReport.pdf>

<sup>20</sup> Official website: <http://webapp.psc.state.md.us/Intranet/home.cfm>; Maryland PSC annual report 2012: <http://webapp.psc.state.md.us/intranet/SiteSearch/Annual%20Reports/2012/2012%20MD%20PSC%20Annual%20Report.pdf>

<sup>21</sup> Official website: <http://www.aer.gov.au/>; AER annual report 2012-13: <http://www.aer.gov.au/node/21752>

<sup>22</sup> Official website: <https://www.ofgem.gov.uk/>, Energy commission annual report 2013: <https://www.ofgem.gov.uk/about-us/corporate-policy-planning-and-reporting/annual-report-and-accounts>

S.No.	Name of country	Name of Regulatory commission	Year of establishment	Rule/Act of establishment	Areas of Regulation	Population (In Millions)	Number of staff	Source of income	Performance Metrics
				statutes.					
6	Philippines	Energy Regulatory Commission (ERC) <sup>23</sup>	2001	Section 38 of EPIRA	Electricity. ERC is tasked to promote competition, encourage market development, ensure customer choice and penalize abuse of market power in the electricity industry.	99	Staff Strength of 220		

Source: AF Mercados Analysis based on the data from official websites and Annual Reports

From the above, it is clear that the financial autonomy is necessary for regulators to exercise independent decision making. The Act and the policy provide for stipulations for this to happen, however implementation of these provisions has been weak in many cases.

<sup>23</sup> Official website: <http://www.erc.gov.ph/> ; Statement of allotment, obligation and balances, 2012: <http://www.erc.gov.ph/Pages/Annual-Report-Budget-and-Targets>

## 2. STAFFING

The staffing at SERC's can be broadly classified into two categories i.e. technical or professional staff and non-technical/support staff relates to services such as peon, security, driver, data entry operator, stenographer etc.

The number of positions sanctioned/current strength, details of technical and non-technical positions, vacant positions etc. for some of the states is given below:

**Table VI-4: Staffing pattern in different SERC's**

S. No.	Name of State	Total Number of Posts(Working or Sanctioned)	Technical Posts	Total non-technical posts	Percentage of technical posts
1	West Bengal	58	42	16	72%
2	Himachal Pradesh	30	19	11	63%
3	Maharashtra	63	39	24	62%
4	Rajasthan	55	32	23	58%
5	Karnataka	50	29	21	58%
6	Odisha	42	18	24	43%
7	Uttar Pradesh	55	21	34	38%
8	Tripura	23	8	15	35%
9	Chhattisgarh	66	23	43	35%
10	Gujarat	50	17	33	34%
11	Kerala	13	4	9	31%
12	Punjab	93	28	65	30%
13	Meghalaya	12	2	10	17%

Notes: All states are not provided above as annual accounts of other SERC's were not available in public domain. Also, annual accounts were available for different years, so latest annual account available for a particular SERC has been considered.

Source: AF Mercados Analysis based on data from Annual Accounts of SERC's

Following can be observed from the above:

- **Inadequate Technical Staff**

It can be observed that positions of specialized technical professionals are limited in several SERC's. Also the percentage of technical posts to total number of staff strength is low. Further, in many SERC's even the total number of working employees/sanctioned employees is observed to be low.

- **Vacant Posts**

Even within the sanctioned posts, there are several positions vacant due to one or the other reason. Vacant posts for few of the SERC's are given below:

**Table: Vacant Posts in SERCs**

**Table VI-5: States with vacant posts in SERCs**

S. No.	Name of State	Total Number of Posts(Working or Sanctioned)	Technical Post	Vacant posts	Technical posts amongst those vacant posts
1	Maharashtra	63	39	18	7
2	Rajasthan	55	32	12	6
3	Uttar Pradesh	55	21	11	9
4	Tripura	23	8	13	4
5	Gujarat	50	17	22	9

Source: AF Mercados Analysis based on data from Annual Accounts of SERC's

- **Staff on Deputation or contract basis**

Another important aspect that needs to be considered with respect to staffing in SERC's is the fact that some of the staff especially the technical staff is on deputation or contract basis.

Also, most of the SERC's are dependent upon the consultants for complying with their mandates. This limits the institutional memory and internal capacity building of the regulatory commissions.

**From the Table on international experience on regulatory institutions it can be observed that all the international regulatory institutions are adequately staffed. Even on the basis of population served per staff of the Commission on an overall level indicates Indian SERC's serves to a larger population per staff highlighting that Indian SERC's are not adequately staffed.**



**Table VI-6: Population served per staff of Regulatory Commission in different countries**

S.No.	Name of country	Name of Regulatory commission	Population served per staff (in lakhs) <sup>24</sup>
1	United States of America	Federal Energy Regulatory Commission (FERC)	2.11
2	USA: California	California Public Utilities Commissions (CPUC)	0.40
3	USA: Maryland	Maryland Public Service Commission (PSC)	0.44
4	Australia	Australian Energy Regulator (AER)	1.83
5	United Kingdom	Office of Gas and Electricity Markets (Ofgem)	0.87
6	Philippines	Energy Regulatory Commission (ERC)	4.50

Source: AF Mercados Analysis based on the data from Annual Reports of respective Commissions.

A comparison with Indian conditions is given below:-

**Table VI-7: Population served per staff of Regulatory Commission in different states in India**

S. No	Name of State	Population	Population served per staff (total) (in lakhs) <sup>25</sup>
1	West Bengal	91,347,736	15.75
2	Himachal Pradesh	6,856,509	2.29
3	Maharashtra	112,372,972	17.84
4	Rajasthan	68,621,012	12.48
5	Karnataka	61,130,704	12.23
6	Odisha	41,947,358	9.99
7	Uttar Pradesh	199,581,477	36.29
8	Tripura	3,671,032	1.60
9	Chhattisgarh	25,540,196	3.87
10	Gujarat	60,383,628	12.08
11	Kerala	33,387,677	25.68
12	Punjab	27,704,236	2.98
13	Meghalaya	2,964,007	2.47

Source: AF Mercados EMI Analysis

Further it must be noted that if one compares the population served per technical staff as compared to total staff, this ratio increases significantly considering large percentage of

<sup>24</sup> Reference:

<http://quickfacts.census.gov/qfd/states/06000.html>

<http://quickfacts.census.gov/qfd/states/06000.html>

<http://quickfacts.census.gov/qfd/states/24000.html>

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3101.0>

[http://www.ons.gov.uk/ons/dcp171778\\_320900.pdf](http://www.ons.gov.uk/ons/dcp171778_320900.pdf)

<http://www.census.gov.ph/content/2010-census-population-and-housing-reveals-philippine-population-9234-million>

<sup>25</sup> [http://www.censusindia.gov.in/2011-prov-results/data\\_files/andhra\\_pradesh/DCOAP-PAPER-1-BROCHURE.pdf](http://www.censusindia.gov.in/2011-prov-results/data_files/andhra_pradesh/DCOAP-PAPER-1-BROCHURE.pdf)

non-technical staff in total staff in India. Even, if we rationalize the ratio due to high population density in India, the number of staff still is inadequate.

**Thus, to ensure independent regulatory institution it becomes important to technically strengthen the State Commission's through adequate staffing and in house development/acquisition of technical skills in SERC's. The staff to be recruited should be allocated to various disciplines with clear role definition and accountability.**

### **3. ACCOUNTABILITY: PERFORMANCE MONITORING AND PUBLIC DISCLOSURES**

With the establishment of SERC's, public participation in regulatory process through holding of public hearing, invitation of comments from public on the petitions filed and draft regulations, issue of discussion papers etc has become an integral part of the working of the Commission. Also, SERC's regularly publishes its annual reports and accounts on its website highlighting/summarizing the work undertaken by the regulatory commission during the year along with the details of their income and expenditure during the year.

The aforementioned measures have increased transparency and accountability of SERC's towards public, however considering the financial performance of the sector and limited consumer participation in the entire regulatory process, there is a need to strengthen the accountability framework. When the regulatory institutions become truly accountable to public, they are expected to function more effectively in discharging of their mandates under the Electricity Act 2003.

Performance monitoring is an important aspect in this regard. Although performance monitoring is undertaken for different state utilities but no such mechanism exists for the SERC's.

However, it is observed internationally, many regulatory institutions have prepared performance metrics to evaluate their own performance with regard to those parameters. At the beginning of the year, goals are being set such as conduct of market reviews, new regulations, target for issuing license during the set time period etc. and this goal setting process is complemented by self-critical review at the end of each year. This review enables faster realization of goals year on year basis and also tracks performance of the regulators over the year. The results of the self-assessment are also published in their respective annual reports. For example Australian Energy Regulator (AER), has published performance indicators which cover different aspects of their work for the year 2012-13 and their observations with regard to the performance in their annual report. This includes both objective and subjective indicators. Table below lists few of the indicators and corresponding results as provided in the AER's Annual Report.

**Table VI-8: Few of the Performance indicators of AER**

S. No.	Performance Indicator	Result
1	Report at least once every six months to the Standing Council on Energy and Resources (SCER) <sup>26</sup> on details of the work program, outcomes of major projects and market activity	Achieved. Before each SCER meeting, an update on the key work and strategic issues were provided.
2	Publish key performance indicators for the AER, relating to strategic priorities and work program areas for 2013-14	Published in July 2013.
3	Consult with consumer representatives to identify barriers to effective engagement in energy markets, and implement strategies in response	Achieved. Consumer Reference Group was established to enable the consultation on Better Regulation. Stakeholder Engagement Strategy was developed so that the internal processes consistently and transparently consider consumers and other stakeholders' interests.
4	Ensure stakeholders perceive the AER as a transparent and consultative decision making body	Work in progress. A new stakeholder survey is planned in 2013-14 to gauge perceptions of the AER. In 2011 survey, 70 per cent of stakeholders rated AER as excellent or good in relation to the independence. In the same survey, 67 per cent of stakeholders said AER 'often' or 'always' provided adequate consultation. AER is focused on making a significant improvement.
5	All stakeholders provided with an adequate opportunity to actively participate and engage in our regulatory processes	Achieved. Information about all regulatory processes is published on website. Submissions are sought in all processes. In addition, public forums and consultation meetings with stakeholders are conducted.
6	Publish seven clear Better Regulation guidelines in 2013	In progress. Work on track for publishing each of the final Better Regulation guidelines by the end of 2013. 30 workshops were held, targeting regulated businesses and other stakeholders. Draft consumer engagement guideline was issued and called for submissions on issues papers relating to guidelines on expenditure assessments, rate of return, expenditure incentives, shared assets and confidentiality.

Source: AER annual report 2012-13: <http://www.aer.gov.au/node/21752>

Similarly, performance indicator of Ofgem is provided below. Ofgem provides the measures of performance, targets at the start of the year and actual realisation as against the targets.

<sup>26</sup> The Standing Council on Energy and Resources (SCER) has responsibility for major energy reform and the national energy legislation, as agreed by the Council of Australian Governments (COAG). The SCER consists of the Commonwealth, state, territory and New Zealand ministers with responsibility for energy and resource matters. Every six months, when the SCER meets, AER reports to the ministers on its work activities, key market outcomes and, if requested, its views on SCER reform proposals.

<b>Table VI</b>	<b>Division</b>	<b>Measure</b>	<b>Target</b>	<b>Actual</b>
1	Markets	Consult on and carry out consultations regarding any applications made for exemption from Third Party Access arrangements under Article 22 by prospective storage and interconnector operators	100%	100%
2	Markets	Send decisions on Article 22 exemptions to the European Commission within prescribed timescales if adequate data has been provided	100%	100%
3	Markets	Assess and make decisions about any Income Adjusting Event within three months of it being raised if adequate information has been provided	100%	None Received
4	Smarter Grids and Governance – Distribution	Make code modification decisions within 25 working days <sup>1</sup> of receiving the Final Modification Report (or, where applicable, final responses to a Final Impact Assessment or other Ofgem consultation)	90%	98%
5	Smarter Grids and Governance – Distribution	Publish code modification Impact Assessments and/or other Ofgem consultations where applicable within 3 months of receiving the Final Modification Report	90%	83%
6	Smarter Grids and Governance – Distribution	Grant competitive licence applications within 45 days of receipt of a duly made application	100%	100%
7	Sustainable Development	Protect consumers by responding substantively to customer contacts	93%	94%
8	Sustainable Development	Respond to complaints on enforcement matters confirming whether we will investigate	90%	97%
9	Finance and Risk Management	Pay undisputed bills	90% in 10 working days	92%
10	Research and Information Centre	Respond to inquiries under the Freedom of Information Act	90% in 20 days from receipt	91%

Source: UK Ofgem, Energy commission annual report 2012-2013: <https://www.ofgem.gov.uk/about-us/corporate-policy-planning-and-reporting/annual-report-and-accounts>

In light of the above, it is important that SERC's in India should also prepare such performance metrics and measure their performance against the set parameters. In this

regard, central agency i.e. CEA or MoP may initiate an annual performance evaluation and benchmarking exercise for the work undertaken by the Regulatory Commission. This would increase public accountability of the SERC's and would ensure their independence.

#### 4. FREQUENCY AND ADEQUACY OF TARIFF REVISIONS

The independence in functioning of regulatory institutions can be analysed through frequency and adequacy of tariff revisions in different states of the country. As highlighted in earlier sections, no or limited tariff hikes were observed during 2005-2011 while the revenue gap significantly increased over these years. The financial position of the utilities deteriorated considerably and in the year 2011-12, the utilities incurred combined losses of Rs. 88,053 crores (without accounting for subsidy).

In light of the above, the Ministry of Power (MoP) requested the APTEL to take appropriate action by issuing necessary directions to all the State Commissions to revise the tariff periodically, if required by suo moto action, in the interest of improving the financial health and long-term viability of the electricity sector in general and distribution utilities in particular.

**In line with the directions of the APTEL, more than 20 states have revised their tariffs in the last two years.**

Table below presents the compliance with OP1 Order of different states for FY 2012-13 on the following parameters:

- Whether Annual Performance review (APR) petition is filed by the utilities as per the regulations
- Whether APR order is being issued as per the regulations.
- Whether Annual Revenue Requirement (ARR) petition is filed by the utilities as per the regulations
- Whether ARR order is being issued as per the regulations
- Whether Tariff is applicable till the end of the FY
- In case petition is not being filed by the utilities whether SERC's have initiated Suo Motu action.

It can be observed that most of the states have complied with the directions of the APTEL especially with respect to the filing of ARR petitions and issuance of ARR order. In case of Gujarat and Sikkim suo motu proceedings were undertaken due to the delay in filing of ARR petitions by the utilities. Assam ERC extended the time period for the utilities but didn't undertake suo motu action till the latest available details.

In case of filing of APR petition with the SERC's it has been observed that few of the state utilities have not complied with the same.

**Table VI-9: Status of compliance of APTEL order OP No. 1 of 2011 with respect to APR and ARR: For financial year 2012-13 as on 30<sup>th</sup> January 2013**

S.No.	SERC's	APR petition filed as per the regulations	APR order being issued as per the regulations	ARR petitions to be filed as per the regulations	Issuance of tariff orders as per the regulations	Tariff applicability only till the end of the FY	Initiation of Suo Motu action for delays in filing
1	Andhra Pradesh	Complied	Complied	Complied	Complied	Complied	
2	Arunachal Pradesh	Arunachal Pradesh ERC came into workable stage only in July 2011. The Utilities, which are Government Departments, have already been requested to file the Tariff Petitions and that they are in the final stages of filing their respective Tariff Petitions for the first time. The Commission has so far not taken any Suo Motu action due to delay on this account as the Departments are new to this exercise and doing it for the first time.					
3	Assam	Commission directed the licensees (APGCL, AEGCL and APDCL) to comply with the order and file petition for APR of 2011-12, True Up for 2009-10 and 2010-11 and determination of ARR for 2012-13. Subsequently, APGCL filed the petition on 28.09.2012 while the Transco and Discom were granted time till 15.11.2012 failing which Suo Motu action was to be initiated.					
4	Bihar	Complied	Complied	Complied	Complied	Complied	
5	Chhattisgarh	Complied	Complied	Complied	Complied	Complied	
6	Delhi	Complied		Not Complied	Not Complied	Not Complied	
7	Gujarat	Not Complied	Not Complied	Not Complied	Not Complied	Not Complied	Yes
8	Himachal Pradesh	Not Complied	Not Complied	Not Complied	Complied	Complied	
9	Haryana			Complied	Complied	Complied	
10	Jammu & Kashmir	Not Complied	Not Complied	Not Complied	Not Complied	Complied	
11	Jharkhand						
12	Joint ERC (Goa and Uts)	Complied		Not Complied	Not Complied	Complied	
13	Joint ERC (Mizoram and Manipur)	Not Complied	Not Complied	Not Complied	Not Complied	Not Complied	
14	Karnataka	Complied	Complied	Complied	Complied	Not Complied	
15	Kerala			Not Complied	Complied		
16	Madhya Pradesh	Not Complied	Not Complied	Complied	Complied	Complied	
17	Maharashtra			Complied	Complied	Not Complied	

S.No.	SERC's	APR petition filed as per the regulations	APR order being issued as per the regulations	ARR petitions to be filed as per the regulations	Issuance of tariff orders as per the regulations	Tariff applicability only till the end of the FY	Initiation of Suo Motu action for delays in filing
18	Meghalaya	Complied	Complied	Complied	Complied	Complied	
19	Nagaland						
20	Odisha	Complied	Complied	Complied	Complied	Complied	
21	Punjab	Complied	Complied	Complied	Not Complied	Complied	
22	Rajasthan	Not Complied	Not Complied	Complied	Not Complied	Not Complied	
23	Sikkim	The Sikkim Commission began functioning only in Nov. 2011. Therefore, data for the period prior to 2011 is not available. However, SERC issued Suo Moto Tariff order on 30.03.2012 for 2012-13.					
24	Tamil Nadu	Complied		Complied	Complied	Complied	
25	Tripura	Complied	Not Complied	Complied	Complied	Complied	
26	Uttarakhand	APR filing has been incorporated in MYT Regulation, 2011 which shall come into effect from 01.04.2013, i.e. for the Control Period FY 2013-14.		Complied	Not Complied	Complied	
27	Uttar Pradesh	Complied for NPCL and not for other utilities	complied for NPCL and not for other utilities	complied for NPCL and not for other utilities	Not Complied	Not Complied	
28	West Bengal	Not Complied	Not Complied	Not Complied	Not Complied	Not Complied	

Notes: Blank cell implies information is not available

Source: Forum of Regulators

Table below presents the compliance with OP1 Order of different states for FY 2012-13 on the following parameters

- Treatment of revenue gap i.e. whether regulatory asset has been created or not
- Whether True up filing has been done as per the regulations
- Whether True up order has been issued as per the regulations.

It can be observed that few of the states have positive revenue gap. These are primarily private distribution companies such as BYPL in Delhi, Torrent Power Surat and utilities of Odisha.

Around 9 states have shown no revenue gap and remaining states have shown a negative revenue gap. While most of the states complied with APTEL and did not created the regulatory assets, states such as Bihar, Chhattisgarh (for CSPDCL), JERC (Goa & UTs) –

Puducherry, Rajasthan, Tamil Nadu, Uttar Pradesh (for NPCL) and West Bengal (WBSEDCL) created regulatory assets.

Further, it can be observed that most of the states have complied with the True up parameter.

**Table VI-10: Status of compliance of APTEL order OP No. 1 of 2011 (Contd.) with respect to revenue gap and true up: For financial year 2012-13 as on 30<sup>th</sup> January 2013**

S.No	SERC's	Revenue gap between ARR and ACS per unit	Treatment of revenue gap (Allowed/Not Allowed creation of Regulatory Asset)	True up filing as per the regulations	True up order as per the regulations
1	Andhra Pradesh	Nil	Not Allowed	Complied	Complied
2	Arunachal Pradesh				
3	Assam				
4	Bihar	Revenue Gap	Allowed but did not allow the carrying cost of these regulatory assets	Complied	Complied
5	Chhattisgarh	Revenue Gap	Not Allowed for BSP/Allowed for CSPDCL. carrying cost shall be/ have been allowed	Complied	Complied
6	Delhi	Positive gap for NDMC and BYPL and Revenue Gap for BRPL and TPDDL. For meeting the revenue gap till FY 2010-11 and liquidation of revenue gap, the Commission has decided to introduce a surcharge of 8% over the revised tariff in FY 2012-13.		Not Complied	Not Complied
7	Gujarat	Positive gap for TPL Surat and Revenue gap for other utilities	Not Allowed		
8	Himachal Pradesh	Nil	Not Allowed		Complied
9	Haryana	Positive Gap			Complied
10	Jammu & Kashmir	Revenue Gap	Not Allowed		
11	Jharkhand				
12	Joint ERC (Goa and Uts)	Revenue Gap Puducherry, Andaman & Nicobar, Goa)	Not Allowed for Chandigarh and Allowed for Puducherry. Also, did not allow the carrying cost of these regulatory assets		
13	Joint ERC (Mizoram and Manipur)	Revenue Gap	Not Allowed	Not Complied	
14	Karnataka	Nil	Not Allowed. has carried forward the gap to the next year.		
15	Kerala	Revenue Gap	Not Allowed		
16	Madhya Pradesh	Nil	Not Allowed	Complied	Complied
17	Maharashtra	Nil	Not Allowed	Complied	Complied
18	Meghalaya	Nil			
19	Nagaland				
20	Odisha	Positive Gap	Not Allowed	Complied	Complied
21	Punjab		Not Allowed	Complied	Not Complied. The True-up for 2010-11



S.No	SERC's	Revenue gap between ARR and ACS per unit	Treatment of revenue gap (Allowed/Not Allowed creation of Regulatory Asset)	True up filing as per the regulations	True up order as per the regulations
					could not be undertaken, as PSPCL did not submit Audited Accounts due to non-finalization of Transfer Scheme by the Govt. of Punjab.
22	Rajasthan	Revenue Gap	Allowed	Not Complied	Not Complied
23	Sikkim	Revenue Gap	Not Allowed		
24	Tamil Nadu	Nil	Allowed. Carrying cost has been allowed	Complied	Complied
25	Tripura	Revenue Gap	Not Allowed		
26	Uttarakhand	Nil	Not Allowed		
27	Uttar Pradesh	Revenue Gap. Carrying cost has been allowed. For NPCL the revenue gap is being met by way of regulatory surcharge of 8%.	Not Allowed for others and Allowed for NPCL.	Not Complied	Not Complied
28	West Bengal	Nil	Allowed. Part of the Regulatory Assets created have been adjusted out in APR/ Truing up for 2008-09, 2009-10 and 2010-11		

Notes: Blank cell implies information is not available

Source: Forum of Regulators

Table below presents the compliance with OP1 Order of different states for FY 2012-13 with respect to Fuel Surcharge Adjustment.

It can be observed that while most of the state regulations provides for fuel surcharge adjustment formula, the rest have assured to provide the same in the near future.

**Table VI-11: Status of compliance of APTEL order OP No. 1 of 2011 (Contd.) with respect to fuel surcharge adjustment: For financial year 2012-13 as on 30<sup>th</sup> January 2013**

S.No.	SERC's	Fuel adjustment mechanism in the regulations	surcharge formula/ in the	Frequency of adjustment	Fuel adjustment done as per the Regulations	Surcharge being per the
1	Andhra Pradesh	Complied		Quarterly	Complied	
2	Arunachal Pradesh					
3	Assam	Complied		Quarterly	Complied	
4	Bihar	Not Complied		Monthly	Complied	
5	Chhattisgarh	Complied		Quarterly for CSPDCL/Monthly for JSPL	Complied	
6	Delhi	Complied		Quarterly	Complied	
7	Gujarat	Complied		Quarterly	Complied	
8	Himachal Pradesh	Complied. Have not provided FSA mechanism in the regulations as there are no thermal generating stations in the State		Quarterly	Complied	
9	Haryana	Complied		Quarterly	Complied	

S.No.	SERC's	Fuel adjustment mechanism regulations	surcharge formula/ in the	Frequency of adjustment	Fuel adjustment done as per the Regulations	Surcharge being the
10	Jammu & Kashmir	Not Complied				
11	Jharkhand					
12	Joint ERC (Goa and Uts)	Complied		Quarterly	Complied	
13	Joint ERC (Mizoram and Manipur)	Complied		Monthly. Both monthly/ quarterly adjustment of Fuel Surcharge	Not Complied. FSA has not been made due to non availability of fossil fuel based generation in the State.	
14	Karnataka	Not Complied. Karnataka Commission stated that a separate order on FSA would be issued in due course of time			Not Complied. In the tariff order for 2012-13 issued on 30th April, 2012 directed all the licensees to submit certain data for fuel cost variation. After the analysis of the same, a separate order would be issued to be effective from the current year.	
15	Kerala	Complied		Quarterly		
16	Madhya Pradesh	Complied		Quarterly	Complied	
17	Maharashtra	Complied		Monthly	Complied	
18	Meghalaya	Complied		Quarterly		
19	Nagaland					
20	Odisha	Complied				
21	Punjab	Complied		Quarterly	Complied	
22	Rajasthan	Complied		Quarterly	Not Complied	
23	Sikkim	Not Complied. First tariff order issued for 2012-13. FSA formula will be provided in next tariff order			Not Complied. Sikkim ERC has stated that FSA will be provided in the next tariff order	
24	Tamil Nadu	Complied		Quarterly	Complied	
25	Tripura	Complied		Quarterly	Not Complied	
26	Uttarakhand	Not Complied. Have not provided FSA mechanism in the regulations as there are no thermal generating stations in the State. However, such provision has been provided in the MYT Regulations which will come into effect from April 01, 2013, for the Control Period FY 2013-14 with quarterly adjustment		However, at present, FSA bills raised by Central Generating stations are being paid by the licensee and the same is being allowed as power purchase cost in the ARR.	Complied	
27	Uttar Pradesh	Complied		Quarterly	Complied	
28	West Bengal	Complied		Yearly	Complied	

Notes: Blank cell implies information is not available

Source: Forum of Regulators

**Thus, it can be observed that Appellate Tribunal for Energy Judgement on OP1 of 2011 has played a significant role in driving SERC's and utilities to undertake periodic tariff revisions thereby enabling financial discipline in the sector.**

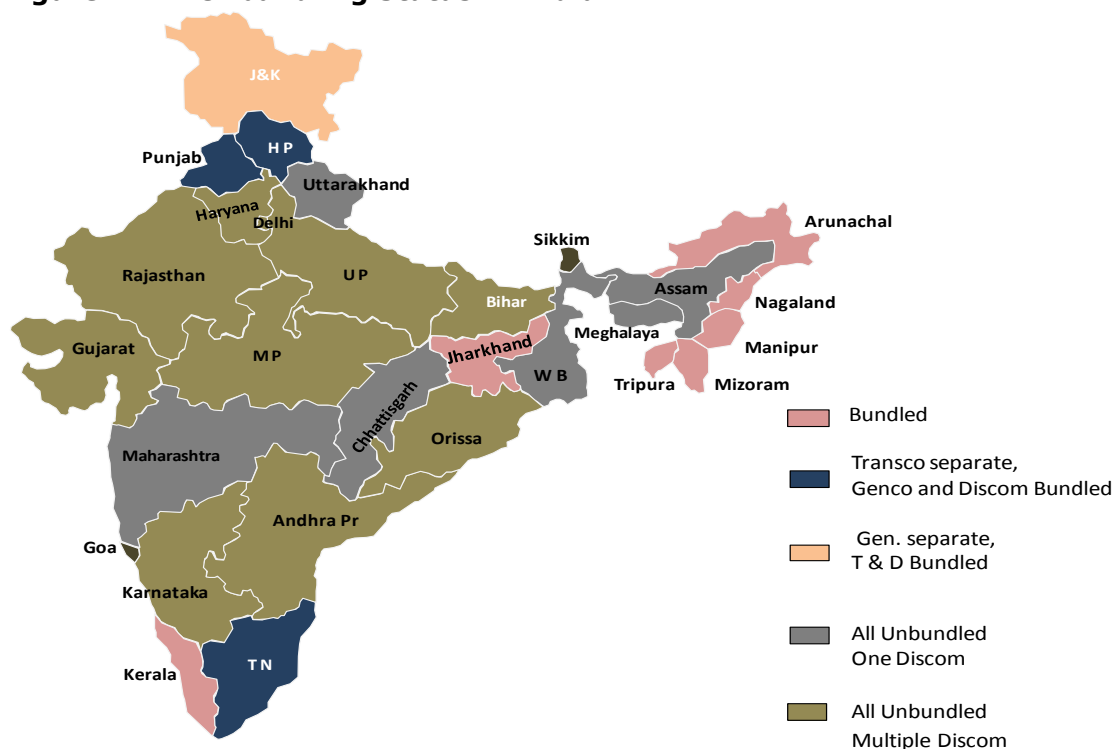
## 5. EFFECTIVE INFORMATION AVAILABILITY WITH THE REGULATORS TO ENABLE DECISIONS ON PRICING

Pricing decisions by regulatory commissions involves detailed analysis of various operational and financial parameters of utility pertaining to different segments of the business and for different consumer categories. The pricing decisions are based on the prudent check of the information submitted by the petitioner.

The information availability to the regulator depends on various factors such as unbundling, introduction of Multi-Year Tariffs (MYT) and the control period, level of metering, ability to calculate the cost of supply and implementation of Regulatory Information Management System in the state. All these are discussed in detail below:

- i. **Unbundling of SEB's:** Data regimes in the last 10 years have improved significantly especially after the Enactment of Electricity Act 2003 and unbundling of various state boards into corporate entities. When the utilities were vertically integrated, it was difficult to segregate costs to different functions of the utilities. However, with the unbundling of the utilities into Generation, Transmission and Distribution and each of the units working as a profit centre data availability has improved significantly. At present, all states have unbundled their SEB's except Jharkhand and Kerala SEBs which are yet to unbundle their operations along with the power departments. The nature of unbundling has differed across the states. Some states have unbundled their SEB's into separate Generation, Transmission and Distribution companies, some states have separated the Transmission function and Generation and Distribution has been retained as one company. The figure below illustrates the state-wise status of unbundling across the country.

**Figure VI-1: Unbundling Status in India**



Source: State Regulatory Commission Websites

After unbundling of the utilities, transfer scheme was introduced wherein all the assets and liabilities of the vertically integrated utility were transferred among the newly formed companies as per the different business segments and issues related

to common infrastructure were addressed. Also, holding company for the unbundled utilities was also created as part of the process.

SEB unbundling has led to separate reporting of all the sub-segments i.e. generation, transmission and distribution. Consequently, the operational and financial parameters for these sub-segments are reported and monitored separately.

Thus, data regimes have improved over the years depending on when the states have been unbundled.

- ii. **Multi-Year Tariff (MYT) framework: Second level of reforms** in terms of introduction of Multi-Year Tariff (MYT) regulations were undertaken by the state electricity regulatory commissions. MYT regulation provides an element of certainty on costs to all the stakeholders, for which the utilities can legitimately be held accountable. MYT regulation also seeks to reduce the cost of regulation and regulatory intervention in routine utility matters.

#### Status of MYT regulation

MYT framework has been successfully implemented in most of the states, with many state utilities being in the stage of MYT for the second control period. Many of the state utilities opted for a relative shorter initial control period (three years), in order to gain experience and improve the infrastructure related to information gathering. The states, which have efficiently been able to implement the strategies envisaged in the initial control period, have opted for a comparatively longer subsequent control periods (five years).

The table below provides a state wise snapshot of the control period(s) ascertained by the utilities to implement the business plan.

**Table VI-12: MYT framework Control Period duration across states**

States	Control Period	Control Period No.1	Control Period No.2	Control Period No.3
Andhra Pradesh	First control period = 3 years and subsequent control periods = 5 years	FY 2006-07 to FY 2008-09	FY 2009-10 to FY 2013-14	FY 2014-15 to FY 2018-19 (filed for approval)
Assam	Generation = First control period, 5 years from 1st April 2006; Transmission = First control period, 3 years from 1st April 2006; Distribution = First control period, 3 years	FY 2013-14 to FY 2015-16		
Bihar	First control period = 3 years	FY 2012-13 to FY 2014-15		
Chhattisgarh	First control period = 3 years	FY 2012-13 to FY 2014-15		
Delhi	First control period = 4 years; extended to 5 years and subsequent control period = 3 years	FY 2007-08 to FY 2010-11; extended till FY 2011-12	FY 2012-13 to FY 2014-15	
Gujarat	First control period = 3 years and subsequent control period = 5 years	FY 2008-09 to FY 2010-11	FY 2011-12 to FY 2015-16	

States	Control Period	Control Period No.1	Control Period No.2	Control Period No.3
Himachal Pradesh	First control period = 3 years and subsequent control period = 3 years	FY 2008-09 to FY 2010-11	FY 2011-12 to FY 2013-14	
Haryana	First control period = 3 years; for Generation, Transmission, Wheeling and Distribution	FY 2014-15 to FY 2016-17		
Jammu & Kashmir	First control period = 3 years	FY 2013-14 to FY 2015-16		
Jharkhand	Generation = First control period, 4 years; Distribution = First control period, 4years; Distribution = First control period, 4years. Submitted on 02.08.2012 for approval.	FY 2012-13 to FY 2015-16		
Karnataka	First control period = 3 years and subsequent control period = 3 years	FY 2007-08 to FY 2009-10	FY 2010-11 to FY 2012-13	
Madhya Pradesh	First control period = 3 years; for Generation, Transmission and Distribution	FY 2013-14 to FY 2015-16		
Maharashtra	First control period = 3 years and subsequent control period = 5 years	FY 2007-08 to FY 2009-10	FY 2011-12 to FY 2015-16	
Orissa	First control period = 5 years; second control period = 5 years; and third control period = 5 years	FY 2003-04 to FY 2007-08	FY 2008-09 to FY 2012-13	FY 2013-14 to FY 2017-18
Rajasthan	First control period = 5 years; second control period = 5 years	FY 2009-10 to FY 2013-14	FY 2014-15 to FY 2018-19 (filed for approval)	
Tamil Nadu	First control period = 3 years; second control period = 3 years	FY 2010-11 to FY 2012-13	FY 2013-14 to FY 2015-16	
Uttar Pradesh	Generation - First Control Period, 5 years; Distribution - None	FY 2009-10 to FY 2013-14		
Uttarakhand	First control period = 3 years	FY 2013-14 to FY 2015-16		
West Bengal	First control period = 1 year; Second control period = 3 years; Subsequent control periods = 3 years	FY 2007-08	FY 2009 to FY 2011	FY 2011-12 to FY 2013-14

Source: Respective ERCs in the state and Forum of Regulators

Hence, states that are in the 2<sup>nd</sup> or 3<sup>rd</sup> control period have significantly improved the data regimes as compared to states that are in the first control period.

### iii. RIMS

Regulators are faced with two kinds of problems with regard to the information– first incomplete information which implies absence of information with the involved entities and second asymmetric information which implies imbalance of information between the

involved entities. This imbalance is created by presence of better and more accurate information with the utility which is not voluntarily shared with the regulators.

One way that regulators attempt to compensate for the inherent information asymmetries is by requesting even more detailed and voluminous information from companies, which of course make the regulatory process even more information-intensive and cumbersome.

Regulatory Information Management System (RIMS) seeks to provide a framework for the interface between the regulator and the regulated entities, and hence improve the quality of regulatory decision making. It specifies formats in which the utilities are expected to submit/upload information with the Commission. Licensees are able to submit this information online and have the flexibility to upload revised drafts of the same document to incorporate the most updated information.

Key benefits of RIMS are:

- Simplifies process of collection and submission of information by regulators and utilities respectively
- Facilitates the process of tariff determination by providing access to accurate and updated information in an easily retrievable database
- Provides a facilitative platform for generation of reports for observing trends and patterns in Key Performance Indicators (KPI) and hence assists in decision making
- Online process reduces the time taken at each decision making step and introduces transparency in the system
- Uniform implementation of RIMS across the states provides uniform information across state utilities and assist in monitoring the operational and financial performance of KPI across state utilities

Orissa was the first Commission to develop and implement RIMS. Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu, Uttar Pradesh and Delhi are some of the other states that have introduced RIMS to improve their information collection processes and databases.

In the light of the above, Forum of Regulators has prepared data templates for RIMS related to Generation, Transmission, Distribution, Renewable and Rural Electrification. However, it is required to implement the above in all SERC's and to continually update the information in the prescribed formats and the defined KPI's to be regularly monitored.

#### **iv. Metering**

The level of metering impacts the availability of true consumption details for different consumer categories, also on determination of actual AT&C losses. However, in certain cases the loss levels are determined based on the estimated consumption of the unmetered category (especially agriculture).

Section 55(1) of the E Act 2003, provided that "No licensee shall supply electricity, after the expiry of two years from the appointed date, except through installation of a correct meter in accordance with regulations to be made in this behalf by the Authority"

Further, clause 5.4.9 of the National Electricity Policy provided the following:

"The Act requires all consumers to be metered within two years. The SERCs may obtain from the Distribution Licensees their metering plans, approve these, and monitor the same."

Even after 10 years of the enactment of the Electricity Act 100% metering in most of the states is still not achieved. The state wise status of the same is given below

**Table VI-13: Status of Metering in different states in India**

S.no.	Name of State	Status of Metering for individual consumers by June-05	Remarks
1	<b>Andhra Pradesh</b>	Partial	100%, except Agriculture
2	<b>Assam</b>	Yes	100%
3	<b>Bihar</b>	Partial	64.21%
4	<b>Chhattisgarh</b>		100% (2009-10.) including pump & BPL connection.
5	<b>Delhi</b>	Yes	Almost 100%
6	<b>Goa</b>	Yes	
7	<b>Gujarat</b>	Partial	100%, except agriculture consumers
8	<b>Haryana</b>	Partial	All consumers have been metered except flat rate agriculture consumers. No new connection is given to agriculture consumers without meter.
9	<b>Himachal Pradesh</b>	Yes	100%
10	<b>Jammu and Kashmir</b>	Partial	Over 50% metered
11	<b>Jharkhand</b>	No	
12	<b>Karnataka</b>	Partial	Metering done to all installations other than agriculture Pumpsets and few BJ/KJ consumers
13	<b>Kerala</b>	Yes	Completed
14	<b>Madhya Pradesh</b>	Partial	72.76% individual Consumers metered
15	<b>Nagaland</b>	No	
16	<b>Odisha</b>	Yes	Over 98%
17	<b>Punjab</b>	Partial	Metering of all consumers except AP consumers is being done in PSPCL.
18	<b>Rajasthan</b>	Partial	Except agriculture consumers.
19	<b>Sikkim</b>	No	Directions issued
20	<b>Tamil Nadu</b>	Partial	85% except agriculture and hut
21	<b>Tripura</b>	Yes	95%
22	<b>Uttar Pradesh</b>	Partial	Except for rural and agriculture
23	<b>Uttarakhand</b>	Yes	Over 98%
24	<b>West Bengal</b>	Partial	100% except agriculture

Source: CEA

It can be observed from the above table that only few of the states such as Assam, Himachal Pradesh, Kerala, Orissa, Delhi, Goa, Tripura, Uttarakhand have been able to achieve almost 100% metering, However, it must be noted that these states are dominated by domestic consumers with no or small share of agriculture consumers. None of the states have been able to meter 100% of the agricultural consumers in the country.

Besides agriculture consumer's parts of domestic, commercial, street lighting, public water works category etc. are also observed to be unmetered in some of the states

The table provides a snapshot of the state wise un-metered (partially or fully) consumer categories for some of the states.

**Table VI-14: State-wise un-metered consumer categories**

States	Agriculture	Domestic	Non-Domestic	Street Lighting	Public Water Works	Industrial
Andhra Pradesh	✓					
Arunachal Pradesh						
Assam						
Bihar	✓	✓	✓	✓		
Delhi						
Goa						
Gujarat	✓					
Haryana	✓					
Jammu & Kashmir	✓	✓	✓	✓	✓	
Jharkhand	✓	✓	✓	✓		
Karnataka	✓	✓				
Madhya Pradesh						
Maharashtra	✓					
Manipur	✓	✓	✓	✓	✓	
Meghalaya		✓				
Mizoram	✓	✓	✓	✓	✓	✓
Orissa		✓				
Puducherry	✓					
Punjab	✓	✓				
Rajasthan	✓					
Tamil Nadu	✓					
Tripura		✓				
Uttar Pradesh	✓	✓	✓			
Uttarakhand	✓	✓				
West Bengal	✓	✓				

Source: CEA

Legend:

✓- Indicates partial/fully unmetered sales

It can be observed that significant portion of agriculture and rural domestic connections are unmetered and across different states and there is a need to initiate timely metering plan for such connections.

Further, to correctly assess the technical losses in the network energy audit, load flow study and system level studies needs to be carried out.



## 6. Recourse to Consumers: Consumer Protection

**The Electricity Act, 2003 envisages a framework where consumer is an important stakeholder and the frameworks aims at ensuring that the efficiency gains achieved through competition get translated into benefits for consumers.** Apart from the framework of competition, the Act also makes specific provisions seeking to safeguard the interests of Consumers. The intent of the Act in terms of safeguarding consumers' interests gets reiterated right in the preamble of the Act, which reads as follows:

*"An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, **protecting interest of consumers** and supply of electricity to all areas, rationalization of electricity tariff..."*

### **Box VI-1: CONSUMER PROTECTION: KEY PROVISIONS IN THE ELECTRICITY ACT, 2003, National Electricity Policy and National Tariff Policy**

#### **Electricity Act 2003**

Some of the major provisions pertaining to protection of consumer interests in the Act are:

- Section 42 of the Electricity Act, 2003 provides, inter alia, for the establishment of a CGRF for settling the grievances of consumers. It also provides for a channel of appeal in the form of ombudsman for settling non-redressal of grievances at the stage of CGRF
- Section 57 of the Act requires the appropriate Commission to frame regulations on standards of performance which a licensee is required to follow failing which Protection of Consumer Interest Legal Provisions Regarding Consumers' Interest he is liable to pay penalty.
- Section 59 of the Act provides for monitoring all such performance standards through periodic reports to be submitted before the Regulatory Commissions
- Section 61 regarding the factors which are to be kept in view in tariff determination. Sub-section (c) thereof refers to encouragement of competition, efficiency, economical use of resources, good performance and optimum investments.
- Section 64(3) which refers to the procedure for making tariff order after considering all suggestions and objections received from the public.

#### **National Electricity Policy**

Para 5.13 provides for Protection of consumers' interests and quality standards. Key aspects include the following:

- It provides that Appropriate Commission should specify expected standards of performance.
- State Commissions should formulate the guidelines regarding setting up of grievance redressal forum by the licensees as also the regulations regarding the ombudsman and also appoint/designate the ombudsman.
- The Central Government, the State Governments and Electricity Regulatory Commissions should facilitate capacity building of consumer groups and their effective representation before the Regulatory Commissions. This will enhance the efficacy of regulatory process.

**National Tariff Policy**

Para 8.0 provides that the State Commission should determine and notify the standards of performance of licensees with respect to quality, continuity and reliability of service for all consumers

Under the Act, most of the regulatory commissions have brought out regulations pertaining to quality of supply and services. Further, consumer forums and ombudsman have also been created to take care of consumer's grievances.

Despite of the enabling provisions of the Act and various regulations of SERC's public participation in the regulatory process has been limited. There is no systematic method of capturing satisfaction and expectations of the consumers other than the opportunity provided to them through discussion papers/public hearings, in which their participation is again very limited. Bulk of the consumers especially rural and domestic consumers are not even aware of such options. In few states, such surveys have been undertaken on the instructions of commission but there is no definite periodicity. Hence, it becomes important to assess the quality and impact of public participation in the process of electricity sector regulation.

**Box VI-2: Summary of Appellate Tribunal Judgement in Review Petition No. 5 of 2009, In Appeal No. 181 of 2008**

Tribunal in the Review Petition No. 5 of 2009, In Appeal No. 181 of 2008 noted that that two-tier mechanism for grievance redressal has not been made functional in several States. It appears that even after the period of 6 years after the Electricity Act, 2003 came into force, only some of the States have implemented the scheme relating to the establishment of the grievance redressal mechanism under Section 42(5), (6) & (7) of the Electricity Act, 2003 and also in respect of the compliance of the various provisions of the scheme of the Supply code under Sections 50, 57 and 59 of the Act. It is also brought to our notice that in some States, the scheme has either been implemented partially or not at all. Thus, tribunal gave the following directions. All the State Commissions/Joint Commissions are hereby directed to secure and ensure the effective implementation of Sections 42(5) to (7), 50, 57 and 59 of the Electricity Act, 2003 by taking the following actions:

- Constitute, appoint and make functional the Consumer Grievance Redressal Forum (CGRF) for each distribution licensee under the regulatory supervision of the respective State Commission/Joint Commission. In case the CGRF has already been
- Constituted but vacancy has arisen, fill up the vacancy in the CGRF.
- Constitute, appoint and make functional the Ombudsman for the State.
- Specify and publicise guidelines governing the functioning of the CGRF and of the Ombudsman as also the grievance redressal mechanism of the consumers of electricity within the State
- Notify and publicise appropriate standards of performance applicable to distribution licensees functioning under the regulatory supervision of the State Commission/Joint Commission.

In line with the above order of tribunal, all states except Arunachal Pradesh and Nagaland have constituted CGRF. All states except Nagaland have appointed Ombudsman.

**The table below presents the status of CGRF and Ombudsman Mechanism in different States**

**Table VI-15: Status of CGRF and Ombudsman Mechanism in different States**

S. No.	State	No. of CGRF	No. of Grievances received by CGRF during the quarter ending December, 2013	No. of Grievances pending by CGRF during the quarter ending December, 2013	No. of Grievances pending which are older than 2 months	No. of Ombudsman	No. of Grievances received by Ombudsman during the quarter ending December, 2013	No. of Grievances pending by Ombudsman during the quarter ending December, 2013	No. of Grievances pending with Ombudsman which are older than 2 months
1	Andhra Pradesh	5				1			
2	Arunachal Pradesh	Nil	Post not yet appointed by Department of Power, GoAP			1	Nil	Nil	Nil
3	Assam	1	Nil	Nil	Nil	1	Nil	1	1
4	Bihar	3	118	299	201	1	2	20	20
5	Chhattisgarh	4	74	34	6	1	4	3	0
6	Delhi	4	279	411	NA	1	8	9	NA
7	Gujarat	8	408	127	4	1	37	14	1
8	Himachal Pradesh	1	11	9	3	1			
9	Haryana	2	113	85	7	1	14	5	0
10	Jammu & Kashmir								
11	Jharkhand	9	10	36	29	1	2	4	3
12	Joint ERC (Goa and UTs)	7	97	35	4				
13	Joint ERC (Mizoram and Manipur)	1	NA	NA	NA	1	Nil	Nil	Nil
14	Karnataka	5	53	147	116	1	0	6	NA
15	Kerala	6	175	189	49	1	28	89	61

S. No.	State	No. of CGRF	No. of Grievances received by CGRF during the quarter ending December, 2013	No. of Grievances pending by CGRF during the quarter ending December, 2013	No. of Grievances pending which are older than 2 months	No. of Ombudsman	No. of Grievances received by Ombudsman during the quarter ending December, 2013	No. of Grievances pending by Ombudsman during the quarter ending December, 2013	No. of Grievances pending with Ombudsman which are older than 2 months
16	Madhya Pradesh	4	134	34	5	1	2	13	1
17	Maharashtra	14				1			
18	Meghalaya	1	Nil	Nil	Nil	1	Nil	Nil	Nil
19	Nagaland	NA				1	The post of Ombudsman not yet created in Nagaland		
20	Odisha	12	1268	495	91	2	32	24	4
21	Punjab	1	34	18	4	1	10	7	Nil
22	Rajasthan	3				NA			
23	Sikkim	1							
24	Tamil Nadu	42	180	98	3	1	21	30	7
25	Tripura	1				1	Nil	Nil	Nil
26	Uttarakhand	2	83	40	5	1	20	26	0
27	Uttar Pradesh	20	406	532	241	2	78	239	181
28	West Bengal	22				1			

Source: Forum of Regulators

Blank cell implies information is not available

States which are bigger in terms of geographical coverage like Uttar Pradesh, West Bengal, Tamil Nadu, Gujarat, Odisha and Maharashtra have more numbers of CGRF ranging from 8 in Gujarat to 42 in Tamil Nadu.

The number of grievances received, is highest in Odisha followed by Gujarat, Uttar Pradesh and Delhi. This clearly brings out that the states which have more number of CGRS has highest number of grievances received. However, there are few exceptions like Delhi and Tamil Nadu.

Delhi only have four (4) CGRF however, the grievances received is among the highest, which is due to better consumer awareness in the State.

Tamil Nadu, which has highest number of CGRF has only 180 grievance received, hence brings out that the consumer awareness and reachability of far villages to CGRF is low. Similar, to this other states in India, either have inadequate number of CGRF or low consumer awareness.

Realising these inadequacies, the Commission has given instructions to utilities to print information about CGRF and Ombudsman on the consumer bill to generate awareness among consumers about the redressal process. The initiative taken by the Commission is noteworthy; however, it still needs to do much more to create awareness about the regulatory process and ensure effective consumer participation.

The above also reflects that the Office of the Ombudsman is disposing of appeals received judiciously and consumers are largely satisfied with orders. However, the small number of consumers approaching the Ombudsman reflects that a very large number of consumers are still not aware of the presence of this institution. Thus, there is a need to create awareness about the redressal mechanism, especially in rural areas.

In order to ensure the quality and reliability of services by the distribution utilities, Electricity Act 03, Sec 57-59 enables the SERCs to specify standard of performance (SoP) for the utility.

It also states that if a licensee fails to meet the standards specified under Sub-section 57 (1), without prejudice to any penalty which may be imposed or prosecution be initiated, shall be liable to pay such compensation to the person affected as may be determined by the appropriate commission.

The Table below provides the status of compensation provided under SoP.

**Table VI-16: Status of Compensation provided under SOP**

Sr.No.	State	The number of cases in which compensation was made and compensation made
1	Delhi	27 cases of BSES Raj and BYPL 6 CGRF and 1 Omb of NDPL Penalty amount - Rs 27900
2	Gujarat	Compensation paid to the consumers / complainants for not meeting with the SOP is NIL for the Qr.III of 2012-13.
3	Haryana	Owing to timely resolution of the consumer grievances and effective operational performance no such compensation was released by the Nigam.
4	Karnataka	The quarterly returns furnished to the KERC for the period 1.4.2012 to 30.6.2012 is furnished. During the year 2011-12 : No. of Applications - 21729400 Disposed within due dated - 21441639 Disposed with delay - 150263
5	Madhya Pradesh	MPPKVDCL-No compensation paid so far.
6	Sikkim	100% NIL compensation.
7	Tripura	No pending order of Hon'ble Commission in regards to performance level benchmark as well as payment of compensation is laying pending with the corporation.

Sr.No.	State	The number of cases in which compensation was made and compensation made
8	West Bengal	WBSEDCL: Information for 2010-11 is under scrutiny for publication. CESC Ltd.: (Jan. - March'11) Compensation paid in only one case.

Source: CEA

**Standard of Performance (SoP) regulations have been notified by most of the states, however, monitoring of these SOPs is weak and the penalties associated and compensation paid to consumer is observed to be low.**

## 7. Conclusion

**In conclusion the following points can be made:**

- Financial independence provides a reasonable proxy of independence in regulatory decision making except a few SERC. Large no. of SERC's in India are dependent on state govt. funding. In addition the requirements of E Act and NEP have not been completely complied with. Globally the regulators have been functioning independently through their own sources of income.
- Inadequacy in technical staff and vacant positions has led to weak institutional memory and internal capabilities. Globally the regulators are found to be well staffed with strong technical teams supporting the process of regulatory assessments. Improvement in Staffing through a well-structured program that also ensures accountability of the recruited staff is much needed.
- Culture of public disclosures of information has been improving over the years with several SERC's regularly reporting their annual reports including description of initiatives and key decisions. However, this needs to be taken to the next level which involves performance monitoring of SERC's on specific indicators.

Frequency and Adequacy of Tariff revisions historically have been one of the key aspects affecting the utility finances. However, ever since the OP1 Judgement in 2011, this has been improving. OP1 has also led to regular monitoring of compliance of SERC's on certain critical parameters.

Unbundling, implementation of MYT framework, introduction of IT systems like RIMS and 100% metering are key priorities that have proved to improve data regimes across various SERC's. These hence need to percolate to all SERC's so that such benefits can be realised by all.

## VII OPEN ACCESS

### 1. OPEN ACCESS AND ITS RATIONALE

Open Access is a fundamental building block of the competitive market framework ushered through the Electricity Act 2003. Conceptually, Open Access in infrastructure services is characterized by separation of 'carriage' from 'content'. Upon separation, carriage is typically subjected to non-discriminatory Open Access for enabling competition in the content segment. This freedom to content segment (flow of energy in this case) cutting down monopolistic practices, increasing competition and thereby giving users greater opportunity to improve efficiency forms the basis of the very concept of Open Access.

Open Access operates at two levels – at the wholesale market level, where all generators (including existing generators operating through long term contracts) are accorded Open Access that varies by the term of the access and at the retail level, where eligible customers are permitted to source their supply from suppliers of choice through Open Access.

Open Access in India also operates by network hierarchy. At the inter-state level it is regulated by the Central Electricity Regulatory Commission (CERC). State level Open Access is regulated by the respective State Electricity Regulatory Commissions. Further, at a state level, transmission and distribution Open Access is differentiated.

The section below details out various aspects of Open Access in India and explains the rationale behind the policy and legal framework driving Open Access.

### 2. LEGAL AND REGULATORY FRAMEWORK BEHIND OPEN ACCESS

The regulatory framework for the introduction of Open Access in Indian Power sector was structured and set to motion with the enactment of Electricity Act 2003. The Electricity Act 2003 was indeed a remarkable legislation which opened up the power sector to different provisions of competition and power markets. Open Access was central to these developments and enabled limited state-level arrangements to be formalized on a national scale.

**Table VII-1: Provisions of Electricity Act, 2003 in the context of Open Access**

Section	Provisions
9 (2)	Every person, who has constructed a captive generating plant and maintains and operates such plant, shall have the right to Open Access for the purposes of carrying electricity from his captive generating plant to the destination of his use.
38 (2)	It is the responsibility of the Central Transmission Utility to provide non-discriminatory Open Access to its transmission system for use by - (i) any licensee or generating company on payment of the transmission charges; or (ii) any consumer as and when such Open Access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be

Section	Provisions
	<p>specified by the Central Commission.</p> <p>Provided that such surcharge shall be utilised for the purpose of meeting the requirement of current level cross-subsidy:</p> <p>Provided further that such surcharge and cross subsidies shall be progressively reduced and eliminated in the manner as may be specified by the State Commission:</p> <p>Provided also that such surcharge may be levied till such time the cross subsidies are not eliminated:</p> <p>Provided also that the manner of payment and utilisation of the surcharge shall be specified by the State Commission.</p> <p>Provided also that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.</p>
39 (2)	<p>It is the responsibility of the State Transmission Utility to provide non-discriminatory Open Access to its transmission system for use by</p> <p>(i) any licensee or generating company on payment of the transmission charges; or</p> <p>(ii) any consumer as and when such Open Access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission.</p> <p>Provided that such surcharge shall be utilised for the purpose of meeting the requirement of current level cross-subsidy:</p> <p>Provided further that such surcharge and cross subsidies shall be progressively reduced and eliminated in the manner as may be specified by the State Commission:</p> <p>Provided also that such surcharge may be levied till such time the cross subsidies are not eliminated:</p> <p>Provided also that the manner of payment and utilisation of the surcharge shall be specified by the State Commission.</p>



Section	Provisions
	Provided also that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.
42 (2)	<p>The State commission shall introduce Open Access in such phases and subject to such conditions, (including the cross subsidies, and other operational constraints) as may be specified within one year of the appointed date by it and in specifying the extent of Open Access in successive phases.</p> <p>Provided further that such surcharge shall be utilised to meet the requirements of current level of cross subsidy within the area of supply of the distribution licensee:</p>
42 (4)	Where the State Commission permits a consumer or class of consumers to receive supply of electricity from a person other than the distribution licensee of his area of supply, such consumer shall be liable to pay <i>an additional surcharge</i> on the charges of wheeling, as may be specified by the State Commission, to meet the fixed cost of such distribution licensee arising out of his obligation to supply.
49	Where the Appropriate Commission has allowed Open Access to certain consumers under section 42, such consumers notwithstanding the provisions contained in clause (d) of sub-section (1) of section 62, may enter into an agreement with any person for supply or purchase of electricity on such terms and conditions (including tariff) as may be agreed upon by them.

Source: Electricity Act 2003

### 3. STATE LEVEL OPEN ACCESS REGULATIONS

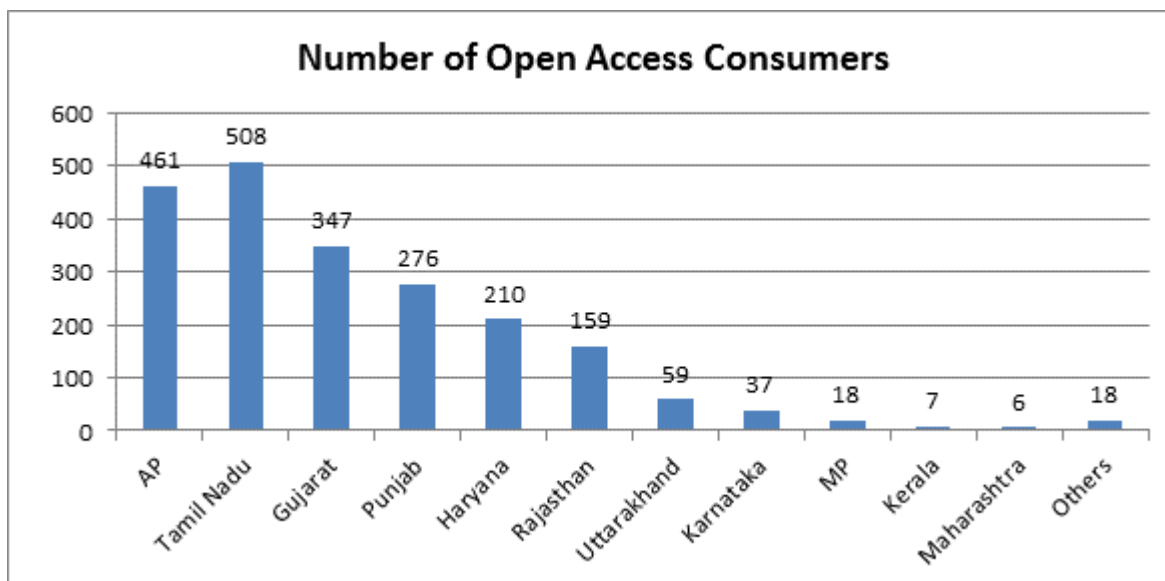
Consequent to the formulation of the Inter-state Open Access Regulations, the National Electricity Policy, 2005 and the Tariff Policy, 2006, in year 2010, the Forum of Regulators formulated a model Open Access regulation for SERCs to adopt in the respective states. In many cases these regulations have however varied from the model regulations of the Forum of Regulators and the provisions of the policies. The status of the regulations for various states is provided below: -

**Table VII-2: State-wise Open Access Regulations**

S.NO.	SERC	STATE	Notification of Open Access Regulations	Determination of Surcharge	Determination of Wheeling Charges
1	APERC	A.P	Yes	Yes	Yes
2	AERC	Assam	Yes	Yes	Yes
3	BERC	Bihar	Yes	Yes	Yes
4	CSERC	Chhattisgarh	Yes	Yes	Yes
5	DERC	Delhi	Yes	Yes	Yes
6	GERC	Gujarat	Yes	Yes	Yes
7	HERC	Haryana	Yes	Yes	Yes
8	HPERC	Himachal	Yes	Yes	Yes
9	J&KSERC	J&K	Yes	Yes	No
10	JSERC	Jharkhand	Yes	Yes	Yes
11	KERC	Karnataka	Yes	Yes	Yes
12	KSERC	Kerala	Yes	Yes	Yes
13	MPERC	M.P	Yes	Yes	Yes
14	MERC	M.H	Yes	Yes	Yes
15	MsERC	Meghalaya	Yes	No	No
16	OERC	Orissa	Yes	Yes	Yes
17	PSERC	Punjab	Yes	Yes	Yes
18	RERC	Rajasthan	Yes	Yes	Yes
19	TNERC	T.N	Yes	Yes	Yes
20	TERC	Tripura	Yes	No	No
21	UPERC	U.P	Yes	Yes	Yes
22	UERC	Uttrakhand	Yes	Yes	Case to Case Basis
23	WBERC	W.B	Yes	Yes	Yes
24	JERC-M&M	Mizoram, Manipur	Yes	No	No
<b>TOTAL ISSUED</b>			<b>25</b>	<b>22</b>	<b>18</b>

Source: Tariff Orders and Open Access Regulations of respective states.

The open access regulations in India have been notified by 25 states and cross subsidy out of these have been determined by 22 states. The figure below presents the number of open access consumers in major states.

**Figure VII-1: State-wise number of OA consumers**

Source: IEX

The practical impediments in implementation of open access have been discussed in the subsequent section.

#### 4. IMPEDIMENTS TO OPEN ACCESS

Open Access is the backbone of competition and supporting pillar for all the key objectives envisaged in the Electricity Act 2003. However, the State Regulatory Commissions are not following the relevant provisions of the Act, Guidelines issued by GoI in a manner consistent with the intent of the Act and the national policies. There are many impediments in the path of successful implementation of Open Access and the Discom continues to be a single point supplier handling both the carriage (wires) and content (energy). This section discusses key challenges to Open Access.

Some of the Operational and Regulatory challenges/barriers to Open Access are given below.

- **Insecurity with respect to dispatch**

Most of the present day short term consumers of Open Access face high level of uncertainty in terms of scheduling of power due to limited availability of transmission network, as the long term and medium term contracts have greater priority. Besides this, any deviation from the scheduled drawal or injection will have financial implications on the Open Access consumers, in terms of Unscheduled Interchange charges. In most of the contracts (excluding sale to State Utility) non-availability of open access is not considered as force majeure and penalties are payable. In case of contracts executed on the Medium term, non-availability of open access is also not considered as force majeure, the seller has to pay huge penalty to the off taker.

- **Irrational Open Access charges**

There exists irrationality with respect to Open Access charges. States like West Bengal, Punjab, Maharashtra, Tamil Nadu etc. have cross subsidy surcharges that are too high. The Tariff policy 2006 has provided a formula for the determination of cross subsidy surcharge, however in states like West Bengal and Punjab the state commissions have either altered with the formula or put additional conditions for the computation of cross

subsidy surcharge. Besides that there is no predictability about the level of future Open Access charges making consumers reluctant to avail this service. **The Act calls for gradual reduction of cross subsidy surcharge, but no such reduction trajectory is found in any of the states.**

**Table VII-3: Cross-Subsidy Surcharge in major states**

States	CSS (Rs./kWh)
Punjab	1.07
Haryana	0.53
Rajasthan	0.13
Uttarakhand	0.4
A.P	0
Kerala	0.52
Tamil Nadu	0
Karnataka	0.64
Maharashtra	2.3 (Express)
Madhya Pradesh	0.81
Chattisgarh	1.14
Gujarat	0.45

Source: IEX

- **Absence of dedicated feeders**

In majority of states, Open Access can be assured only in case of separate feeder lines. However, most of the present day network is meshed in nature along with embedded consumers (non-Open Access consumers). In the event of load shedding by distribution licensee for a feeder where both Open Access consumers and embedded consumers (non-Open Access consumers) are connected, Open Access rendered becomes infructuous.

- **Resistance of licensee**

The distribution licensee normally hesitates to implement the Open Access for fear of losing high paying industrial consumers who cross subsidise the agriculture and domestic consumers. The other reason cited by the distribution companies is that their demand and supply projections would go haywire if industrial consumers who constitute almost 30% of the consumption migrate, it will lead to chaos both in terms of demand projections and way to handle the long term capacity contracted to meet their need.

- **Biased role of SLDC**

Most of the States do not have Independent SLDC (State Load Dispatch Centre); they operate as a department under State Transmission Company (STU). Conflict of interest may arise between State Discom and SLDC or between SLDC and the Open Access consumer. SLDC usually act as a barrier to Open Access sitting on applications, denying generators the right to sell power to a third party as on date.

- **Regulatory gaps**

The Open Access regulations have significant gaps and lacks clarity thus creating doubts. Some of them are:

- The current regulations are silent about billing and monitoring of any Open Access transaction at the state level.
- There is no mechanism specified in the regulations for undertaking and monitoring the day ahead scheduling, real time dispatch, carrying of weekly MRI (Meter Reading Instrument), preparation of UI (Unscheduled Interchanges) account and monthly account etc.
- There is no formula mentioned in the regulations regarding calculation of additional surcharge.
- The regulations do not specify any mechanism for computation of stand by charges

Further certain States like Tamil Nadu and Karnataka have invoked Section 11<sup>27</sup> thereby restricting export of power outside the State. As SLDC is operated by the State Utility, the Open Access consumers located outside the State gets affected.

## 5. RECENT POLICY THRUST IN GRANT OF OPEN ACCESS

GoI has hence set up a group that is working on ways to implement the plan which will require a separation of the distribution ('carriage') and the retail supply ('content') businesses, with separate licenses for each, the implementation of the plan would require changes in the Electricity Act of 2003. The Electricity Act of 2003 in the present format allows open access which means providing access to use the wire by paying a transmission or wheeling charge to the owner of the network. Network business being a natural monopoly, the regulator must ensure that there is non-discriminatory open access, that is, if the network has capacity, the utility cannot decline the use of it by anyone, all this is available in the existing Act. The plan being considered now is different because it allows retail competition wherein the consumers will be able to choose their supplier from the multiple retail supply licenses that would be available for each area including the incumbent supplier. Retail competition also means a new entrant can poach from the original licensee.

India has been placing fundamental reliance on Open Access as a means for power sector development, creation of capacity, operation of the power markets and provision of service to consumers. With the policy makers putting increasing thrust on distribution sector reforms and the Ministry of Power advocating for separation of power supply business and network ownership, Open Access Consumers takes the centre stage.

Based on this review, the key learning are listed below.

### a. Legal Provisions Separating Carriage from Content

The distinction between carriage and content in the electricity supply business is very important and law needs to differentiate and recognize such separation. Such separation can have significant impact on the behavioural pattern of the licensee, Open Access customers as well as the sector in general.

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<sup>27</sup> Electricity Act 2003, **Section 11-** "The Appropriate Government may specify that a generating company shall, in extraordinary circumstances operate and maintain any generating station in accordance with the directions of that Government". For the purposes of this section, the expression "extraordinary circumstances" means circumstances arising out of threat to security of the State, public order or a natural calamity or such other circumstances arising in the public interest.

## **b. Implementation of Obligation to Connect**

Section 43, Electricity Act 2003 reads “licensee, shall, on an application by the owner or occupier of any premises, give supply of electricity to such premises, within one month after receipt of the application requiring such supply”. Further it states “It shall be the duty of every distribution licensee to provide, if required, electric plant or electric line for giving electric supply to the premises”.

Thus a licensee is bound to provide adequate infrastructural facilities. This does not discriminate between a consumer who has availed power through Open Access and a Discom’s own consumer. But the practical difficulties in many States are that the consumers have been denied Open Access on grounds of inadequate infrastructure and applications are delayed. This is a violation of the law and against the spirit of the Act. The policy makers must ensure that violation of any law in this regard is dealt with firmly.

## **c. Standardization of Regulations Across Various States within the Country**

India has 28 States (now 29), as power is concurrent subject each State Regulator issues its own set of Regulations. Because of this it is a tremendous challenge for an Open Access consumer to find the most optimal source to procure power. This has been the major issue in the subject. Gaps and lack of clarity in some of the sections of Open Access regulations has made it extremely difficult to implement the concept on the ground.

*In an era of Open Access the terms, nomenclature, drafting of the documents, definitions should be standardised. The Regulations should be clear and uploaded on the Regulators website. All the charges and terms and conditions (latest) that are applicable for a transaction should be available on the State Regulators website. The regulations should clearly specify guidelines regarding billing, monitoring, standby charges and most important the calculation of various charges applicable to an Open Access consumer. For further clarity an illustration to listing out the charges applicable should also be provided.*

## **d. Universal Service Obligation of the Discoms**

The issue was under deliberation for the last few months and involved highest level of decision makers in the country. Ministry of Power has taken a stand that in case the Open Access consumer procures power from other than the local discom then it is logical that DISCOMS do not have an obligation to compulsorily supply power to such consumers. And if the consumer intends to use the network of DISCOMS, he has to give notice upon which the DISCOM is duty bound to provide non-discriminatory open access on its network.

In a power deficit country with poor transmission network there is a need for redundancy in the supply of power. But only a few States have standby supply options most of the other States charge the highest rates (almost double the HT Charge rate) making it one of the biggest obstacles to avail Open Access. The regulators should ensure that the guidelines and orders issued by them are not too stringent and biased towards one party. For Open Access to be implemented in sound manner it is important that interest of both the Discoms and the consumers is taken care of. An Open Access consumer should get assured standby supply of power from the discom and proper measures and mechanism should be adopted to ensure that the commercial interest of the discom is not put at stake.

### **e. Provisions Related to Supply from (Independent and Non-Independent) Network**

It has been observed that most of the Open Access consumers draw power from a meshed network. If the licensee imposes load shedding, the Open Access consumer is also affected. This poses a serious risk to an Open Access consumer as contractually the consumer would have to pay penalty to the generator for not drawing power. The FOR Regulations on Open Access allow for scheduling on both dedicated as well as common feeder but the conditions imposed are restrictive in nature.

### **f. Independence of System Operators**

Independence of system operators has a key influence on the operationalisation of Open Access. State Load Dispatch Centres (SLDC's) which operate the entire system within a State, have been found acting as a barrier to Open Access, sitting on applications, denying generators the right to sell power to a third party. This is because most of the States do not have an independent system operator. These SLDC's operate as a department under State Transmission Company (STU) resulting in conflict of interest between the State Discom and the SLDC. Thus it is very crucial to have an independent system operator who is unbiased and is responsible for scheduling, dispatch, monitoring and accounting of various transactions.

Open Access, if implemented in right spirit is likely to bring positive results. But the manner in which the implementation is progressing in the midst of issues and bottlenecks, Open Access is not going to be an easy feat to achieve and would need effective policies and transparent execution.

On an incremental basis the commercial risks of a Discom buying electricity from the power markets and the cost of electricity paid by the Open Access customer is no different. The conventional wisdom is that the migration of large customers would impoverish the utilities. This is at best a partial truth. Incrementally, it often costs more to serve the industrial customers than not to serve them<sup>28</sup>. Hence, an orderly migration of such customers is not inimical to utility interest, which can have a net benefit from reasonable cross-subsidy charges and also recover the network costs through reasonable wheeling charges. This is however very poorly understood. It is noteworthy that holding on to higher value consumers has not allowed Discoms to become financially healthy.

At an overall level, Open Access is going to be an important part of power sector development in India. Recent developments on the subject have created interest among the shareholders and policy makers. Though the atmosphere of uncertainty and confusion will take time to fade away, Open Access provides a significant opportunity for new capacity development and an efficient way to serve consumer needs.

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<sup>28</sup> Assuming a power purchase cost of Rs. 5.00 at generation bus bar (which is normal for imported coal or non-pithead domestic coal projects) the average cost to serve HT consumer is in the range of Rs. 7.3 per kWh after considering normative transmission costs and losses and the HT distribution costs and losses. Hence, if the average HT industrial tariff is less than Rs. 7.3 per kWh, as is often the case, serving such consumers can be a losing proposition for the utility, on the margin.

## VIII REVIEW OF APPROCHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION

An efficient management of power supply to the agriculture consumers constitute an integral part of any programme of the power sector. However, most of the states still have not achieved 100% metering for agricultural consumers, hence determination of unmetered agricultural consumers becomes critical.

Hence, this section compares the methodology adopted by various State ERCs with major agricultural consumer base to estimate the sales to agriculture segment.

### 1. Andhra Pradesh

In 2011-12, agricultural sales in Andhra Pradesh contributed ~ 28% of the overall sales mix in the state. The total agriculture connections in FY 2012-13 accounted for 29.90 lakh. As per the GoAP policy, agricultural sector is provided seven hours of electricity supply.

The state distribution utilities in Andhra Pradesh has been estimating unmetered agriculture consumption based on information available from meters fixed on LV side of Distribution Transformers primarily catering to the agricultural pump sets for working out a consumption norm. This consumption norm is further utilized for a more realistic estimation of unmetered agricultural consumption. The specific consumption per HP/month is arrived and is made applicable to all un-metered services by multiplying specific consumption and connected load in HP to arrive at total agriculture consumption.

However, there is lot of difference between the approved and actual sales, same has been provided below:-

**Table Table VIII-1: Comparison of Agricultural Sales Approved against Actual**

	2013-14	2012-13	2011-12	2010-11
Approved Sales by SERC – in MUs	19305	19305	17569	16262
Filled Sales by Utilities – in MUs	23743	22458	20840	19722
Actual Sales – in MUs	-	22013	20191	17126

Source: AF Mercados Analysis based on the data from Tariff orders and PFC

Hence, this clearly brings out that there is no alternative to 100% metering as observed from the table that the agricultural sales approved are less than the actual sales.

The commission has approved a new ISI methodology to estimate the agricultural sales; however, implementation of the methodology requires updating of agricultural DTR data which currently is not updated, given the expansion of High Voltage systems for agricultural consumers. Hence, the utilities have continued to follow the old approach of estimating agricultural sales.

### 2. Gujarat

In 2011-12, agriculture sales contributed ~25% of the overall consumer sales mix in the state, with ~57% of the agriculture consumers or ~81% of the agriculture sales unmetered. The methodology adopted by the state commission for demand estimation is as follows:

- The energy consumed by the unmetered agriculture consumers is assessed based on 1700 units/HP/Annum.



- Minimum 8 hours of supply is provided to the agriculture consumers, with excess hours of supply being provided during cropping season. Further, in a critical case when the power supply is reduced to 5 hours, the shortage of supply is compensated during subsequent period when power position improved.
- Historical, weighted average consumption of metered consumers is considered to assess the consumption for the existing and new metered consumer connections being added.

The table below provides a snapshot weighted average consumption norms for metered agriculture consumers, as approved by the state commission for different utility.

**Table VIII-2: Agricultural Consumption Norms in Distribution Utilities of Gujarat**

DISCOM	Control Period	Weighted Average Consumption Norm
UGVCL	FY 2011-12 to FY 2015-16	970 kWh/HP/annum
MGVCL	FY 2011-12 to FY 2015-16	1011 kWh/HP/annum
DGVCL	FY 2011-12 to FY 2015-16	524 kWh/HP/annum
PGVCL	FY 2011-12 to FY 2015-16	529 kWh/HP/annum

Source: Approved Multi Year Tariff Order, FY 2012-16

Further, initiatives like the Jyotigram Yojna, aimed at segregation of sale to agriculture users from other users in rural areas, have resulted in provision of reliable power to the agriculture consumers.

### 3. Haryana

In 2011-12, agricultural sales in Haryana contributed to ~31% of total sales. As per the approved tariff order for 2013-14, unmetered agricultural sales approved by Commission are 44% of total agricultural sales.

The Commission in Haryana estimated consumption of Agricultural Pump (AP) consumers on the basis of the actual consumptions recorded by the energy meters installed on 11 KV segregated AP feeders at the grid substations and a small percentage of consumption of AP consumers connected on feeders other than the segregated AP feeders. The Commission has retained the same methodology for projecting AP Sales from past five years.

The tariff applicable for agriculture pump (AP) supply consumers in Haryana is currently under two categories i.e. AP metered consumers billed on energy consumption basis and AP un – metered consumers who are currently paying a flat rate per BHP per month. As per CoS estimates of the Commission the AP consumers are paying just about 6% of the CoS. However, as per the Commission order that the entire revenue gap in the AP consumer category is bridged by way of AP Subsidy from the State Government and no consumer category is cross – subsidizing the AP consumers.

### 4. Karnataka

In 2011-12, agriculture sales contributed ~37% of the overall consumer sales mix in the state, with more ~ 76% of the agriculture connections in the state unmetered. The methodology adopted by the state commission for demand estimation is as follows:

- The unmetered irrigation pump (IP) sets are charged based on the consumption norms, derived by the actual consumption per IP set as indicated in the monthly reports furnished by state distribution utilities up to December of the financial year.
- The consumption has been projected for 6 hours, three phase supply to the irrigation pump sets

The table below provides a snapshot weighted average consumption norms for metered agriculture consumers, as approved by the state commission for different utility.

**Table VIII-3: Agricultural Consumption Norms in Distribution Utilities of Karnataka**

DISCOM	Weighted Average Consumption Norm
BESCOM	7534 units/installation/year
CESC	8613 units/installation/year
GESCOM	9708 units/installation/year
HESCOM	8210 units/installation/year
MESCOM	3916 units/installation/year

*Source: Approved Tariff Order 2012-13 for the respective DISCOMs*

Further, initiatives undertaken by the state commission to implement a robust Demand Side Management, has mandated bifurcation of agricultural loads from 11KV feeders and adoption of HVDS for agriculture loads, in order to implement efficient rationing of power to agriculture consumers.

### 5. Madhya Pradesh

In 2011-12, agricultural sales in Madhya Pradesh accounted for 33% of total sales. The approach followed for determination of agriculture sales is the Compound Annual Growth Rates (CAGRs) CAGR (for small, medium and long term) approach along with correction factor to account for any State/ Central Govt schemes, pending connections.

The analysis of the data, appropriate/reasonable growth rates are assumed for future consumer/ sale forecasts from the past CAGRs of the Category/Sub-category. The forecast also considers the impact of schemes/ plans of licensees such as RGGVY as stated above.

The Commission has emphasized the importance of energy accounting and meterisation and hence, Discoms are directed to prepare and implement appropriate loss reduction strategies and schemes. Meterisation at various levels of the distribution network such as feeder/ DTR metering and consumer metering is of prime importance. The Commission, has however, noted with deep concern that not much headway has been made in this direction by the distribution licensees during the past years. While there appears to be some progress with regard to feeder meterisation, meterisation of agricultural DTRs and individual un-metered domestic connections remains neglected.

Hence, only 14% of Agriculture DTR has been metered as per the tariff order of FY 2013-14.

### 6. Maharashtra

In Maharashtra, MERC has been approving agricultural consumption based on the recorded consumption of sample metered consumers after filtering for abnormal records, viz., zero connected load, average billing, negative consumption, high connected load, etc., for all the zones. Further, the data was analyzed to work out a zone-wise consumption norm in hrs/hp/annum which was subsequently utilized for projecting zone wise metered and unmetered agricultural consumption. The exercise of sample study was undertaken by the utility as per the direction of MERC.

## 7. Punjab

In 2011-12, agriculture sales contributed ~29% of the overall consumer sales mix in the state. The energy sales to agriculture pumps are fully unmetered, and consumption based on demand estimates. The methodology adopted by the state commission for demand estimation is as follows:

- The consumption (in BHP) of agriculture pumps is calculated through installation of about 10% sample meters and recording of energy pumped through AMR meters installed at various substations. The impact of level of rainfall in the monsoon season is also factored to calculate the consumption norm
- The consumption is projected for six or eight hours of power supply to the agriculture pump sets

The state distribution utility has stated difficulty in complete installation of meters to the tube-well consumers and recording the consumption of all agriculture pump consumers due to financial aspect, staff shortage aspect and other administrative reasons.

Further, for approval of agriculture sales, the commission allows a 5% growth over the demand submitted in the review order by the state utility.

## 8. Rajasthan

In Rajasthan, Commission normally considers Compounded Annual Growth Rate (CAGR) of 3 or 5 previous years, as the case may be, in assessing energy requirement in a year. However, in case of Agriculture, connected load and specific consumption have been used for calculating sales as adopted in tariff order of FY 2012-13. This methodology is more appropriate rather than using CAGR of sales, as agricultural consumption varies considerably on year to year basis due to erratic nature of rainfall in the State. In addition, supply hours for agriculture in the past have varied considerably due to various reasons, which also lead to significant changes in consumption of power in agriculture. This methodology has been used in the order for estimating the energy sales of Agriculture consumers (both metered and flat rate).

The Commission, however, has approved the sales for FY 2013-14 using the following assumptions.

1. For metered category, the no. of consumers, specific consumption (kWh/KW/Year) and connected load (KW) for all Discoms have been taken as per tariff petitions after the reduction of no. of consumers and connected load of Farm Houses.
2. The Commission has considered that new and converted consumers on the average could be taken to be in the metered category for 6 months. Accordingly, connected load and specific consumption as applicable for metered category have been considered for 6 months in case of new consumers and those converted from flat rate for working out their sales.

## 9. Tamil Nadu

The agricultural consumption is calculated every month based on the sample meter reading furnished by the field in the absence of 100 % metering. The sample meters to a value of 5 % are provided/ available in each area/circle in which readings are taken every month by the field staff. As sample meter readings are available in each area/circle wise on monthly basis, the area wise geographical condition and seasonal condition are taken care for arriving at computed consumption.

This calculated agricultural consumption in each area/circles are combined /added to arrive at the total agricultural consumption in the State. Since 5 % sample meters are available in

each and every area/circle and the readings are taken in all the sample meters every month by the field staff, the computed consumption of the total agricultural consumption in the State based on sample meter readings is a reasonable and scientific agricultural consumption data.

However Anna University has already been appointed for suggesting a suitable scientific methodology for arriving at the agricultural consumption in Tamil Nadu in the absence of 100 % metering.

**Hence, based on the review of the approaches followed by the different states following are the major approaches under which the states can be classified.**

**Table VIII-4: Different Agricultural Consumption Estimation Approaches**

<b>Agricultural Sales Estimation Approaches</b>				
Estimation Based on information available from meters fixed on LV side of distribution transformers	Based on the sample meter readings of each area/circle	Based on Load Factor and information available from meters at feeder level	Based on the past CAGRs which are adjusted based on the future outlook	Based on normative level of consumption
<b>Andhra Pradesh</b>	<b>Tamil Nadu Maharashtra</b>	<b>Haryana, Punjab</b>	<b>Madhya Pradesh &amp; Rajasthan</b>	<b>Karnataka Gujarat</b>

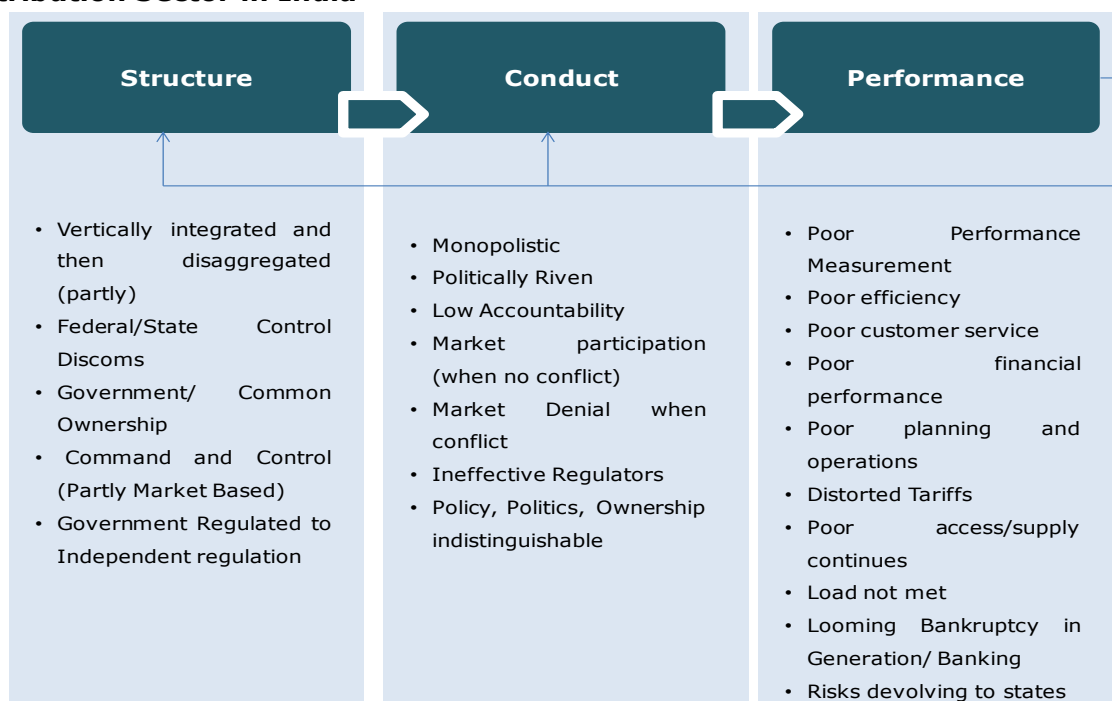
**Some of the SERC's have been proactive like Gujarat, Tamil Nadu and Andhra Pradesh, and have initiated / carried out the research studies to determine the methodology for estimation of agricultural sales in absence of metering. Although it is acknowledged by SERCs that there is no alternative to 100%, the current status of agricultural metering is still dismal in the country.**

## IX REVIEW OF GOOD PRACTICES IN POWER DISTRIBUTION WITHIN THE COUNTRY

Review of good practices undertaken as part of this study is based on the Structure-Conduct-Performance framework, commonly used in industrial economics, offering a causal explanation to performance of the system under analysis. The framework is based on the premise that structure of the market determines the conduct of its participants and this conduct drives market performance.

The figure below maps the overall electricity sector (focussing on power distribution), its conduct and performance of the players. The key attributes under the SCP Framework are provided below based on which observations have been drawn.

**Figure IX-1: Structure Conduction Performance Framework applied on Electricity Distribution Sector in India**



The key points that emerge from the above are as follows:

- Ownership plays a key role in determining utility behaviour.** In India, discoms are largely state owned that provides limited incentives for the utilities to meet their obligations. As a result, these are inefficient and often unresponsive to quality and service obligations. A number of policies since the reforms have been initiated have talked about introduction of private participation in the sector however these remain unimplemented. *As per revised Mega Power Policy, to avail the benefits under policy, a pre-condition for the beneficiary States should have constituted their Regulatory Commissions with full powers to fix tariffs as envisaged in the Central Act. They would also have to privatise distribution in the cities having a population of more than one million.* Clause 5.4.4 of the National Electricity Policy *also provided for need to encourage Private sector participation in distribution for achieving the requisite reduction in transmission and distribution losses and improving the quality of service to the consumers.* Even as part of the FRP of GoI, states have to submit the Road-Map for

private participation in distribution. As stated above, private participation needs to be ushered in to bring about rapid efficiency improvement.

Level of efficiency and the pace at which such efficiency can be achieved under state ownership has reached a plateau in the recent past. Private sector involvement has resulted in benefits wherever these have been introduced. e.g. Delhi, Mumbai, Noida, Ahmedabad, Surat, Kolkata, Saraikela. Generation and Transmission segments are other examples that have been opened much more widely.

Thus, initiatives aimed at introduction of private participation need to be backed with strong implementation wherewithal to ensure execution in a timely manner. Examples of economies transitioning to private participation in distribution include US, Turkey, UK, Australia etc. Many of these countries have taken this up in a structured manner by segregating wires and retail business (discussed later).

- **Distribution Franchisee model was introduced with reasonable success, however adoption by other states has been slow and derided with problems-** The Franchisee model has achieved some success wherein the franchisees have been able to reduce the losses for the distribution utility. This includes Bhiwandi region in MSEDCL (Maharashtra) area of operation wherein the franchisee reduced the AT&C losses to 19% from 58%. Similarly, in Agra region in DVVNL (Uttar Pradesh) area of operation wherein the franchisee reduced the T&D losses to 46% in 2011 as compared to 67% in 2010. Despite of the successes, many franchisee initiatives have either been cancelled or deferred after initial interest due to host of challenges related to state employee's resistance, disagreement over contractual terms, inaccurate base line data of T&D losses, collection efficiency, asset details and customer database etc.
- **Unbundling has only been partially implemented** - Power sector in India was characterised by vertically integrated utilities with generation, transmission and distribution functions being served by a single entity. Gradually, competition was introduced, wherein these vertically integrated utility were segregated based on the functional lines i.e. generation, transmission and distribution. However, distribution and retail supply are still bundled and no distinction is being made between carriage and content. Experience of several countries worldwide indicates that competition and efficiencies at the retail levels can be best achieved through separation of carriage and content. In such cases, multiple suppliers are allowed to supply through a common network. Implementation of this requires changes in the law, which have been in discussion since long, however this has been pending since long. Successful examples of this include US, UK, Australia etc.
- **Policy, Politics and Ownership have been indistinguishable-** Electricity has been an important part of the politics of the country and despite of the reforms undertaken over the decade, policy, politics and ownership have remained indistinguishable. Most of the states have not been able to achieve 100% metering as envisaged in the E Act 2003. Agricultural tariffs and metering have remained low across all major agricultural states. Subsidy levels have increased over the years and in certain cases subsidy received by the utilities have been less than the subsidy booked by the Discoms clearly in violation of the provisions of the Act.
- **Monopolistic nature of the utilities results in limited accountability especially on obligation to serve-** Due to the monopolistic nature of the utilities (largely a resultant of market structure and ownership), accountability of the utilities to the

consumers has been low. The service levels by the utilities have been poor. There exists large no. of households which are still to be electrified. Non-obligation on the part of utilities to serve load have led to creation of stranded capacity and have put the entire generation sector at the risk of bankruptcy. This has also impacted the effective functioning of the market wherein the players are increasingly unwilling to take market risk and intends to move towards long term contracts. In case of Brazil, to promote investments into the sector, distribution companies were required to contract for 100% of their forecast demand over a five year time period through auctions as a necessary requirement (with built in incentive penalty mechanism for under and over contracting). If after a 12-month period the distribution company is short of electricity, it will have to buy energy through short-term contracts at spot market prices. However, these prices may not be passed through to final consumers above the limit of 103% of the tariff. As a result, when a distribution company is over contracted, difference settlement will produce revenue gains or losses. Allocation of these gain and losses must obey the following rules: (a) over contracting up to 3% of the market, gain will be appropriated by the utility and losses will be passed through to consumers next year; (b) over contracting above 3% of the market: gains and losses are absorbed by the distribution company.<sup>29</sup>

- **Interference in Market functioning** - Government interference in the market has also impacted effective functioning and reliability of the market players and performance. At various points of time interventions by the state government has impacted the market. This includes cases wherein Section 11<sup>30</sup> of the Electricity Act has been invoked by the State Governments. States like Tamil Nadu and Karnataka have invoked Section 11 thereby restricting export of power outside the State. As SLDC is operated by the State Utility, the Open Access consumers located outside the State gets affected. Further, states such as Gujarat has recently banned state industry from sourcing electricity from other states, which has compelled the industry to buy costlier power from government-run utilities instead of purchasing power from other states through trade on electricity exchanges. Efficient market functioning not only improves performance but also provides signals that lead to long-term generation planning and load forecasting.
- **Command and Control mechanism of regulation needs to be fully replaced with incentive regulation** -Traditionally, most common type of control mechanism used has been the "Command and Control Method". There has been documented evidence in international literature that regulation through this method can produce unintended effects or even reverse effects through functional disruption of the system being regulated. There have also been evidences of Indian utilities where in targets set under such a regulatory regime have not been met by the utilities (primarily public) at large.

<sup>29</sup> <https://www.essex.ac.uk/ebs/research/BAAALDEE/paper%204.doc>. Privatisation and Electricity Sector Reforms in Brazil: Accounting Perspective, Cláudio de Araújo Wanderley, University of Sheffield, UK And John Cullen, University of Sheffield, UK, And, Mathew Tsamenyi, University of Birmingham, UK

<sup>30</sup> Electricity Act 2003, **Section 11-** "The Appropriate Government may specify that a generating company shall, in extraordinary circumstances operate and maintain any generating station in accordance with the directions of that Government". For the purposes of this section, the expression "extraordinary circumstances" means circumstances arising out of threat to security of the State, public order or a natural calamity or such other circumstances arising in the public interest.

In order to ensure that the desired norms are met there is need to combine this with a robust and clear incentive and disincentive framework both at the utility level and also at the employee level in the utility. Benefits of introducing MYT regulations have slowly started to come in terms of improved data regimes and better performance, however these need to be translated to operational level in the utilities for improving the performance. Examples of successful implementation of incentive regulation include UK, US etc.

- **Independent Regulation is still work in progress** - Electricity Act provided for creation of independent regulatory institutions with pricing functions being provided to the regulatory institutions to ensure competition, efficiency and financial discipline in the sector. Creation of regulatory institutions has led to increased participation of the consumers in the regulatory decision making process thereby increasing overall transparency in the sector. However, tariff revisions have been inadequate and infrequent. Only after the intervention of APTEL through its judgement in OP1 of 2011 order, various states have revised tariffs and have complied with the directions of the order. Hence, true independence of the state regulators is still to be achieved as envisaged in the Act. This is unlike the practices in many other countries including USA, UK, and Australia where regulators have much better enforcement powers and are much more autonomous. Weak enforcement has also affected Discom performance.
- **Poor Performance Measurement and Customer services:** The distribution utilities are characterised with AT&C high losses primarily due to theft, pilferage and technical losses in the network. Due to lack of metering at the consumer level, DT and feeder level, accurate estimation of losses becomes difficult. Also, it is observed that no scientific study is generally being carried out to realistically assess the level of losses and the break-up of this in terms of technical and non-technical components. Further, Standards of Performance (SOP) which provides power to consumers and penalise utility for poor performance become weak due to the lack of proper measurement of the defined parameters. Reliability of power, customer services and accountability to consumers has been poor across utilities. It is important to deploy adequate measurement tools and systems for proper energy accounting and management and also to provide adequate customer services. In this regard adoption of IT and Smart Grid initiatives assumes significant importance. Some of the practices in this regard are highlighted below
  - **Data Measurement and Management:** The growth of IT enabled enterprise systems within utilities has led to an increase in data collection, transportation, storage and analysis. It is important that the data generated and collected by these systems is managed efficiently; provide adequate access to real time (or near real time) data and security of data is ensured. Data processing cycle includes generation of data through sensors, meters etc. before being transported for storage and processing by various applications which is then transformed into actionable operations for analytics and visualization. Finally it is integrated with enterprise data for driving strategic decisions. Data analytics hence assumes immense importance. Eg: The reliability problems in the Indian Power Systems were exposed by the grid failure in 2012 and introduction of WAMS will help to provide insight into grid stability allowing system operators to take preventative action. It will support advanced automatic corrective measures like adaptive islanding, blocking or deblocking of distance relay zones under power swings etc.



- **Adoption of new technologies** for instance Feeder automation and auto reclosers enables automation of utility operations. Feeder Automation improves the information capability of the utility in terms of digital fault records, power quality monitoring, sequence of events and events data etc. Similarly, Substation with Auto reclosers have several advantages over conventional substation such as 30% space saving, low maintenance costs, no separate battery bank, circuit breakers which trips and close automatically on temporary faults etc. Feeder automation system was successfully implemented in Puttur division's urban and rural feeder under MESCOM (Mangalore Electricity Supply Company Limited). Feeder Automation led to reduction in T&D losses by 16.8% and 9.5% in urban and rural feeder respectively. In terms of revenue improvement, 4.5% and 3% improvement was observed in urban and rural feeders respectively. Several similar initiatives are being taken up to bring about smart management practises.
- **Overall IT enablement:** In order to improve overall performance and also to automate various functions across the utility, Andhra Pradesh discoms have adopted various IT initiatives mentioned below. Some of these have been implemented as part of R-APDRP program as well.
  - CAT (Consumers Analysis Tool) – software to integrate Billing and Collection Data from Private Accounting Agencies (PAA) and consumers – Reveals exception, followed up by field officers. Generates reports in meter irregularities, collection irregularities and First Information Reports of theft cases
  - Consumer Billing Software – to ensure the PAA are on common platform – generates un-inform data for superior quality maintenance
  - Transformer Information Management system (TISM) – manages transformer information and tracks transformer life-cycle Assists Vendor analysis on transformer performance
  - Customer Service Centres, Call Centres Computerised Collection Centre, Spot Billing and E-Seva
  - Automatic Metering (AMR) on Distribution Transformers and feeders, GIS and Consumer Indexing, Establishing of data centers etc.
- **Advanced Metering Infrastructure (AMI) Deployment-** Ministry of Power (MoP) has initiated implementation of the 14 Smart Grid Pilot projects across various distribution utilities in India. Smart grids have matured to a level that can now provide strong decision support system to utilities for improving their performance. In this regard, AMI installations have been a key functionality selected under the pilot projects. Even if the results of these pilots have not been out, the need and usefulness is well established.
- **Outage Management System (OMS)** has been implemented by Tata Power Delhi Distribution Limited (TPDDL) for faster and more accurate location and restoration of faults in LT network, thereby reducing downtime.
- **Power Purchase Optimisation for better cost management-** Monopoly by its very nature does not provide the most efficient outcomes for the society. Lack of competition does not sufficiently drive the utilities to optimise costs and performance to the best possible scenario. Lack of load forecasting and power purchase planning has led to over reliance on the spot markets thereby increasing the costs of the utilities. There is a

need to handle power procurement, its sale, manage generation from own sources and allocated capacities from other sources, manage banking arrangements etc. so as to have the most beneficial matrix mix for utility of Long/short/medium term purchase of power, merit order dispatch, UI, Co-ordination of generation, transmission and System Operation facilities for smooth operation of Generation/Transmission and Distribution network and maintaining balance between demand and supply. Focus on cost minimisation to reduce the revenue gap has been limited across utilities. States such as Punjab, J&K, Delhi and Rajasthan have now realised the importance of optimisation of power purchase costs have initiated development of such model and skills to optimise such costs.

- **Limited focus on Demand Side Management for managing demand-** Besides the supply side options, implementation of effective demand side options is another cost effective option to serve demand. However, demand side options have been an underutilised strategy by the utilities. Notification of DSM regulations and implementation of the same has been limited across the utilities. Utilities of Maharashtra and Delhi have taken a lead in implementation of DSM schemes. This includes implementation of DSM campaign by Tata Power, Mumbai "My Mumbai, Green Mumbai" wherein exchange programme for ceiling fans targeted towards residential sector and ACs targeted towards LT industrial consumers through bulk discounts was launched. Tata Power Delhi Distribution Limited (TPDDL) also launched scheme related to replacement of ACs and refrigerators in their areas of operation.
- **Load Management through implementation of Demand response** is another option for the utilities. Demand Response is consumer's ability to reduce electricity consumption at their location when wholesale prices are high or the reliability of the electric grid is threatened. Tata Power, Mumbai was the first utility in India to launch a DR scheme. It has enrolled a capacity of 10 MW load under this program and has carried out several load curtailment events in 2012. Tata Power incentivizes such customers by paying them an amount of about Rs. 2 per unit saved. Similarly, TPDDL is undertaking Automated Demand Response program with Smart Meters in Delhi. The project's components include ADR infrastructure, smart meters, RF mesh-based communication, meter data management system and integration with other operational technology and IT systems like OMS, SAP, etc. A total of around 250 consumers are participating in this project.
- **Limited implementation of Open Access:** Open Access can bring about several benefits such as optimum utilization of the network, improvement in the availability and reliability of supply through sale of surplus captive capacity to third parties, provide distribution licensees/HT Consumers the freedom to source power from alternative sources in a competitive manner and the generating entity to choose its own buyer etc. However, the State Regulatory Commissions are not following the relevant provisions of the Act, Guidelines issued by GoI in a manner consistent with the intent of the Act and the national policies. There are many impediments in the path of successful implementation of Open Access as the Discom continues to be a single point supplier handling both the carriage (wires) and content (energy). For introducing true competition in the market open access is a pre-requisite. Successful examples of this include countries such as UK, US, Australia, New Zealand, Peru etc.

- **Innovations at the Central level have had limited percolation at the state level**  
- Electricity is in the Concurrent List in the Constitution and the primary responsibility for the same lies with the state government. Several developments have been done at the central level that needs to percolate at the state level. This includes Point of Connection (PoC) transmission pricing mechanism at inter- state level and other innovations led by CERC that have resulted in better grid management.
- **Development of Ancillary Service Market-** Managing variability by SLDC has been a challenge. The generation stations are obligated to operate as per their finalized schedules and while the grid codes allow SLDC to exercise supervisory control, frequent and rapid schedule changes by the SLDC are abhorred by the generators, particularly when such changes result in significant heat rate and maintenance penalties. In many cases the generation is not flexible enough to respond to such changes and the only option available with the SLDC is to cut off load. Shedding of 'load' should be a last resort and not the only means of restoring system stability. This results in extremely poor service levels and practices that are inimical to consumer interests, unmatched on this scale anywhere in the world. It is therefore important to develop ancillary service market in the country. European countries, such as Spain, Germany, and Great Britain (amongst others) and several states/Regions in the USA have created market for Ancillary services.
- **Rural electrification has been a challenge faced by many distribution utilities** in the country as expansion of network in remote areas is not economically viable for the utilities. However, promotion/deployment of decentralised grids and micro grids by the utilities to serve consumers in their area of supply and meet their universal service obligation has been limited. One of the examples in deployment of micro grids in India includes that of Gram Power which has established India's first Smart Microgrid in Rajasthan. This provides one of the cost effective model for rural electrification. A village cooperative model is being followed wherein the connection holders are the members of this cooperative and government subsidy and bank loan being arranged by Gram Power for this cooperative to fund the microgrid. Similarly, PPP models on servicing rural loads through decentralised micro-grids need to be encouraged. Several useful examples include DESI Power, India, Husk Power Systems, India, Green Empowerment/Tonibung/PACOS (GE/T/P), Malaysia, Electricité d'Haiti (EDH), Haiti etc.

## **X RECOMMENDATIONS FOR THE FOURTEENTH FINANCE COMMISSION**

Based on the assessment undertaken, the following key points emerge for improving the power sector operations and state finances from the power sector are listed below.

- Level of efficiencies and the pace at which such efficiencies can be achieved under state ownership has reached a plateau in the recent past. States with weak performance and high financial losses i.e. Rajasthan, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Bihar, Jharkhand, Haryana, Madhya Pradesh should be the first candidate states to introduce privatization or private participation in distribution business<sup>31</sup>. Even the FRP conditions have emphasized on the private participation in distribution. In addition, introduction of private participation needs to be backed with strong implementation wherewithal to ensure execution in a time bound manner.
- Unbundling of utilities should not be deferred any further. This is a statutory requirement and violation should not be condoned. Also any difference between subsidy committed by the state government and subsidy received by the distribution utilities should not be allowed as this is in violation of Electricity Act 2003. In addition to the above, unbundling of the distribution segment further into wires and retail business is even more important. Global experience has suggested that efficiencies at the retail level can best be achieved through separation of carriage and content. Changes in this regard though initiated have taken a long to be implemented.
- Power purchase costs constitutes majority of cost of the distribution utilities. Power purchase optimization through better load forecasting is necessary to optimize costs and minimize the revenue gap. Hence, identification of shortage or surplus at an intra-day/day ahead level becomes difficult. There is need to handle power procurement, its sale, manage generation from own sources and allocated capacities from other sources, manage banking arrangements etc. so as to have the optimal mix for utility of Long/short/medium term purchase of power. This is one measure that can have significant impact on the distribution finances.
- The financial restructuring package of GoI is a welcome step, but poses attendant risks with it. It will be important to give the proposals proper implementation support on operational efficiency improvement, which is at the core of the performance issues. We have suggested the formation of a specialist TASK FORCE at the national level that will have the mandate and operational wherewithal to support the states in efficiency improvement.
- To ensure regulatory independence it is important to provide financial autonomy to regulators. State governments should establish the State Electricity Regulatory Commission fund as provided earlier. Improvement in staffing through a well-structured program that also ensures accountability of the recruited staff is much needed. Further, the schedule of fees and charges should be clearly notified by all SERCs and the revenue so accrued should remain with SERCs to be utilized for its

<sup>31</sup> While in some cases such as Madhya Pradesh, Bihar etc private participation was introduced through distribution franchisee, the actual progress on ground has been slow.

own functioning. Delinking the SERCs fund with Government budgetary allocations is critical for independent functioning.

- Culture of public disclosures of information has been improving over the years with several SERC's regularly reporting their annual reports including description of initiatives and key decisions. However, this needs to be taken to the next level which involves performance monitoring of SERC's also, on specific indicators. Appellate Tribunal for Electricity through the OP1 judgment has partly initiated this exercise on some parameters; however this can further be enhanced to include a range of performance metrics on which performance of SERCs can be evaluated.
- Frequency and Adequacy of Tariff revisions historically have been one of the key aspects affecting the utility finances. However, ever since the OP1 Judgment in 2011, this has been improving. SERC's should ensure timely revision in tariffs to reflect cost of the utilities.
- Implementation of MYT framework, introduction of IT systems like RIMS and 100% metering are key priorities that have proved to improve data regimes across various SERC's. These hence need to be implemented by all SERCs through strong directives and regular compliance of these directives.
- Adoption of IT (information technology) is very important not only to improve quality and reliability of supply but also to improve the overall efficiency in delivery of electricity to the consumers. It is important to initiate metering at different level of power system i.e. individual customers, DT and feeder level for proper performance measurement of the utilities on various parameters such as AT&C losses, standards of performance etc.
- Promotion of Open Access is important for the power sector development, creation of capacity, operation of the power markets etc. Independence of system operators is important in this regard. Independence of system operators has a key influence on the operationalization of Open Access. State Load Dispatch Centres (SLDC's) which operate the entire system within a State, have been found acting as a barrier to Open Access, sitting on applications, denying generators the right to sell power to a third party. This is because most of the States do not have an independent system operator. These SLDC's operate as a department under State Transmission Company (STU) resulting in conflict of interest between the State Discom and the SLDC. Thus it is very crucial to have an independent system operator who is unbiased and is responsible for scheduling, dispatch, monitoring and accounting of various transactions. The regulations governing open access also needs to be standardized across the states to promote open access in the country.
- Benefits of introducing MYT regulations have slowly started to come in terms of improved data regimes and better performance, however these need to be translated to operational level in the utilities for improving the performance by creating right kind of incentives and disincentives.

## XI ANNEXURE – I

### TERMS OF REFERENCE (TOR) FOR THE STUDY ON “POWER SECTOR OPERATIONS AND IMPACT ON STATE FINANCES”

S no.	Scope of Work	Coverage in the report
<b>Assessment of Impact of Policy Reforms</b>		
1	Assessment of the status of implementation of the provision of National Electricity Policy with regard to the tariff vis- a-vis tariff revision implemented by each of the State Governments keeping in view the gap between average cost of supply and average cost of purchase.	Section III
2	The National Electricity Policy (Section 5.5.4) provides that the State Governments may provide advance subsidy to the extent they consider appropriate in terms of section 65 of the (National Electricity) Act in which case necessary budget provision would be required to be made in advance so that the utility does not suffer financial problems that may affect its operations. In practice however, there have been vast deviations from this policy across the States. Review and examine the total levels of subsidy announced and paid by various Governments to their utilities and the main causes for the burgeoning uncovered subsidies.	Section III
<b>Assessment Utility Operations and Impact on State Finances</b>		
3	Undertake assessment of reasons for failure of the power sector reforms of 2003. Assessments of liabilities were brought over to state's accounts then and the extent to which these have been settled?	Section III, IV
4	Assess the general efficiency and functioning of DISCOMs through a cross-States comparison and the likely prospects of DISCOMs in the next 5 years. Review of some good power distribution practices within the country.	Section III, IX
5	Undertake inter-State comparison of free power/cross-sector power subsidization and performance on AT&C losses. The study may also assess the impact of the Central and State taxes and levies on the Power sector, and the feasibility of bringing about parity and uniformity across the States.	Section III, IV
6	The State Governments have extended large amounts of guarantees to the state utilities having a strong bearing on the fiscal profile of the States. Review and assess impact of excessive issue of bonds/guarantees to the DISCOMs and the likelihood of the devolving of the guarantees thereupon; assessment of the overall fiscal situation (i.e., fiscal deficit and debt) of individual states if we include the power sector finances into the state government accounts.	Section IV
7	Examine the design of the new power re-structuring	Section V

	programme approved by the Central Government and assess its impact on the State Governments with special emphasis on the financial health of the DISCOMs. Assess the feasibility and desirability of making the new scheme of financial restructuring of State owned DISCOMS mandatory along with mandatory periodic tariff revision to cover the losses (minus upfront subsidy by the State) within a specified time period. Whether it would be advisable to enforce required tariff revisions through enactments by the States?	
<b>8</b>	Assessment of revenues accruing to states on account of taxes imposed on distribution of electricity? The assessment to take into account the Centre-State aspects and inter-state aspects in the power sector.	Section IV
<b>9</b>	Keeping in view that no pricing is possible unless the consumption details are available (in reference to un-metred/agricultural consumption etc.) i.e. approaches adopted for pricing in such cases - how do you manage what you cannot measure or have no information about?	Section VIII
<b>10</b>	Review of provisions in the law relating to entry to other players at the retail level/ entry threshold on account of cross-subsidization (Open Access).	Section VII
<b>Assessment of Effectiveness of Regulatory Practices</b>		
<b>11</b>	Information availability of measurement and impact on regulatory effectiveness on account of information availability; is information with Regulators enough to take decisions on pricing?	Section VI
<b>12</b>	How can the Electricity Regulatory Commissions (ERCs) become truly independent and the manner in which they can focus more on economic perspectives. Assessment of measures on how the ERCs can distance themselves from Government in order to take independent decisions with examples of best practices in India.	Section VI
<b>13</b>	Enforcement of Regulatory policy in the context of the extent to which the pricing and policy are linked under the existing laws; assess how enforceable capacity of regulators varies with ownership, especially in the Indian context of government ownership of distribution licensees.	Section VI
<b>Review of Good Practices</b>		
<b>14</b>	Review the best global and domestic regulatory practices in the electricity sector, including the legal and institutional arrangements, to ensure that public utility pricing is insulated from policy. Fixed charges are levied even when no electricity is supplied. There is no recourse for consumers when there is no supply. Review the global practices on price regulation without guarantee of service?	Section VI,IX



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## **POWER SECTOR OPERATIONS AND IMPACT ON STATE FINANCES**

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### **VOLUME II: STATE REPORTS**

**PREPARED FOR:**

**THE FOURTEENTH FINANCE COMMISSION**

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**PREPARED BY:**

**AF-MERCADOS ENERGY MARKETS INDIA PVT. LTD. (AF-MERCADOS EMI)**

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August 2014

Innovation by experience





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**ABBREVIATIONS**

ACS	Average Cost Of Supply
AES	American Electricity Supply Corporation
AP	Agriculture Pump
APCPDCL	Central Power Distribution Company Ltd
APEPDCL	Eastern Power Distribution Company Ltd
APERC	Andhra Pradesh Electricity Regulatory Commission
APGENCO	Andhra Pradesh Power Generation Corporation
APNPDCL	Northern Power Distribution Company Ltd
APSEB	Andhra Pradesh State Electricity Board
APSPDCL,	Southern Power Distribution Company Ltd
APTEL	Appellate Tribunal For Electricity
APTRANSCO	Transmission Corporation of AP Ltd
ARR	Average Revenue Realized
AT&C	Aggregated Technical & Commercial
AVVNL	Ajmer Vidyut Vitran Nigam Ltd
BBMB	Bhakra Beas Management Board
BESCOM	Bangalore Electricity Supply Company
BEST	Brihan-Mumbai Electricity Supply and Transport Undertaking
BPL	Below Poverty Line
BRPL	BSES Rajdhani Power Ltd
BSES	Bombay Suburban Electric Supply
BYPL	BSES Yamuna Power Ltd
CAG	Comptroller and Auditor General
CAGR	Compound Annual Growth Rate
CERC	Central Electricity Regulatory Commission
CESC	Calcutta Electric Supply Corporation
CESU	Central Electricity Supply Utility
CGS	Central Generating Stations
CHD	Customer Help Desks
CoS	Cost of Supply
DESU	Delhi Electricity Supply Undertaking
DGVCL	Dakshin Gujarat Vj Company Ltd
DHBVNL	Dakshin Haryana Bijli Vitran Nigam Ltd
Discom	Distribution Company

DSM	Demand Side Management
DTRs	Distribution Transformer
DVB	Delhi Vidyut Board
EHT	Extra High Tension
EHV	Extra High Voltage
ERC	Energy Regulatory Commission
FRP	Financial Restructuring Plan
GEB	Gujarat Electricity Board
Genco	Generation Company
GERC	Gujarat Electricity Regulatory Commission
GESCOM	Gulbarga Electricity Supply Company
GoAP	Government of Andhra Pradesh
GoH	Government of Haryana
GoR	Government of Rajasthan
GSDP	Gross State Domestic Product
GSECL	Gujarat State Electricity Corporation Ltd
GUVNL	Gujarat Urja Vikas Nigam Ltd
HERC	Haryana Electricity Regulatory Commission
HESCOM	Hubli Electricity Supply Company
HT	High Tension
HPGCL	Haryana Power Generation Corporation Limited
HSEB	Haryana State Electricity Board
HVDS	High Voltage Distribution System
HVPLN	Haryana Vidyut Prasaran Nigam Limited
IPP	Independent Power Producer
JdVVNL	Jodhpur Vidyut Vitran Nigam Ltd
JSEB	Jharkhand State Electricity Board
JSERC	Jharkhand State Electricity regulatory Commission
JVVNL	Jaipur Vidyut Vitran Nigam Ltd
KEB	Karnataka Electricity Board
KERC	Karnataka Electricity Regulatory Commission
KESCO	Kanpur Electric Supply Company
KJ	Kutir Jyoti
KPTCL	Karnataka Power Transmission Corporation Limited
LIP	Large Industrial Power
LT	Low Tension

MCL	Mahanadi Coalfields Limited
MES	Military Engineering Services
MESCOM	Mangalore Electricity Supply Company
MGVCL	Madhya Gujarat Vj Company Limited
MP	Madhya Pradesh
MPECS	Mula- Pravara Electric Co-operative Society
MPERC	Madhya Pradesh Electricity Regulatory Commission
MPMKVVCL	Madhya Pradesh Madhya Kshetra Vidyut Vitran Company Limited
MPPGCL	Madhya Pradesh Power Generating Company Limited
MPPKVVCL	Madhya Pradesh Poorv Ksherta Vidyut Vitran Company Limited
MPPKVVCL	Madhya Pradesh Paschim Vidyut Vitran Company Limited
MPPTCL	Madhya Pradesh Power Transmission Company Limited
MSEB	Maharashtra State Electricity Board
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd
MSEDCL	Maharashtra State Electricity Distribution Company
MSETCL	Maharashtra State Electricity Transmission Company
MSPGCL	Maharashtra State Electricity Generation Company
MYT	Multi Year Tariff
NDMC	Delhi Municipal Corporation
NDPL	North Delhi Power Ltd
NEP	National Electricity Policy
NESCO	North Eastern Electricity Supply Company of Orissa Ltd
NEW	North Eastern Western
NTP	National Tariff Policy
O & M	Operations & Maintenance
OA	Open Access
OERC	Orissa Electricity Regulatory Commission
OHPC	Odisha Hydro Power Corporation Ltd
OPTCL	Odisha Power Transmission Corporation Limited
OSEB	Orissa State Electricity Board
PFC	Power Finance Corporation
PGVCL	Paschim Gujarat Vj Company Limited
POWERCOM	Punjab State Power Corporation Ltd
PSEB	Punjab State Electricity Board
PSERC	Punjab State Electricity Regulatory Commission
RE	Renewable Energy

REL	Reliance Energy Ltd
RERC	Rajasthan Electricity Regulatory Commission
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RGPPL	Ratnagiri Gas and Power Private Limited
RoE	Return on Equity
RRVNL	Rajasthan Rajya Vidyut Prasaran Nigam Ltd
RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Ltd
RSEB	Rajasthan State Electricity Board
RSEB	Rajasthan State Electricity Board
RVPN	Rajasthan Rajya Vidyut Prasaran Nigam Ltd
RVUN	Rajasthan Rajya Vidyut Utpadan Nigam Ltd
SEB	State Electricity Board
SERC	State Electricity Regulatory Commission
SLDC	State Load Dispatch Centre
SOUTHCO	Southern Electricity Supply Company of Orissa Ltd
STU	State Transmission Utility
T&D	Transmission and Distribution
TANGEDCO	Tamil Nadu Generation and Distribution Corporation Ltd
TANTRANSCO	Tamil Nadu Transmission Corporation
TNEB	Tamil Nadu Electricity Board
TNERC	Tamil Nadu Electricity Regulatory Commission
TPC	Tata Power Company Ltd
Transco	Transmission Company
UGVCL	Uttar Gujarat Vij Company Ltd
UHBVNL	Uttar Haryana Bijli Vitran Nigam Ltd
UPERC	Uttar Pradesh Electricity Regulatory Commission
UPJVNL	Uttar Pradesh Jal Vidyut Nigam Limited
UPPCL	Uttar Pradesh Power Corporation Limited
UPRVUNL	Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited
VVNL	Vishweshwaraiah Vidyut Nigam Limited
WBSEB	West Bengal State Electricity Board
WBSEDCL	West Bengal State Electricity Distribution Company
WBSETCL	West Bengal State Electricity Transmission Company
WESCO	Western Electricity Supply Company of Orissa Ltd

# I ANDHRA PRADESH

## 1. INTRODUCTION

### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Andhra Pradesh was one of the first states to restructure its power sector. The State Government decided to undertake restructuring of Andhra Pradesh State Electricity Board (APSEB) due to worsening financial position of APSEB. The State Government initiated reforms in Power Sector in April 1997. The Andhra Pradesh Electricity Reform Act was enacted in 1998, the Andhra Pradesh Electricity Regulatory Commission (APERC) was set up in April 1999, and the APSEB was subsequently unbundled on functional lines.

The vertically integrated APSEB was restructured into two companies i.e. Andhra Pradesh Power Generation Corporation (APGENCO) for generation function and Transmission Corporation of AP Ltd (APTRANSCO) for transmission and distribution functions.

The First Transfer Scheme vesting the assets, liabilities personnel, etc., with the APGENCO and APTRANSCO was implemented w.e.f. 1st February 1999. The distribution function was subsequently separated from APTRANSCO (through the notification of second transfer scheme) with the creation of the following area based distribution companies (DISCOMs) in 2001:

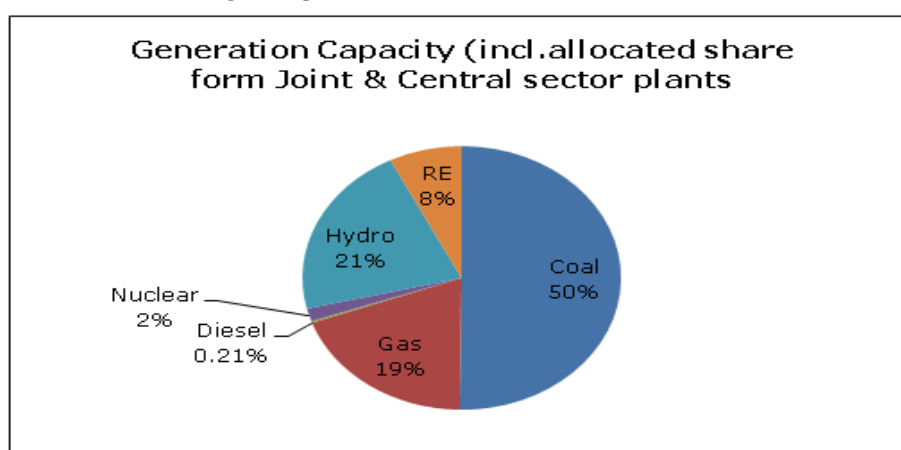
- Eastern Power Distribution Company Ltd. (APEPDCL, Vishakhapatnam)
- Northern Power Distribution Company Ltd. (APNPDCL, Warangal)
- Central Power Distribution Company Ltd. (APCPDCL, Hyderabad)
- Southern Power Distribution Company Ltd. (APSPDCL, Tirupati)

### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Andhra Pradesh was 17,285 MW. It has grown by 4% from Feb 2013 level of 16,876 MW. Out of total capacity as on Feb 2014, coal based power capacity accounted for ~50% followed by Hydro (~21%) and Gas (~19%). RE based capacity accounted for a share of ~7%.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure I-1: Generation Capacity Mix as on Feb 2014- Andhra Pradesh**



Source: CEA

### 1.3. POWER SUPPLY POSITION

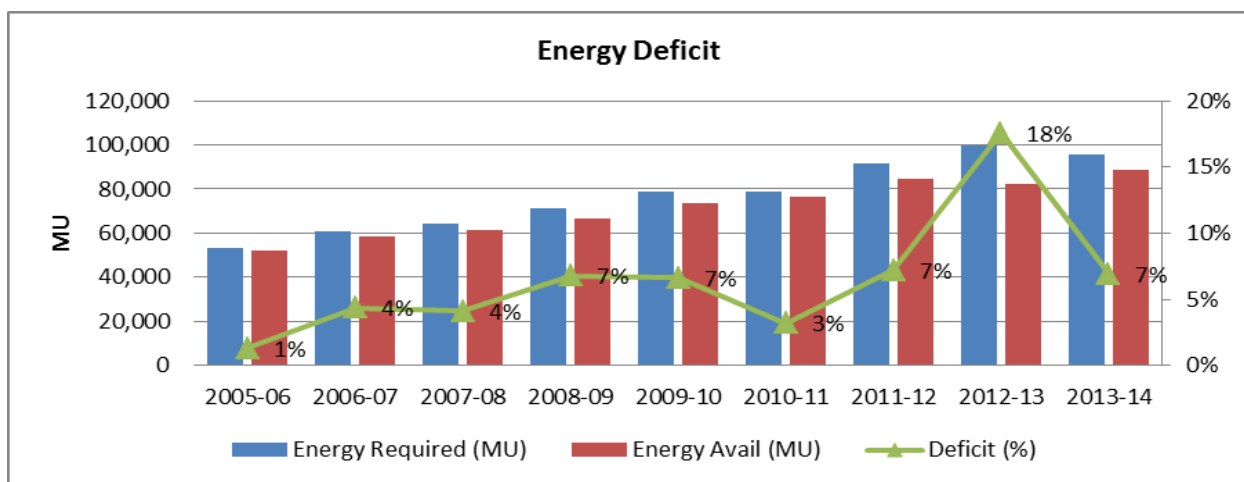
Andhra Pradesh has been witnessing consistent power supply shortage. The energy deficit has increased from 1% in FY 2005-06 to 18% in FY 2012-13. The peak deficit has increased from 5% in FY 2005-06 to 20% in FY 2012-13. The peak deficit increased substantially in FY 2011-12 to 15% and 20% in FY 2012-13 as compared to 6% in FY 2010-11. The increasing energy and peak deficit in the state is due to slow rate of capacity addition and limited transmission corridor available between NEW (North Eastern Western) and South grid. Further, low Plant Load Factor (PLF) of hydro power plants caused by poor/weak monsoons and declining availability of natural gas from KG D6 basin leading to low PLF for the gas based power plants has contributed to energy and peak deficit in the state.

However, with the integration of Southern Grid with the National Grid in January 2014, energy and peak deficit is expected to decrease. Energy deficit and peak deficit in FY 2013-14 was 6.9% and 6.5% respectively, due to very good hydro inflows.

However, going forward the hydro power generation could further be impacted to due to effect from EL Nino. India Meteorological Department (IMD) officials said the monsoon is expected to be below normal because of the El-Nino effect, which is generally associated with the warming of ocean water.

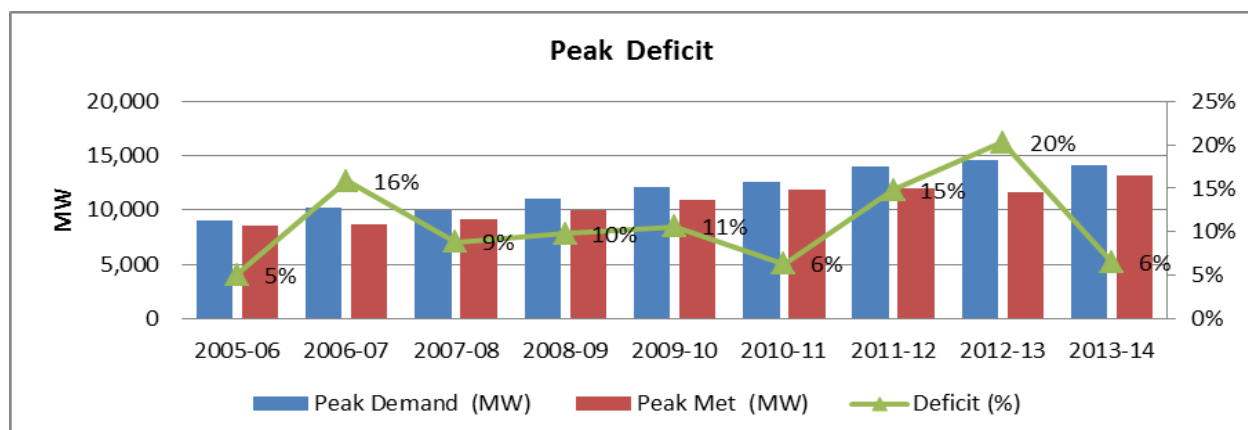
The trend of energy and peak deficit observed in Andhra Pradesh over the years is highlighted in the figure below:

**Figure I-2: Energy Deficit - Andhra Pradesh**



Source: CEA

**Figure I-3: Peak Deficit - Andhra Pradesh**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF ANDHRA PRADESH

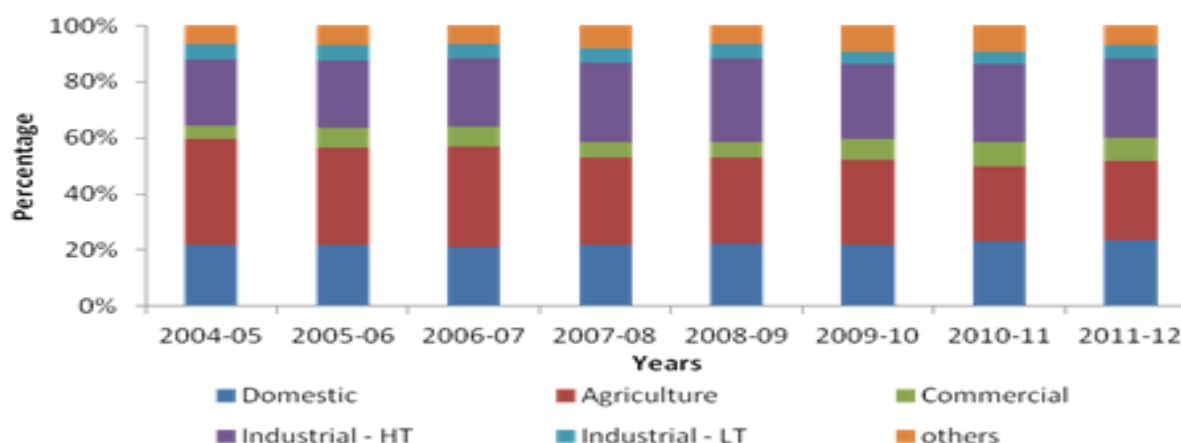
APCPDCL which is the largest utility in Andhra Pradesh supply electricity in seven districts viz. Hyderabad, Ranga Reddy, Anantpur, Kurnool, Mahaboobnagar, Nalgonda and Medak; followed by APEPDCL which is a second largest utility supplies electricity in five districts in the southern state of Andhra Pradesh.

The other two utilities which are smaller in size are APNPDCL which caters to districts of Warangal, Karimnagar, Khammam, Nizamabad and Adilabad and ASPDCL serves the regions of Krishna, Guntur, Prakasam, Nellore, Chittoor and Kadapa districts.

The share of agricultural sales have reduced over the years while the share of industrial sales have increased over the years. The share of agricultural sales have reduced from 38% in 2004-05 to 28% in 2011-12 and the industrial sales have increased from 29% in 2004-05 to 34% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure I-4: Historical Trend in Consumer Sales Mix - Andhra Pradesh**



Source: PFC

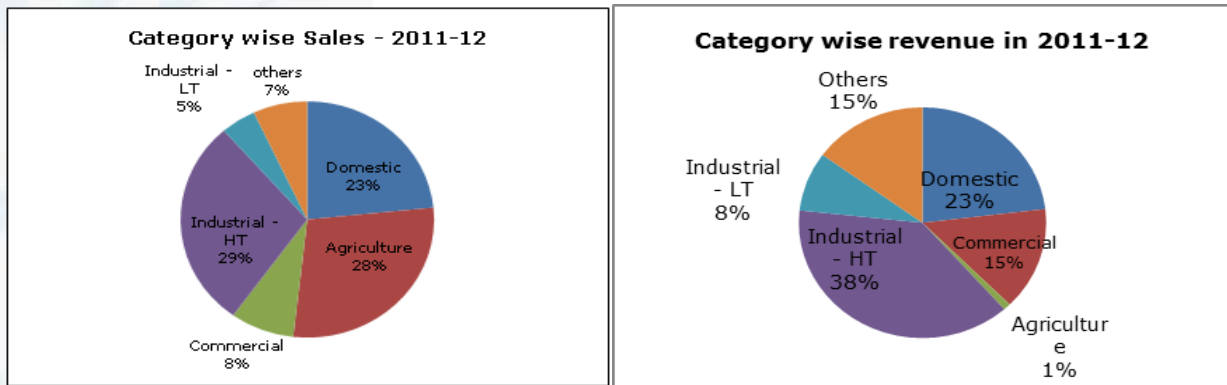
The overall sales have registered a CAGR of 9% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of 17.8% followed by the industrial category with a CAGR of 12%.

In terms of revenue contribution, industries contributed more than 45% of revenue, followed by domestic and commercial categories with a share of 23% and 15%, respectively, while agriculture contributed a meagre 1% of the revenue (Refer Figure I-5 below). This clearly indicates that domestic and agriculture categories are heavily cross subsidized by the industrial and commercial categories.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.



**Figure I-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Andhra Pradesh**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Andhra Pradesh distribution utilities have historically remained on a lower side compared to the national average.

The loss level reported by the distribution utilities of Andhra Pradesh is in the range of 15% - 18% since FY 2006. This, however, is based on the estimated consumption in the agricultural sector (in absence of agriculture metering in the state). The trend observed over the years in collection efficiency has been on a higher side.

**Table I-1: Year on Year Trend in AT&C losses and Collection Efficiency - Andhra Pradesh**

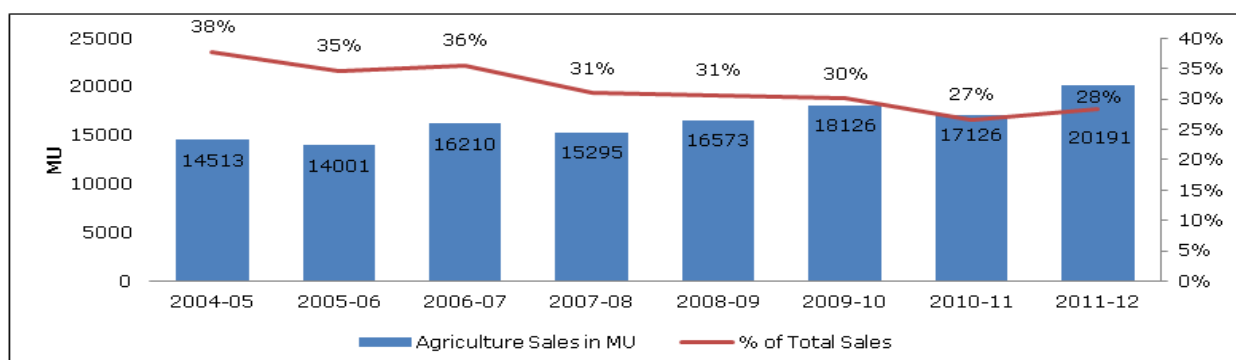
Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	21%	16.7%	17.9%	16.2%	13%	16.4%	17.5%	15.3%
Collection Efficiency	96%	100%	97%	98%	98%	98%	95%	97%

Source: PFC

The agricultural sales have reduced over time and hence reduction in losses is in line with the reducing agricultural sales. The figure below highlights the historical trend of agriculture sales in Andhra Pradesh.

The graph below highlights the historical trend of agriculture sales

**Figure I-6: Historical Trend in Agricultural Sales – Andhra Pradesh**



Source: PFC

Further, losses have also reduced due to the investment undertaken in the development of HT lines over the years. HT/LT ratio has improved over the years, HT/LT ratio improved from 0.55 in 2005-06 to 0.61 in 2009-10. The HT LT ratio has improved in the state with support from various funding agencies. The same has been provided in the Box Below.

### Box I: Improving HVDS system to reduce losses

APSPDCL High Voltage Distribution System (HVDS) with the objectives to improve voltages at consumer end, reducing line losses, avoid theft of energy, and minimize the power supply interruptions for agricultural consumers are being constructed. HVDS works were completed in first phase in 2005-06 under 88 Nos. of 33/11 KV Sub-Stations under Rural Electrification Corporation (REC) funding. In phase-II HVDS works were carried out in 2007-08, 2008-09 & 2009-10 under 71 Nos. 33/11KV Sub-Stations in Chittoor District and 70 Nos. 33/11KV Sub-Stations in Kadapa District under Kfw funding. For balance Sub-Stations in Chittoor and Kadapa Districts & other Districts Krishna, Guntur, Prakasam, Nellore the HVDS works is under progress under REC funding. For the balance HVDS works in Krishna, Guntur, Prakasam, Chittoor & Kadapa Districts the scheme proposals were sanctioned under JICA funding

### 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost accounts for ~80% of the total distribution cost (Refer table below).

The per unit cost break-up for different cost components for the state of Andhra Pradesh is provided in the table below:-

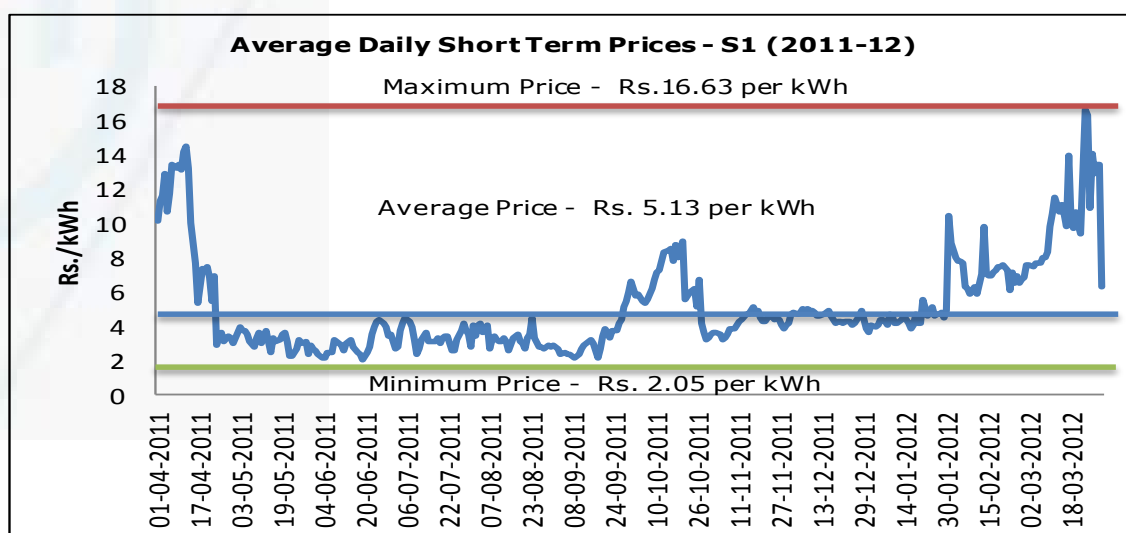
**Table I-2: Year on Year Trend Distribution Cost Breakup - Andhra Pradesh**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.95	1.86	1.96	2.08	2.66	2.69	2.98	3.72
O&M (R&M + A&G + EC)	0.54	0.18	0.21	0.23	0.22	0.22	0.36	0.37
Interest	0.14	0.11	0.10	0.08	0.11	0.16	0.19	0.28
Depreciation	0.11	0.10	0.11	0.10	0.11	0.12	0.14	0.15
Other cost	-0.02	0.02	-0.03	0.13	0.08	0.03	0.02	0.00

Source: PFC

It can be observed that power purchase cost per unit has increased over the years especially in FY12. Power purchase cost increased significantly in FY12 due to decreased power availability from hydro and gas based plants and increased purchase of costly power from the short term market by the utility.

The short term prices prevailing in the IEX power exchange for area S1 in FY 2012 is given below:

**Figure I-7: Exchange Prices for S1 Area for FY 2011-12 - Andhra Pradesh**

Source: Indian Energy Exchange

This drastic reduction in availability of hydel power, as a result of inadequate rainfall and resultant shortage of water in the reservoirs in the State, the average fixed cost per unit of hydel power is increasing. As a result, the tariff to be paid to AP Genco for hydel power is increasing from Rs 1.79 per unit in 2011-12 to Rs 3.34 in 2012-13 and to Rs 3.46 per unit in 2013-14. However, this is further going to worsen, due to expected lower than average monsoons due to EL-Nino. Hence, the fixed cost would further increase coupled with dependence on the short term power would be a major concern for the state.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. No tariff hikes were observed for several years and tariffs were increased in FY 11 and FY 12 wherein tariffs were hiked by 13% and 24% respectively.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table I-3: Historical Trend Consumer Category Wise Revenue Realization - Andhra Pradesh**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	2.29	2.26	2.36	2.42	2.47	2.83	3.09	3.34
Agriculture	0.35	0.15	0.07	0.08	0.08	0.21	0.11	0.11
Commercial	5.78	5.57	5.56	7.86	7.77	5.99	5.97	5.98
Industrial HT	3.82	3.70	3.60	3.33	3.26	3.64	4.28	4.52
Industrial LT	3.96	3.83	4.08	4.15	4.07	4.64	6.18	6.26
Others	3.15	4.94	4.31	5.01	4.92	3.86	4.73	7.30

Source: PFC

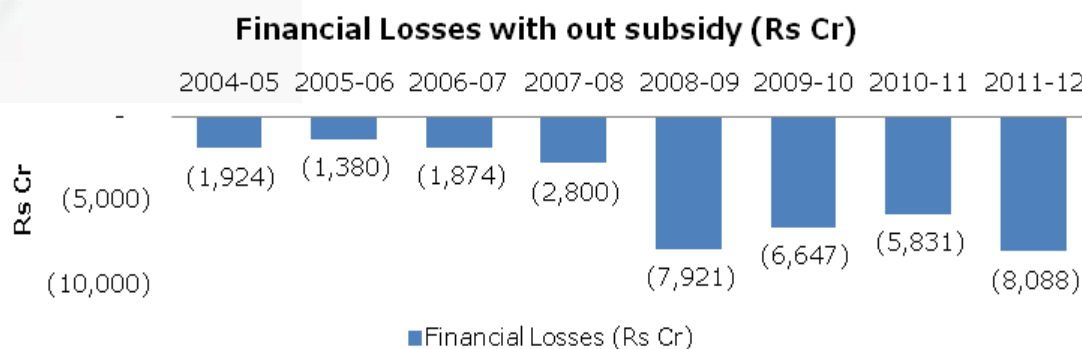
The state government is heavily subsidizing agricultural sector and the share of the state government subsidies accounts for ~ 24% of the total revenues in FY 2011-12. Increase in power purchase cost, no major tariff hikes over the years and low subsidy payout has resulted in deterioration of the financial position of the distribution utilities of the state.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Andhra Pradesh has increased over the years. As discussed earlier, this is because of increasing power purchase cost and inadequate tariff revisions over the years.

**Figure I-8: Historical Trend Financial Losses (w/o) subsidies – Andhra Pradesh**



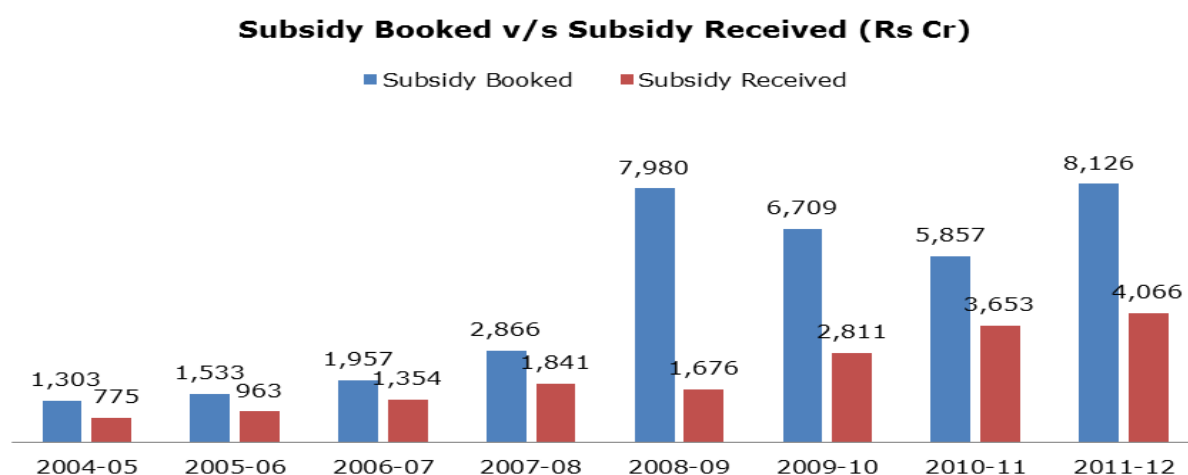
Source: PFC

The losses decreased in FY 2010-11 due to increase in tariff for different categories of consumers, however, low realization of subsidy booked contributed to financial deterioration of the distribution utilities.

#### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The subsidy burden of the State Government in 2011-12, was 24% of the total revenues, which was 12% in FY 2004-05. The figure below provides the subsidy booked v/s subsidy received for the distribution utilities in the state

**Figure I-9: Historical Trend Subsidies Booked v/s Subsidies Received – Andhra Pradesh**



Source: PFC

As shown in the graph above, the amount of subsidies booked by the state has increased significantly from FY 05 to FY 12. This is primarily on account of subsidy to the agricultural category and certain sections of domestic category. It can be observed from the above

figure, that in all the years, amount of subsidy realised was less than the amount of subsidy booked leading to financial losses to the state utilities.

*The subsidy received being so much lower than the subsidy booked is a flagrant violation of the law as per Section 65 of the EA states that "If the State Government requires the grant of any subsidy to any consumer or class of consumers in the tariff determined by the State Commission under section 62, the State Government shall, notwithstanding any direction which may be given under section 108, pay, within in advance in the manner as may be specified, by the State Commission the amount to compensate the person affected by the grant of subsidy in the manner the State Commission may direct, as a condition for the licence or any other person concerned to implement the subsidy provided for by the State Government".*

The subsidies which were booked by the State Government are based on the estimated sales by SERC for that particular year. For example, subsidies year marked for FY 2010-11, were 4500 Cr based on the SERC estimated sales. However, as actual sales are higher than what was estimated and hence the utilities book the subsidies based on these extra sales also. The subsidies booked in FY 2010-11 as per PFC is Rs 5857 Cr, however the realized subsidies are still less than year marked subsidies. The year wise details have been provided below :-

**Table I-4: Trends of Subsidy booked v/s Approves Sales - Andhra Pradesh**

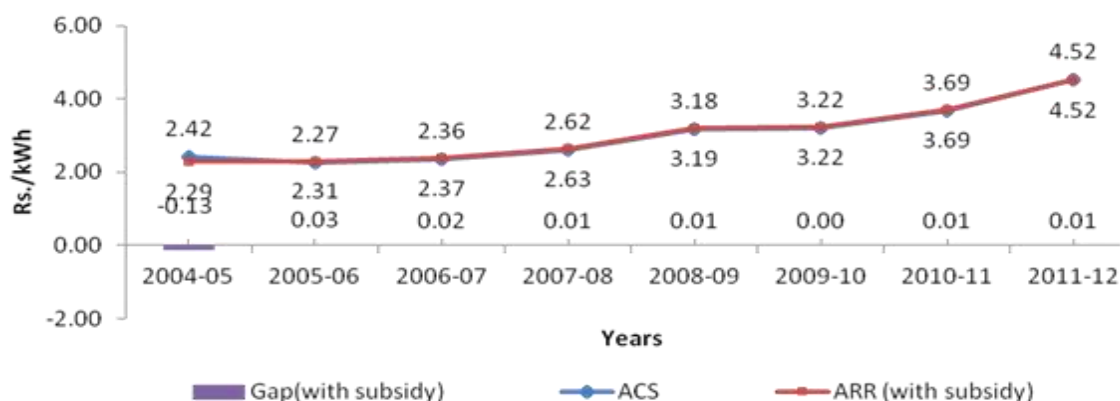
Particulars	2013-14	2012-13	2011-12	2010-11
Approved Sales in MU	19305	19305	17569	16262
Filled Sales by Discoms in MU	23743	22458	20840	19722
Actual Sales in MU	-	22013	20191	17126
Subsidy Year Marked - as per approved sales in Rs Cr	5480	5358	4145	4500
Subsidy Booked in Rs Cr	-	-	8126	5857
Subsidy Realized in Rs Cr	-	-	4066	3653

Source: Tariff orders and PFC

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has remained marginal over the years. This is primarily due to the full cost recovery tariff approach being followed by the Commission.

**Figure I-10: Historical Trend ACS v/s ARR (with subsidy) – Andhra Pradesh**



Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms less than 1% of the total tax revenue of the state government. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details for the same are provided in the table below.

**Table I-5: Tax Revenue from Power Sector - Andhra Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	159	286	304.95
Total Tax Revenue	47,317	6,0376	71034.56
Power sector Tax Revenue/Total state Tax Revenue	0.34%	0.47%	0.43%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The Non-Tax revenue from power sector is through **dividends, interest on loans and advances, Royalty/Cess on water for power generation, T & D, Rural Electrification** etc. The non-tax revenue, forms an insignificant portion of the total non-tax revenues of the state government. The details for the same are provided in the table below.

**Table I-6: Non-Tax Revenue from Power Sector - Andhra Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	18	17	38.43
Total Non-Tax Revenue	7803	10720	11694.34
Power sector Tax Revenue/ Total state Tax Revenue	0.23%	0.16%	0.33%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

**The overall Revenue generated from the power sector has increased from Rs 177 Cr in FY 2009-10 to Rs ~343.38.Cr.**

**However, the revenue from power sector forms a minimal share of total revenues (~1%) of the state.**

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table I-7: Expenditure on Power Sector - Andhra Pradesh**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	10	22	33.02
Revenue Expenditure	3,258	3,756	4,415.8
Total Power Sector Expenditure	3,268	3,778	4,448.9

Source: CAG Audited Accounts for the state - 2011-12, 2010-11, 2009-10

**The Capital and Revenue expenditure incurred on the Power sector has increased over the period of three years since FY10 primarily on account of increased expenditure on Hydel and Thermal Generation.**

**The expenditure on Power Sector has exceeded the Revenue generated from Power Sector over the years.**

#### **4.3. POWER BONDS**

**The state had issued power bonds the detail of outstanding balance is provided below:**

As per RBI 'State Finance Report' 2014, the outstanding balance of Power Bond as on 31<sup>st</sup> March 2014 was Rs 490 Cr.

#### **4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table I-8: Guarantees as a Percentage of Total Revenues - Andhra Pradesh**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	7,272	7,445	8,723
Total Revenues of the State	55,121	71,096	82,729
Guarantees as a %age of Total Revenues of State	13%	10.47%	10.54%

Source: CAG Audited Accounts for the state - 2011-12, 2010-11, 2009-10

As shown above, there has been an increase in the Guarantees given by the government to Power sector. However, the guarantees given to Power Sector relative to the state revenue have decreased from 13% in FY10 to 10.5% in FY12.

The table below depicts the three year average share of different utilities in sector guarantees

**Table I-9: Utility wise Breakup of Guarantees - Andhra Pradesh**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
AP TRANSCO	1,023	1,869	704.37	15%
AP GENCO	6,250	5,577	5,023.39	72%
AP Power Finance Corporation Ltd <sup>1</sup>		0	2,995.19	13%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

As evident from the table, majority of the guarantees given by the state government has been towards the generation sector. The Guarantees to the power sector has primarily risen on account of guarantees given to AP Power Finance Corporation.

#### **Subsidy**

In 2011-12, subsidy to AP Transmission Company for agriculture and allied subsidy of Rs 4300 Cr was extended

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is calculated by a summation of the total Expenditure of the state government on the sector including Capital and Revenue expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid(Net of Receipts) by the State Government.*

**Table I-10: Financing Requirement of Power Sector (2011-12) - Andhra Pradesh**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	4,448.9
Loans And Advances made by the State Government (Net of Recoveries)	1,439.81
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	633.98

<sup>1</sup> Andhra Pradesh Power Finance Corporation is a 100% AP Government owned company that supports/augments the resources for financing the power sector reforms in AP



Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.06
Total Power Sector Financing during the year	6,522.71
Sector Financing Requirement as a % age of total revenues of state	7.88%
GSDP nominal	4,05,046.00
Sector Financing Requirement as a % age of GSDP	1.61%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	(4,022)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	12.754%
Sector Financing Requirement as a % age of GSDP including financial losses	2.60%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 7.88% of the revenue generated by the state and 1.61 % of the Gross State Domestic Product.

Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector decreases to 7.84% of the State revenue and 1.60 % of the GSDP.

## 5. FINANCIAL RESTRUCTURING PLAN

Increase in power purchase costs, inadequate tariff hikes, almost free supply of electricity to the agricultural sector and low subsidy realization from the state government has deteriorated the financial position of the utilities in the state. In this context, distribution utilities of Andhra Pradesh adopted the FRP of the central government. The current status and likely outlook of FRP in the state is discussed in the section below.

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

As per the FRP scheme, the Andhra Pradesh government would take 50% of STL by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period.

### 5.2. FRP OUTLOOK

In this section, key parameters for the state have been looked at in order to comment on the likeliness of the state to meet the mandatory conditions set forth by the FRP and be eligible for the central grants incentive scheme.

The color scheme used in the table depicting state parameters refers to the color key provided here -

	Area of concern
	Can be better
	Good

Some of the key parameters relevant to FRP implementation have been shown in the table below for Andhra Pradesh.

**Table I-11: Historical Parameters – Andhra Pradesh**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	17%	18%	16%	13%	16%	18%	15%	n.a	n.a
<b>Tariff Hikes</b>	-3%	0%	0%	0%	0%	13%	24%	n.a	n.a
<b>Subsidy Received/Booked</b>	63%	69%	64%	21%	42%	62%	50%	n.a	n.a
<b>Interest Cost/Total Cost</b>	5%	4%	3%	3%	5%	5%	6%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy - in Rs./kWh</b>	0.26	0.33	0.44	1.10	0.89	0.77	1.08	n.a	n.a

Source: AF- Mercados Analysis based on data from PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses for Andhra Pradesh distribution utilities have historically remained on a lower side compared to the national average. This, however, is based on the estimated consumption in the agricultural sector (in absence of complete agriculture metering in the state). A >1.5% annual reduction in AT&C losses from 18% reference point in 2010-11, in order to receive central grants support, will require persistent efforts on part of the utilities. However, it is important to note here that AT&C losses are a derived figure in AP due to lack of metering. Hence, it might not be completely appropriate to take the AT&C loss reference point as given in the table above.
- After a period of no tariff revisions for 4 years, tariffs were hiked in 2010-11 and 2011-12. While the tariff hike has been considerable, frequency of revisions will be crucial in the future.
- Transparency in disbursement levels, a requirement in FRP, can pose an issue for Andhra Pradesh. Only about half of the subsidies booked by the utilities have been actually received in the last 3 years. In addition, lack of complete agricultural metering will limit subsidy support levels under the FRP.
- The share of Interest expenses is not very high in the state. The moratorium on principal repayments will further reduce bring down this burden in the coming years.
- The ACS-ARR Gap needs to be reduced by 25% of Rs 0.77/kWh every year in the moratorium period in order to be eligible for the central grants incentive based on the AT&C losses. This will be possible with more frequent tariff hikes, as the state has not received the required subsidies in the past. In addition, subsidy support might now be limited due to lack of metering.

In Andhra Pradesh, AT&C losses are already at low levels. Since subsidy support has been limited in the past, the regulator will have to ensure that tariffs are hiked frequently and the ACS-ARR Gap is reduced.

However, post Telangana Bill, there will be changes in implementation of Financial Restructuring Plan for the state of Andhra Pradesh and Telangana. The Andhra Pradesh reorganization bill 2013 states the following:

1. The present DISCOMS would be divided among the successor states on the following basis:
  - NPDCL and CPDCL would be responsible for power distribution in the state of Telangana, with two districts of CPDCL, namely Kurnool and Anantapur would shift to the state of Andhra Pradesh and accordingly handed over to the respective DISCOM
  - SPDCL and EPDCL would be responsible for power distribution in the state of Andhra Pradesh, while the two districts reassigned would now be under SPDCL
2. Units of APGENCO shall be divided based on geographical location of power plants.
3. The ratio of power distribution of the Central Generating Stations to the State of Telangana and Semandhara would be based on the actual energy consumption during the last 5 years by the DISCOMS in the respective Successor State.

4. The existing Andhra Pradesh Electricity Regulatory Commission (APERC) shall function as a joint regulatory body for a period not exceeding six months within which time separate SERCs will be formed in the successor States.
5. Existing Power Purchase Agreements (PPAs) with respective DISCOMS shall continue for both on-going projects and projects under construction

#### **FRP implications of the State Division:**

##### ***Andhra Pradesh:***

FRP details with respect to Andhra Pradesh are given below:

**Table I-12 : FRP scheme state details – Andhra Pradesh**

<b>Particulars</b>	<b>Amount (Rs. Cr).</b>
Accumulated losses as on 31/03/2012	6353
STL eligible under the scheme as on 31/03/2012	7438
Bonds issued by the Government	4046

Source: Data submitted by the state to the FFC

**Table I-13: Interest repayment on bonds by the State Government per year – Andhra Pradesh**

<b>Company</b>	<b>Bonds Issued (Rs. Cr.)</b>	<b>Interest @ 10%(Rs. Cr.)</b>
EPDCL	1806	181
SPDCL	2240	224
Total	4046	404

Source: Data submitted by the state to the FFC

##### ***Telangana:***

FRP details for Telangana are given below:

**Table I-14 : FRP scheme state details – Telangana**

<b>Particulars</b>	<b>Amount (Rs. Cr).</b>
Accumulated losses as on 31/03/2012	11315
STL eligible under the scheme as on 31/03/2012	9232
Bonds issued by the Government	4554

Source: Data submitted by the state to the FFC

**Table I-15: Interest repayment on bonds by the State Government per year – Telangana**

<b>Company</b>	<b>Bonds Issued (Rs. Cr.)</b>	<b>Interest @ 10%(Rs. Cr.)</b>
CPDCL	2810	281
NPDCL	1744	174
Total	4554	455

Source: Data submitted by the state to the FFC

## 6. ASSESSMENT OF REGULATORY EFFECTIVENESS

Andhra Pradesh was one of the first states to restructure its power sector. The State Government decided to undertake restructuring of Andhra Pradesh State Electricity Board (APSEB) due to worsening of financial position of APSEB.

APERC, the sector regulator, has also played a proactive role in the improved performance by the Utilities in Andhra Pradesh. It has not only issued tariff orders regularly in time since 2000-01, but also notified several regulations, codes and guidelines for effective functioning of the utilities. However, over the last few years, the performance of the Utilities has sharply declined and the tariff increases have not kept pace with the increasing costs

Some of the key aspects have been discussed below: -

### 6.1. FINANCIAL INDEPENDENCE OF STATE REGULATORY COMMISSION

The primary source of income for the SERC's include grant from the state government and their own revenue generated through fees for annual license, fees for filing application etc.

If SERC's are significantly dependent on state grants for their operations vis-a-vis their ability to generate revenue implies that they are financially dependent on the state government, hence might not be able to undertake independent decisions, and may get be influenced by the decisions of the State Government.

It has been observed that many of the SERC's are dependent on the state government grants for meeting their expenditures.

The table below provides the share of State Government funding as percentage of SERC's income for the states compared with Andhra Pradesh

**Table I-16: State Government Funding as a Percentage of income of SERC:- Andhra Pradesh compared with other key states.**

S. No.	States	State Government funding as a percentage of income of SERC's
1	Haryana	100%
2	Meghalaya	80%
3	Karnataka	72%
4	Jharkhand	58%
<b>5</b>	<b>Andhra Pradesh</b>	<b>34%</b>
6	Himachal Pradesh	23%
7	Uttar Pradesh	5%
8	West Bengal	0%
9	Odisha	0%
10	Maharashtra	0%

Source: AF Mercados Analysis based on the data from Annual Reports of SERCs

## 6.2. STATUS OF IMPORTANT REGULATIONS

The regulator has notified Open Access regulation which was issued in 2005. APERC has introduced Multi-Year-Tariff framework and notified Regulation 4 of 2005 (Terms and Conditions for Determination of Tariff for Wheeling and Retail Sale of Electricity) on 14th November 2005 and MYT's first control period is effective from FY 2006-07 onwards. APERC has been issuing MYT regulations and have notified draft MYT for its 3<sup>rd</sup> control period from 2014-15 to 2018-19.

## 6.3. STATUS OF OPEN ACCESS IMPLEMENTATION

As on March 2013, Andhra Pradesh has 445 number of open access consumers which is second highest in India after Tamil Nadu. Cross subsidy surcharge in AP is nil as compared to other states Cross Subsidy Surcharge in Haryana (Rs. 0.53/kWh) is comparable to Gujarat (Rs. 0.45/kWh), Bihar (Rs. 0.50/kWh) and is less than in Maharashtra (~Rs. 2.30/kWh) Punjab (Rs. 1.07/kWh) and West Bengal (Rs. 2.21/kWh)

## 6.4. FREQUENCY OF TARIFF REVISIONS

The tariff revisions were done in FY 2010-11 after a gap of 8 years wherein tariffs were hiked substantially i.e. 13%. Thereafter commission has approved a tariff hike in FY 2012 by 24%. The table below provides the details of tariff revision in the state.

**Table I-17: Historical Trend in Tariff Revisions – Andhra Pradesh**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	13%	24%	NA	NA

Source: Approved Tariff Orders of DISCOM for that year

## 6.5. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION

In 2011-12, agricultural sales in Andhra Pradesh contributed ~ 28% of the overall sales mix in the state. The total agriculture connections in FY 2012-13 accounted for 29.90 lakh. As per the GoAP policy, agricultural sector is given seven hours of electricity supply.

All the four Discoms are implementing HVDS to agriculture consumers to give better quality power by reducing the length of conventional LT Lines. Already HVDS is implemented in 7 districts.

The state distribution utilities in Andhra Pradesh has been estimating unmetered agriculture consumption based on information available from meters fixed on LV side of Distribution Transformers primarily catering to the agricultural pump sets for working out a consumption norm. This consumption norm is further utilized for a more realistic estimation of unmetered agricultural consumption. The specific consumption per HP/month is arrived and is made applicable to all un-metered services by multiplying specific consumption and connected load in HP to arrive at total agriculture consumption.

However, the commission has approved a new ISI methodology to estimate the agricultural sales; however, implementation of the methodology requires updating of agricultural DTR data which currently is not updated. Hence, the utilities have continued to follow the old approach of estimating agricultural sales.



## 7. SUMMARY

The key aspects of the state are discussed below;-

- 1. Inadequate Tariff Revisions:** The tariff revisions in the state have been inadequate. No tariff hikes were observed for several years, and tariffs were increased in FY 11 and FY 12 wherein tariffs were hiked by 13% and 24% respectively, which were not commensurate with increasing power purchase cost.
- 2. Power purchase cost:** AP has a substantial share of hydro power in generation based capacity, i.e. to the tune of 21%, which makes it dependent on monsoons. The weak monsoons over the years have led to low PLF from hydro power plants. This is further going to worsen, due to expected lower than average monsoons in future. Further, due to non-availability of gas the PLF's of gas based power plants have also reduced. These issues have led to procurement of costly medium and short term power leading to increase in power purchase cost.
- 3. Subsidy:** The subsidy burden of the state has increased to 24% of revenues in 2011-12 from 12% in 2004-05. The dependence on such high levels of subsidies is unsustainable for the sector. The trend in subsidy pay-out with respect to subsidy booked has been as low as 21% FY 2008-09. However, Subsidy payout has increased in 2010-11 and 2011-12, to the tune of 50%-60%. The low subsidy payout has deteriorated the financial position of the utility.
- 4. Financial Losses:** The distribution financial losses without subsidies in Andhra Pradesh has increased over the years due to inadequate tariff revisions. The losses without subsidy have increased from Rs 1924 Cr to Rs 8088 Cr in FY 2011-12.
- 5. FRP:** The state has opted for the FRP scheme, under the scheme the bonds to the tune of INR 1380 Cr has been issued. The key area of concerns for the state for successful implementation of FRP is its high subsidy burden and inadequate tariff revisions, which have led to huge ACS-ARR gap that need to be reduced significantly to 26%. However, post the Telangana Bill, there may be consequent effect in implementation of FRP in the state.
- 6. States Guarantees** for the sector are significant and account for ~10.54% of Total Revenues of the state
- 7. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 7.88% of the revenue generated by the state and 1.61 % of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector decreases to 7.84% of the State revenue and 1.60 % of the GSDP.

However, post Telangana bill, which provides for division of new state also provided how the power infrastructure will be divided. Hence, post the divisions the state power sector will go through a significant change.

## II ARUNACHAL PRADESH

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

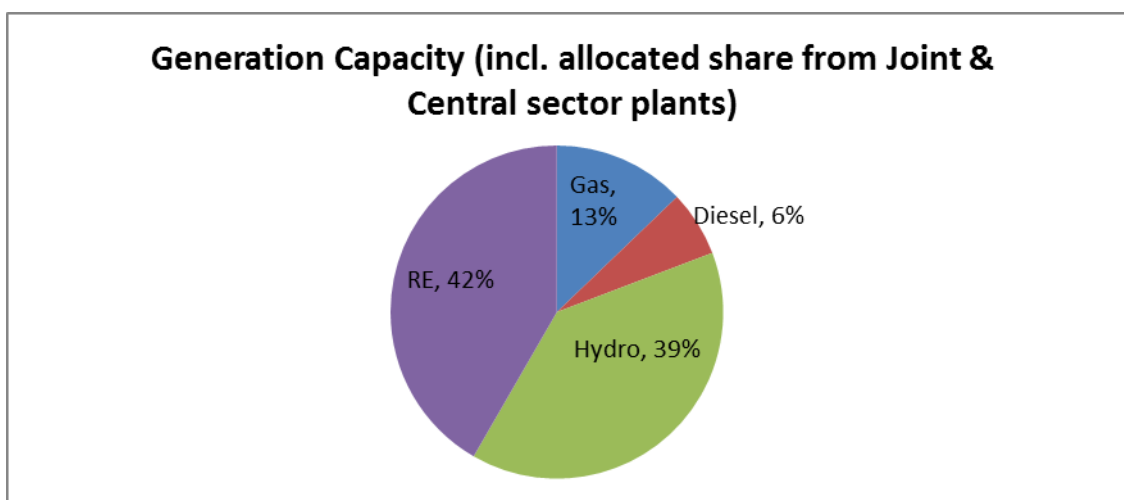
The government of Arunachal Pradesh constituted the Electricity Regulatory Commission for the state on 7<sup>th</sup> May 2010 to bring in efficiency and transparency in tariff determination and maintenance of accounts. The Power Department of the State Government is responsible for carrying out the business of Power transmission and distribution in the state. Arunachal Pradesh majorly meets its power requirements through procurement from central sector power generating stations. A small amount is met through Arunachal Pradesh Department of hydro power development.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Arunachal Pradesh was 249.41 MW. Out of total capacity as on Feb 2014, RE power capacity accounted for ~42% followed by large Hydro (~39%) and Gas (~13%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure II-1: Generation Capacity Mix as on Feb 2014 – Arunachal Pradesh**



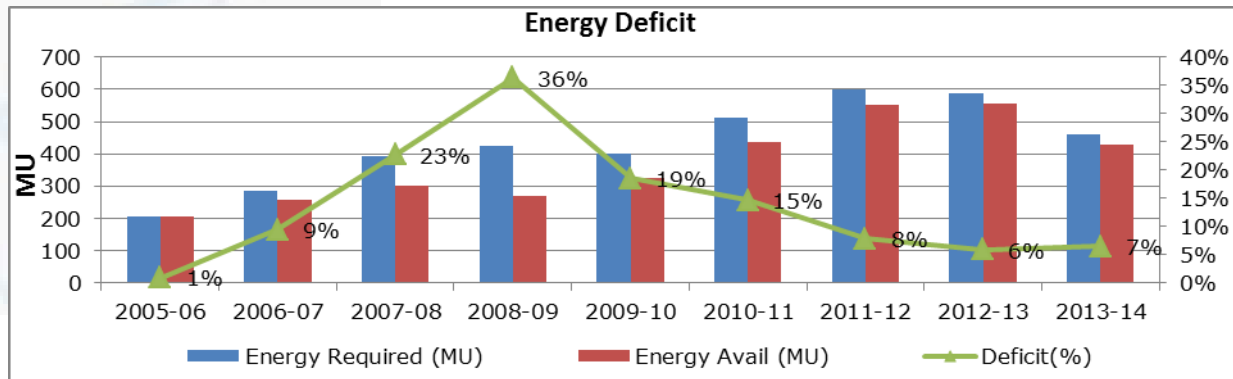
Source: CEA

#### 1.3. POWER SUPPLY POSITION

With efficient guidelines laid down by the commission towards the Electricity Department, there have been visible improvements in the power supply position in the state. The energy deficit has decreased from 15% in FY 2010-11 to 7% in FY 2013-14 and the peak deficit has significantly decreased from 16% in FY 2010-11 to 1% in FY 2013-14. The state meets most of its power requirements through procurement from central power stations and power allocations from state hydro plants. The state also procures power from the short term market, especially during peak hour deficits. The state has firm power allocations from central generating stations and any additional demand beyond the said allocation is met through external sources. Till date, the state has been meeting such shortages through Unscheduled Interchange (UI).

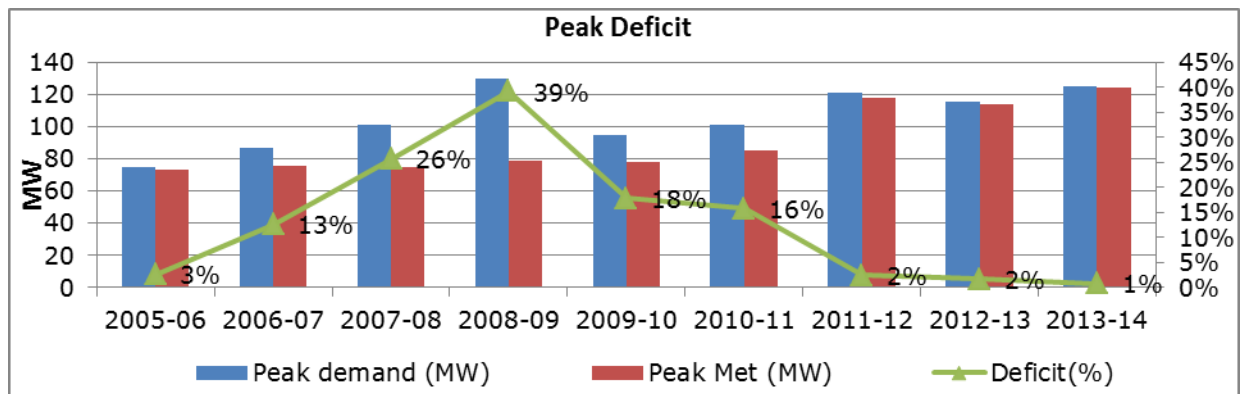
The trend of energy and peak deficit observed in Arunachal Pradesh over the years is highlighted in the figure below:

**Figure II-2: Energy Deficit – Arunachal Pradesh**



Source: CEA

**Figure II-3: Peak Deficit – Arunachal Pradesh**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

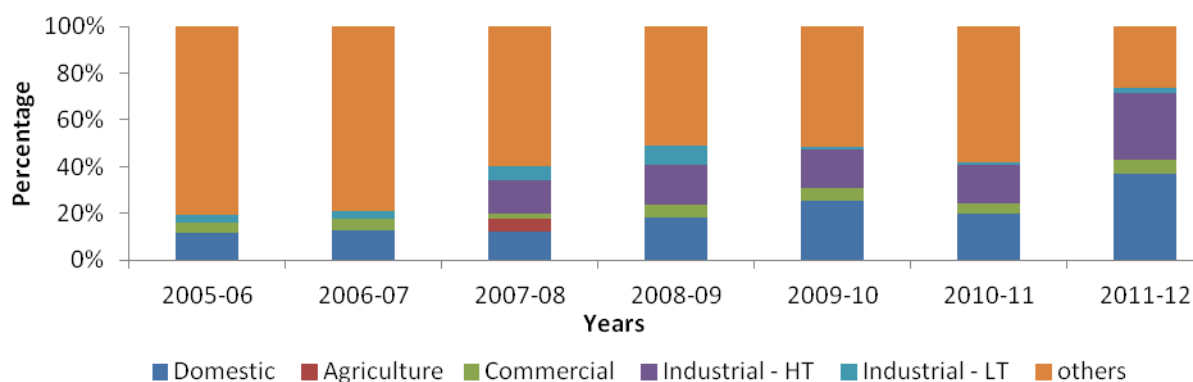
### 2.1. CONSUMER SALES MIX OF ARUNACHAL PRADESH

The Arunachal Pradesh Department of Power (APDOP) is the sole unit taking care of the power supply in the state across different consumer categories.

In FY 2011-12, domestic sector dominated the sales mix with a share of 37%, followed by Industrial HT category (29%). The share of domestic category has increased from 11.7% in 2005-06 to 36.8% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure II-4: Historical Trend in Consumer Sales Mix – Arunachal Pradesh**



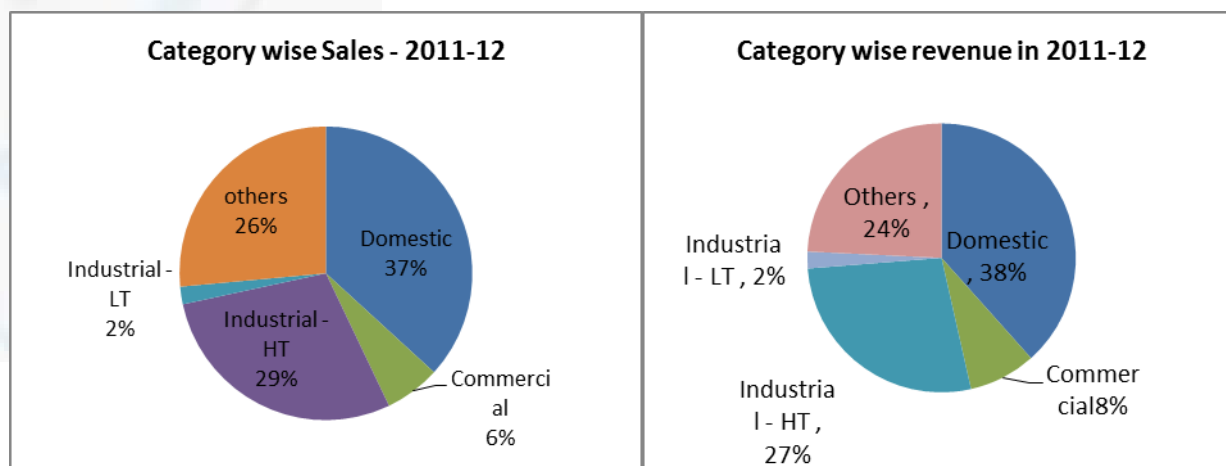
Source: PFC

The overall sales have registered a CAGR of 2.16% over the span of seven years wherein the sales of HT Industrial category have registered a higher CAGR of 28% within five years followed by the Domestic category with a CAGR of 25%.

In terms of revenue contribution, domestic category contributed for about 38% of revenue, followed by HT Industrial category and commercial category with a share of 27% and 8%, respectively (Refer Figure I-5 below).

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure II-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 – Arunachal Pradesh**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The losses for APDOP have been high because maximum sale is in the domestic segment with low individual consumption, which is spread over a wide geographical area, leading to increasing low voltage lines and T&D losses.

**Table II-1: Year on Year Trend in AT&C losses and Collection Efficiency - Arunachal Pradesh**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	69.0%	58.0%	61.6%	60.2%	58.8%	61.5%	65.6%	69.0%
Collection Efficiency	29%	104%	91%	109%	94%	96%	69%	29%

Source: PFC

The prevailing transmission networks in the state are not efficient. There haven't been adequate investments in T&D networks, particularly in sub transmission and distribution. Further, defective metering, unmetered supply and pilferage have increased the losses.

The collection efficiency has also been on the lower side because of unmetered supply. Until 2010, less than 50% of consumers were metered (Source: Planning commission report on state performance). Moreover, a large portion of the meters at the consumer end is found to be obsolete/defective.

## 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of distribution cost. Power purchase cost has accounted for an average of ~50% of the total distribution cost over the years (Refer table below).

The per unit cost break-up for different cost components for the state of Arunachal Pradesh is provided in the table below:-

**Table II-2: Year on Year Trend Distribution Cost Breakup - Arunachal Pradesh**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	-	2.43	2.47	2.42	1.29	2.44	2.49	3.84
O&M (R&M + A&G + EC)	-	1.48	1.89	1.55	1.05	2.33	3.19	2.51
Interest	-	0.47	0.60	0.43	0.23	0.45	0.37	0.20
Depreciation	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other cost	-	0.20	0.27	0.19	0.04	0.08	0.07	0.07

Source: PFC

It can be observed that power purchase cost per unit has increased over the last four financial years. There are few reasons behind that:

- The demand for power has increased in the state with increasing domestic share and urbanization, while the level of capacity addition has been poor.
- The state has been procuring emergency requirements through Unscheduled Interchange (UI).
- Since, most of the state power requirements are met through allocated power from central generating stations, the transmission charges payable to PGCIL has also been increasing.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased with respect to the increasing power purchase cost.

The table below shows the revenue realization (without subsidy) from different consumer categories of consumers over the years.

**Table II-3: Historical Trend Consumer Category Wise Revenue Realization - Arunachal Pradesh**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.86	2.08	2.71	2.84	3.00	3.17	3.33	1.86
Agriculture	-	-	-	-	-	-	-	-
Commercial	1.76	2.22	9.00	3.33	3.85	4.00	4.21	1.76
Industrial HT	-	-	2.36	2.47	3.00	3.21	3.03	-
Industrial LT	1.82	2.50	3.18	3.40	5.00	3.33	3.33	1.82
Others	2.05	2.16	2.80	2.46	3.41	2.80	2.93	2.05

Source: PFC

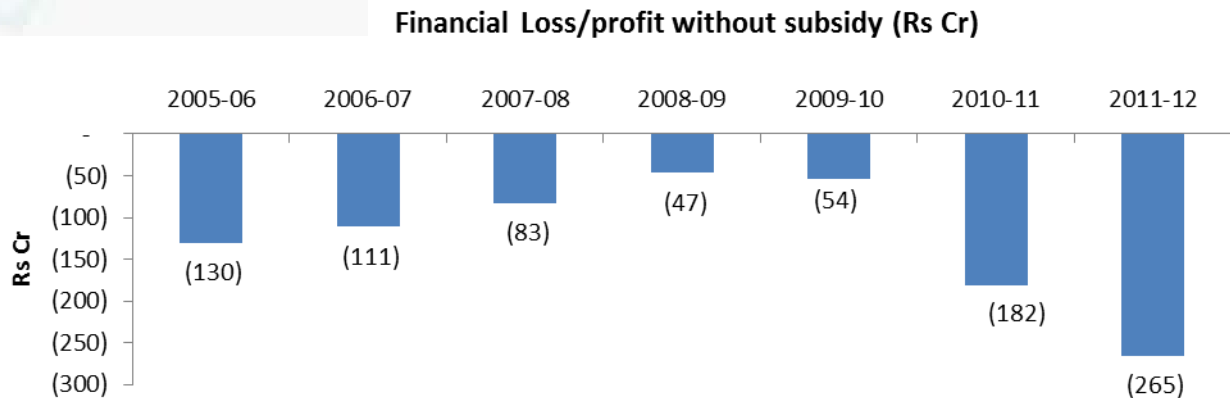
Tariff revision in the state as per the commission tariff order (FY 13-14) has only been for Industrial LT and HT categories of up to 5.24%

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Arunachal Pradesh has increased over the years. As discussed earlier, this is because of increasing power purchase cost and inadequate tariff revisions over the years.

**Figure II-6: Historical Trend Financial Losses (w/o) subsidies – Arunachal Pradesh**



Source: PFC

Due to lack of intra state grid infrastructure, the state needs to export domestically generated power which otherwise could have been utilized locally. As a result, the power purchase cost has subsequently increased over the years with increasing procurement from short term market.

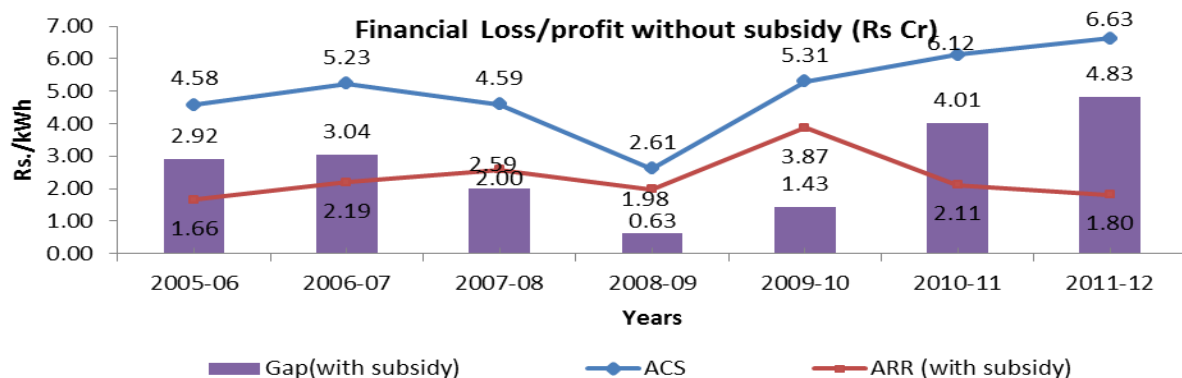
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There has been no subsidy booked or received over the years.

#### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has been high in the initial years. There has been a decrease from 2007 onwards and a rise again from 2009. The rise is observed is a result of increasing power purchase cost and inadequate tariff revisions as discussed above.

**Figure II-7: Historical Trend ACS v/s ARR (with subsidy) – Arunachal Pradesh**



Source: PFC

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms a negligible part of the total tax revenue over the years. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details for the same are provided in the table below.

**Table II-4: Tax Revenue from Power Sector – Arunachal Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0	0	0.0003
Total Tax Revenue	649	935	1,157
Power sector Tax Revenue / Total state Tax Revenue	0%	0%	0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through royalty/cess on water for power generation. The Non Tax revenue from power sector forms a substantial portion of the total non-tax revenue of state over the years. There has been a decrease in the revenue from Power Sector along with the total state Non –Tax Revenue. The decrease in power sector Non –tax revenue has been on account of decrease in receipts from Hydel Generation.

The details for the same are provided in the table below.

**Table II-5: Non-Tax Revenue from Power Sector - Arunachal Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	329	282	145
Total Non-Tax Revenue	511	530	360
Power sector Non - Tax Revenue /Total state Non-Tax Revenue	64%	53%	40%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The overall income generated from the power sector has decreased from Rs 329 Cr in FY 2010 to Rs 145 Cr in FY2012 along with the share in total state receipts.

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.



**Table II-6: Expenditure on Power Sector - Arunachal Pradesh**

Categories	2009-10	2010-11	2011-12 Rs Cr.
Capital expenditure	294	257	204
Revenue Expenditure	209	277	359
Total Power Sector Expenditure	502	534	563

Source: C&AG Audited Accounts for the state - 2011-12, 2010-11, 2009-10

The capital expenditure on Power sector has decreased over the years primarily on account of decrease in investments in Hydel Generation. The revenue expenditure however, has increased over the years on account of increase in expense towards T&D.

**The expenditure on Power Sector has exceeded the Revenue generated from Power Sector over the years.**

#### **4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

In 2011-12, no guarantees or subsidies were given to the power sector.

#### **4.4. POWER BONDS**

Power Bonds were issued in 2003-04 to be discharged completely by 2016. The bonds were issued to tune of Rs 12.03 Cr. The total outstanding at the end of 2011-12 was Rs. 9.6 Cr. As per RBI 'State Finance Report' 2014, there was no outstanding amount of Power Bond liability as on 31<sup>st</sup> March 2014.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.

**Table II-7: Financing Requirement of Power Sector (2011-12) - Arunachal Pradesh**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	563
Loans And Advances made by the State Government (Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	2.4
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0
Total Power Sector Financing during the year	565
Sector Financing Requirement as a % age of total revenues of state	11%
GSDP nominal	5,666
Sector Financing Requirement as a % age of GSDP	9.98%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	(265)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	16%
Sector Financing Requirement as a % age of GSDP including financial losses	14.66%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 11% of the revenue generated by the state and 9.98 % of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 16% of the State revenue and 14.66 % of the GSDP.

State investments towards power sector went to Hydel generation, whereas major portion of the revenue expenditure went towards transmission and distribution followed by Hydel generation. Considering the significant amount of Discom loss, there is a need for investments in T n D segment to strengthen the infrastructure.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Government of Arunachal Pradesh constituted the Arunachal Pradesh State Electricity Regulatory Commission (APSERC) on 7<sup>th</sup> May, 2010 and it started its operations from 2<sup>nd</sup> March, 2011. The regulator is fairly new in the state with its first tariff order on 2013. The Commission has issued recent notifications of Open Access Regulations, 2012 and MYT regulations, 2013.

The key aspects of regulatory effectiveness have been discussed below -

### **5.1. STATUS OF MYT REGULATIONS**

The Commission has notified MYT Regulations in FY 2013. However, its implementation is not carried forward by the commission because of lack of requisite and reliable data.

### **5.2. STATUS OF OPEN ACCESS IMPLEMENTATION**

The Commission notified the Open Access Regulations on 19<sup>th</sup> Nov, 2012. According to the regulation:

- Consumers requiring 5MW or more and a generating station of 5MW and more shall be eligible for intra-state transmission system
- Similarly, a consumer having load of 1MW and less than 5MW, and a generating station within the same band would be eligible for distribution system connectivity
- The regulation further provides guidelines on open access transmission charges, wheeling charges, cross subsidy surcharge and additional surcharges.

### **5.3. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions in the state have not been frequent. The latest major tariff revision which took place was in 30<sup>th</sup> May 13, to the tune of 5.24% for Industrial IT and HT consumers for FY13-14.

## 6. SUMMARY

The energy deficits in the state have decreased over the years while at the same time the power purchase cost has subsequently increased because of lower capacity addition in the state generation capacity and lack of intra state grid infrastructure. All this have led to procurement of costly short term power. The metering level has been equally poor. All these factors, put together have lead to poor financial position of the state power sector. The key parameters of the states are discussed below-

1. **Unmetered sales:** There has been low level of metering both at the feeder and consumer end. Until 2010, less than 50% of the consumers were metered. This shows that there is an urgent need of improvement with this regard.
2. **Inadequate Tariff Revisions:** The tariff revisions in the state have been inadequate. No tariff hikes were observed for several years. The commission has only issued its first tariff order in which it approves a tariff hike of 5.24% for Industrial HT and LT consumers for FY 13-14. There hasn't been appropriate tariff hikes against the increasing power purchase cost
3. **Power purchase cost:** The power purchase cost have increased over the years primarily because of low capacity addition and lack of intra-state grid infrastructure.
4. **Financial Losses:** The distribution financial losses without subsidies in Arunachal Pradesh has increased over the years due to inadequate tariff revisions and poor metering level. The loses without subsidy have increased form Rs 47 Cr in FY 2008-09 to Rs 265 Cr in FY 2011-12.
5. **Regulatory:** Not many reforms have been observed in the state w.r.t., the power sector. The regulatory commission was established in 2010, with its first tariff order in 2013. The process of unbundling is still not undertaken and till date the Electricity Department of the state government is responsible for generation, transmission and distribution of electricity. Even after a decade past the electricity act, the state has been poor in terms of reforms implementation.
6. **Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 11% of the revenue generated by the state and 9.88% of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector increases to 16% of the State revenue and 14.66% of the GSDP.

## III ASSAM

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The power sector reforms in the state of Assam underwent with the unbundling of Assam State Electricity Board (ASEB) on the functional line with one generation company, a transmission company and three distribution companies were formed out of ASEB.

- Lower Assam Electricity Distribution Company – Distribution Company
- Upper Assam Electricity Distribution Company - Distribution Company
- Central Assam Electricity Distribution Company - Distribution Company
- Assam Power Generation Company Limited – Generation Company
- Assam Electricity Grid Corporation Limited - Transmission Company

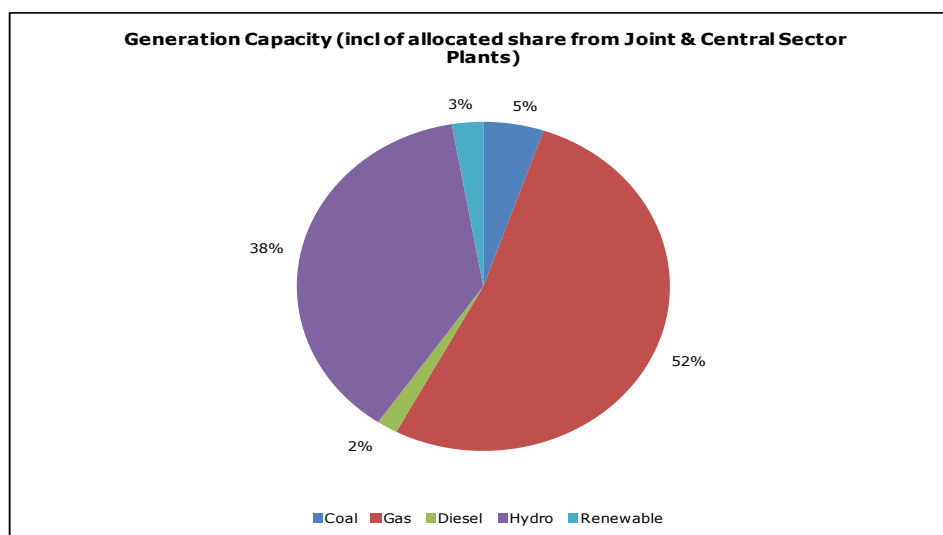
Government of Assam transferred, the functions, properties, interests, rights, obligations and liabilities of UAEDCL and CAEDCL along with to LAEDCL with effect from 1st April 2009. The name Lower Assam Electricity Distribution Company Ltd. Was changed to Assam Power Distribution Company Ltd.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants), for Assam was 1,140.04MW, out of which gas-based capacity accounted for ~52% of the total installed capacity; followed by hydro (~38%) and coal (~5%). Renewable based capacity accounted for ~3% of the overall capacity mix in the state.

Figure below presents the generation capacity mix in the state of Assam.

**Figure III-1: Generation Capacity Mix - Assam**



Source: CEA

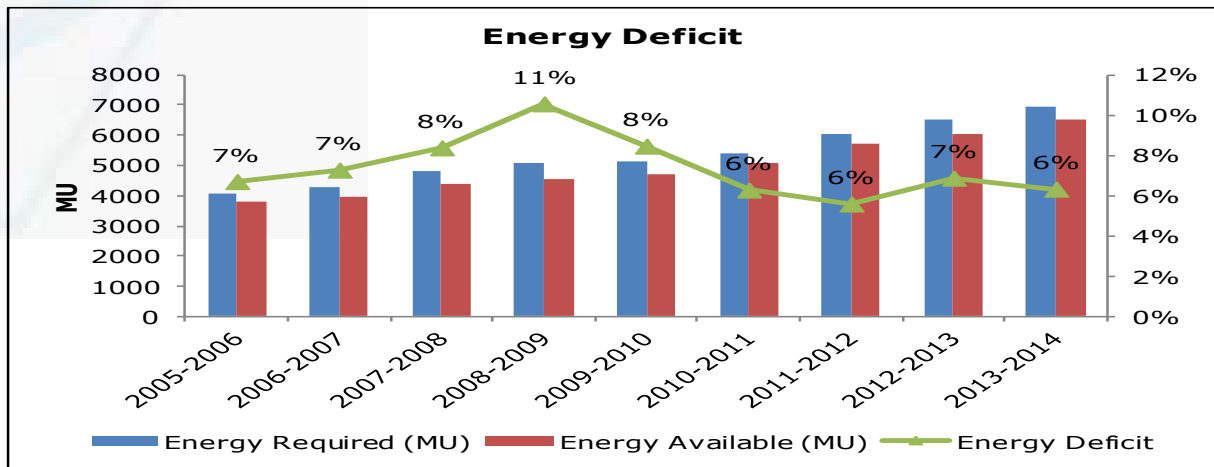
#### 1.3. POWER SUPPLY POSITION

The energy deficit levels in the state of Assam have been steady in the range of 7% to 11%, due to slow growth in energy and peak demand from FY 06 to FY 14. Further, the

peak deficit in the state has been in the range of 8% to 17% from FY 06 to FY 14. The peak deficit increased in FY 09, due to sharp increase in peak demand in that year.

The trend of energy deficit observed in Assam over the years is presented in the figure below:

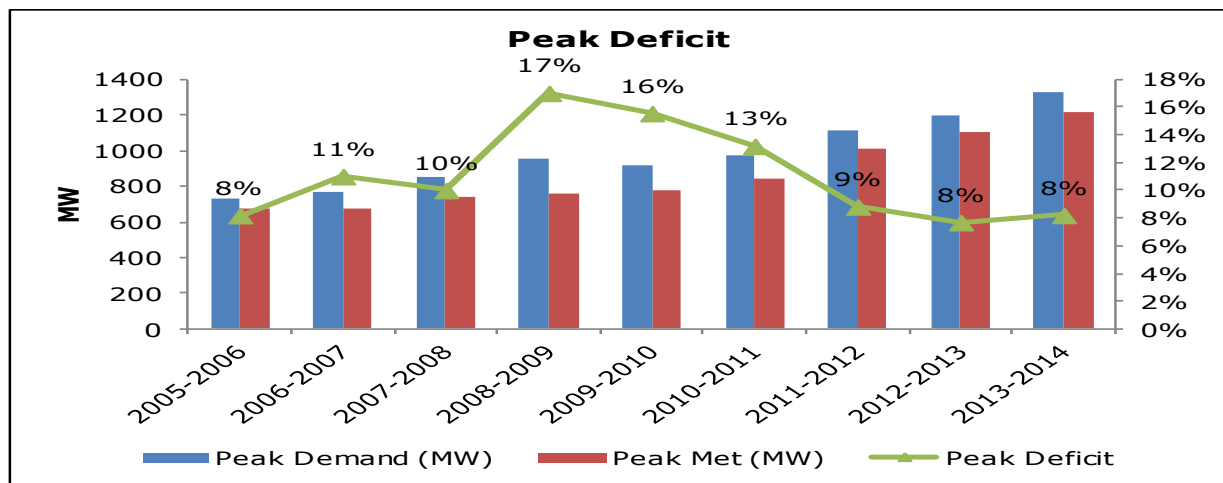
**Figure III-2: Historical Trend in Energy Deficit – Assam**



Source: CEA

The trend of peak deficit observed in Assam over the years is presented in the figure below:

**Figure III-3: Historical Trend in Peak Deficit – Assam**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF ASSAM

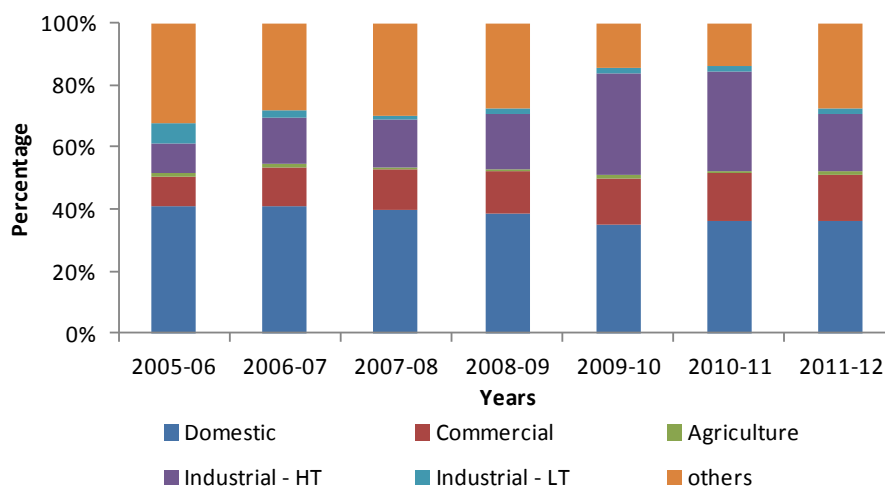
The distribution activities in the state of Assam is carried out by the re-bundled APDCL that caters to more than 3 million consumers in the state, with ~93% domestic consumers in the state.

In 2011-12, domestic consumer sales dominated the sales mix with a share of 36%, followed by industries (19%) and commercial (15%) segments. Further, agriculture had a marginal 1% share in the overall sales mix in the state.

The share of domestic sales have reduced over the years while the share of industrial sales have increased. The share of domestic sales have reduced from 41% in 2005-06 to 36% in 2011-12 and the industrial sales have increased marginally from 16% in 2005-06 to 19% in 2011-12. It must be noted that the decline in industries in overall sales mix in 2011-12 compared to 2010-11 was due to representation of tea and rubber industries to Other consumer segments.

The figure below illustrates the year on year trend in the consumer mix for the state of Assam.

**Figure III-4: Historical Trend Consumer Sales Mix – Assam**

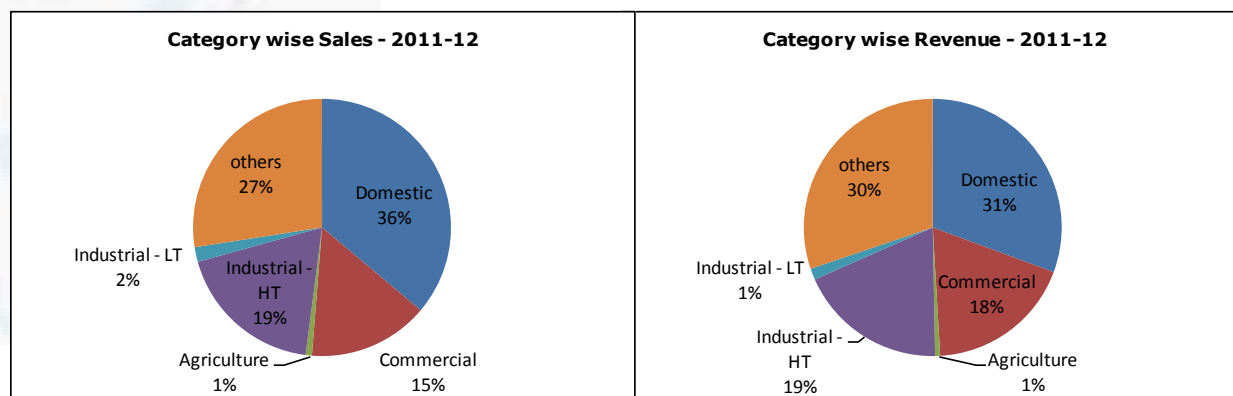


Source: PFC

The overall sales has registered a CAGR of ~11% from FY 05 to FY 12; wherein sales to commercial and industrial consumers have registered a comparatively higher CAGR of ~16% and 13% in the same period.

In terms of revenue contribution, domestic category contributed ~31% of the revenue, followed by industrial (excluding rubber and tea) and commercial categories with a share of 19% and 18% respectively.

**Figure III-5: Comparative Analysis Consumer Sales and Revenue Mix (w/o subsidy) in 2011-12 – Assam**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The AT&C losses of the distribution utility have historically been high when compared to the national average. The AT&C losses increased substantially in FY 10, on account of poor collection efficiency in that year.

The table below illustrates the year on year trend on commercial losses and collection efficiency of the distribution utility.

**Table III-1: Historical Trend AT&C losses and Collection Efficiency - Assam**

Year	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	35.2%	36.6%	34%	33%	56%	29%	29%
Collection Efficiency (%)	94%	94%	98%	96%	59%	96%	93%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost, accounting for ~81% of the overall distribution costs. The per unit cost break-up for different cost components for the state of Assam is provided in the table below:-

**Table III-2: Historical Trend in Distribution Cost Breakup - Assam**

Cost Component (Rs per kWh)	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	2.14	2.34	3.18	3.21	3.01	3.95	4.27
O&M (R&M + A&G + EC)	0.79	0.77	0.88	0.93	0.93	0.94	0.99
Interest	0.11	0.10	0.15	0.17	0.16	0.16	0.17
Depreciation	0.09	0.08	0.11	0.14	0.14	0.16	0.11
Other cost	0.10	-0.01	0.05	0.04	0.03	0.01	-0.27

Source: PFC



As discussed, the generation capacity in the state of Assam is dominated by gas based generation. The increase in power purchase price in FY 11, on account of increase in gas price (APM gas) from \$1.9 per MMBTU to \$4.2 per MMBTU in the same year, significantly increased the power purchase cost. Further, with the enactment of Rangarajan's committee report on the domestic gas pricing, would further increase the APM gas price to \$8.40 per MMBTU.

The per unit employee cost (constitutes ~89% of the overall O&M costs) continues to remain high, on account of inefficient utilization of the existing manpower by the state distribution utility.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has increased commensurate to increasing power purchase cost (from FY 06 to FY 10). However, with increase in APM gas price in FY 11, the increase in revenue realization has not reflected the increase in power purchase costs.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table III-3: Historical Trend in Consumer wise Average Revenue Realization (w/o subsidy) - Assam**

Years	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	3.06	3.30	3.39	3.24	3.60	3.34	4.22
Agriculture	6.06	5.46	5.80	5.58	5.31	5.59	6.06
Commercial	4.12	4.44	5.71	3.81	3.45	3.55	4.06
Industrial HT	6.42	4.71	4.91	4.53	2.33	2.59	4.97
Industrial LT	1.25	3.80	6.84	3.05	3.00	3.06	3.82

Source: PFC

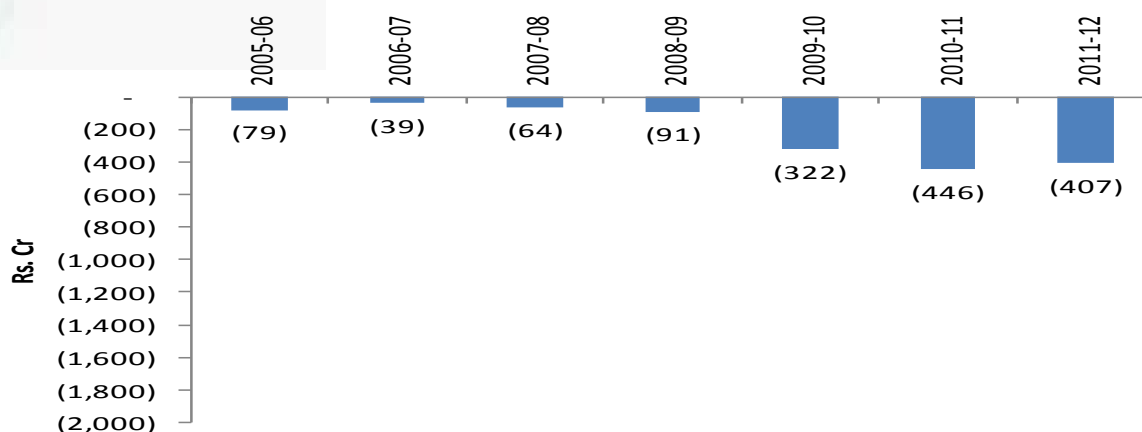
As shown in the table above, the average revenue realization declined in FY 10 due to increased commercial losses reported in that year.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Assam has increased substantially from FY 10 to FY 12. The figure below depicts the year on year trend in the profit/ (loss) booked by the state DISCOM

**Figure III-6: Historical Trend in Financial Losses (w/o subsidy) - Assam**



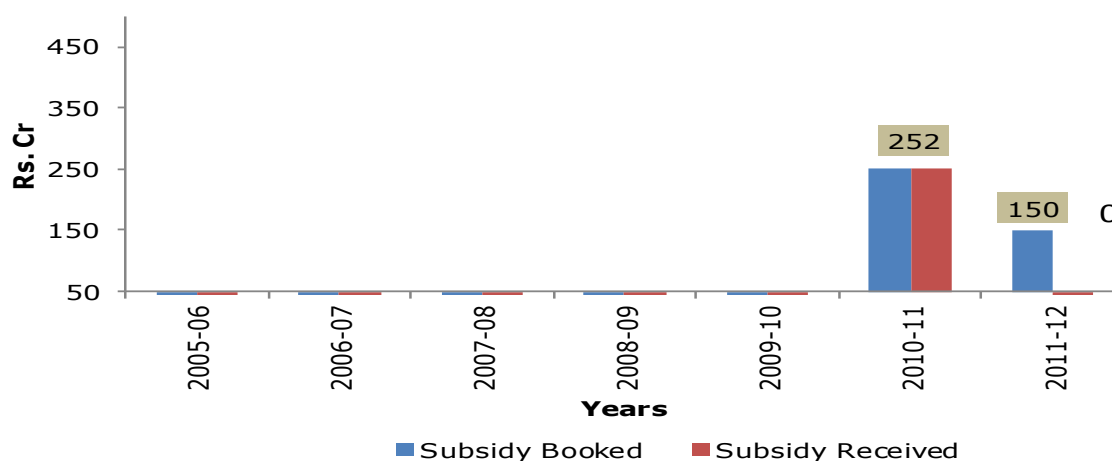
Source: PFC

The loss levels increased significantly in FY 10, on account of increased AT&C losses reported in that year. In addition, with the sharp increase in gas prices and inadequate increase in consumer tariffs have resulted in increase in reported financial losses of the distribution utility.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

In 2011-12, the subsidy contributed ~6% of the total revenues of the state distribution utility. The distribution company booked subsidy for the first time in 2010-11, due to increased power purchase costs. The figure below presents the year on year trend in subsidies booked and received by the state DISCOM.

**Figure III-7: Historical Trend in Subsidy Booked v/s Subsidy Received - Assam**



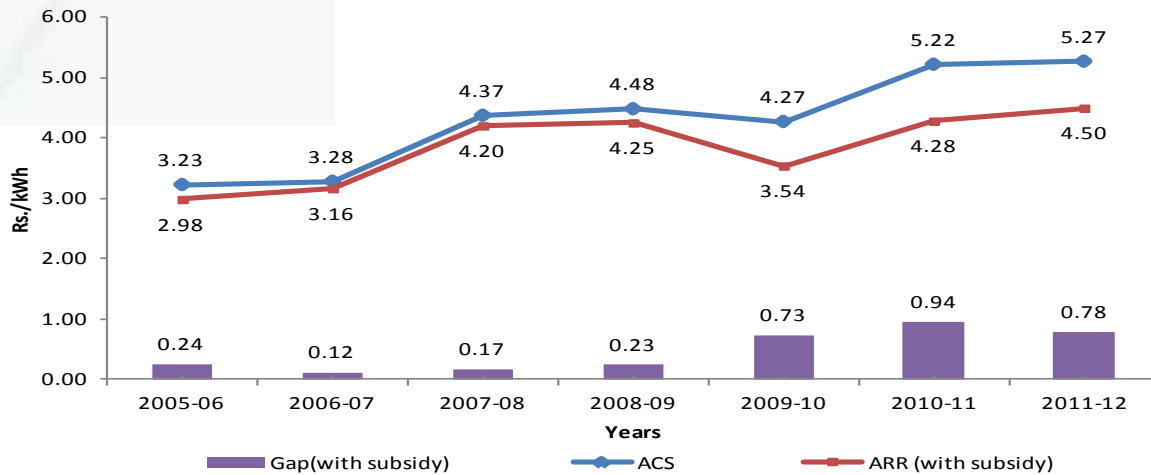
Source: PFC

In 2011-12, the distribution company did not receive the booked subsidy from the state government, further straining the financial health of the distribution utility.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has increased substantially from FY 10 to FY 12. The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure III-8: Historical Trend in ACS v/s ARR (with subsidy) - Assam**



Source: PFC

The high AT&C loss levels (in FY 10) and increased power purchase costs (FY 11 onwards) have resulted in increase in gap (with subsidy). Further, the tariff hike did not commensurate the increase in cost to serve.

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~0.3% of the total tax revenue in the state. The details for the same are provided in the table below:

**Table III-4: Tax Revenue from Power Sector - Assam**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	27	42	37
Total Tax Revenue	10,326	13,898	16,922
Power sector Tax Revenue / Total state Tax Revenue	0.26%	0.3%	0.22%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The power sector has not generated any Non Tax Revenue since FY 10. The table below highlights the same:

**Table III-5: Non-Tax Revenue from Power Sector - Assam**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	0	0	0
Total Non-Tax Revenue	2,753	2,373	2,867
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0	0%	0.0%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The overall income generated from the Power Sector has increased marginally over the years. However, the contribution of Power Sector in overall State Revenues has been approximately the same (~0.3%).

### 4.2. EXPENDITURE ON POWER SECTOR

The details of the expenditure made on the power sector by the state are provided in the table below:

**Table III-6: Expenditure on Power Sector- Assam**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital Expenditure	181	174	117
Revenue Expenditure	12	29	102
Total Expenditure	192	202	219

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The capital expenditure has decreased in FY2011-12, primarily on account of decrease in investments towards T&D whereas the revenue expenditure has substantially increased on account of fresh expenditure against ASEB for debt services under RGGVY assistance of REC and assistance to Assam Electricity Regulatory Commission. .

The expenditure on Power sector has been more than the Revenue generated from the power sector over the years.

### **4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table III-7: Guarantees as a Percentage of Total Revenues - Assam**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	2	1	8
Total Revenues of the State	13,079	16,272	19,789
Guarantees as a %age of Total Revenues of State	0.01%	0.01%	0.04%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The state government guarantees towards power sector constituted a marginal share (~0.01%) of the overall state revenues.

The sector did not receive any subsidy from state government.

### **4.4. POWER BONDS**

8.5% Power Bonds of Assam were issued by State Government to be redeemed by 2016. The outstanding balance as on 1st April 2007 was Rs 771.78 Cr. The total outstanding balance at the end of 2011-12 was Rs 343.01 Cr. Rs (-) 85.75 Cr has been added every year to the outstanding amount. The minus figure is due to transfer of amounts from Market Loan bearing interest to not bearing interest on their maturity for repayment.

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bond as on 31<sup>st</sup> March 2014 was Rs 170 Cr.

#### 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table III-8: Power Sector Financing (2011-12) - Assam**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	219
Loans And Advances made by the State Government (Net of Recoveries)	64
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0
Total Power Sector Financing during the year	283
Sector Financing Requirement as a % age of total revenues of state	1.43%
GSDP nominal	80172
Sector Financing Requirement as a % age of GSDP	0.35%
Financial Profit/ (Losses) of DISCOM during the year (With Subsidy realised)	(557)
Sector Financing Requirement (including financial losses of DISCOM ) as a % age of total revenues of state	4%
Sector Financing Requirement (including financial losses of DISCOM ) as a % age of GSDP	1.05%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

The financing requirement for the Power sector in the state was estimated to be ~2% of the revenue generated by the state and 0.48 % of the Gross State Domestic Product. Considering, the financial losses of DISCOM in the year, the financing requirement of the sector increases to 4% of the State revenue and 0.99% of the GSDP.

## 5. REGULATORY EFFECTIVENESS

Assam Electricity Regulatory Commission was established as a single member commission on February, 2001 as per provisions of Electricity Regulatory Commission Act 1998.

The major functionality of the regulator were as follows:

- To determine the Tariff for Electricity whole sale, Bulk, Grid or retail as the case may be in the manner prescribed in the Act.
- To determine the tariff payable for the use of the transmission facilities in the manner prescribed in the Act.
- To regulate power purchase and procurement process of the transmission utilities including the prices at which power shall be procured from the generating companies ,generating stations, or from other sources for transmission sale distribution and supply in the state .
- To promote competition efficiency and economy in the activities of electricity industries to achieve the objects and purposes of the Act.

### 5.1. BUDGETING

The status of budgeting information is not available in public domain.

### 5.2. STAFFING

The status of staffing information is not available in public domain.

### 5.3. MYT REGULATION

The MYT has been implemented for the second control period (FY 14 to FY 16). The commission had selected a first control period (three years). The Multi Year Tariff (MYT) regime is benefit to consumers as well to the utilities, enabling them to plan for the long term, without any apprehension of regulatory uncertainty.

### 5.4. TARIFF REVISION

The tariff revisions in the state have been regular, except in FY 09. The state commission has not approved a sharp increase in tariff from FY 07 to FY 13. However, the tariff increased by ~10% in FY 13.

The ineffective tariff revision in the state is one of the primary reasons for high level of gap between cost of supply and revenue realization. The table below depicts the historical trend in historical revision in the state.

**Table III-9: Historical Trend in Tariff Revisions - Assam**

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
Average Tariff Revisions	3.30%	1.11%	0.00%	4.61%	2.71%	3.09%	10.13%

Source: Approved Tariff Orders of DISCOM for that year

### 5.5. LEVEL OF METERING

The state distribution utility has been able to attain 100% metering across the consumer segments. Although, it is not known whether all the meters are effectively functioning and recording the energy consumed. The commission has noted that the commercial losses recorded in the state are mostly due to pilferage/electricity theft.

## **5.6. OPEN ACCESS**

The State Load Dispatch Centre (SLDC) of Assam which was established in the year 1983. SLDC, Assam is presently being operated by the state transmission utility of Assam i.e. Assam Electricity Grid Corporation Ltd. (AEGCL). The SLDC is responsible to keep account of the quantity of electricity transmitted through the state grid including the energy exchanged through Power Exchange entities, and bi-lateral trading through Open Access system. Open access regulations were issued by AERC on August 1 2005 as 'Open Access Regulations, 2005'. The present application status of open access consumers is not available.

The regulator has had a positive impact on the operations of the distribution utilities, with important provision of the Electricity Act, 2003 and National Tariff Policy enacted by the state distribution utility like the MYT framework, 100% metering, regular tariff revision. However, the impact of the above mentioned provisions were negated by sharp increase in gas prices that has further increased the financial loss levels in the state. The state distribution utility needs support from government subsidies to balance further increase in power procurement costs.



## 6. SUMMARY

- 1. Re-bundling:** The state distribution utility in the state were unbundled in 2004 into three independent distribution utilities. However, lack of inter-utility coordination, increased costs resulted in horizontal re-bundling of the distribution utility into APDCL in 2009.
- 2. Increased Power Purchase Costs:** The gas based install capacity contributes maximum to the capacity addition in the state of Assam. The financial health of the distribution utility was adversely affected with the increase in APM gas price in FY 2010-11. The power purchase costs are further going to increase with the implementation of Rangarajan's Committee report on domestic gas pricing.
- 3. Level of Metering:** The state distribution utility has been able to implement 100% metering across consumer categories. Although, the pilferage/electricity theft due to defective meters is a cause for concern.
- 4. Financial Losses:** The financial losses in the state has increased from FY 10, on account of high AT&C losses and increased power purchase costs. The distribution utility has not received subsidies from the state government to cover the financial, further increasing the losses by the state distribution utility.

**The current financial position of the power sector poses a moderate risk on the state finances. However, with the proposed increase in domestic gas price along with lack of subsidy realization from the state government can increase the risk of power sector on the state finances.**

## IV BIHAR

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Bihar is the 12th largest state in terms of geographical size at 94,163 km<sup>2</sup> (2.86 percent of the India's total area) and third largest by population (population density of Bihar is 1102 per sq. km, population of Bihar accounts for 8.58 percent of the total population of India). Close to 85 percent of the population lives in villages<sup>2</sup>.

The economy of Bihar has been showing a steady growth trend. In recent years, not only the pace of growth has been accelerated, it has become more inclusive in nature. With the bifurcation of state in November 2000, newly created Jharkhand state took away the mineral rich part of the state and the present Bihar was left with its agro-based economy. Bihar GDP has grown at a CAGR of 18.8% in last nine years i.e. FY 2004-05 to FY 2012-13. With the increasing growth in Bihar the energy demand has also increased at a CAGR of 10% for the same period. In 2012-13, out of the total investments in Bihar, 70% were in power sector.

The power sector in Bihar was controlled by the Energy Department, Government of Bihar. The Bihar State Electricity Board (BSEB) was constituted under section 5 of Electricity (Supply) Act, 1948 on 1st April, 1958. It was deemed licensee in terms of Section 14 of the Electricity Act, 2003. Bihar State Electricity Board was engaged in the business of generation, transmission and distribution of electricity in the State of Bihar. However, BSEB was restructured on functional basis with effect from 1st November, 2012 into five successor companies under Bihar State Electricity Reforms Transfer Scheme 2012 issued by Energy Department, Government of Bihar, namely,

- ❑ Bihar State Power Holding Company Limited (BSPHCL)
- ❑ Bihar State Power Generation Company Limited (BSPGCL)
- ❑ Bihar State Power Transmission Company Limited (BSPTCL)
- ❑ North Bihar Power Distribution Company Limited (NBPDC) and
- ❑ South Bihar Power Distribution Company Limited (SBPDCL)

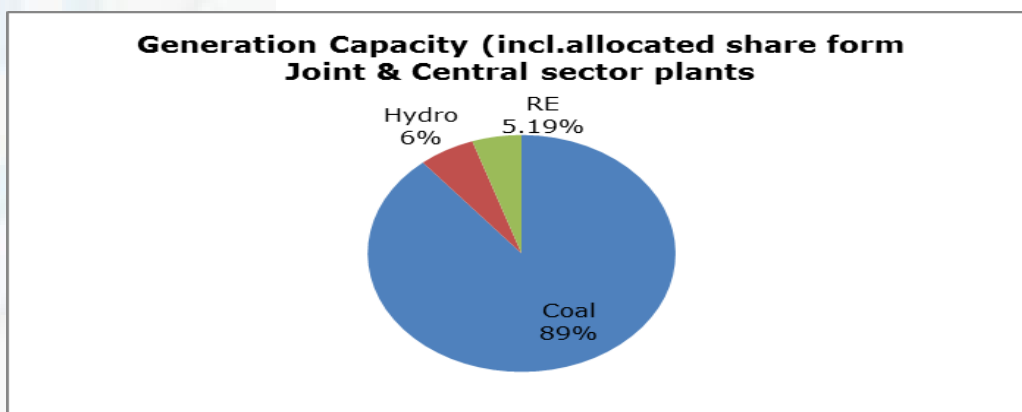
Bihar State Electricity Regulatory Commission (BERC) was constituted in May 2005 and the first tariff order was issued in FY 2006-07. The state's financial performance of power sector is dismal.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Bihar was 2198 MW. It has grown by 19% from Feb 2013 level of 1,849 MW. Out of total capacity as on Feb 2014, coal based power capacity accounted for ~89% followed by Hydro (~6%) and Renewable (~5%).

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

<sup>2</sup> IBEF

**Figure IV-1: Generation Capacity Mix as on Feb 2014- Bihar**

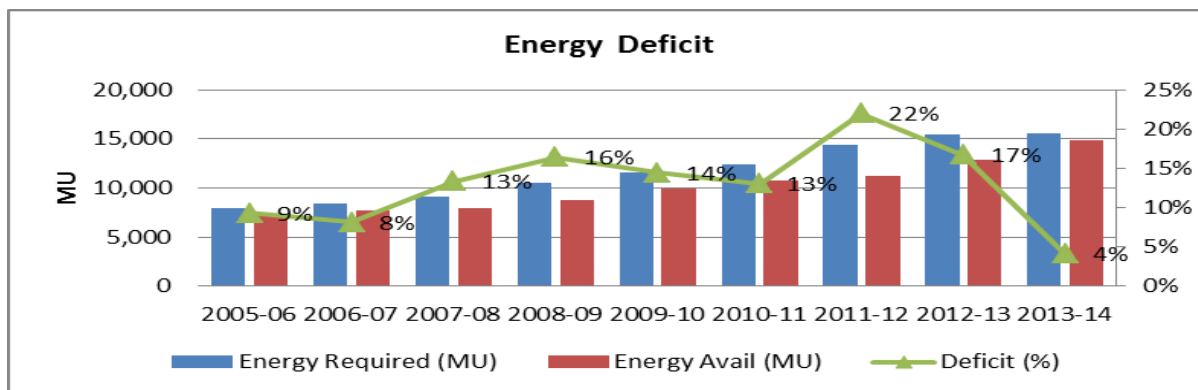
Source: CEA

### 1.3. POWER SUPPLY POSITION

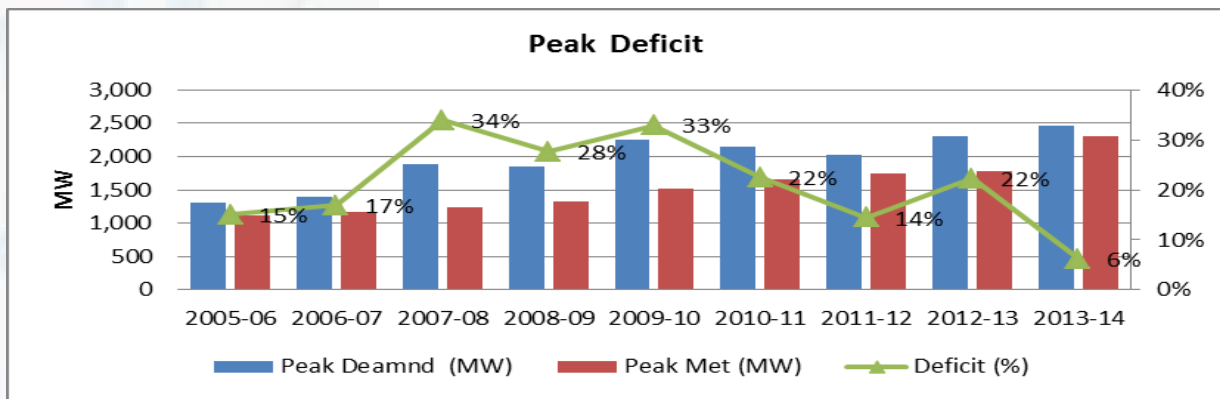
Bihar has been facing significant peak and energy deficit over past several years. The energy deficit has remained in the range of 9% - 22%, given the increase in load growth and inadequate capacity addition. However, in FY 2013-14 the energy deficit has reduced to 4%, due to increase in generation capacity by 19%.

The peak deficit in Bihar have remained in the range of 17% -34% till FY 2012-13, and peak deficit in FY 2013-14 has reduced to 6%.

The trend of energy and peak deficit observed in Bihar over the years is presented in the figure below:

**Figure IV-2: Energy Deficit – Bihar**

Source: CEA

**Figure IV-3: Peak Deficit – Bihar**

Source: CEA

Large area of the State is still un-electrified and there is no access. As the rural electrification program is underway, these groups of consumers will be added to the network and are expected to increase the energy demand.

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF BIHAR

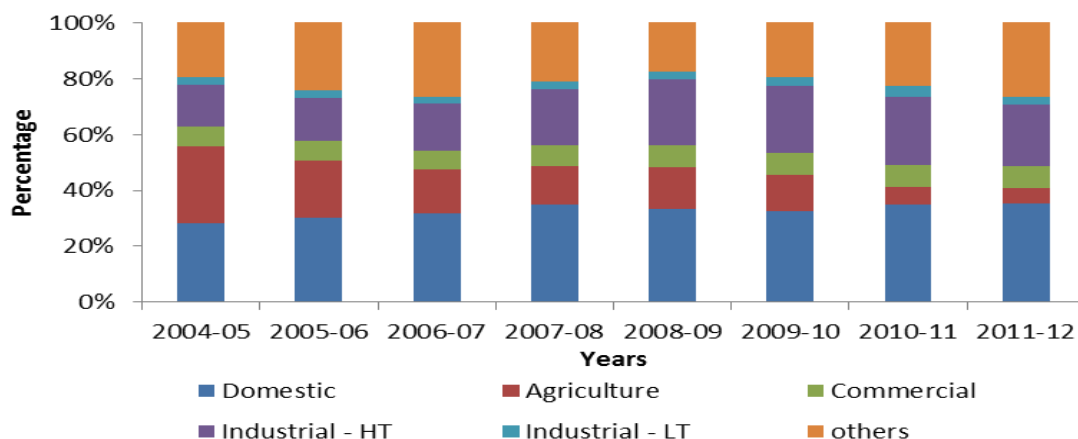
The two distribution utilities in Bihar are NBPDCCL which is engaged in the business of distribution of electricity in 21 districts of North Bihar and BSPDCCL in 17 districts of southern Bihar.

In 2011-12, domestic sales dominated the consumer sales mix with a share of ~35%, followed by Industries (22%) and Commercial (7.8%). The other and agricultural sales accounted for ~26% and 5.4% of sales mix in Bihar.

The share of domestic sales have increased from 28% in FY 2004-05 to 35% in FY 2011-12. However, the the share of agricultural share has significantly reduced from 27% in FY 2004-05 to 5% in FY 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure IV-4: Historical Trend in Consumer Sales Mix – Bihar**

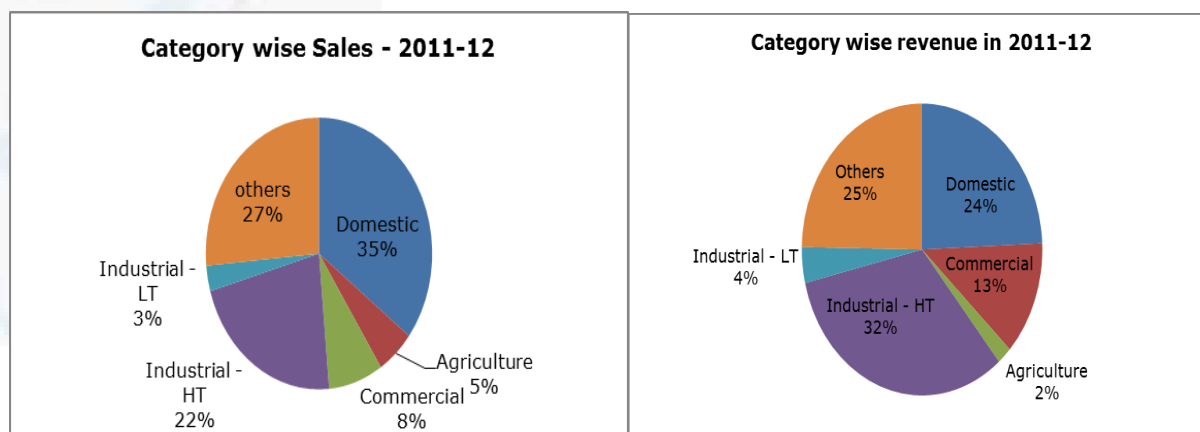


Source: PFC

The overall sales have registered a CAGR of 7% over the span of eight years wherein the sales of industrial category have registered a higher CAGR of 13% followed by other category with a CAGR of 12%.

In terms of revenue contribution, industries contributed to 36% of revenue, followed by others (25%), domestic (24%) and commercial (13%). This clearly indicates that domestic categories is heavily cross subsidized by the industrial and commercial categories.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure IV-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Bihar**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Bihar distribution utilities are among the highest in India i.e. ~64% in FY 12. The AT&C losses in Bihar have remained high over the years, it accounted for 83% in FY 05. In FY 09, the losses reported were lowest, due to the realization of past arrears, which led to increase in collection efficiency. The trends of collection efficiency in the state have remained dismal over the years.

**Table IV-1: Year on Year Trend in AT&C losses and Collection Efficiency – Bihar**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	83%	83.7%	44.0%	44.5%	34.4%	43.9%	47.4%	64.5%
Collection Efficiency	28%	29%	104%	91%	109%	94%	96%	69%

Source: PFC

The high AT&C losses in the state are due to high unmetered domestic consumers, primarily by Kutir Jyoti and Below Poverty Line consumers. Apart from this categories, which accounts for unmetered sales are irrigation, street lighting, and agriculture. The loss reduction activities are capital intensive as the network of the state is in dilapidated condition, which is one of the reasons of high AT&C losses in the state. In addition, various consumer center activities like improvement in metering, billing, collection, and vigilance needs improvement to reduce commercial losses.

However, going forward, the State Electricity Regulatory Commission has set the reduction targets for Transmission and Distribution (T&D) losses, which is 28.5% in FY 2015-16. To achieve, this distribution utilities have planned to invest close to Rs 20,000 crore in distribution assets by 2015-16 to achieve the loss trajectory. **Post unbundling the status of metering has improved. In SBPDCL, 94% of the consumers are metered and 77% in NBPDCCL.** Considering lack of manpower and investment constraints, task of meter reading, billing and collection has been outsourced to private agencies. Outsourcing has been undertaken up-to section level with adequate empowerment so that efficiency can be improved through quick decision making.

### 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost in Bihar accounts for ~60% of the total distribution cost. However, the interest cost in the state is quite high and accounts for about ~20 - 25% of the total distribution cost. This is due to the increasing large scale capital investments, which is necessary to sustain the network and to supply power and also due to huge financial losses of the distribution utility.

The per unit cost, break-up for different cost components for the state of Bihar is provided in the table below:-

**Table IV-2: Year on Year Trend Distribution Cost Breakup – Bihar**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.75	1.79	1.82	2.17	2.33	2.72	3.38	4.03
O&M (R&M + A&G + EC)	0.55	0.51	0.73	0.81	0.85	0.70	0.70	0.97
Interest	0.80	0.83	0.99	1.10	1.08	1.06	1.20	1.33
Depreciation	0.18	0.16	0.07	0.07	0.07	0.06	0.09	0.11
Other cost	0.52	0.50	0.01	0.05	0.03	0.08	0.07	0.26

Source: PFC

The power purchase cost in the last three years of assessment i.e. from FY 10 - to FY 12 has increased substantially; one of the reasons is high T&D losses in the state and hence, state has to purchase more quantum of power. In 2011-12, the increase in the power purchase cost was because of one time charges (arrears) charged by the Central Generating Stations.

Given the huge capital investment in the future to improve the T&D system in the state, the interest cost would further increase, however, the state has also opt for the financial restricting plan (FRP) of central government and may improve the interest burden of the state. The same has been discussed in the FRP chapter.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost as no tariff hikes were observed for several years. The tariff was revised in FY 11. However, the tariff realization improved in FY 12 as tariff were hiked to the tune of 21% in FY 12.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table IV-3: Historical Trend Consumer Category Wise Revenue Realization – Bihar**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.70	1.70	1.65	1.82	1.82	1.82	2.14	3.19
Agriculture	0.32	0.45	0.55	0.64	0.63	0.64	2.24	1.68
Commercial	4.32	4.35	4.82	4.84	4.88	4.83	6.39	7.56
Industrial HT	4.50	4.38	4.49	4.39	4.34	4.28	5.11	6.84
Industrial LT	4.36	4.34	4.95	4.96	4.69	4.48	4.60	6.06
Others	3.78	3.59	3.56	4.08	5.02	4.15	4.63	4.34

Source: PFC

The state government is heavily cross subsidizing domestic and agricultural consumers and the share of the state government subsidies accounts for ~ 39% of the total revenues in FY 2011-12. Increase in power purchase cost, no major tariff hikes over the years, high T&D losses and further disallowance of the power purchase cost as a difference between actual and normative T&D losses has resulted in deterioration of the financial position of the distribution utilities of the state.

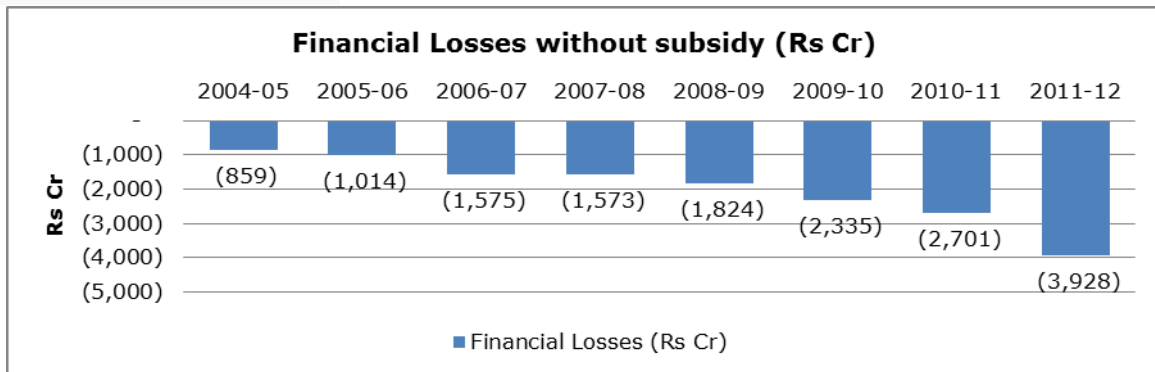


### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Bihar has been increasing over the years. The reasons for the same is disallowance of power purchase cost due to difference in actual T&D and normative T&D losses; increasing power purchase cost; and inadequate tariff revisions over the years.

**Figure IV-8: Historical Trend Financial Losses (w/o) subsidies – Bihar**

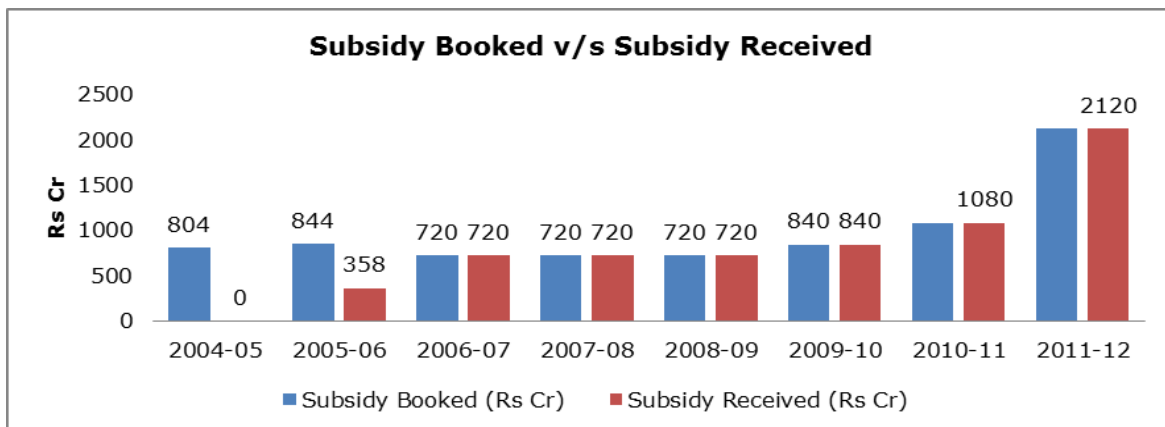


Source: PFC

#### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The subsidy burden of the State Government in 2011-12, was 39% of the total revenues, and was 33% in FY 2004-05. The subsidy burden of the state has remained high over the span of eight years. The figure below provides the subsidy booked v/s subsidy received for the distribution utilities in the state

**Figure IV-9: Historical Trend Subsidies Booked v/s Subsidies Received – Bihar**



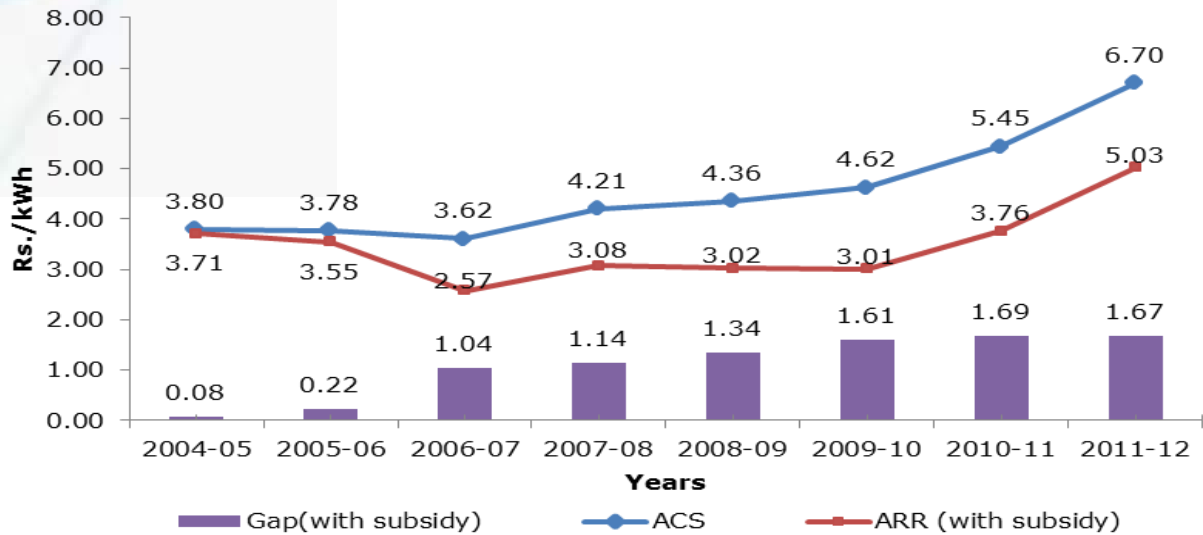
Source: PFC

As shown in the graph above, the amount of subsidies booked by the state has increased significantly from FY 05 to FY 12. The subsidy in Bihar is provided for subsidizing the tariff for domestic category and BPL consumers and also towards cost of capital assets, loss due to floods and cyclones which are frequent in the state.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has increased over the years. The cost of supply has increased substantially, however the tariff hikes have been inadequate to cover the gap between ACS and ARR.

**Figure IV-10: Historical Trend ACS v/s ARR (with subsidy) – Bihar**



Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms less than 1% of the total tax revenue of the state government. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details for the same are provided in the table below.

**Table IV-4: Tax Revenue from Power Sector– Bihar**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	67	65	55
Total Tax Revenue	26,292	33,848	40,547
Power sector Tax Revenue / Total state Tax Revenue	0.25%	0.19%	0.13%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The power sector has not generated any Non Tax Revenue over the years. As evident, the overall revenue from power sector in the state has decreased marginally over the years.

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table IV-5: Expenditure on Power Sector– Bihar**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	376	1,007	102
Revenue Expenditure	868	1,216	2,168
Total Power Sector Expenditure	1,244	2,223	2,270

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

**The overall expenditure on power sector has increased over the years. The capital expenditure on Power Sector is towards Rashtriya Sam Vikas Yojna and the variation is subject to the annual expenditure outlay planned under the scheme. The Revenue expenditure has increased primarily on account of assistance to public sector and other undertakings.**

**The total expenditure on power sector has been significantly more than the revenue from power sector over the years.**

### **4.3. POWER BONDS**

**The state had issued power bonds. The detail of outstanding balance is provided below:**

8.5% Tax free special Bonds (Power Bonds) of the State Government were raised in 2003-04. The outstanding balance as on 1st April 2006 was Rs 2,075.61 Cr. The outstanding balance as on 31st March 2012 was Rs 830.24 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bond as on 31<sup>st</sup> March 2014 was Rs 420 Cr.

### **4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table IV-6: Guarantees as a Percentage of Total Revenues - Bihar**

<b>Particulars</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>
Rs Cr			
Guarantees given by State Govt.	511	195	195
Total Revenues of the State	61,819	78,381	41,437
Guarantees as a %age of Total Revenues of State	0.83%	0.25%	0.47%

*Source: CAG Audited Accounts for the state - 2011-12, 2010-11, 2009-10*

As shown above, there has been a decrease in the guarantees given to power sector over the years.

The table below provides the utility share distribution of the guarantees for 2011-12 by the state government.

**Table IV-7: Utility wise Breakup of Guarantees – Bihar**

<b>Utilities</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>Average Share in Sector Guarantees (%)</b>
Rs Cr				
Bihar State Electricity Board	511	195	195	100%

*Source: CAG Audited Accounts for the state - 2011-12, 2010-11, 2009-10*

Over the span of three years, the guarantee payments have been made solely towards Bihar State Electricity Board.

## Subsidy

The table below depicts the share of utilities in subsidies given to Power sector and share of sector in total state subsidy.

**Table IV-8: Utility wise Breakup of Guarantees – Bihar**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
				Rs Cr
Resource Gap of State Electricity Board	840	1,080	2,133	100%
<b>Power Sector subsidy (% of total subsidy)</b>	840	1,080	2,133	82%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The increasing Subsidy payments given to Power Sector have been towards resource gap of State Electricity Board. The three year aggregate proportion of subsidy payments made towards Power Sector forms a significant 82%the Total Subsidy payments in the state.

### 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is calculated by a summation of the total Expenditure of the state government on the sector including Capital and Revenue expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid(Net of Receipts) by the State Government.*

**Table IV-9: Financing Requirement of Power Sector (2011-12) – Bihar**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	2,270
Loans And Advances made by the State Government (Net of Recoveries)	926
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	208
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.004
Total Power Sector Financing during the year	3,404
Sector Financing Requirement as a % age of total revenues of state	8%

Particulars	2011-12 Rs. Cr.
GSDP nominal	1,44,278
Sector Financing Requirement as a % age of GSDP	2.36%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	-1,808
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	13%
Sector Financing Requirement as a % age of GSDP including financial losses	3.61%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated to be ~13% of the revenue generated by the state and 3.85 % of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to a significant 18% of the State revenue and 5.11% of the GSDP.

The financing requirement of the sector is significantly higher than the marginal amount of revenues generated from the sector. This reflects the poor performance of power sector in the state and the high level of burden on the state finances.

## 5. FINANCIAL RESTRUCTURING PLAN

Increase in power purchase costs, inadequate tariff hikes, almost free supply of electricity to the agricultural sector and low subsidy realization from the state government has deteriorated the financial position of the utilities in the state. In this context, distribution utilities of Bihar adopted the FRP of the central government. The status and likely outlook of FRP in the state is discussed in the section below.

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

Given below is the status of the implementation of financial restructuring plan (FRP) in the state.

**Table IV-10: Status of FRP in Bihar**

Particulars	Bihar
Accumulated Losses as on 31.3.2012	-
STL (eligible under the scheme)	1782 Cr
Bonds issued by Discoms to participating lenders	817 Cr - issued
Tariff petition for 2014-15	ARR filed
Operational losses to be funded (2013-14)	2630 Cr
Road-Map for private participation in distribution	Started in some districts
Status of liquidation of regulatory assets	Being examined
Status of preparation of time bound plan for metering of all category of consumers	Being Prepared
Status of enactment of State Electricity Distribution Responsibility Bill	Under Progress

Source: Ministry of Power

## 5.2. FRP OUTLOOK

In this section, key parameters for the state have been looked at in order to comment on the likeliness of the state to meet the mandatory conditions set forth by the FRP and be eligible for the central grants incentive scheme.

The color scheme used in the table depicting state parameters refers to the color key provided here -

	Area of concern
	Can be better
	Good

BSEB reported a financial loss (without subsidy) of Rs.3928 Cr. in 2011-12, translating into a financial gap of Rs.3.64/kWh.

As per the FRP scheme, the Bihar government would take over Rs. 818 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The bonds worth Rs 818 Cr. would be repaid with an interest rate of 10.2% per annum payable semi-annually. The first interest payment is due on 13<sup>th</sup> Sept. 2014, which is after 6 months of the allocation. While, the principle repayment will be due after the moratorium period of three years.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Bihar.

**Table IV-11: Historical Parameters - Bihar**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	84%	44%	47%	34%	44%	47%	65%	n.a	n.a
<b>Tariff Hikes</b>	0%	10%	-	3%	-	0%	21%	11%	6%
<b>Subsidy Received/Booked</b>	42%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	22%	27%	26%	25%	23%	23%	20%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	1.34	1.92	2.09	2.21	2.52	2.81	3.64	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- In the state of Bihar, the past record in AT&C losses has been one of the poorest in the country. While the technical and commercial losses have actually gone up in the past due to ageing transmission infrastructure and power thefts, a 3% annual reduction will now be required for Bihar to benefit from central grants support scheme.



- Even on the revenue front, Bihar has performed poorly. The tariff hikes have been insufficient and irregular over the last few years. On the other hand, subsidy received-booked ratios have continued to stay at 100%, which is a positive sign.
- The share of Interest expenses has been over 20% for the last few years. With the moratorium on principal repayments on 50% STL, the liquidity situation is expected to improve in the near term, which is especially important considering the working capital stress in the system.
- The ACS-ARR Gap needs to be reduced by 25% of the 2010-11 benchmark level (Rs. 2.81/kWh) every year in order to avail the central grants incentive scheme. The Gap will need to be reduced to 54 paise/unit by 2014-15. This will be possible only with even higher tariff hikes as subsidy transparency requirements will limit subsidy support levels. This is an area of concern, especially when the Gap has actually increased considerably in 2011-12.

Like Jharkhand, frequent and substantial tariff revisions coupled with consistent reduction in AT&C losses is possibly the only way for Bihar to benefit from the FRP scheme and improve its financial health, both in short and long term.

## 6. ASSESSMENT OF REGULATORY EFFECTIVENESS

Bihar State Electricity Regulatory Commission (BERC) was constituted by the Government of Bihar under Section 17 of the Electricity Regulatory Commission Act, 1998 vide Government of Bihar notification No.1284 dated 15th April 2002. The BERC was constituted in May 2005. The first tariff order issued by BERC was for the FY 2006-07.

Some of the key aspects have been discussed below: -

### 6.1. STATUS OF IMPORTANT REGULATIONS

The regulator has notified Open Access regulation which was issued in 2006. BSERC has introduced Multi-Year-Tariff framework and have notified Terms and Conditions for Determination of Tariff in 2010. BSERC have also notified the MYT regulations in March 2013 and the first control period is effective from FY 2012-13 to FY 2014-15.

### 6.2. FREQUENCY OF TARIFF REVISIONS

The tariff revisions were done in FY 2010-11 after several years wherein tariffs were hiked substantially i.e. 21% in FY 12. Thereafter commission has approved a tariff hike in FY 2013 by 11%. The table below provides the details of tariff revision in the state.

**Table IV-12: Historical Trend in Tariff Revisions – Bihar**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	Yes	21%	11%	6%

The commissions to avoid sudden tariff shocks for the consumers have been approving revenue gap of the utilities as a regulatory assets. IN 2013-14, the commission approved regulatory asset of Rs 494 Cr.

## 7. SUMMARY

The key aspects of the state are discussed below;-

- 1. Inadequate Tariff Revisions:** The tariff revisions in the state have been inadequate. No tariff hikes were observed for several years, and tariffs were increased post FY 11, wherein the tariffs were hiked by 21% in FY 12 and 11% in FY 13, which were not commensurate with increasing power purchase cost.
- 2. Subsidy:** The subsidy burden of the state has remained high to the tune of 39% of total revenues in 2011-12 and this was 33% in 2004-05. The dependence on such high levels of subsidies is unsustainable for the sector. The trend in subsidy pay-out with respect to subsidy booked has been 100% post FY 2006.
- 3. High Technical and Commercial Losses :** The Aggregated Technical & Commercial losses (AT&C) for Bihar distribution utilities are among the highest in India i.e. ~64% in FY 12. However, going forward, the State Electricity Regulatory Commission has set the reduction targets for Transmission and Distribution (T&D) losses, which is 28.5% in FY 2015-16. To achieve, this distribution utilities have planned to invest close to Rs 20,000 crore in distribution assets by 2015-16 to achieve the loss trajectory.
- 4. Financial Losses:** The distribution financial losses without subsidies in Bihar has increased over the years due to inadequate tariff revisions and high T&D losses. The regulator has disallowed difference in power purchase cost due to difference in actual and normative T&D losses and thus this has resulted in disadvantageous for distribution utilities.
- 5. FRP:** The state has opted for the FRP scheme, under the scheme the bonds to the tune of INR 817 Cr has been issued. The key area of concerns for the state for successful implementation of FRP is its high subsidy burden and inadequate tariff revisions, which have led to huge ACS-ARR gap that need to be reduced significantly to 25%.
- 6. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be ~13% of the revenue generated by the state and 3.85 % of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to a significant 18% of the State revenue and 5.11% of the GSDP.

## V CHHATTISGARH

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Chhattisgarh as a state was carved out of Madhya Pradesh on 1<sup>st</sup> November 2000.

Chhattisgarh State Electricity Board (CSEB) was formed in 2000 in accordance with the Section 5 of the Electricity Supply Act 1948. The Chhattisgarh State Load Dispatch Centre (CSLDC) was also established in the same year. Chhattisgarh State Electricity Board was unbundled to form five companies in accordance with the provisions of Electricity Act 2003 by the Govt. of Chhattisgarh on 19.12.2008 with the issuance of the CSEB Transfer Scheme Rules, 2008. The companies came in existence w.e.f. 01.01.2009. The five companies recognized out of CSEB were:

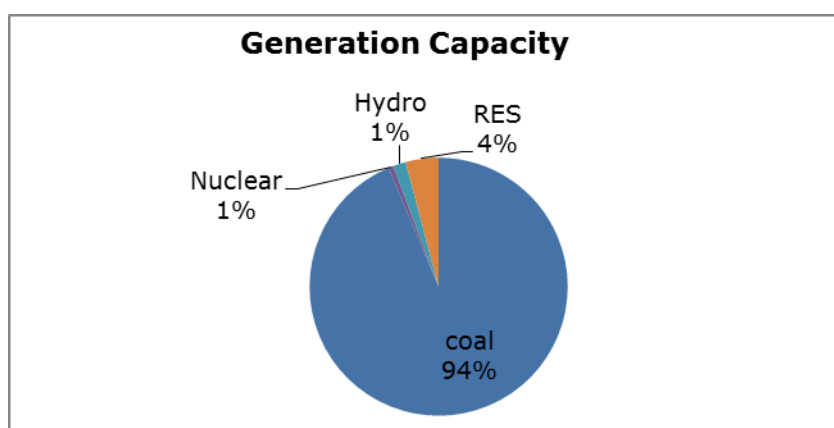
- Chhattisgarh State Power Holding Company Limited (CSPHCL)
- Chhattisgarh State Power Generation Company Limited (CSPGCL)
- Chhattisgarh State Power Transmission Company Limited (CSPTCL)
- Chhattisgarh State Power Distribution Company Limited (CSPDCL)
- Chhattisgarh State Power Trading Company Limited

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Chhattisgarh was 7494.91 MW. There was a 15% increase in the generation capacity from February 2013. Out of total capacity as on Feb 2014, coal based power capacity accounted for ~94% followed by RES (~4%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure V-1: Generation Capacity Mix as on Feb 2014- Chhattisgarh**



Source: CEA

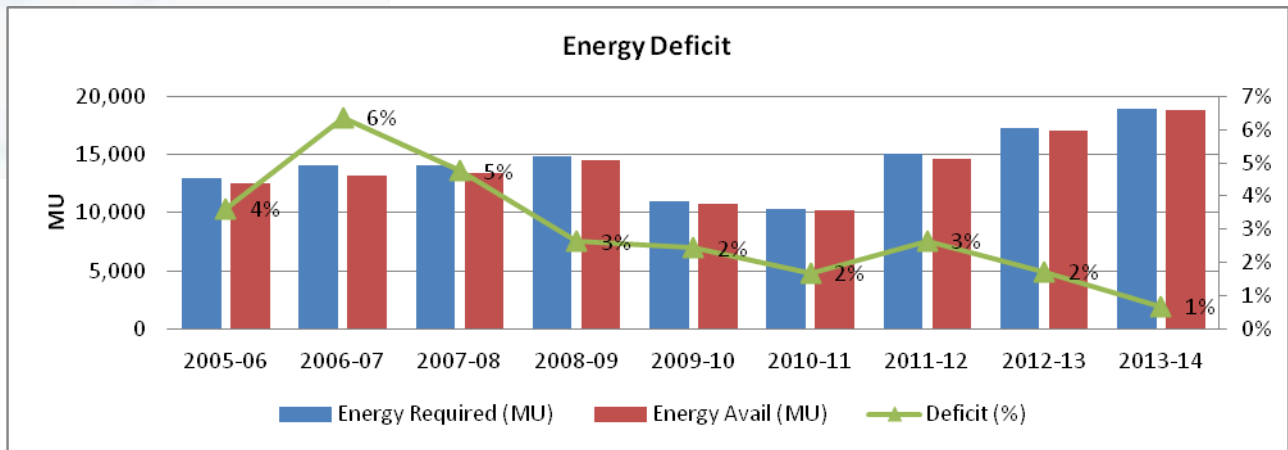
#### 1.3. POWER SUPPLY POSITION

The energy and peak deficit in the state of Chhattisgarh has been reduced significantly in FY 14. The energy deficit reduced from ~6% in FY 07 to ~1 % in FY 14. Simultaneously, the peak deficit reduced from ~28% in FY 07 to ~1% in FY 14.

The state has been investing in augmentation of the generation capacity. Apart from the sourcing power from CSPGCL, the state also purchases from Central Generating Stations and Renewable sources.

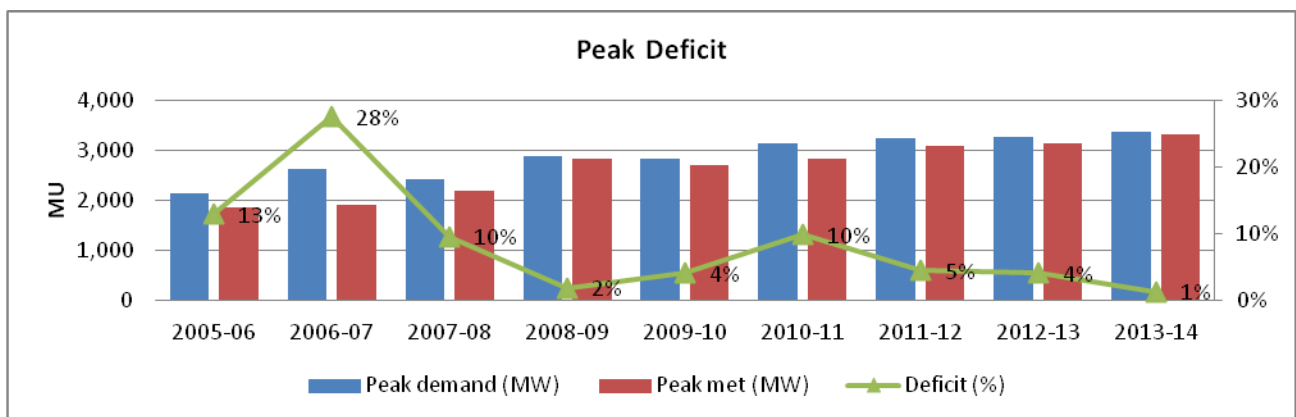
The trend of energy and peak deficit observed in Chhattisgarh over the years is highlighted in the figure below:

**Figure V-2: Historical Trend in Energy Deficit – Chhattisgarh**



Source: CEA

**Figure V-3: Historical Trend in Peak Deficit – Chhattisgarh**



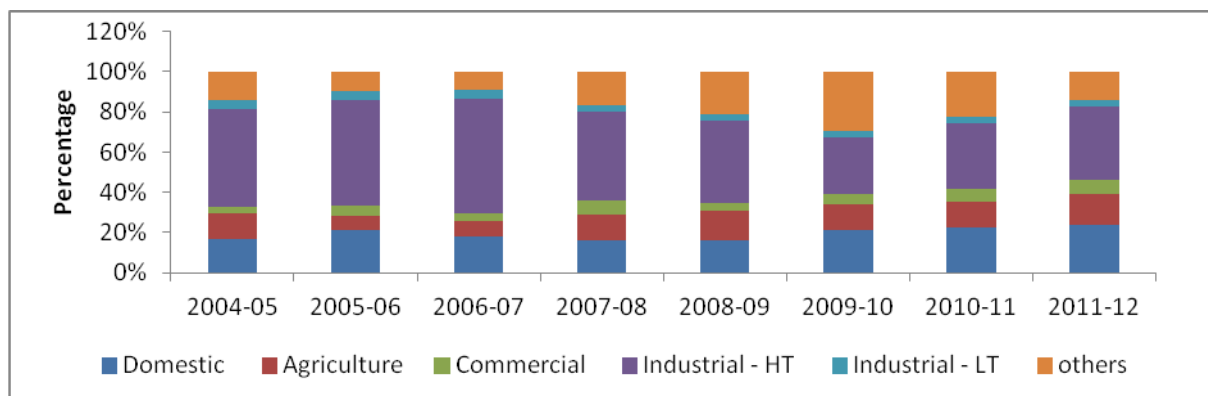
Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF CHHATTISGARH

In FY 2011-12, industries dominated the sales mix with a share of 39%, followed by domestic and agricultural sales with share of 24% and ~16% respectively. However, share of Industrial sales in total sales have fallen from 2004-05 levels of 53% to 39% in FY 2011-12, on the other hand domestic sales as a percentage of total sales have grown from 17% in 2004-05 to 24% in FY 2011-12.

**Figure V-4: Historical Trend in Consumer Sales Mix - Chhattisgarh**

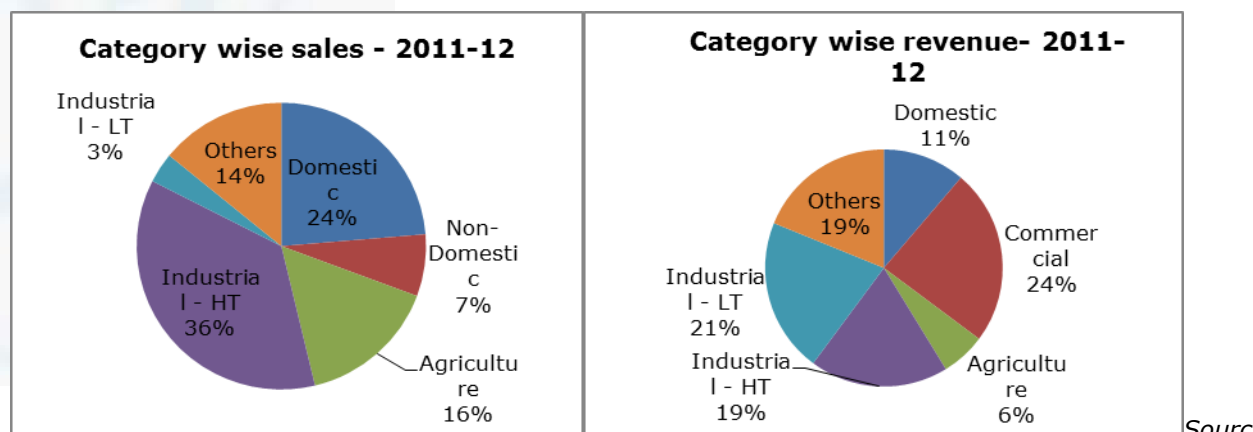


Source: PFC

The overall sales have increased at a CAGR of ~10% over a span of seven years wherein the sales of commercial category have registered a higher CAGR of 23% along with the sales of Domestic category with a CAGR of 36%.

In terms of revenue contribution, Industrial category contributed to ~40% of total revenue followed by Commercial and Domestic category which contributed to ~24% and ~11% of the total revenue respectively. Domestic and agriculture consumer categories are subsidised by state government and also cross subsidised by other categories. Sale of surplus energy available through bilateral sale, open access, power exchanges or UI has been approved by the commission.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from different category of consumers.

**Figure V-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Chhattisgarh**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregate Technical & Commercial (AT&C) losses for Chhattisgarh state distribution utilities have been constant since FY 2004-05. There has been no improvement in the collection efficiency as well. Apart from the issue of no improvement, the significant level of losses is another cause of concern in the state. The table below shows the trend in AT&C Losses and Collection Efficiency.

**Table V-1: Year on Year Trend in AT&C losses and Collection Efficiency - Chhattisgarh**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses	32%	32%	32%	32%	32%	32%	32%	32%
Collection Efficiency	98%	98%	98%	98%	98%	98%	98%	98%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost accounts for 84% of the total distribution cost. The average distribution cost in Chhattisgarh has grown at a CAGR of 17% over a span of four years i.e. after unbundling of CSEB. The power purchase cost has grown at CAGR of 22%.

**Table V-2: Year on Year Trend Distribution Cost Breakup - Chhattisgarh**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	NA	NA	NA	NA	1.58	1.97	2.34	2.84
O&M (R&M + A&G + EC)	NA	NA	NA	NA	0.49	0.45	0.46	0.44
Interest	NA	NA	NA	NA	0.02	0.05	0.04	0.05
Depreciation	NA	NA	NA	NA	0.05	0.04	0.07	0.07

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Other cost	NA	NA	NA	NA	0.00	0.00	0.03	0.00

Source: PFC

Considering the power purchase cost, it is relatively lower than other states owing to proximity to coal belts in the state and hence lower transport charges. However, the increase in cost is due to the increase in coal prices, other fixed and variable charges and inflationary pressure.

#### 2.4. REVENUE REALIZATION

**The tariff realization has increased for all categories of consumers over the years. Considering the frequent increase in tariffs there has been per year increase in realizations for almost all the years except in FY 2009-10.**

The table below shows the revenue realization (without subsidies) from different consumer categories over the years.

**Table V-3: Historical Trend Consumer Category Wise Revenue Realization - Chhattisgarh**

Years	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.60	1.86	2.38	2.17	2.15	1.89	1.97	2.40
Agriculture	0.32	0.58	0.50	0.30	0.28	0.44	1.03	1.30
Commercial	4.83	3.20	4.17	1.70	3.09	2.49	4.45	5.13
Industrial HT	4.06	4.52	3.78	4.10	4.22	5.18	2.26	4.04
Industrial LT	3.99	3.95	3.65	3.23	2.73	3.17	3.94	4.50
Others	2.31	3.31	4.08	4.26	6.55	2.81	6.36	4.03

Source: PFC

Revenue from sale of surplus power is also a stream of income in the state.

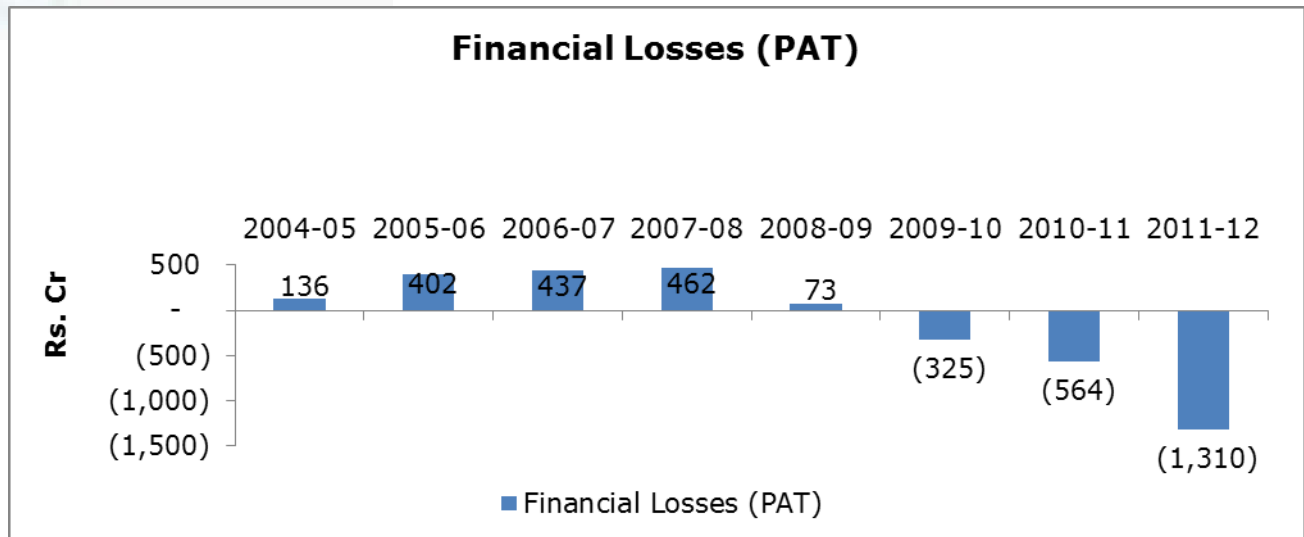


### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The CSEB had been a profitable entity up to its unbundling in FY 09. Since then the Chhattisgarh State Distribution Utility has shown increasing level of losses. The segregation of Generation and Transmission from the estimation of Discoms financial earning brought forward the condition of weak financial health of the Discoms in the state.

**Figure V-6: Historical Trend Financial Losses (w/o) subsidies – Chhattisgarh**



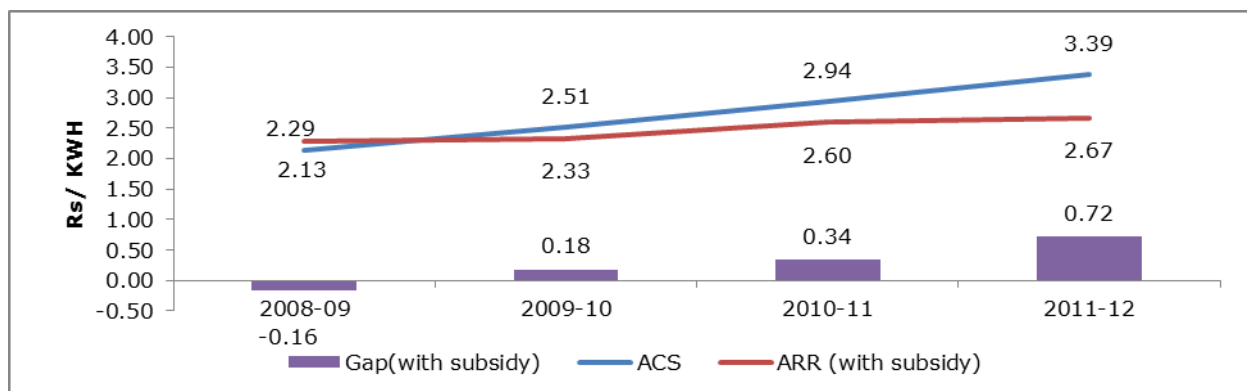
Source: PFC

#### 3.2. ACS v/s ARR

The gap between average cost of supply and average revenue realized has increased in FY 09. This suggests tariff hikes has not been commensurate to the increase in cost. Also the high level of AT&C losses have contributed to the low revenue realization.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure V-7: Historical Trend in ACS v/s ARR – Chhattisgarh**



Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

#### Tax Revenue

The tax revenue from the power sector forms a marginal share of ~4% of the total tax revenue. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government.

**Table V-4: Tax Revenue from Power Sector - Chhattisgarh**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	417	503	638
Total Tax Revenue	11,504	14,430	17,033
Power sector Tax Revenue / Total state Tax Revenue	4%	3%	4%

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

#### Non Tax Revenue

The non-tax revenue from power sector is through **dividends, interest on loans and advances, royalty/cess on water for power generation, Rural Electrification, T & D etc.** The details for the same are provided in the table below.

In FY10, the Power sector generated Rs 100 Cr as the Non Tax Revenue contributing a marginal share of ~3% in the total state Non Tax Revenue. In FY11 and FY12, power sector did not generate any Non-tax revenue. **The overall income generated from the power sector has increased from Rs 517 Cr in FY10 to Rs 638 Cr in FY12.**

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector in the state of Chhattisgarh.

**Table V-5: Expenditure on Power Sector - Chhattisgarh**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	0	0	900
Revenue expenditure	213	298	337
Total expenditure	213	298	1237

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

In FY12, there has been a substantial rise in the overall expenditure primarily on account of state investments towards T&D.

**The quantum of expenditure exceeds the quantum of revenue generated from the power sector over the years.**

### **4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

#### **Guarantees**

The table below depicts the guarantees given to power sector relative to the total revenue of the state

**Table V-6: Guarantees as a Percentage of Total Revenues - Chhattisgarh**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt	429	429	429
Total Revenues of the State	14,547	18,266	21,091
Guarantees as a %age of Total Revenues of State	2.95%	2.35%	2.04%

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

The guarantees given to power sector constituted for a marginal share (less than 3%) of total revenues of the state.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table V-7: Guarantees Utility wise Breakup - Chhattisgarh**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Chhattisgarh State Power Holding Company	429	429	429	

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

he guarantee payments of Power Sector has been solely towards Chhattisgarh State Power Holding Company

#### **Subsidy**

The table below depicts the aggregate share of utilities in subsidies given to Power sector and the aggregate share of sector in total state subsidy over three years.

**Table V-8: Power Sector Subsidy as a Percentage of State Subsidy - Chhattisgarh**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
Rs Cr				
Grant for Single bulb collection	134	134	134	67.82%
Electrification of Government schools and hospitals	10	10	10	5.07%
Grant for free supply of electricity to agriculture Pumps	177	177	177	89.81%
<b>Power Sector subsidy (% of total subsidy)</b>	140	202	321	11.88%

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

The major proportion of Subsidy has been towards grant for free supply of electricity to agriculture Pumps.

Over the span of three years, the subsidy granted to the power sector accounted for a significant proportion (~12%) of the total state subsidy.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bond as on 31<sup>st</sup> March 2014 was Rs 100 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table V-9: Power Sector Financing Requirement (2011-12) – Chhattisgarh**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	1,237
Loans And Advances made by the State Government (Net of Recoveries)	(98)

8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net Of Receipts)	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net Of Receipts)	0
Total Power Sector Financing during the year	1,139
Sector Financing Requirement as a % age of total revenues of state	5%
GSDP nominal	84,674
Sector Financing Requirement as a % age of GSDP	1.35%
Financial Profits/ (Losses) of Discoms during the year	(1,310)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	12%
Sector Financing Requirement as a % age of GSDP including financial losses	2.89%

Source: State Government annual accounts from CAG 2011-12, Data book for DCH - 22nd April, 2013.

The financing requirement for the Power sector in the state was estimated to be ~5% of the revenue generated by the state and a marginal 1.35 % of the Gross State Domestic Product. Considering, financial profits / Losses of Discoms in the year, the financing requirement of the sector increases to 12% of the state revenues and 2.89% of the State GSDP.

The financing requirement of the sector is significantly higher than the revenues generated from the sector. The main component contributing to the requirement is substantial Discom Losses. In 2011-12, entire capital expenditure went towards T & D. However, there is a need for further investments in building and strengthening the infrastructure in the state.

## 5. ASSESSMENT OF REGULATORY EFFECTIVENESS

The Chhattisgarh state electricity regulatory commission was constituted by the government of Chhattisgarh in 2002 as a two member commission.

### 5.1. STATUS OF IMPORTANT REGULATIONS

The Commission came out with CSERC (Terms and Conditions of Determination of Tariff according to Multi-Year Tariff Principles) Regulations, 2010. The commission has notified MYT regulations in December, 2010 for CSPGCL, CSPTCL, CSPDCL and CSLDC for a control period of 3 years from FY 2010-11 to FY 2012-13. The commission notified CSERC (MYT) regulations, 2012 for a control period of 3 years from FY 2013-14 to FY 2015-16.

Open access of transmission lines was introduced in the state in 2007. Currently the open access norms in the state are guided by CSERC (Connectivity and Intra-State Open Access) Regulations 2011, in accordance to which the Cross subsidy surcharge to be paid by the open access consumers for FY 2011-12 is 0.95 paisa/unit for EHV consumers and 0.34 paise/unit for HV consumers. For open access consumers procuring power from renewable energy based power generating plant, the cross subsidy surcharge payable shall be 50% of the cross subsidy surcharge determined for that year.

### 5.3. FREQUENCY OF TARIFF REVISIONS:

The tariff revisions in the state have been frequent. However, the percentage of tariff hike has been relatively low. The table below presents the tariff revisions.

**Table V-10: Trends in Tariff Revisions - Chhattisgarh**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
<b>Average Tariff Revisions</b>	NA	3.45%	3.20%	2.96%	NA	2.86%	2.97%	3.39%	4.07%

Source: Approved Tariff Orders of DISCOM for that year

## 6. SUMMARY

The key aspects of state are discussed below:

1. **Generation:** The generation capacity and energy availability improved along with increase in demand. The proximity to coal belts ensures increase in coal based generation capacity at low cost. Relatively low cost on transportation has also contributed to low cost of coal based power generation.
2. **Losses:** The state has a relatively very high level of AT&C losses with no reduction in the losses or improvement in collection efficiency over the years.
3. **Financial losses:** Since 2010, the Discoms have incurred increasing level of losses. This is primarily due to the segregation of Discoms from generation and transmission sector.
4. **State financial exposure:** In 2011-12, the state invested significant amount in the development of T & D infrastructure. The expenses incurred by the state as assistance to the sector were relatively low. However, a substantial amount of financial losses of Discoms has worsened the burden of sector on the state.

## VI DELHI

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Delhi is one of the fastest growing states in the country, with an economic growth rate of 9 per cent in 2012-13; the state government expects to register growth of 11 per cent to 11.5 per cent by the end of 2017<sup>3</sup>. Delhi has one of the highest per capita electricity consumption among the states in India.

Traditionally, power supply in Delhi was the responsibility of the Delhi Electricity Supply Undertaking (DESU), which was an integrated utility with generation, transmission, and distribution functions. Poor performance of DESU led to it being succeeded by the Delhi Vidyut Board (DVB) in 1997, which was established as a State Electricity Board under the Electricity (Supply) Act, 1948. The creation of DVB proved to be merely a change in the legal status of the organization without any structural changes. The change did not affect the functioning and the work culture of the organization. Its performance continued to deteriorate.

Further, as privatization was expected to bring efficiency to Delhi Vidyut Board, the board was unbundled. The generation companies established were -Indraprastha Power Generation Company Limited (IPGCL) and Pragati Power Corporation Limited (PPCL). Delhi Transco Limited (DTL) was established with a responsibility of transmission business and, the business of power distribution was transferred to three private companies – **BSES Yamuna Power Limited** (BYPL), **BSES Rajdhani Power Limited** (BRPL) and **North Delhi Power Limited** (NDPL<sup>4</sup>).

Post privatization financial and operational performance of the state utilities has improved over the years.

#### 1.2. GENERATION MIX

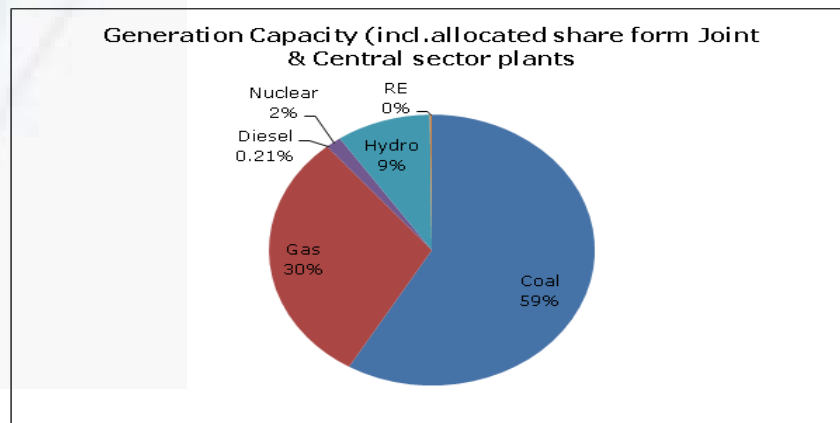
The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) was 7789 MW, out of which Coal based power capacity accounted for ~58% followed by Gas (~30%) and Hydro (~9%). The capacity addition (incl. procurement from Central & JV plants) has grown by 9% against the previous year.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

<sup>3</sup> Indian Brand Equity Foundation (IBEF)

<sup>4</sup> The name has been changed to Tata Power Delhi Distribution Limited (TPDDL)



**Figure VI-1: Generation Capacity Mix as on February 2014 - Delhi**

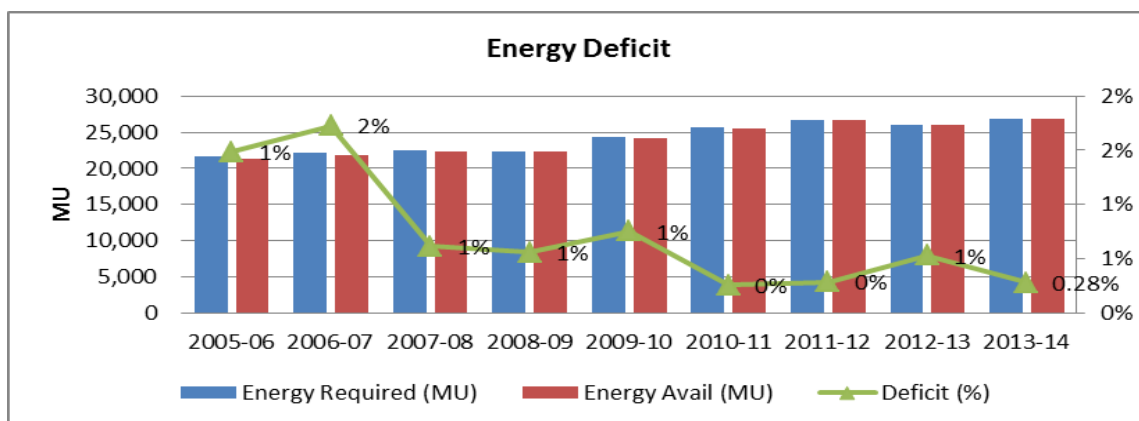
Source: CEA

### 1.3. POWER SUPPLY POSITION

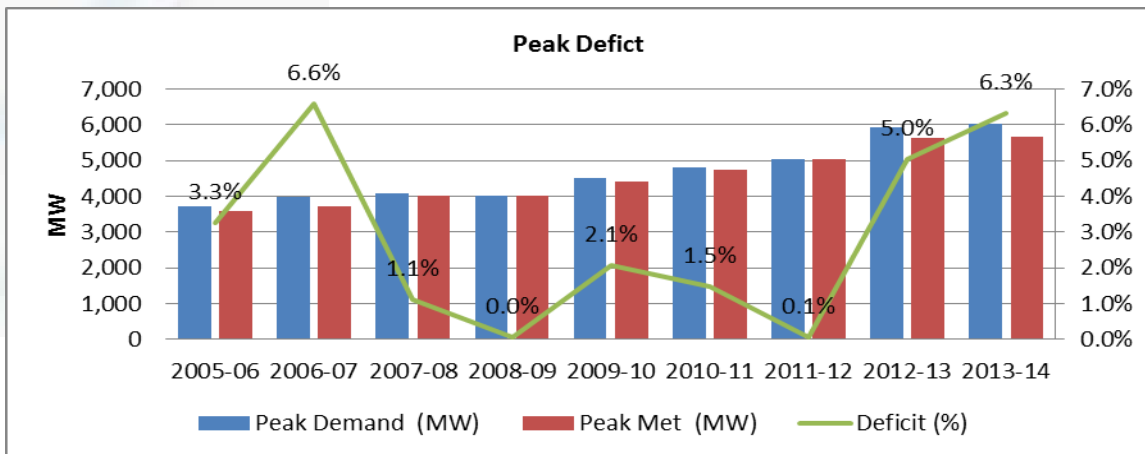
The energy deficit in Delhi has been low over the years. The energy deficits have been approximately in the range of 0%-2% over the past seven years. However, on the contrary the peak deficits in Delhi have been high, due to high temperatures in summers. The peak deficit in Delhi has increased from ~3% in FY 2004-05 to ~6% in FY 2013-14.

In recent past, post 2011-12, the peak deficits in Delhi have increased substantially, owing to steep rise in the peak demand. The peak demand registered a growth of 19% in FY 2012-13.

The trend of energy and peak deficit observed in Delhi over the years is highlighted in the figures below:

**Figure VI-2: Energy Deficit - Delhi**

Source: CEA

**Figure VI-3: Peak Deficit – Delhi**

Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF DELHI

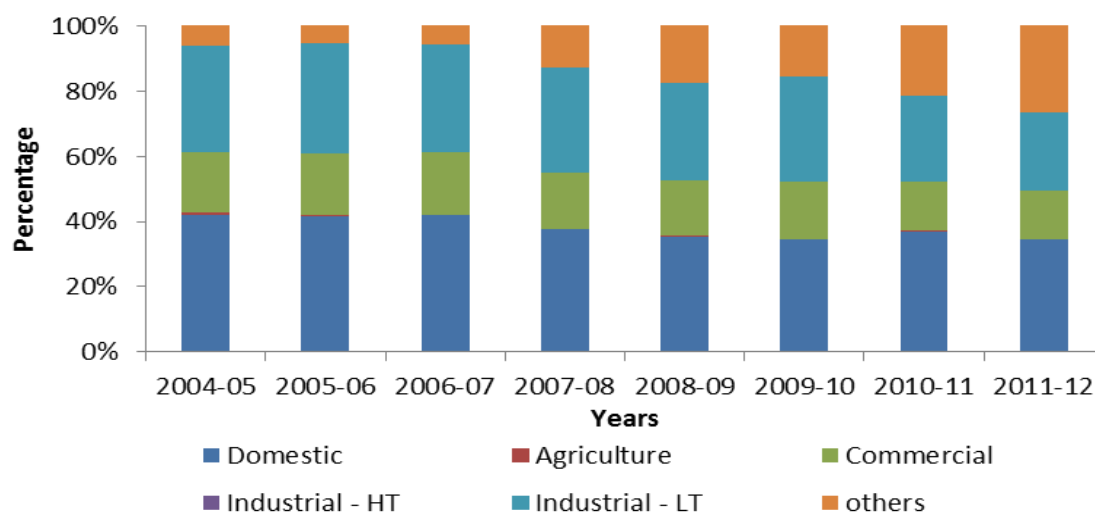
The distribution utilities in Delhi are BSES Rajdhani, which operates in the area of South West Delhi; BSES Yamuna Power, which operates in area of Central East and East Delhi; and Tata Power Delhi Distribution Limited (TPDDL), which operates in specified area of North and North West of Delhi.

Electricity Sales in Delhi has grown at a CAGR of 12%, which is better than other states in India. In FY 2011-12, domestic consumers dominated the sales mix with a share of 34%, followed by Industrial (24%) and commercial (15%). The other category accounted for 27% of the sales mix.

The share of domestic category has reduced from 42% in FY 2004-05 to 34% in FY 2011-12

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure VI-4: Historical Trend in Consumer Sales Mix - Delhi**

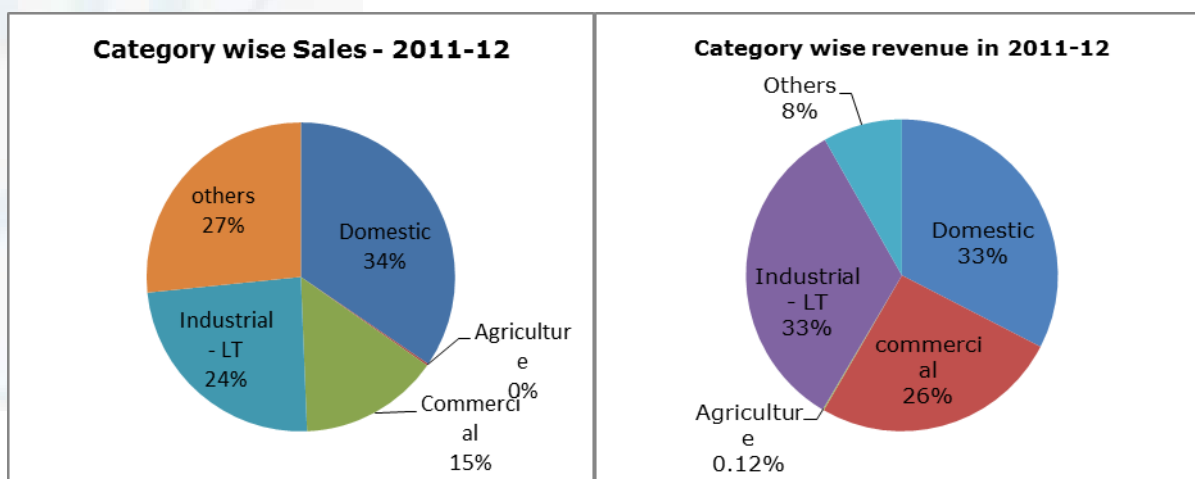


Source: PFC

The overall sales have increased at a CAGR of ~12% over a span of seven years, wherein the sales to other category have registered a higher CAGR of 38% followed by commercial category with a CAGR of 8.4%.

In terms of revenue contribution, Industrial and Domestic categories contributed to 33% each of total revenues, followed by commercial and other categories with a share of 26% and 8% respectively.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from different category of consumers.

**Figure VI-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Delhi**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Delhi state distribution utilities have improved from 42.9% in 2005-06 to 18.6% in 2011-12. The reduction in losses was visible post privatization, as many key initiatives by the distribution utilities to reduce tariffs have been implemented. The table below shows the trend in AT&C Losses and Collection Efficiency.

**Table VI-1: Year on Year Trend in AT&C losses and Collection Efficiency - Delhi**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	42.9%	40.3%	34.3%	38.0%	17.9%	20.8%	15.8%	18.6%
Collection Efficiency	92%	96%	101%	87%	105%	95%	103%	97%

Source: PFC

The initiatives undertaken for loss reduction include the following:

### A. Technical Initiatives for Loss Reduction by distribution utilities in Delhi

1. Replacement of electromechanical meters,
2. Balancing of unbalanced Distribution Transformer
3. Augmentation of Overloaded Distribution Transformer.
4. Revamping of low tension (LT) distribution systems by changing / repairing worn out equipment and cables.
5. Installation of automatic power factor controllers for providing reactive compensation
6. Distribution transformers metering for computing AT&C Loss at DT level.
7. Installation of Street Light Controller to avoid Energy Wastage
8. Introduction of Automation and Information Technology

### B. Privileged Consumer Schemes

To acknowledge and encourage its regular paying consumers, utilities has institutionalized a privileged consumer scheme through which discounts are offered to its consumers. They have also institutionalized a structured approach towards Consumer Relationship Management as it organizes regular meetings with consumer representative groups such as RWAs, IWAs etc.

**C. Customer Service:** Distribution utilities have set up Customer Help Desks (CHD"s) and, Commercial Call Centre to for online registration of consumer complaints and to address Consumer Complaints. Genset vans & Mobile Transformers made available all round the clock. A special drive "Roshini" was undertaken in which uninterrupted illumination was provided during the entire festive season.

**D. Metering Related :** Mass Meter Replacement drive was undertaken for all Large Industrial Power (LIP) consumers. Electronic Meters have also been introduced for Domestic Consumers and faulty meters are being replaced on a priority basis with tamper-proof electronic meters.

### 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost accounts for ~80% of the total distribution cost). The distribution cost in Delhi has grown at a CAGR of 21% over a span of seven years and power purchase cost has grown at a CAGR of 22%.

The per unit cost break-up for different cost components is highlighted in the table below:-

**Table VI-2: Year on Year Trend Distribution Cost Breakup – Delhi**

<b>Cost Component (Rs. per kWh)</b>	<b>FY 06</b>	<b>FY 07</b>	<b>FY 08</b>	<b>FY 09</b>	<b>FY 10</b>	<b>FY 11</b>	<b>FY 12</b>
<i>Power Purchase Cost</i>	2.03	2.16	3.23	3.30	3.99	4.73	5.75
<i>O&amp;M (R&amp;M + A&amp;G + EC)</i>	0.33	0.36	0.37	0.41	0.60	0.50	0.57
<i>Interest</i>	0.04	0.14	0.20	0.23	0.24	0.36	0.52
<i>Depreciation</i>	0.14	0.16	0.18	0.17	0.15	0.15	0.17
<i>Other cost</i>	-0.03	0.07	-0.02	0.03	-0.01	0.01	0.06

Source: PFC

Until 2007, DTL was responsible for power purchase from various sources. The DISCOMS paid DTL for the power purchase cost as per the Bulk Supply Tarff (BST) determined by DERC based on the paying capacity of each DISCOM. However, post the policy direction period, PPAs were allocated to the DISCOMS based on the ration of energy drawl in the previous year.

Hence, the procurement shifted from bulk purchase to individual purchases and even bilateral purchases. As a result, the power purchase cost witnessed a steep rise in FY 08 as against FY 07. The power purchase cost has also increased to the tune of 30 % in past two years i.e. FY 2011 and FY 2012. Majority of power procurement in Delhi is through central sector based power plants, the cost of which is determined by CERC<sup>5</sup>.

Hence, power purchase cost is not in control of the state utilities. Moreover, the state own generation capacity which majorly are costly gas based stations have no gas, but the utilities have to pay the fixed charges to these generators.

**The distribution utilities in Delhi are doing their best to reduce the power purchase cost, a policy advocacy at various forums to reduce the same, including surrendering of costly power plant, is being made. TPDDL's petition regarding**

<sup>5</sup> As per the Tariff Order of 2013-14 for TPDDL, BYPL & BRPL

**surrendering of costly power from gas based stations has been admitted by DERC. On the other hand, BSES, has approached the State government to shut their old coal based power plants, and reallocate their coal allocation for new plants, which will further reduce the power purchase cost.**

The interest cost has also increased substantially in FY 11 and FY 12. The cost has increased by 65% in FY 11 and by 49% in FY 12. The interest cost which accounted for 1% in FY 2004-05, now accounts for 7% of the distribution cost. Due to high outstanding regulatory assets, the distribution utilities are facing cash crunch, wherein they have to procure short term loans for working capital requirements at high interest rates.

## **2.4. REVENUE REALIZATION**

**The tariff realizations have increased in FY 2011-12 except agricultural consumers as tariff revisions to the tune of 12% were approved by the regulator for all the three distribution utilities. The tariff revisions are not frequent in the state;** however, utilities are being provided fuel surcharge, which is on account of fuel price variations and apart from it, utilities revenue gap is also created as a regulatory .

The table below shows the revenue realization (without subsidies) from different consumer categories over the years.

**Table VI-3: Historical Trend Consumer Category Wise Revenue Realization - Delhi**

<b>Years</b>	<b>FY 05</b>	<b>FY 06</b>	<b>FY 07</b>	<b>FY 08</b>	<b>FY 09</b>	<b>FY 10</b>	<b>FY 11</b>	<b>FY 12</b>
<b>Domestic</b>	2.79	2.75	2.79	3.42	3.48	4.30	3.54	3.84
<b>Agriculture</b>	1.25	1.58	2.22	1.67	2.14	2.00	2.35	2.35
<b>Commercial</b>	5.60	5.50	6.08	6.39	6.47	6.40	6.42	7.17
<b>Industrial LT</b>	5.03	4.95	5.19	4.75	4.93	4.71	4.68	5.64

Source: PFC

The state has a favorable consumer mix, and low losses have led to better tariff realizations from all consumer categories.

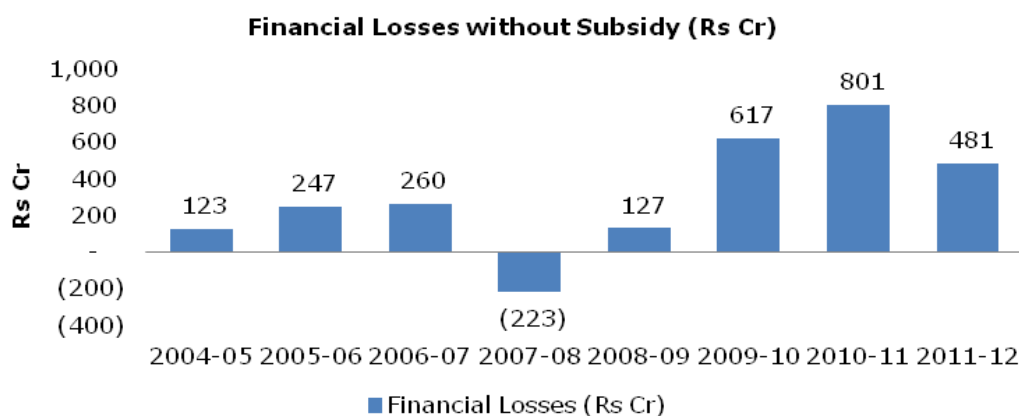
Having discussed the operational performance and revenue realized by the distribution utilities, it's now important to analyze the financial performance of the distribution utilities.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The discoms in Delhi have been financially profitable (without subsidies) over the years. However, in FY 2007-08, due to the increase in power purchase cost the net profit margin of distribution utilities has averaged at 4% in the last three years of assessment i.e. FY 2009-10 to FY 2011-12.

**Figure VI-6: Historical Trend Financial Losses (w/o) subsidies – Delhi**



Source: PFC

The continuous improvement in the operational norms has led to a profitable situation of Delhi distribution sector.

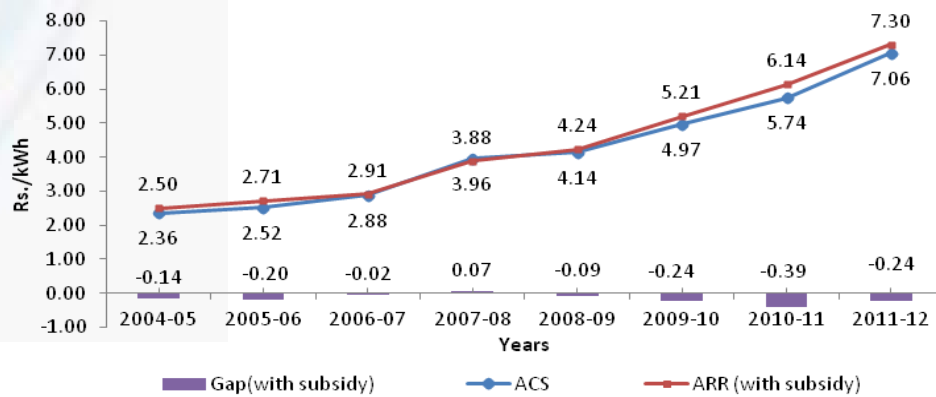
The regulator has also approved the revenue gap as regulatory assets, which is supposed to be liquidated every three years, however, the outstanding regulatory assets have increased substantially over the years, and liquidating it altogether will give tariff shock to the consumers. As per the tariff order of FY 2013-14, the status of regulatory assets is Rs 2066 Cr for TPDDL, Rs 9327 Cr for BRPL and Rs 5553 Cr for BYPL.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There is no history available of Subsidies received to Distribution Utilities in Delhi.

#### 3.3. ACS v/s ARR

The distribution utilities in Delhi have reported negative gap between average cost of supply and average revenue realized, hence are revenue surplus..

**Figure VI-7: Historical Trend ACS v/s ARR (with subsidy) – Delhi**

Source: PFC

The prudent operational strategy adopted by the state DISCOMs, with low AT&C losses, along with favourable consumer mix comprising of marginal percentage share of agriculture sales and high urban consumers has resulted in robust financial health of the state DISCOMs.



## 4. STATE EXPOSURE TO POWER SECTOR

CAG audited annual accounts not available for Delhi.

## 5. ASSESSMENT OF REGULATORY EFFECTIVENESS

The Government of National Capital Territory of Delhi constituted the Delhi Electricity Regulatory Commission (DERC) on March 3, 1999 and it became operational from December 10, 1999. DERC has been proactive in implementing second generation reforms in the state which notifications of MYT Regulations which are currently in the second control period and Open Access Regulations.

The key aspects of regulatory effectiveness have been discussed below -

### 5.1. STATUS OF MYT REGULATIONS

The Commission has notified MYT Regulations in FY 2007-08 for a first control period of control period of four years from FY 2007-08 to FY 2010-11 and which was further extend to FY 2011-12. The MYT regulations have been notified for second control period, which specifies the Terms and Conditions for Determination of Tariff for Generation, Transmission, and Distribution of electricity under the Multi Year Tariff (MYT) framework for the period FY 2012-13 to FY 2014-15.

**Table VI-4: Status of MYT Regulations - Delhi**

States	Control Period	Control Period No.1	Control Period No.2
Delhi	First control period = 4 years; extended to 5 years and subsequent control period = 3 years	FY 2007-08 to FY 2010-11; extended till FY 2011-12	FY 2012-13 to FY 2014-15

Source: CEA

### 5.2. STATUS OF OPEN ACCESS IMPLEMENTATION

The Commission has notified the Open Access Regulations in Financial Year 2005-06 for consumers more than 1MW. The open access in Delhi has been implemented and the Cross subsidy surcharge in Delhi ranges from Rs 2.30 per unit. In comparison to other states the cross subsidy surcharge is as follows i.e. Haryana it is (Rs. 0.53/kWh) in Gujarat (Rs. 0.45/kWh), Bihar (Rs. 0.50/kWh) and in Punjab (Rs. 1.07/kWh) and West Bengal (Rs. 2.21/kWh).

### 5.3. FREQUENCY OF TARIFF REVISIONS

The tariff revisions in the state have not been frequent. The only major tariff revision which took place was in FY 2011-12, to the tune of 11%. However, the utilities are being allowed to pass on increased variable cost due to variation in fuel prices. The table below presents the tariff revisions.

**Table VI-5: Trends in Tariff Revisions - Delhi**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	0%	11%	0%	3%

Source: Approved Tariff Orders of DISCOM for that year

## 6. SUMMARY

The operational efficiency of distribution utilities has improved post privatization due to prudent practices and optimal consumer mix in the state. The success of distribution model in Delhi has been a trend setter in the country. The Delhi Power Distribution Model is an example of political will for reforms and efficient performance of private sector.

The key aspects for the state is discussed below-

1. **Distribution Practices:** The initiatives taken by distribution utilities in Delhi have set the standards high for distribution practices in India. The implementation of these practices could provide possible learning for the utilities, which are suffering from huge losses. With IT implementation in distribution operations and customer service, the state has improved its quality of supply.
2. **Operational Efficiency:** The Delhi has recorded AT&C losses as amongst the lowest in the country. The initiatives taken by Delhi utilities have helped them achieve their loss reduction targets. The major tariff hikes approved by commission in Delhi has only been in FY 12. Yet, the distribution utilities in Delhi have managed to be profitable and the utilities are being approved of Fuel Surcharge against rising price of fuel.
3. **Power Purchase cost:** The power purchase cost in Delhi has been increasing like the other states in country; however, Delhi purchases power majorly from Central sector plants and thus do not have any control over the efficiencies of this. In this regards, state has approached regulatory commission to surrender the costly power, so that it can manage its power purchase portfolio better.
4. **Tariff Revisions:** the tariff revisions in the state have not been frequent over the span of seven years. The only major tariff revision that took place was in FY 2011-12, to the tune of 11%. However, the utilities are being allowed to pass on increased variable cost due to variation in fuel prices.
5. **Financial Performance:** The financial performance of the state utilities has improved over the years. However, the utilities still face cash crunch, given the high outstanding regulatory assets, which is forcing the utilities to go for costly short term loans. Hence, it is important to either hike the tariffs or liquidate the regulatory assets to improve the cash crunch situation of the utilities. However, liquidating will bring huge tariff shocks to the consumers. Hence, the only option left is to increase the tariffs.
6. **Regulatory asset:** As on FY 2013-14, the status of regulatory assets is Rs 2066 Cr for TPDDL, Rs 9327 Cr for BRPL and Rs 5553 Cr for BYPL. The regulatory assets are supposed to be liquidated within three years of its creation; however, the same has not been done.

## VII GOA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

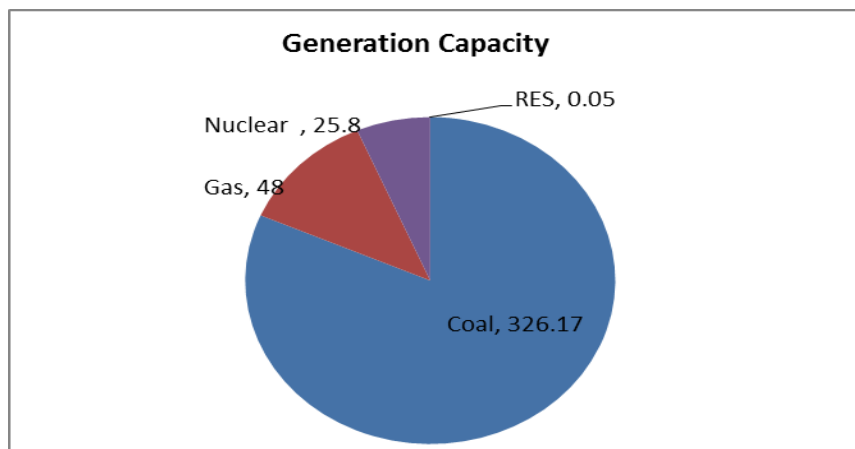
The Electricity Department of Goa (ED- Goa) created in 1963, is the only licensee in the state for transmission and distribution of Electrical Energy. The Department does not have its own generation and purchases power majorly from the Central Sector Power Stations of the National Thermal Power Corporation as per the allocation made by the Central Government. There are no direct link lines between the generating station of NTPC and Goa and hence the NTPC power is availed through the Grids of the neighboring State of Maharashtra and Karnataka. It also procures power from IPPs, co-generation & other sources.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Goa was 400.02 MW. Out of total capacity as on Feb 2014, coal based power capacity accounted for ~82% followed by Gas (~12%) and Nuclear (~6%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure VII-1: Generation Capacity Mix as on Feb 2014- Goa**



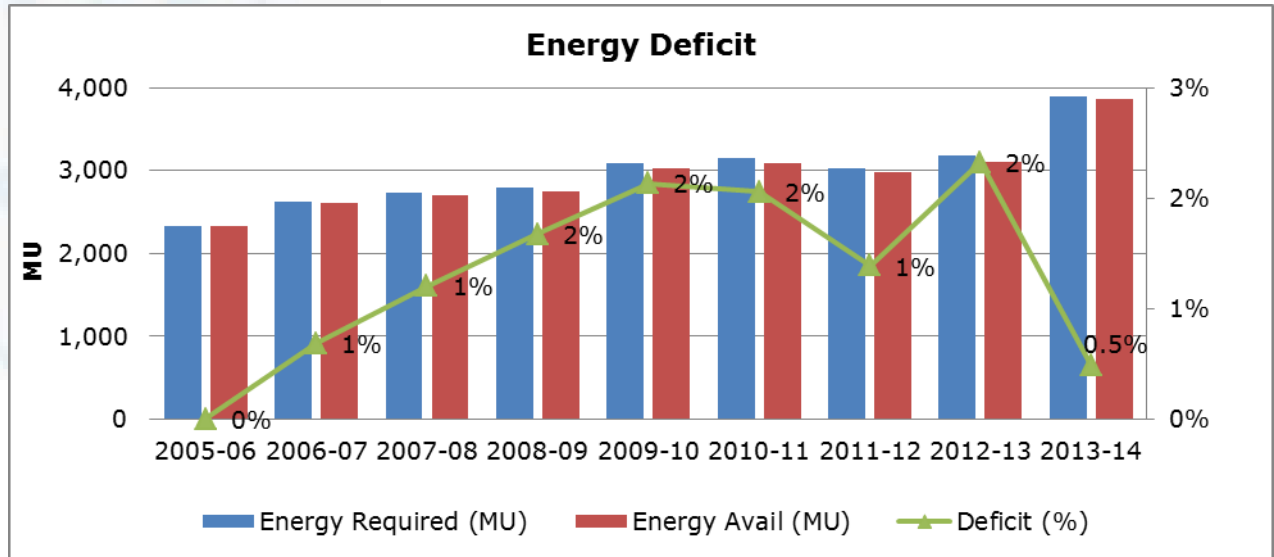
Source: CEA

#### 1.3. POWER SUPPLY POSITION

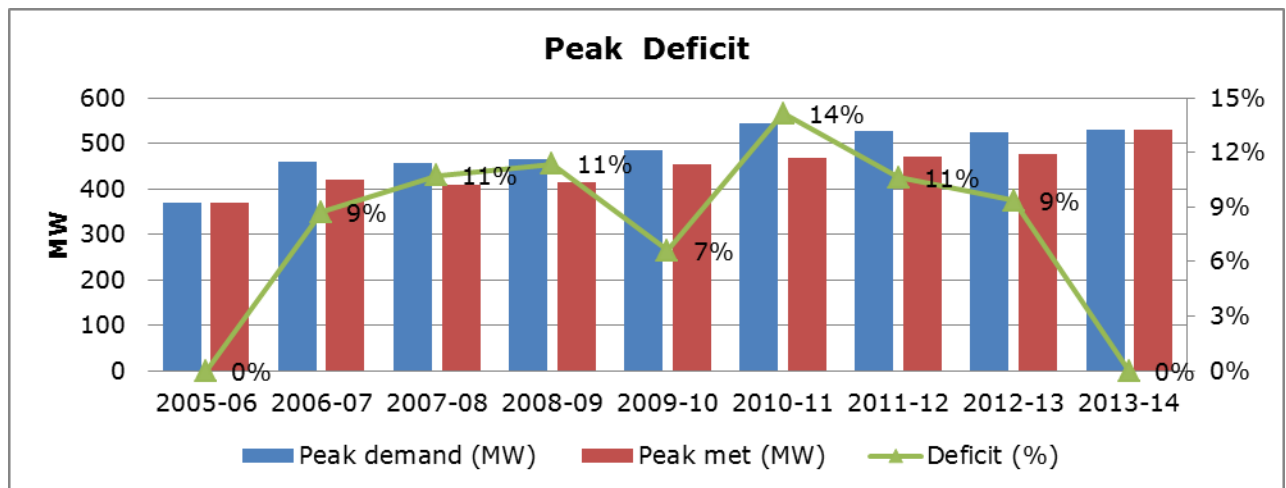
The energy and peak deficit in the state of Goa has been eliminated in FY 14. The energy deficit reduced from ~1% in FY 08 to ~0.5 % in FY 14. Simultaneously, the peak deficit reduced from ~11% in FY 08 to ~0% in FY 14.

Due to long term PPAs with CGS on round the clock basis, there is surplus power available to ED-Goa during off-peak period.

The trend of energy and peak deficit observed in Goa over the years is highlighted in the figure below:

**Figure VII-2: Historical Trend in Energy Deficit – Goa**

Source: CEA

**Figure VII-3: Historical Trend in Peak Deficit – Goa**

Source: CEA

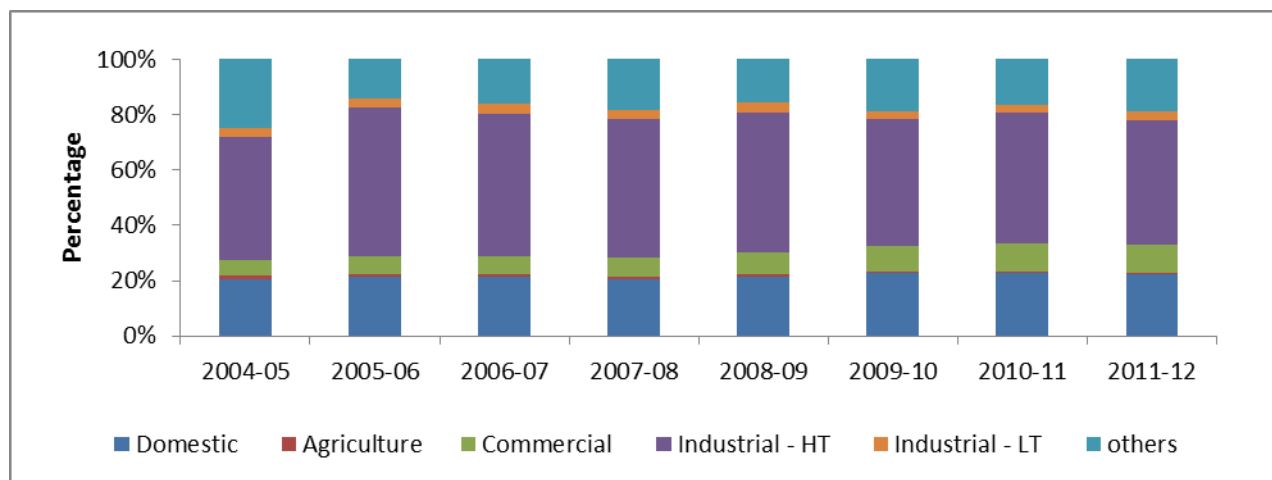
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF GOA

In FY 2011-12, the industrial consumers dominated the sales mix, with a share of ~49% followed by domestic (22.3%) and commercial (9.9%). The others category accounted for 18.7 % of the sales mix. The share of industrial category and Domestic increased marginally over the years.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure VII-4: Historical Trend in Consumer Sales Mix - Goa**



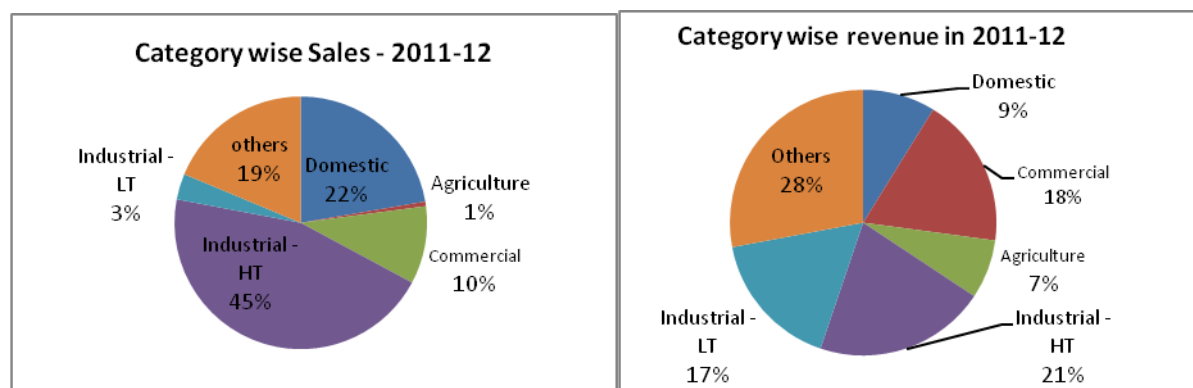
Source: PFC

The overall sales have increased at a CAGR of ~5% over a span of seven years wherein the sales of commercial category have registered a higher CAGR of 10% and the sales of Domestic category have registered a CAGR of 4%.

In terms of revenue contribution, Industrial category contributed to ~38% of total revenue followed by Commercial and Domestic category which contributed to ~18% and ~9% of the total revenue respectively.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from different category of consumers.

**Figure VII-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Goa**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregate Technical & Commercial (AT&C) losses for Goa electricity department have reduced from 18% in 2004-05 to 15% in 2011-12. The table below shows the trend in AT&C Losses and Collection Efficiency.

**Table VII-1: Year on Year Trend in AT&C losses and Collection Efficiency - Goa**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses	18%	12.4%	16.9%	13%	22%	6%	14%	15%
Collection Efficiency	99%	104%	98%	103%	99%	110%	100%	98%

Source: PFC

Various works under APDRP scheme contributed towards reduction in outages and the AT&C losses in the state of Goa.

Steps undertaken by ED-Goa to reduce the Distribution Loss at an optimum level are:

- The bifurcation of the feeders
- New Sub-Stations to improve the voltage profile and reliability of power supply
- Augmentation of the capacity of Sub-Stations
- Underground cabling in parts of Goa

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost accounts for 85% of the total distribution cost. The average distribution cost in Goa has grown at a CAGR of 12% over a span of seven years and power purchase cost has grown at CAGR of 10 %

The per unit cost break-up for different cost components is highlighted in the table below:-

**Table VII-2: Year on Year Trend Distribution Cost Breakup – Goa**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.32	1.42	1.64	1.77	1.96	1.91	2.20	2.64
O&M (R&M + A&G + EC)	0.22	0.26	0.24	0.26	0.32	0.47	0.44	0.44
Interest	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.02
Depreciation	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.01
Other cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: PFC

The distribution cost in Goa is relatively low compared to other states. The major portion of the state power procurement comes from NTPC. Hence the purchasing cost is subject to fluctuation in coal/ Gas prices. The O&M expenses have majorly increased on account of inflation.

## 2.4. REVENUE REALIZATION

The tariff realizations have increased in FY 2011-12 for all categories of consumers. The major increase in the realization was in Commercial category in the past seven years. In comparison to FY11, both commercial and industrial increased significantly.

The table below shows the revenue realization (without subsidies) from different consumer categories over the years.

**Table VII-3: Historical Trend Consumer Category Wise Revenue Realization - Goa**

Years	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
<b>Domestic</b>	2.79	2.75	2.79	3.42	3.48	4.30	3.54	3.84
<b>Agriculture</b>	1.25	1.58	2.22	1.67	2.14	2.00	2.35	2.35
<b>Commercial</b>	5.60	5.50	6.08	6.39	6.47	6.40	6.42	7.17
<b>Industrial LT</b>	5.03	4.95	5.19	4.75	4.93	4.71	4.68	5.64

Source: PFC

The state has a favorable consumer mix, and low losses have led to better tariff realizations from all consumer categories. The increase in tariff realization can be attributed to Tariff revisions of 11.8% in FY12.

The state also earns revenue from the sale of surplus power available to ED-Goa during the off peak period. In FY 2011-12, the state earned Rs 109 Cr from sale of surplus power.

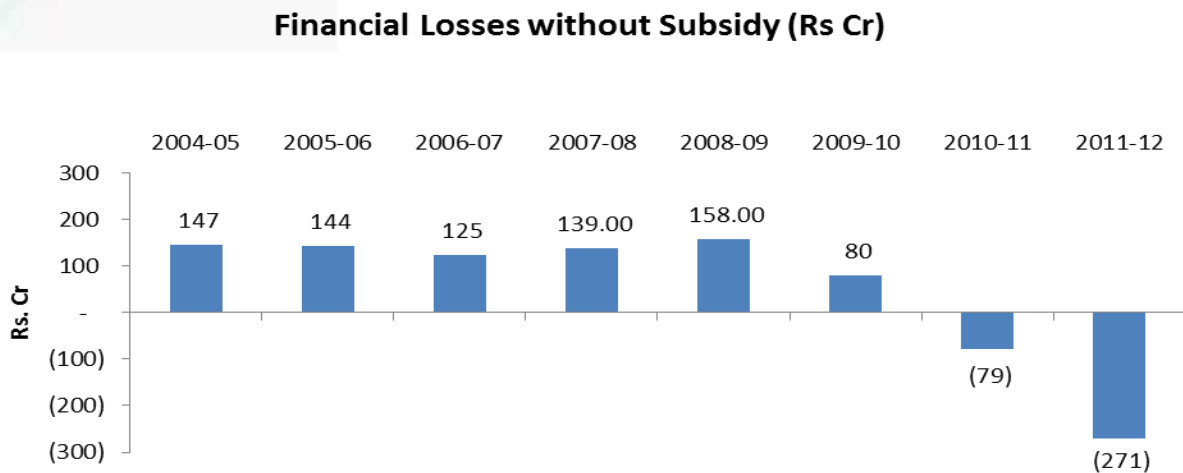


### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

ED-Goa was recorded as a profitable venture over the years. However, in FY 2010-11 and FY 2011-12, it started to incur financial losses.

**Figure VII-6: Historical Trend Financial Losses (w/o) subsidies – Goa**



Source: PFC

The primary reason has been the substantial increase in Power purchase cost and O & M cost in FY 11 and FY 12, without any commensurate increase in tariffs.

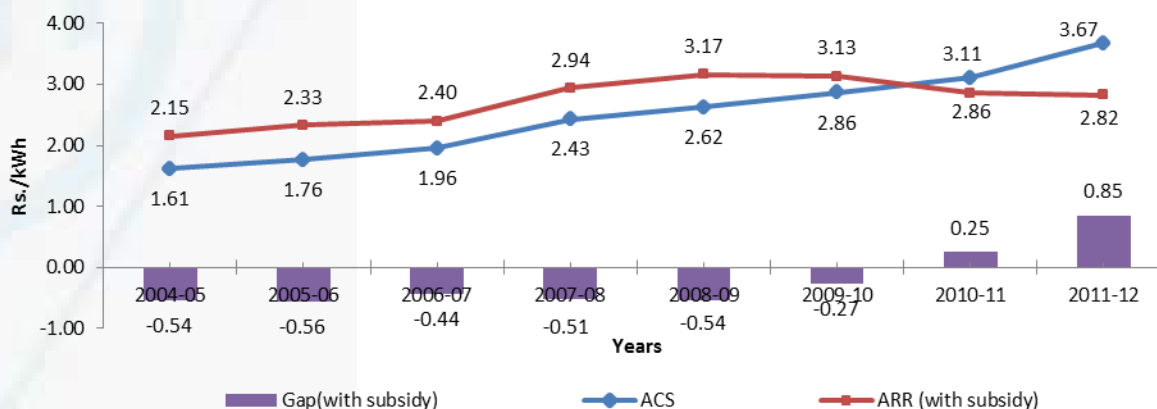
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There is no history available of Subsidies given to ED- Goa

#### 3.3. ACS v/s ARR

The gap between average cost of supply and average revenue realized has increased in FY 11 and FY12. This is primarily due to the significant increase in power distribution cost and prevalent AT&C losses in the state.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure VII-7: Historical Trend in ACS v/s ARR – Goa**

Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

CAG audited annual accounts not available for Goa.

## 5. ASSESSMENT OF REGULATORY EFFECTIVENESS

A Joint Electricity Regulatory Commission for all Union Territories (except Delhi) was established in 2005, as "Joint Electricity Regulatory Commission for Union Territories" Later with the joining of the state of Goa, in 2008, the Commission came to be known as "Joint Electricity Regulatory Commission for the state of Goa and Union Territories".

The key aspects of regulatory effectiveness have been discussed below -

### 5.1. STATUS OF MYT REGULATIONS

- Draft report on MYT framework has been issued but is yet to be implemented.
- The control Period is of three financial years i.e. from April 1, 2014 to March 31, 2017
- It comprises (but not be limited to) the detailed category-wise sales and demand projections, power procurement plan, capital investment plan, financing plan and physical targets.

### 5.2. STATUS OF OPEN ACCESS IMPLEMENTATION:

The regulation framework for open access has been issued. However, it is still under implementation.

### 5.3. FREQUENCY OF TARIFF REVISIONS:

The tariff revisions were done in FY 2012-13, w.e.f 1<sup>st</sup> June 2012, after a gap of 11 years, wherein the tariffs were hiked substantially by 11.8%. Thereafter, another tariff revision has been accepted for the FY 2014-15 to the tune of 7.62%

**Table VII-4: Trends in Tariff Revisions - Goa**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	0%	0%	11.8%	0%

## 6. SUMMARY

1. **Reforms:** The power sector in the state has yet not undergone the structural reforms and hence there is a Power Department (ED- Goa) that is responsible for all the functions of the sector. Also the state does not have an independent regulatory commission and comes under JERC for Goa and union territories.
2. **AT&C Losses:** The technical improvements and initiatives like underground transmission lines or increasing capacity of substations have helped extensively to reduce the losses.
3. **Peak and Energy Deficit:** The peak and energy deficit for the state has reduced over the years and came down to less than 1% in FY 2011-12. This can be attributed to the ED-Goa's strategy of entering into long term PPAs with CGS on RTC basis and to the infrastructural development for decreasing the losses.
4. **Tariff Hikes:** There has been tariff revision in the state after a gap of 11 years. The proposal of tariff revision was rejected in FY2013-14. A revision of 7% has been accepted by the commission for Fy2014-15. However, due to the increasing cost and no commensurate increase in tariff, Discoms have started to incur losses since FY 2010-11.
5. **Regulatory effectiveness:** In spite of the good operational and financial performance, the state is lagging behind in terms of its regulatory effectiveness. Even though commission has notified JERC (Open Access in Transmission and Distribution) Regulations 2009, the progress of implementation have been very slow. The MYT framework and Open Access regulation is yet to be implemented. The establishment of SLDC and STU which are required to facilitate Open access is yet to be notified.

## VIII GUJARAT

### 1. INTRODUCTION

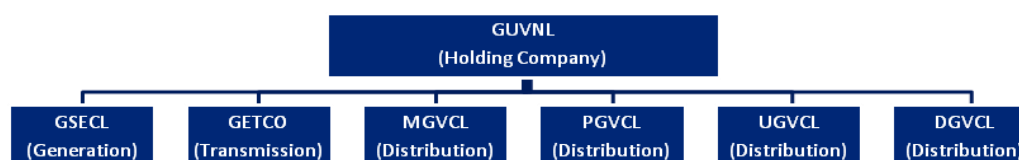
#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The Government of Gujarat constituted the Gujarat Electricity Regulatory Commission (GERC) in November, 1998. Until the year, 1998 Gujarat Electricity Board (GEB) was a profit earning organization but for various reasons it started incurring losses and by the end of Financial Year (FY) 03 the cumulative losses were Rs 6,233 Cr. The Government of Gujarat decided to restructure the electricity industry with an objective to improve the operational efficiency and consumer services. The vertically integrated state electricity board, GEB was unbundled from 1st April 2005. The Companies that were incorporated as a part of this restructuring exercise were:

- Gujarat State Electricity Corporation Limited (GSECL) - Generating Company to which all generating plants of GEB were transferred
- Gujarat Electricity Transmission Corporation Limited (GETCL) - Transmission Company to which transmission business of GEB were transferred.
- Uttar Gujarat Vij Company Limited (UGVCL) - Distribution Company to which distribution function of GEB was transferred.
- Dakshin Gujarat Vij Company Limited (DGVCL) - Distribution Company to which distribution function of GEB was transferred.
- Madhya Gujarat Vij Company Limited (MGVCL) - Distribution Company to which distribution function of GEB was transferred.
- Paschim Gujarat Vij Company Limited (PGVCL) - Distribution Company to which distribution function of GEB was transferred.
- Gujarat Urja Vikas Nigam Limited (GUVNL) - Holding Company responsible for trading and residual functions of extinct SEB.

The current structure of the power sector in the state is shown below along with the functional responsibilities of each utility.

**Figure VIII-1: Power Sector Structure – Gujarat**



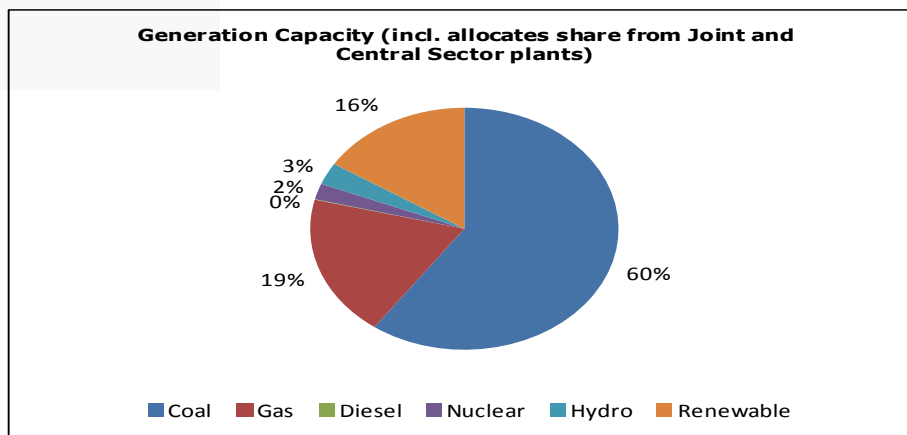
Source: GERC

## 1.2. GENERATION MIX

The total installed capacity as on December 2013 (including allocated share in Joint & Central Sector plants), for Gujarat was 26,269 MW, out of which coal-based capacity accounted for ~60% of the total installed capacity; followed by gas (~19%) and renewable-based (~16%).

Figure below highlights the generation capacity mix in the state of Gujarat.

**Figure VIII-2: Generation Capacity Mix - Gujarat**



Source: CEA

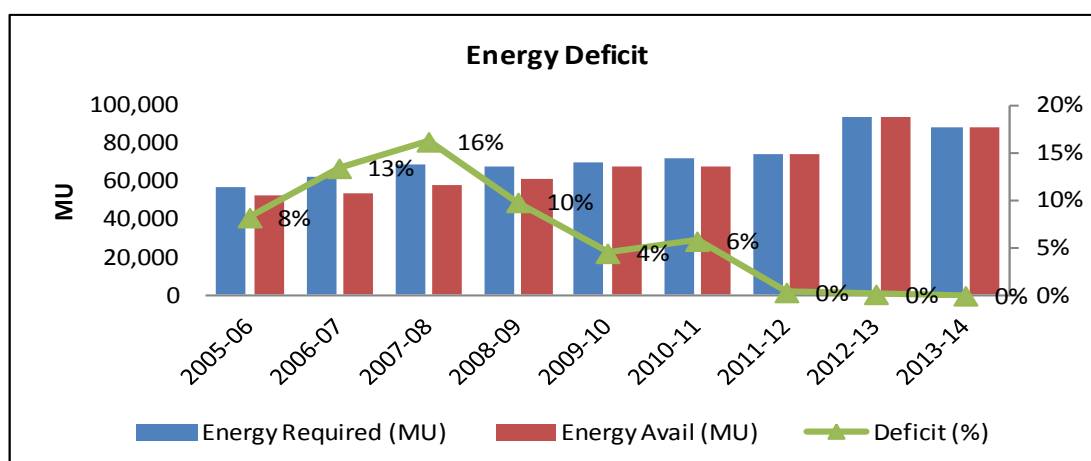
## 1.3. POWER SUPPLY POSITION

The energy and peak deficit in the state of Gujarat has been eliminated in recent years. The energy deficit reduced from ~16% in FY 08 to ~0% in FY 12. Simultaneously, the peak deficit reduced from ~29% in FY 08 to ~0% in FY 13 and FY 14. The increasing capacity addition, through long-term power purchase agreements (especially coal and gas-based capacity addition), has been able to meet the increasing energy demand in the state, also cover the previous year deficit levels.

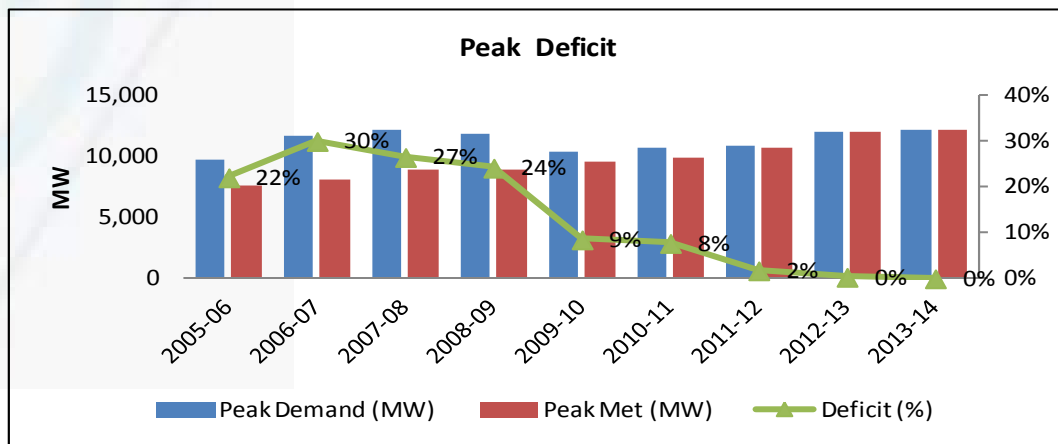
Load-shedding or power cuts in the urban areas are almost zero, although due to rise in demand during harvesting season, power supply is sometimes rationed in rural areas.

The trend of energy and peak deficit observed in Gujarat over the years is highlighted in the figure below:

**Figure VIII-3: Historical Trend in Energy Deficit – Gujarat**

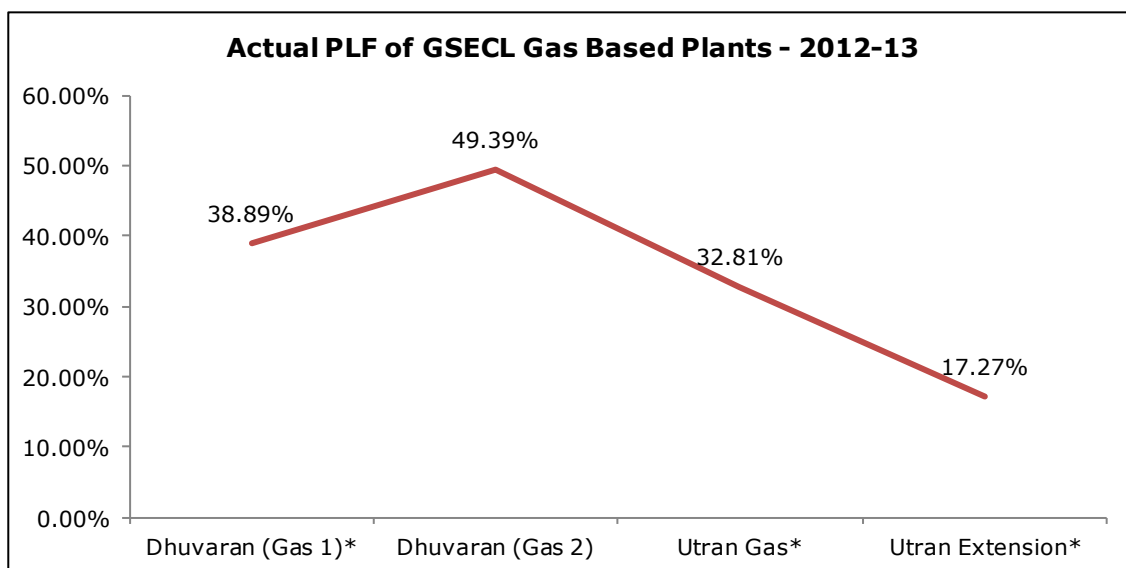


Source: CEA

**Figure VIII-4: Historical Trend in Peak Deficit – Gujarat**

Source: CEA

In order to cater the increasing power demand in the state GUVNL, had signed long-term power purchase agreements with independent power producer, for the state distribution companies (DISCOMs). However, with the decline in growth of demand of power in the state has made the state power surplus. Further, the inability to sell the excess power has resulted in payment of fixed charges to these power producers, leading to an increased power purchase cost. This is particularly true for the gas station, which are stranded for the lack or cost of gas. The figure below indicates the operating PLFs of the state run gas based plants.

**Figure VIII-5: Operating PLF of State Gas Based Plants – Gujarat**

Source: GSECL Filing of Petition for True Up of FY 2012-13

\*GUVNL has signed Long Term PPA with above plants.

The above trend is expected to continue in near future, which will impose a huge financial burden on the state power sector.

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF GUJARAT

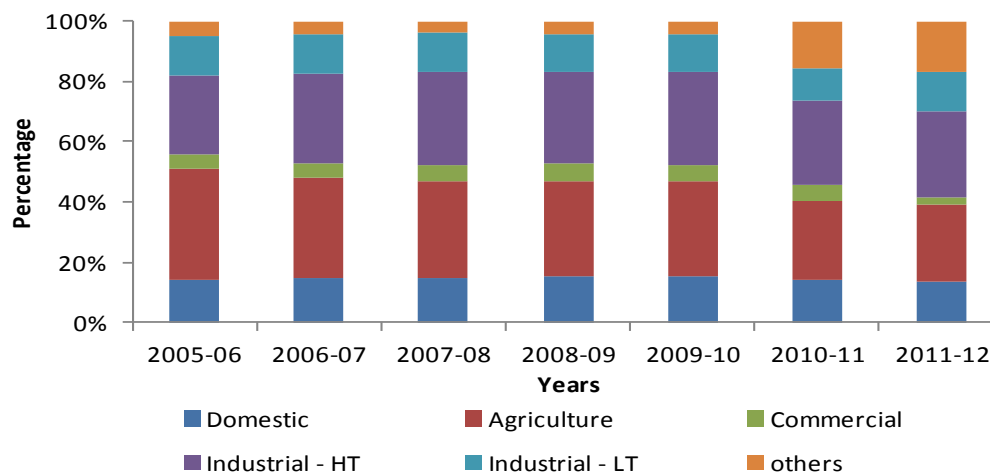
The distribution activity in the state of Gujarat is segregated into four state government DISCOMs and a private DISCOM. The state distribution utility in the state serves ~12 million consumers in the state, with more 9.5 million consumers or ~79% domestic consumers served by the state DISCOMs. The industrial consumers constitute ~2% share in the consumer mix of the state DISCOMs.<sup>6</sup>

In 2011-12, industries dominated the sales mix with a share of 42%, followed by agriculture (25%) and domestic (14%) categories

The share of agricultural sales have reduced over the years while the share of industrial sales have increased. The share of agricultural sales have reduced from 36% in 2005-06 to 25% in 2011-12 and the industrial sales have increased marginally from 40% in 2005-06 to 42% in 2011-12. Although, the sales towards railway traction was added to the consumer sales mix in FY 11, increasing the share of other consumer segments in FY 11 and FY 12.

The figure below illustrates the year on year trend in the consumer mix for the state of Gujarat.

**Figure VIII-6: Historical Trend Consumer Sales Mix - Gujarat**



Source: PFC

The overall sales has registered a CAGR of ~8% from FY 06 to FY 12; wherein sales to industrial and domestic consumers have registered a comparatively higher CAGR of ~12.1% and 10.3% in the same period.

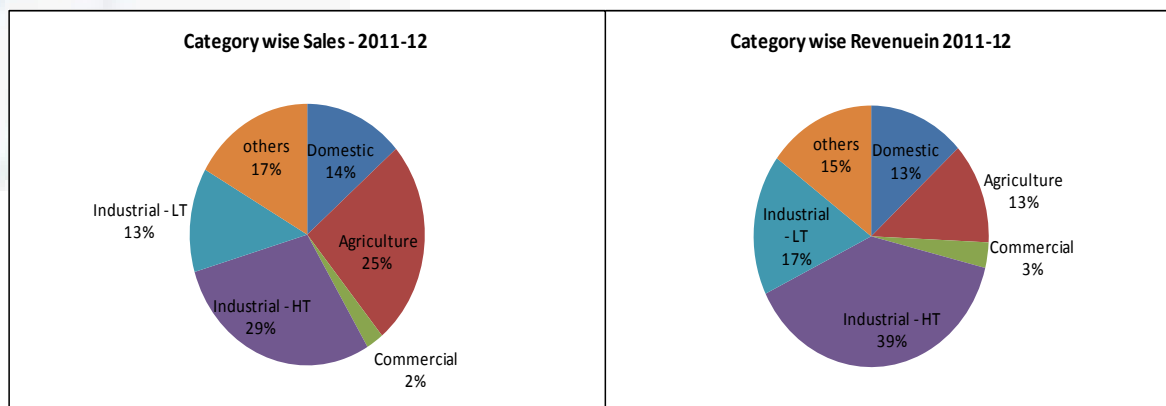
In 2011-12, with ~7% consumers and ~25% share in the overall consumer sales mix the agriculture segment contributed ~13% share in the overall revenue of the state DISCOMs. The industrial segment contributed ~ 56% of the overall revenue to the state DISCOMs, followed by sales to domestic and agriculture categories, with a share of ~13% each. This clearly indicates that electricity sales to agriculture segment and certain categories of

<sup>6</sup> Approved Multi-Year Tariff Order 2012-16, for the state DISCOMs.



domestic consumers (especially BPL consumers) are cross-subsidized by the industrial consumer categories and are also supported via state government subsidies. The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumer categories.

**Figure VIII-7: Comparative Analysis Consumer Sales and Revenue Mix (w/o subsidy) in 2011-12 – Gujarat**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Gujarat distribution utilities have historically remained on a lower side compared to the national average. Further, the loss levels in the state have reduced significantly from 27% in FY 06 19% in FY 12. The loss levels have been calculated with an approved consumption norm for the unmetered agriculture pumps that constitute ~57% of agriculture consumers and ~81% of total energy sales to agriculture consumer segment. The trends observed in collection efficiency have been on the higher side, with state registering more than 95% collection efficiency in all the representative years<sup>7</sup>.

The table below illustrates the year on year trend on commercial losses and collection efficiency of the state DISCOMs.

**Table VIII-1: Historical Trend AT&C losses and Collection Efficiency - Gujarat**

Year	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	27%	24%	23%	22%	23%	17%	19%
Collection Efficiency (%)	100%	98%	100%	99%	99%	99%	97%

Source: PFC

Further, with initiatives like Jyotigram Yojna the state DISCOMs have been able to segregate the agriculture users from other users in the village, which has enabled efficient metering in the state. The box below provides a brief about the Jyotigram Yojna adopted in the state.

<sup>7</sup> Approved Multi-Year Tariff Order 2012-16, for the state DISCOMs.

**Box VIII-1: A Brief about Jyotigram Yojna****Jyotigram Yojna**

A Gujarat Government initiated to improve the rural power supply in the state, aimed at providing 24-hour, three-phase power supply to more than 18,000 villages in the state and pre-announced eight hours per day supply to the tube-well owners. The initiative required complete rewiring in the rural part of the state. The users covered under the programme include domestic, schools, hospitals, and village industries. The electricity to all the users are provided at metered rates.

The scheme focuses on providing rationally managed subsidies where needed, and pricing where possible. Further, the farmers operating tube-wells continue to receive electricity for 8 hours.

The scheme initially launched for eight districts on pilot basis, was extended to the entire state by November 2004, covering ~90% of Gujarat's villages. The scheme initiated a massive laying of parallel rural transmission network. Feeders supplying agricultural connection were bifurcated from those supplying to commercial and residential connection at sub-station itself. Meters on distribution transformer centers were also installed on both the sides of feeders to improve the accuracy for energy accounting [MGVCL 2007].

The outcome of the Jyotigram Yojna resulted in 24 hours un-interrupted supply of power across the 18,000 villages in the state and improved reliability and predictability of supply, especially to the tube-well operators. Further, the segregation of agricultural energy from other consumers has reduced the subsidy burden of the state government and improved the metering capabilities of the state DISCOMs.

Historically, the HT/LT ratio (0.94 in 2009-10) in the state has remained high.

**2.3. TRENDS IN DISTRIBUTION COSTS**

Power purchase cost accounts for majority of distribution cost, accounting for ~91% of the overall distribution costs.

The per-unit cost break-up for different cost components for the state of Gujarat is provided in the table below:-

**Table VIII-2: Historical Trend in Distribution Cost Breakup - Gujarat**

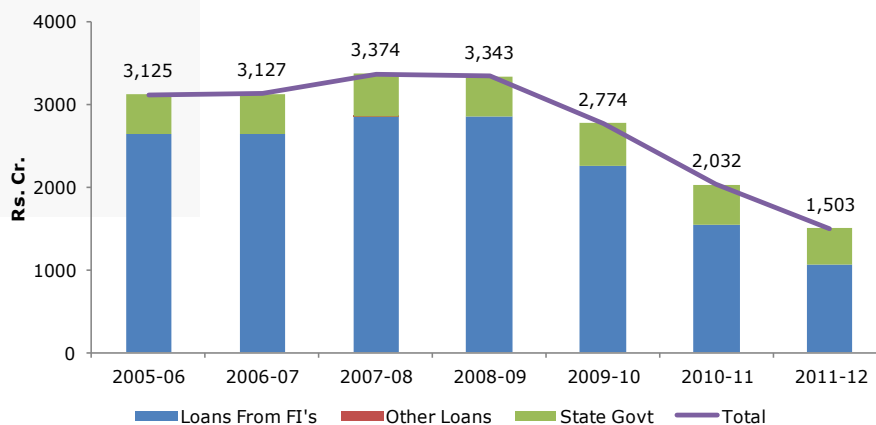
<i>Cost Component (Rs per kWh)</i>	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
<i>Power Purchase Cost</i>	2.08	2.35	2.63	3.15	2.92	3.55	3.97
<i>O&amp;M (R&amp;M + A&amp;G + EC)</i>	0.15	0.23	0.21	0.22	0.23	0.23	0.21
<i>Interest</i>	0.10	0.09	0.08	0.09	0.08	0.07	0.06
<i>Depreciation</i>	0.06	0.07	0.08	0.09	0.09	0.10	0.11
<i>Other cost</i>	0.00	0.01	0.02	0.01	0.04	0.03	0.01

Source: PFC

The power purchase cost has increased significantly in recent years on account of increasing capacity addition through long term power purchase agreements. Further, with the recent decline in growth-rate of demand for power, the sector in Gujarat has become a surplus state with stranded capacity and an obligation to pay the fixed charges to the power producers.

The percentage share of interest costs have also decreased from ~4% in FY 06 to ~1% in FY 12, on account of decreasing debt subscribed by the state DISCOMs. The figure below highlights the decreasing trend in the overall debt taken by the state DISCOM.

**Figure VIII-8: Historical Trend in Debt taken by the state DISCOMs – Gujarat**



Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization (without subsidies) from different consumer categories have increased commensurate to increasing power purchase cost. The state DISCOMs has also successfully implemented the MYT framework for tariff determination.

The power purchase costs reduced in the year FY 10 compared to the high levels in FY 09, resulting in reduced consumer-wise average realization in that year.

The table below presents the revenue realization (without subsidies) from different consumer categories over the years.

**Table VIII-3: Historical Trend in Consumer wise Average Revenue Realization - Gujarat**

Years	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	2.93	2.98	3.05	3.80	3.74	3.69	4.09
Agriculture	0.97	1.05	1.14	1.91	1.71	1.67	2.07
Commercial	4.70	4.83	4.88	5.64	5.62	5.53	5.52
Industrial HT	4.33	4.66	4.53	5.45	5.34	5.17	5.65
Industrial LT	4.23	4.34	4.39	5.19	5.12	5.09	5.69

Source: PFC

Agricultural sector is being heavily subsidized by the state government and the share of the state government subsidies accounts for ~4% of the total revenues. Although, the agriculture consumers are heavily cross-subsidized by the industrial consumers, it can be observed that the tariff for agriculture sector is one of the highest in the country.

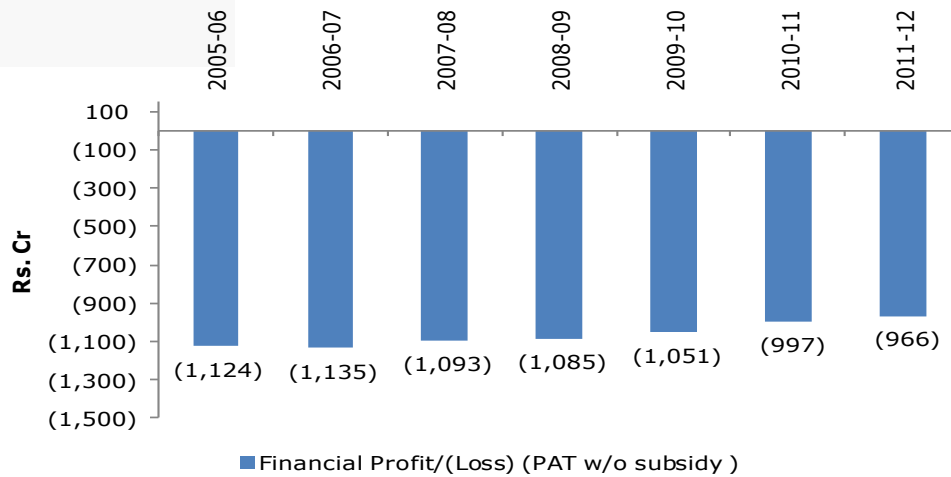
The utilities as per the MYT order are being provided a fixed fuel surcharge (FPPPA), which is on account of fuel price variations

## ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

### 2.5. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Gujarat has decreased over the years. The figure below depicts the year on year trend in the profit/ (loss) booked by the state DISCOMs.

**Figure VIII-9: Historical Trend in Financial Losses (w/o subsidy) - Gujarat**



Source: PFC

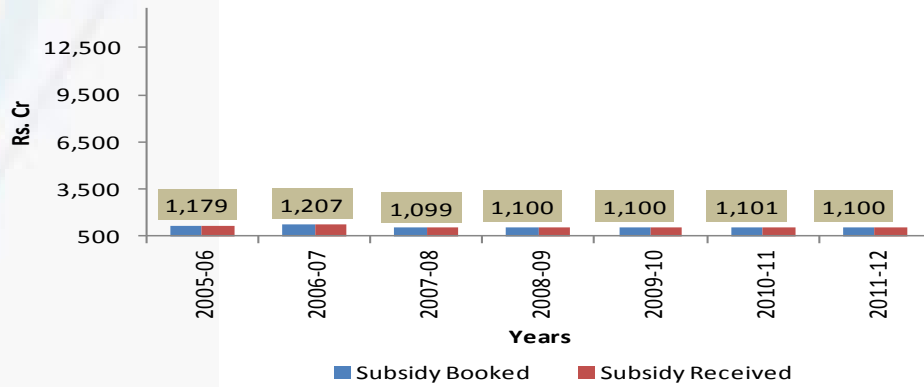
Further, after accounting for the subsidies provided by the state government, the state DISCOMs reports a financial profit. In 2011-12, the state DISCOMs reported a profit (with subsidy) of Rs. 134.05 Cr.

### 2.6. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

In 2011-12, the subsidy contributed ~4% of the total revenues of the state DISCOMS compared to ~12% in 2005-06. The subsidy level was fixed at ~Rs 1100 Cr by the state government (in the MYT 2012-16) and is distributed among DISCOMs, in proportion to the unmetered category consumers. The subsidy booked has reported an annual decline of 1% over the span of six years, to the ACS that has registered a CAGR of 10% over the same period.

The figure below depicts the year on year trend in subsidies booked and received by the state DISCOMs.

**Figure VIII-10: Historical Trend in Subsidy Booked v/s Subsidy Received - Gujarat**



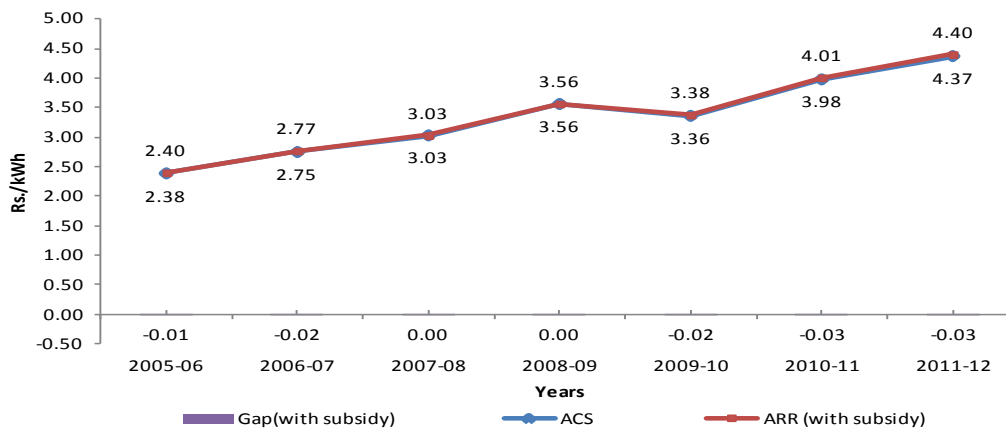
Source: PFC

## 2.7. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized (with subsidy) has remained close to zero over the years. This is primarily due to the full cost-recovery tariff approach followed by the Commission.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer.

**Figure VIII-11: Historical Trend in ACS v/s ARR (with subsidy) - Gujarat**



Source: PFC

### 3. STATE EXPOSURE TO POWER SECTOR

#### 3.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~7% of the total tax revenue in the state in 2011-12. The details for the same are provided in the table below:

**Table VIII-4: Tax Revenue from Power Sector - Gujarat**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	2,644	3,263	3,654.56
Total Tax Revenue	32,631	43,018	52,032.60
Power sector Tax Revenue / Total state Tax Revenue	8.10%	7.58%	7.02%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Tax Revenue from the sector has increased over the years; however, the contribution of sector in total tax revenue generation has decreased marginally.

The non-tax revenue from power sector is through **Royalty/CESS on water for power generation, transmission and distribution, Rural Electrification etc.** The Non-Tax revenue, which contributes a marginal ~2% of the total non-tax revenues in 2011-12. The details for the same are provided in the table below:

**Table VIII-5: Non-Tax Revenue from Power Sector - Gujarat**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	0.5	5.3	105.75
Total Non-Tax Revenue	5,452	4,915	5,276.52
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0.01%	0.11%	2.00 %

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

In FY12, there has been a substantial rise in the revenue generation from the sector as compared to Rs 0.5 Cr in FY10

The overall income generated from power sector has increased from **Rs 2,664 Cr** in 2009-10 to **Rs 3,760 Cr** in 2011-12. However, the contribution of Power Sector in overall State Revenues has been approximately constant (~7%) since FY10.

### 3.2. EXPENDITURE ON POWER SECTOR

The details of the expenditure made on the power sector by the state are provided in the table below:

**Table VIII-6: Expenditure on Power Sector - Gujarat**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital Expenditure	442	735	880.20
Revenue Expenditure	2,896	3,146	3,358.70
Total Expenditure	3,338	3,882	4,238.90

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

**The Capital and Revenue expenditure incurred on the Power sector has increased over the period of three years.**

Further, it can be observed that the state power sector has moved towards self sufficiency as revenue from Power sector exceeded the revenue expenditure made by the state towards the power sector in FY 11 and FY 12.

### 3.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The table below depicts the guarantees given to power sector relative to the total revenues of the state.

**Table VIII-7: Guarantees as a Percentage of Total Revenues - Gujarat**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	2,257	2,076	576
Total Revenues of the State	38,083	47,933	57,309
Guarantees as a %age of Total Revenues of State	5.93%	4.33%	1.00%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

As shown above, The state government guarantees have declined substantially in FY 2012, constituting a marginal ~1.00% of the overall state revenue from a share of ~6% in FY 2010.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table VIII-8: Guarantees Utility wise Breakup - Gujarat**

Share of various utilities in state Guarantees	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
--	---------	---------	---------	--

				Rs Cr			
Gujarat Urja Vikas Nigam Limited-	2,199	1,485	544.84	86%			
Gujarat State Electricity Corporation Limited	58	10	27.22	2%			
Other	0	582	3.65	12%			

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The majority share of the guarantee (~86%) towards power sector since FY10 is pledged towards the loan taken by the state holding and trading company, GUVNL.

### **Subsidy**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table VIII-9: Power Sector Subsidy as a Percentage of overall subsidy – Gujarat**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Power Sector subsidy	2,838	2,635	3,167

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The power sector received a substantial average share of ~57% of the overall subsidy given by the state government. As stated earlier ~1100 Cr, is directed towards the state DISCOMs to cover the agriculture sales in the state.

### **3.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bond as on 31<sup>st</sup> March 2014 was Rs 330 Cr.

### **3.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement, which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table VIII-10: Power Sector Financing (2011-12) - Gujarat**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	4238.91



Particulars	2011-12 Rs. Cr
Loans And Advances made by the State Government (Net of Recoveries)	16.82
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	5.39
Total Power Sector Financing during the year	4261.12
Sector Financing Requirement as a % age of total revenues of state	7.44%
GSDP nominal	3,98,884
Sector Financing Requirement as a % age of GSDP	1.07%
Financial Profit/ (Losses) of DISCOMs during the year (With Subsidy realized)	134.00
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	7.20%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	1.03%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated at 7.44% of the revenue generated by the state and 1.07% of the Gross State Domestic Product. Further, the profits (with subsidy realized) reduced the financing requirement of the sector to ~7.20% of the state revenue and ~1.03% of the state GSDP.

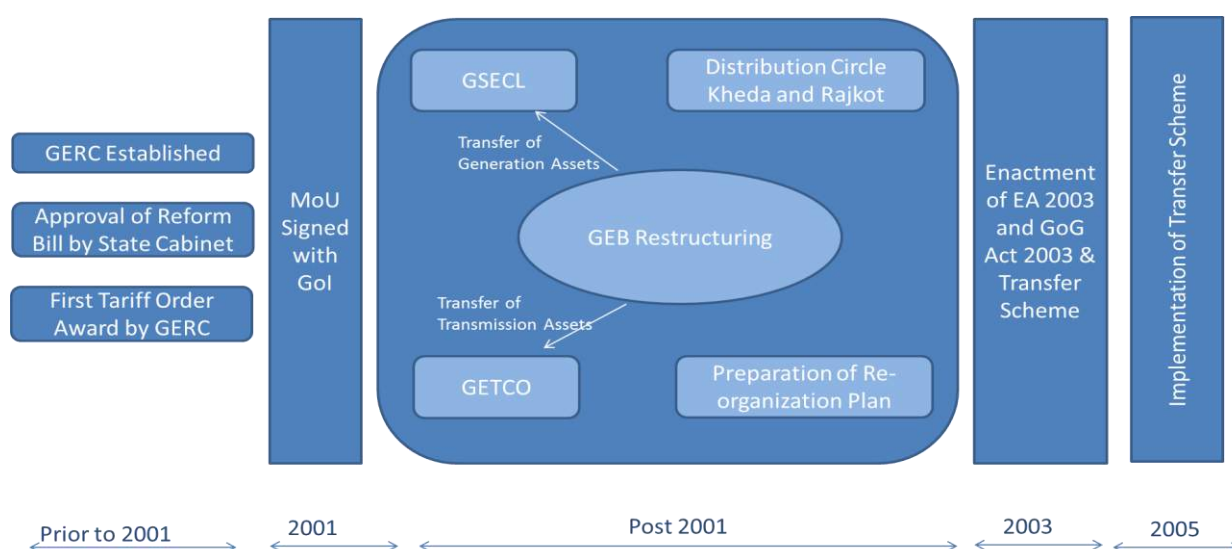
However, it can be observed that the power sector in Gujarat is self-sufficient and is able to generate sufficient revenues to cover the state grants.

## 4. ASSESSMENT OF REGULATORY EFFECTIVENESS

The Gujarat Electricity Regulatory Commission was constituted on 12th November, 1998 under provisions of Electricity Regulatory Commissions Act, 1998. GERC has the mandate to regulate the Electricity Sector in the state of Gujarat in a transparent, effective and efficient manner to safeguard the interests of consumers. In pursuance of the above stated objectives, the Commission has introduced a system of regular interactions with the stakeholders in the Electricity Sector, the Co-ordination Forum of all the power utilities in the State, and the Consumer Grievance Redressal Forums, to address the issues relating to consumers as well as the electricity supply industry.

The figure below presents the various milestones during the reform process that started in 2001.

**Figure VIII-12: Power Sector Reforms - Gujarat**



Source: GUVNL and other reports

### 4.1. BUDGETING

The state regulatory commission, GERC, is self-sufficient in its operations. The primary source of income is license and petition fees from licensees, IPPs, open access consumers, etc, on submission of petitions, review of order, renewal of annual license, etc. The state reported a surplus of Rs. 18.29 Cr in the year FY 12<sup>8</sup>.

### 4.2. STAFFING

The staff of the commission is appointed through direct recruitment, contract or deputation basis. Further, the staffing is divided into technical and non-technical staff. In 2011-12, 34% of the position in the commission was towards the technical staff. In 2011-12, 44% of the positions (technical and non-technical) remained vacant.

Another important aspect that needs to be considered is that a considerable mix of the staff especially the technical staff is on deputation or contract basis. Deputation is generally done from another government department or from the utility itself, which again limits the true independence of the staff of SERC's.

<sup>8</sup> Annual Report GERC – 2011-12.

### 4.3. MYT REGULATION

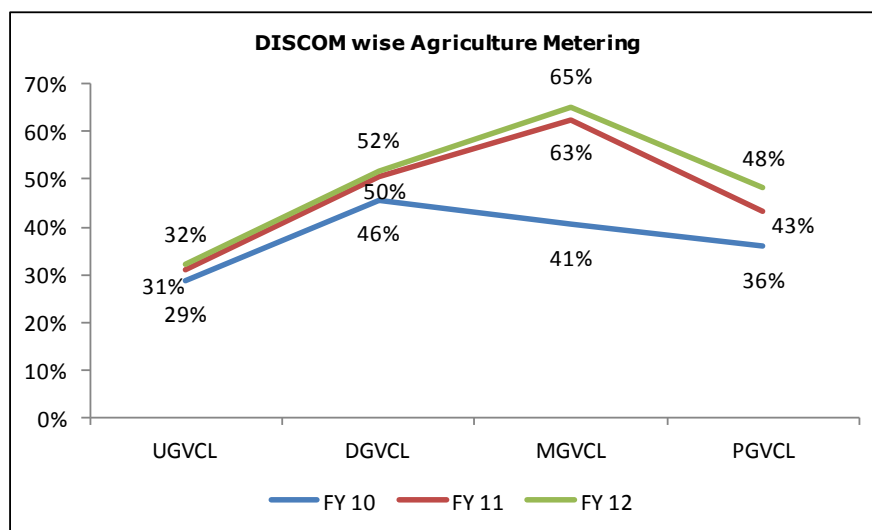
The MYT has been implemented for the second control period. The commission had selected a shorter first control period (three years). After the successful implementation of the first control period (FY 09 to FY 11), through reduction in AT&C losses, revenue realization, improved metering and other operational parameters the state commission approved second control period for five years (FY 12 to FY 16).

The utilities as per the MYT order are being provided a fixed fuel surcharge (FPPPA), which is on account of fuel price variations

### 4.4. LEVEL OF METERING

The commission had directed all the distribution licensees to submit their plans to the state commission on the level of metering in the state. The state distribution utilities have submitted that all connections in the state are metered, except the agriculture connections. Further, the new agriculture connections are provided with meters. The figure below presents the increase metering in DISCOM (FY 10 to FY 12).

**Figure VIII-13: Historical Trend in Agriculture Metering (FY 10 – FY 12) - Gujarat**



Source: Annual Report GERC (FY 10 to FY 12)

#### 4.4.1. AGRICULTURE METERING

The state commission has approved a consumption norm for both the metered and unmetered agriculture connection in the state. The table below depicts the consumption norms approved by the commission for unmetered and metered connections.

**Table VIII-11: Consumption Norms of Metered and Un Metered Agriculture Consumers - Gujarat**

DISCOM	Consumption Norm – Unmetered Connection	Weighted Average Consumption Norm – Metered Connections
UGVCL	1700 kWh/HP/annum	970 kWh/HP/annum
MGVCL	1700 kWh/HP/annum	1011 kWh/HP/annum
DGVCL	1700 kWh/HP/annum	524 kWh/HP/annum
PGVCL	1700 kWh/HP/annum	529 kWh/HP/annum

Source: Approved Multi Year Tariff Order, FY 2012-16

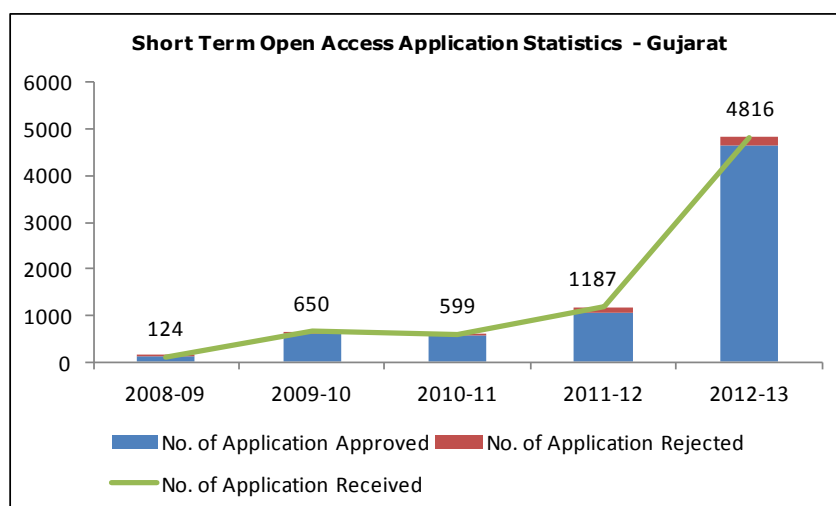
Minimum 8 hours of supply is provided to the agriculture consumers, with excess hours of supply being provided during cropping season. Further, in a critical case when the power supply is reduced to 5 hours, the shortage of supply is compensated during subsequent period when power position improved.

#### 4.5. OPEN ACCESS

Gujarat State Load Dispatch Center has been mandated with dealing of open access function in the state. Open access has started only a few years ago in the State, but has been well accepted by the players, essentially the captive consumers. In year 2007-08, total of 5 captive consumers filed applications for open access of 50 MW worth capacity. However the implementation was in 2 cases with a capacity of 5 MW.

Post 2008-09 several short term open access cases have been received and handled by the state commission. The figure below presents the short term open access application statistics in Gujarat from FY 09 to FY 13.

**Figure VIII-14: Historical Trend in Short Term Open Access Application (FY 09 – FY 12) - Gujarat**



Source: SLDC Annual Report, FY 09 to FY 13

Further, the state has granted capacity reaching more than 5009.32 MW or 12629.52 MU through short-term transactions in the year 2011-12, as shown in the table below:

**Table VIII-12: Comparative Analysis of short term transaction in Gujarat – FY 09 and FY 12**

	2008-09		2011-12	
	Granted MW	MUs	Granted MW	MUs
<b>Intra State Short Term Open Access</b>	25	24.5	617.50	2177.99
<b>Power Exchange Transactions</b>	85	86.4	3391.92	4046.38
<b>Bilateral Transactions</b>	441	501.6	999.90	6405.16
<b>Total</b>	551	612.7	5009.32	12629.52

Source: GETCO Annual Reports

## 5. SUMMARY

- 1. Demand Supply Gap:** The state has completely been able to eliminate the deficit levels through significant capacity addition in recent years and has resulted in state having surplus generation capacity.
- 2. Excess Power Generation:** As stated earlier, the excess power generation in the state could pose a significant financial risk on the state power sector. The gas plants continue to operate at low PLFs on account of lack or cost of gas and the trend is expected to continue in near future. GUVNL can redesign the existing contracts (where technically feasible) of gas plants to supply peaking and Ancillary Services that would make them productive and perhaps (under revised contracts) reduce the fixed costs burden. It would also help the state absorb more Renewable Energy in the system.
- 3. AT&C Loss Reduction:** The state DISCOMs are one of the most efficiently operated DISCOMs in the country. The DISCOMs have hedged the risk of increasing power purchase costs through long-term power purchase agreements with generation units. The year on year tariff revision is aligned to the increasing costs of the state DISCOMs. Further, the decreasing AT&C losses by the state DISCOMs are have also reduced the financial burden of the state DISCOMs.
- 4. Rural Electrification:** The state DISCOMs have successfully been able to achieve 100% rural electrification in the state, with provision of three-phase power supply in more than 18000 villages, through Jyotigram Yojna.
- 5. Regulatory Effectiveness:** The state commission has efficiently been able to implement most of the policy reforms over the last decade. The financial independence of the state commission is one of the important factors to achieve the regulatory effectiveness in the state.
- 6. Decline in Subsidy:** The state distribution utility has witnessed a decline in subsidy over the span of six years, which reiterates the robust financial policy adopted by the state distribution utilities to reduce the dependency on the state government and increase self-sufficiency in the state.
- 7. Self Sufficiency:** The state DISCOMs has consistently reported financial profits (with subsidy), indicating the financial prudence of the state DISCOMs. Further, the state power sector generates sufficient revenues to cover the state grants and subsidies towards the power sector.

The decision to provide metered sales to the new agriculture consumers will reduce the proportion of un-metered sales in the overall consumer mix in the state and would also support the state DISCOMs to efficiently ascertain the agricultural demand in the state and help further reducing the commercial losses.

**Although, the current financial health of the power sector pose a low risk on the state finances, but the increased power purchase costs due to stranded capacity can pose a financial risk in the future.**

## IX HARYANA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Haryana, with a population of 2.5 crores is one of the wealthier states in India with second highest per capita income in the country. The state is located in the northern part of India, with significant parts of its southern region now a part of the national capital region (NCR). Over the last decade, a growing manufacturing and services sector has fuelled rapid real estate and infrastructure growth and a shift away from agriculture in the composition of the economy. However, despite this Haryana is primarily an agricultural state and agriculture plays an important role in the state's identity and economic structure.

Haryana was among the first states to initiate the structural changes considered a prerequisite for strengthening utility governance and moving the sector towards operating on commercial principles. Although, was a laggard in terms of implementing the second generation reforms e.g. MYT etc.

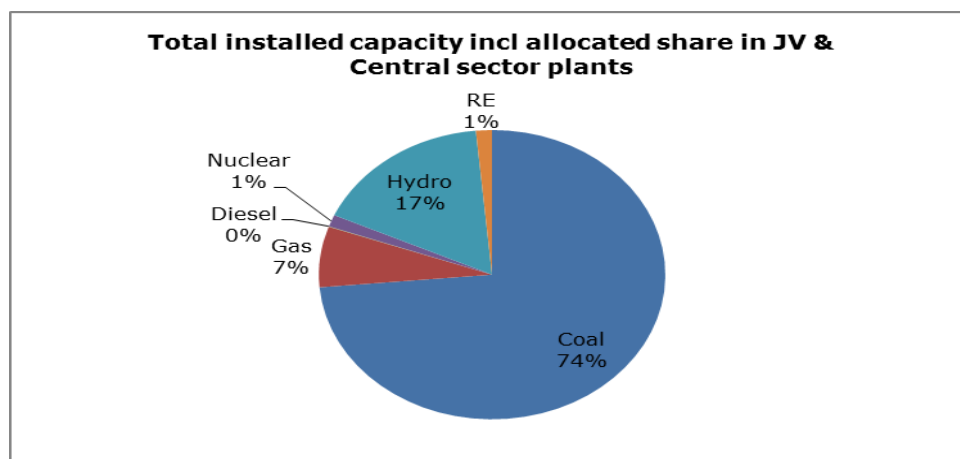
In 1998-99, Government of Haryana (GoH) unbundled the vertically integrated Haryana State Electricity Board (HSEB) and corporatized the four successor companies - Haryana Power Generation Corporation Limited (HPGC), to undertake generation of electricity, Haryana Vidyut Prasaran Nigam Limited (HVPN) to undertake transmission, and Uttar Haryana Bijli Vitran Nigam Ltd. (UHBVN) and Dakshin Haryana Bijli Vitran Nigam Ltd. (DHBVN) with the exclusive mandate over electricity distribution and retail supply in the north and south of the state respectively. The Haryana Electricity Regulatory Commission (HERC) was set up in 1998, as an autonomous entity responsible for regulation.

#### 1.2. GENERATION MIX

As on February 2014, Haryana's total generation installed capacity (including allocated share in Joint & Central Sector plants) of 9,865 MW out of which 74% share is of Coal based generation, followed by Hydro (17%) and gas (7%). The capacity has grown by 22% against last year, which was 7695 MW in Feb 2013.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure IX-1: Generation Capacity Mix as on Feb 2014- Haryana**



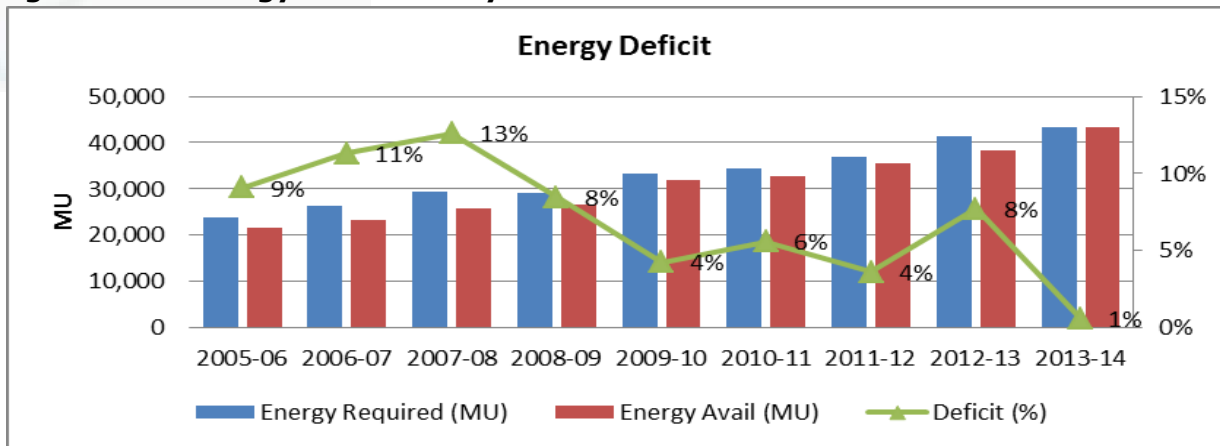
Source: CEA

### 1.3. POWER SUPPLY POSITION

Haryana has been witnessing significant supply deficits for several years because of load growth and lack of adequate capacity addition. However, the energy deficits have shown reducing trends in recent past. The energy deficits in the state have reduced from 9% in FY 2005-06 to 1% in FY 2013-14.

The trend of energy deficit observed in Haryana over the years is highlighted in the figure below:

**Figure IX-2: Energy Deficit - Haryana**

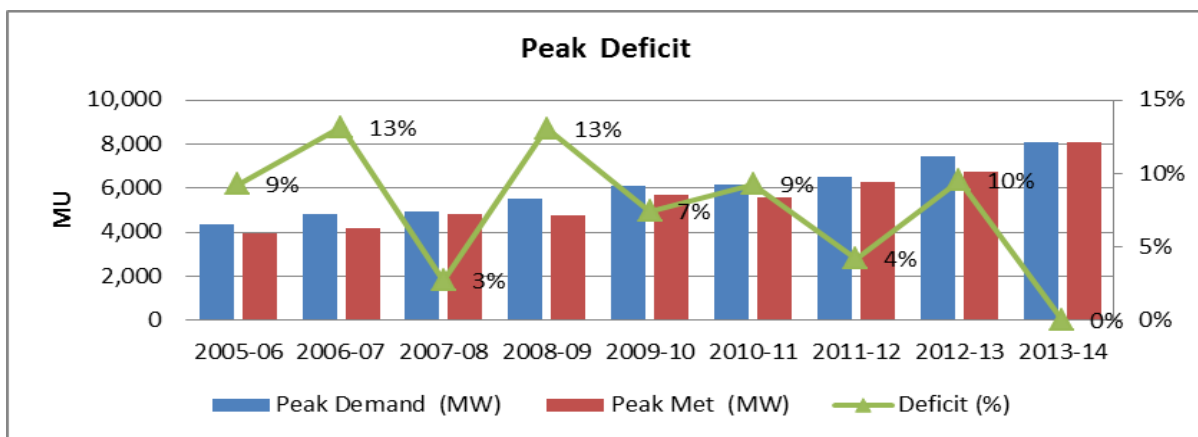


Source: CEA

The peak deficits in the state have reduced from 9% in FY 2005-06 to 0% in FY 2013-14.

The trend of peak deficit observed in Andhra Pradesh over the years is highlighted in the figure below

**Figure IX-3: Peak Deficit - Haryana**



Source: CEA

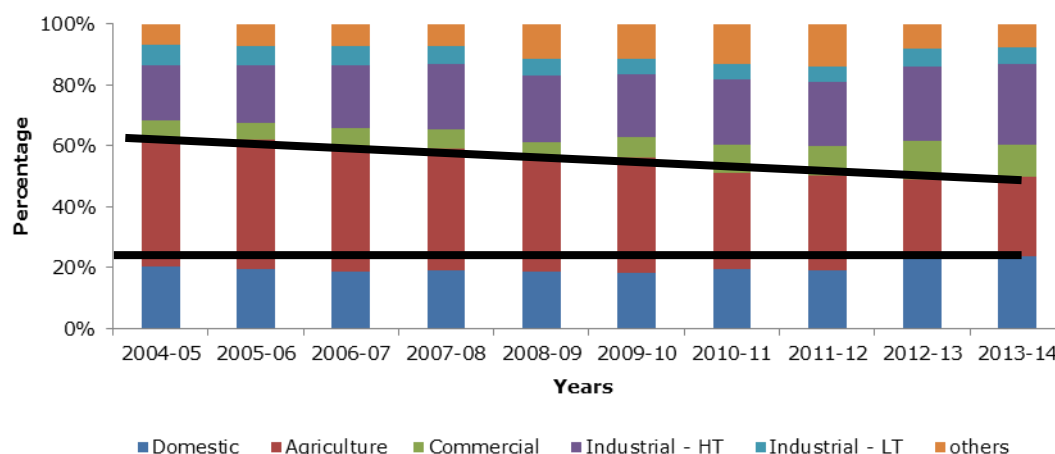
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF HARYANA

Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL) and Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL) are the two State Govt. owned companies, engaged in the business of distribution and retail supply of electricity in the state of Haryana. While the UHBVNL hold the Distribution and Retail Supply License to cater distribution and retail supply of electricity in the North Zone of Haryana, comprising of Ambala, Yamunanagar, Karnal, Kurukshetra, Jind, Rohtak and Sonapat circles, the DHBVNL hold Distribution and Retail Supply to cater distribution and retail supply of electricity in the South Zone of Haryana comprising of Bhiwani, Faridabad, Gurgaon, Hisar, Narnaul and Sirsa circles.

The historical trend in the consumer mix for the state is given in figure below:-

**Figure IX-4: Trends of Sales Mix - Haryana**



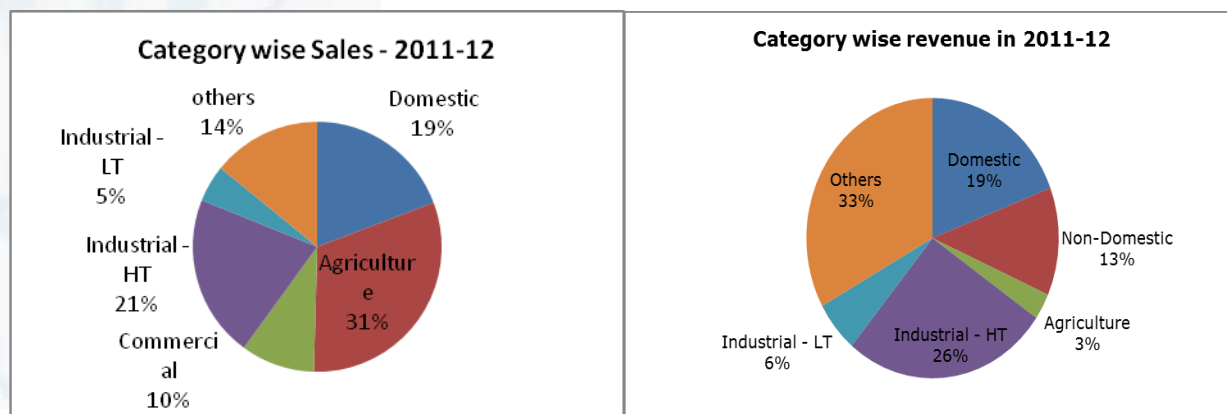
Source: PFC

Haryana electricity sales is dominated by agriculture, however the share of agriculture has steadily reduced from 42% in 2004-05 to 31% 2011-12. In the approved Tariff orders of FY 2012-13 and FY 2013-14 the approved sales for agriculture category has reduced to 26%.

On the revenue front, other category accounted for 33% share total revenues, followed by Industries and Domestic with a share of 32% and 19% respectively. However, the agricultural category yields 3% of the total sales revenue.

The figure below presents the comparative analysis of consumer sales and revenue mix for 2011-12



**Figure IX-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Haryana**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Haryana distribution utilities have shown an improving trend, it has improved from 41% in 2004-05 to 27.6% in 2011-12. As per the approved tariff order of FY 2013-14, the currently 44% of the agricultural sales are unmetered.

**Table IX-1: Year on Year Trend in AT&C losses and Collection Efficiency - Haryana**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	44%	42.8%	25.6%	32.3%	33.3%	29.3%	28.0%	27.6%
Collection Efficiency	82%	83%	105%	94%	90%	96%	94%	93%

Source: PFC

The steep drop in the 2006-07 in AT&C losses is because of increase in collection efficiency above 100%.

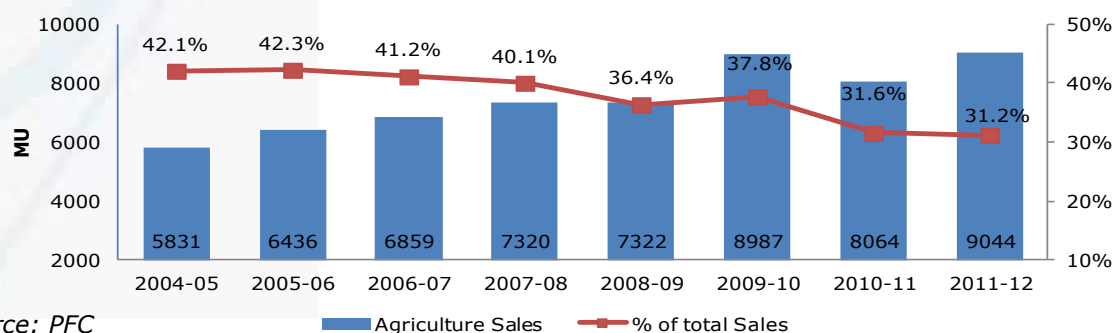
Haryana Electricity Regulatory Commission does not specify loss reduction targets for the utilities; hence, it's difficult to comment on loss reduction as there are no targets specified. However, as per the loss reduction targets proposed by utilities it is supposed to be 20 % in FY 14 and 17.7% in the terminal year of 12<sup>th</sup> Plan.

Capital expenditure of Rs. 989.25 crore during FY 2013-14 was proposed under various system augmentation and system strengthening schemes and also for various loss reduction schemes. This will strengthen the distribution system and remove the system constraints to meet the expected growth in demand and would improve reliability of supply. One of the top priorities of the Nigam, in the next financial year, is to meet the loss reduction targets. The major heads under which the capital expenditure is proposed to be carried out for bringing about a reduction in AT&C losses are robust metering infrastructure, HVDS/LT connectivity of already executed HVDS works/new works, power factor improvement etc.

The improvement in AT&C losses are in line with reducing agriculture sales and improving HT: LT ratio. HT: LT ratio has improved from 0.69 in 2005-06 to 0.79 in 2009-10.

The graph below highlights the historical trend of agriculture sales and improvement in HT: LT ratio

**Figure IX-6: Agriculture Sales Trend – Haryana**



Source: PFC

### 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost forms the major cost component of distribution in Haryana. The power purchase cost accounts for ~80% of the total distribution cost and have remain constant from past four years (refer table below). One of the reasons of this is high cost of power supply in Haryana than the other states, because of its distance from the primary fuel resources and old state generation capacity.

The distribution cost break-up for Haryana as a percentage of total cost is provided in the table below:-

**Table IX-2: Year on Year Trend Distribution Cost Breakup - Haryana**

Cost Component	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	2.05	2.06	2.35	2.88	3.28	3.46	3.58	4.25
O&M (R&M + A&G + EC)	0.36	0.26	0.29	0.28	0.46	0.59	0.37	0.35
Interest	0.05	0.05	0.06	0.10	0.20	0.25	0.35	0.47
Depreciation	0.07	0.07	0.05	0.07	0.07	0.05	0.05	0.06
Other cost	0.08	0.15	0.01	-0.01	0.21	0.02	0.06	0.03

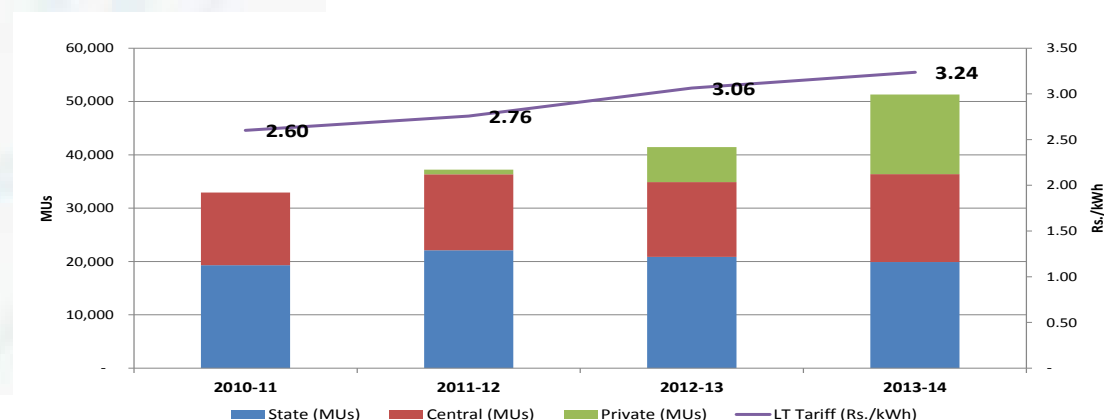
Source: PFC

It is clear from the table above that the power purchase cost has continued to be ~80% from last 8 years. The Interest Cost is gradually increasing have shown an increasing trend and accounted for ~9% of total distribution cost in 2011-12.

State has adopted for Financial Restructuring Plan and after its Financial Restructuring plan gets approval its interest component will reduce.

Increasingly, Power Purchase Portfolio is moving towards imported coal power portfolio due to domestic coal constraints. After the CERC's order on tariff hike for Adani Mundra and TATA Mundra power purchase cost will further increase for Haryana.

The power purchase cost has increased by 11% in FY 2012-13 as compared to a 6% increase in the previous year. The brief analysis of this is provided in the figure below.

**Figure IX-7: Trends of Long Term Power Purchase Cost (Rs/kWh) – Haryana**

Source: AF Mercados Analysis based on the data from respective years tariff order

## 2.4. REVENUE REALIZATION

The revenue realization of has improved from FY 2010-11 to FY 2013-14, due to tariff revisions happened in these years. The tariffs have been hiked by 19% in FY 2010-11, followed by 19% in FY 2012-13 and 13% in FY 2013-14.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table IX-3: Historical Trend Consumer Category Wise Revenue Realization - Haryana**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	3.33	3.33	3.32	3.32	3.26	3.19	3.02	3.40
Agriculture	0.39	0.39	0.38	0.38	0.40	0.27	0.35	0.33
Commercial	4.28	4.28	4.32	4.17	4.23	4.03	4.29	4.43
Industrial HT	4.68	4.48	4.10	4.13	4.12	4.02	4.43	4.27
Industrial LT	4.43	4.43	4.37	4.38	4.23	4.26	4.43	4.21

Source: PFC

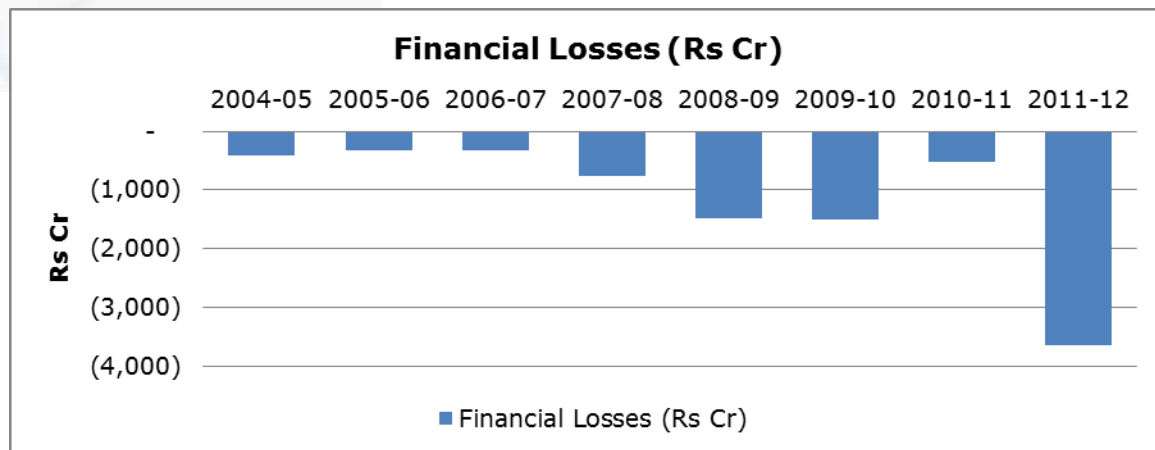
The agriculture sale which forms the major part of the sales has annual revenue realization for less than Rs 1 per kWh. The state's unmetered agricultural sales in FY 2013-14 are 44% of the total agricultural sales. The metering levels in Haryana, still needs improvement, consequent of which tariff realization would increase. It clearly indicates that the agricultural consumers in Haryana are being cross subsidized with Industrial and Commercial categories.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses of distribution utilities combined have increased every year with an improvement in FY 2010-11, where tariff hike by 19% was approved by the regulator.

**Figure IX-8: Historical Trend Financial Losses (w/o) subsidies – Haryana**



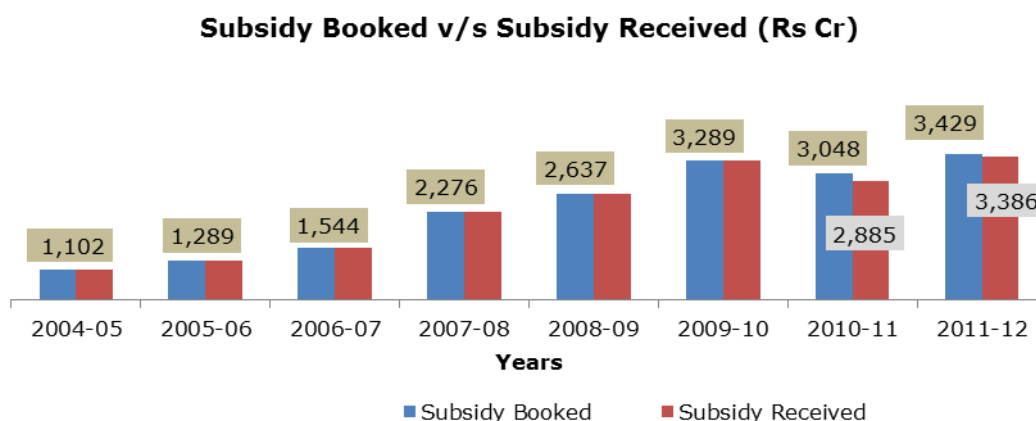
Source: PFC

The financial losses have increased substantially in FY 2011-12 due to substantial increase in power purchase cost (increase by 31% over last year) and interest cost (increase by 49% over last year). The total accumulated losses till FY 2011-12 are over 9700 Cr.

#### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The subsidy burden of the State Government has been high over the years. In 2011-12, subsidy booked was 32% of the total revenues (excluding subsidy) which was 29% in FY 2004-05. The graph below highlights the subsidy booked v/s subsidy received.

**Figure IX-9: Historical Trend Subsidies Booked v/s Subsidies Received – Haryana**



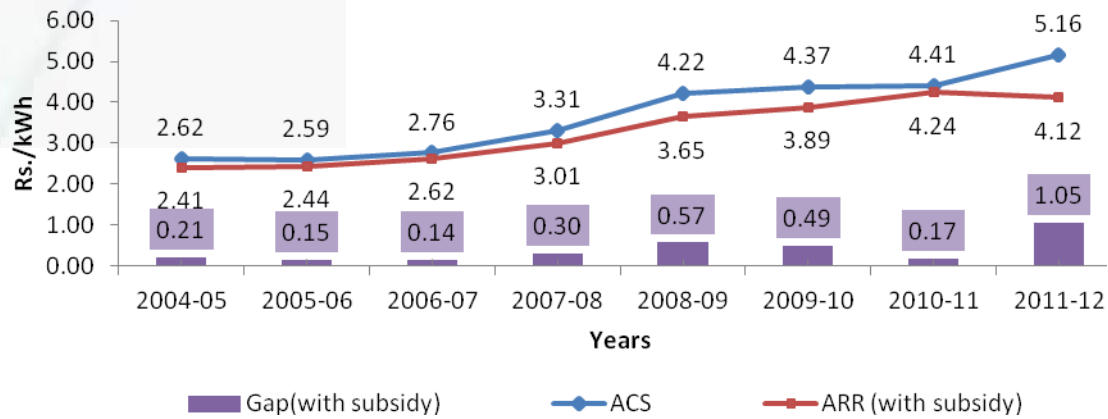
Source: PFC

The trend in subsidy pay-out with respect to the subsidy booked was 100% till FY 2009-10. The subsidy payout has decreased marginally in 2010-11 and 2011-12.

### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized has increased from Rs/kWh 0.21 in FY 2004-05 to Rs/kWh 1.05 in FY 2011-12.

**Figure IX-10: Historical Trend ACS v/s ARR (with subsidy) – Haryana**



Source: PFC

The gap had reduced in FY 2010-11 due to average tariff hike of 19%. The tariff hikes have been frequent after FY 12 where in hikes of over 19% and 13% have been approved in FY 13 and FY respectively. However, after January 2014 the tariff reduction by state government has been done for domestic and agriculture consumers due to the coming elections. However, these tariff hikes have not been sufficient to cover the gap between the ARR and ACS.

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The tax revenue from the power sector forms ~1% of the total tax revenue.

**Table IX-4: Tax Revenue from Power Sector - Haryana**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	120	130	166.43
Total Tax Revenue	14,994	19,092	23,081.00
Power sector Tax Revenue / Total state Tax Revenue	1%	1%	1%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Non Tax revenue, formed a marginal 0.07% of the total non-tax revenues in 2011-12. The non-tax revenue from power sector is through royalty/cess on water for power generation. The details for the same are provided in the table below.

**Table IX-5: Non-Tax Revenue from Power Sector - Haryana**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	120	130	166
Total Non-Tax Revenue	2,741	3,421	4,721.65
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	4.36%	3.81%	3.52%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

Even though the non tax revenue has increased from Rs 120 Cr in FY10 to Rs 166 Cr in FY12, there has been a decrease in contribution of power sector in state non tax revenues. The Non Tax revenue from the Power Sector appear as General Receipts in the CAG accounts

**The overall income generated from power sector, has increased from Rs 111 Cr in 2009-10 to Rs. 169.66 Cr in 2011-12.**

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector by the state of Haryana

**Table IX-6: Expenditure on Power Sector - Haryana**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	899	654	801.60
Revenue Expenditure	2788	2,956	3591.24
Total Expenditure	3687	3,610	4392.84

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The biggest outflow from the government to the power sector has been in the form of revenue expenditure as shown above. The Revenue expenditure incurred on the Power sector has substantially increased over the period of three years since FY10 primarily on account of expenditure under T&D.

**The quantum of expenditure on Power sector has been more than the Revenue generated from Power sector over the years.**

#### **4.3. POWER BONDS**

Power Bonds were issued in August 2003 to be discharged completely by April 2016. The bonds were issued to the tune of Rs. 2,022 crore. As per the State CAG account the total outstanding amount at the end of 2011-12 was Rs. 808 crore. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bond as on 31<sup>st</sup> March 2014 was Rs 400 Cr.

#### **4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The table below depicts the guarantees to the power sector relative to the state revenues.

**Table IX-7: Guarantees as a Percentage of Total Revenues - Haryana**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Guarantees given by State Govt.	1,633	1,428	2,077
Total Revenues of the State	17,735	22,513	27,803
Guarantees as a %age of Total Revenues of State	9%	6%	7%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Guarantees given by the government to the Power sector has increased since FY 10, but the share in Total revenues of the state has decreased over the years from ~ 10% in FY10 to ~ 8 in FY 12..

The table below depicts the three year average share of different utilities in sector guarantees:

**Table IX-8: Guarantees Utility wise Breakup - Haryana**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Haryana Power Generation Limited	443	352	253	<b>20%</b>
Haryana Vidyut Parsaran Nigam Limited	1,137	1,037	1,006	<b>62%</b>
Uttar Haryana Bijli Vitran Nigam Limited	29	21	321	<b>7%</b>
Dakshin Haryana Bijli Vitran Nigam	24	17	497	<b>10%</b>

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily risen due to increase in Guarantees towards Discoms and Genco. Over the span of three years, Discoms accounted for a share of 53% in the Power Sector Guarantees.

### **Subsidy**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table IX-9: Power Sector Subsidy as a Percentage of overall subsidy - Haryana**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
Rs Cr				
Transmission and Distribution-	2,771	2,940	3,576.58	99.7%
New and Renewable Energy	8	8	7.47	0.3%
Special Component Plan for Scheduled Castes	1	1	0.70	0.0%
<b>Power Sector Subsidy/ Total State Subsidy</b>	<b>2,780</b>	<b>2,949</b>	<b>3,584.75</b>	<b>91.1%</b>

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10



Over the span of three years subsidy to the T&D accounted for ~99% of the total subsidy given to the Power Sector by the state government. The sector accounted for a significant three year aggregate share of 91% in the total state subsidy.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table IX-10: Power Sector Financing Requirement (2011-12) - Haryana**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	4,392.84
Loans And Advances made by the State Government (Net of Recoveries)	127.02
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	202.23
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.10
Total Power Sector Financing during the year	4,722.20
Sector Financing Requirement as a % age of total revenues of state	17%
GSDP nominal	179097.00
Sector Financing Requirement as a % age of GSDP	2.64%
Financial Profits/(Loss) of Discoms during the year (with subsidy realized)	(3674.00)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	30%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	4.69%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state has been estimated at 17% of the revenue generated by the state and 2.64 % of the Gross State Domestic Product.

In order to cover the financial losses of Discoms in 2011-12, the financing requirement of the sector increases to 30% as a percentage of the State revenue and 4.69 % as a percentage of the GSDP.

## 5. FINANCIAL RESTRUCTURING PLAN

Increase in power purchase costs, inadequate tariff hikes, almost free supply of electricity to the agricultural sector and low subsidy realization from the state government has deteriorated the financial position of the utilities in the state. In this context, distribution utilities of Andhra Pradesh adopted the FRP of the central government. The current status and likely outlook of FRP in the state is discussed in the section below.

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

Given below is the current status of the implementation of financial restructuring plan (FRP) in the state.

**Table IX-11: Current Status of FRP in Haryana**

	<b>Haryana</b>
<b>Accumulated Losses as on 31.3.2012</b>	19707 cr.
<b>STL (eligible under the scheme)</b>	14,764 cr.
<b>Bonds issued by Discoms to participating lenders</b>	7366 cr.
<b>Tariff petition for 2014-15</b>	ARR filed
<b>Operational losses to be funded (2013-14)</b>	2018 cr.
<b>Road-Map for private participation in distribution</b>	Under finalization
<b>Status of liquidation of regulatory assets</b>	HERC has allowed 45% during current year
<b>Status of preparation of time bound plan for metering of all category of consumers</b>	Being Prepared
<b>Status of enactment of State Electricity Distribution Responsibility Bill</b>	Under Progress

The financial restructuring plan for Haryana has been approved by the government and the banks. The restructuring amount eligible under the scheme is Rs. 14,764 crore. 50% of short-term liabilities stand at Rs 7,366 crore as of 1<sup>st</sup> March, 2012. As part of the plan, the tariff petition for 2014-15 has been filed. Also, the commission has allowed liquidation of 45% of the regulatory assets during the current year.

### 5.2. FRP OUTLOOK

In this section, key parameters for the state have been looked at in order to comment on the likeliness of the state to meet the mandatory conditions set forth by the FRP and be eligible for the central grants incentive scheme.

The color scheme used in the table depicting state parameters refers to the color key provided here -

	Area of concern
--	-----------------

	Can be better
	Good

UHBVNL and DHBVNL reported a combined financial loss (without subsidy) of Rs.7060 Cr. in 2011-12, translating into a financial gap of Rs.2.04/kWh.

As per the FRP scheme, the Haryana government would take over Rs.7382 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. Bonds of Rs. 7367 Cr has been issued by the Discoms as per the sanctions received from the banks. The State government has also provided a budget of Rs. 721.93 Cr. on account of reimbursement of interest to the Discoms for FY 2014-15 on the bonds issued. The scheme would also permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period.

The following table highlight the Financial Implication on account of payment of Principal amount and Interest payment on account of FRP for the period 2015-16 to 2019-20.

**Table IX-12: Financial Implication on account of payment of Principal amount and Interest payment – Haryana (Rs. Crores)**

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Principal		-	-	-	737	737
Interest	722	722	722	722	722	650
<b>Total</b>	<b>722</b>	<b>722</b>	<b>722</b>	<b>722</b>	<b>1459</b>	<b>1387</b>

Source: Data submitted by the state to the FFC

Total fiscal impact of FRP on state resources by the end of FY29 will be Rs.14217 Cr. (Rs 7367 Cr as principal and Rs. 6858 Cr as interest)

Some of the key parameters relevant to FRP implementation have been shown in the table below for Haryana

**Table IX-13: Historical Parameters - Haryana**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	43%	26%	32%	33%	29%	28%	28%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	19%	0%	19%	13%
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	95%	99%	n.a	n.a
<b>Interest Cost/Total Cost</b>	2%	2%	3%	5%	6%	8%	9%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.73	0.80	1.20	1.58	1.54	1.14	2.04	n.a	n.a

Source: PFC report on utility finances and Discom ARRs

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have come down considerably in the last few years – from over 40% in 2005-06 to 28% in 2011-12. This is in line with reducing agricultural sales. A >1.5% annual reduction in AT&C losses is required in order to benefit from the central grants scheme. If the discoms continue to reduce AT&C losses at the rate they have decreased in the past, the potential grants from the central government will be significant.
- The tariffs were not revised for a period of 8 years. While the tariffs have been revised in the last 2-3 years, the frequency of these hikes will play a key role in determining the financial gap in the future.
- The subsidy received-booked ratio has consistently been close to 100%, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the lack of complete agricultural metering in the state. At present, the agricultural metering is 44%.
- The share of Interest expenses is increasing significantly YoY. With the moratorium on principal repayments on 50% STL and the remaining being taken over by the government, the interest burden will reduce to some extent in the short term.
- The ACS-ARR Gap needs to be reduced annually by 25% of the 2010-11 benchmark level in the moratorium period, in order to be eligible for the central grants incentive. By 2014-15, the Gap will need to be reduced to 28 paise/unit. To reduce the financial gap by that extent, tariff revisions will need to be frequent and substantial.

In Haryana, AT&C losses have improved significantly over the years. However, tariff revisions have not been frequent. Regular tariff revisions in the last 2-3 years point towards the utilities' intent to improve its financial health and meet the requirements set forth by the FRP.

## 6. ASSESSMENT OF REGULATORY EFFECTIVENESS

Haryana Electricity Regulatory Commissions (HERC) was established in August 1998. Haryana was one of the first few states in India who endeavored to implement comprehensive power sector reforms much before the enactment of the Electricity Act, 2003 by the Government of India.

The aspects of regulatory effectiveness are discussed below:-

### 6.1. STATUS OF IMPORTANT REGULATIONS :

The state has notified MYT regulations for the first control period from FY 2014-15 to FY 2016-17.

**Table IX-14: Details of MYT Regulations (2011-12) - Haryana**

States	Control Period	Control Period No.1
Haryana	First control period = 3 years; for Generation, Transmission, Wheeling and Distribution	FY 2014-15 to FY 2016-17

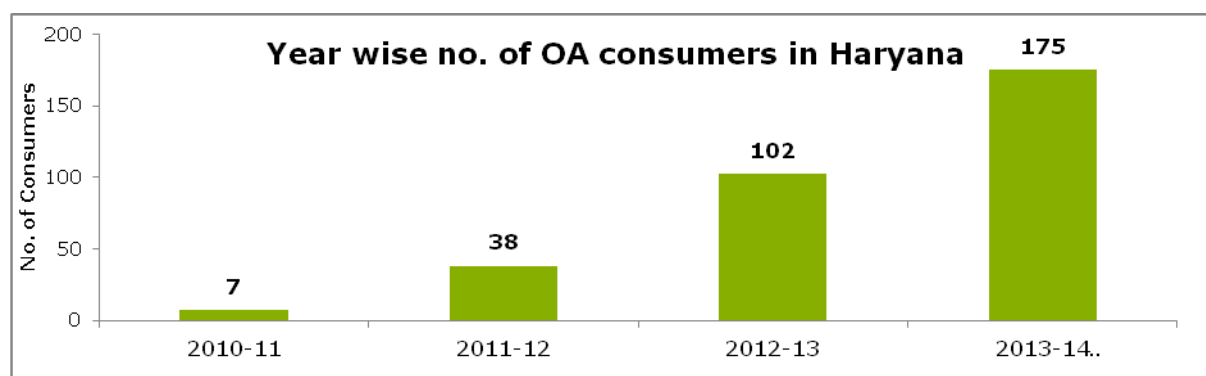
Source: CEA

### 6.2. STATUS OF OPEN ACCESS IMPLEMENTATION :

Haryana Electricity Regulatory Commission has notified (Terms and Conditions for grant of connectivity and open access for intra-state transmission and distribution system) Regulations, 2012. Cross Subsidy Surcharge in Haryana (Rs. 0.53/kWh) is comparable to Gujarat (Rs. 0.45/kWh), Bihar (Rs. 0.50/kWh) and is less than in Maharashtra (~Rs. 2.30/kWh) Punjab (Rs. 1.07/kWh) and West Bengal (Rs. 2.21/kWh)

Though there has been an increase in number of consumers over the years, the number is not significant when compared to other States like T.N., Punjab, and Rajasthan (despite the fact that Haryana has a huge industrial base). The details are provided below:-

**Figure IX-11: Trends of Open Access – Haryana**



Source: IEX

Non-tariff barriers like requirement of independent feeder is a concern for consumers connected on mixed feeder.

### 6.3. FREQUENCY OF TARIFF REVISIONS:

The tariff revisions were done in FY 2010-11 after a gap of 8 years wherein tariffs were hiked substantially i.e. 19%. Thereafter commission has approved a tariff hike in FY 2012-13 & FY 2013-14 by 19% and 13% respectively. The table below provides the details of tariff revision in the state.

**Table IX-15: Trends of Tariff Revisions - Haryana**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	19%	0%	19%	13%

### 6.4. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION

In 2011-12, agricultural sales in Haryana contributed to ~31% of total sales. As per the approved tariff order for 2013-14, unmetered agricultural sales approved by Commission are 44% of total agricultural sales.

The Commission in Haryana has estimates consumption of Agricultural Pump (AP) consumers on the basis of the actual consumptions recorded by the energy meters installed on 11 KV segregated AP feeders at the grid substations and a small percentage of consumption of AP consumers connected on feeders other than the segregated AP feeders. The Commission has retained the same methodology for projecting AP Sales from past five years.

The tariff applicable for agriculture pump (AP) supply consumers in Haryana is currently under two categories i.e. AP metered consumers billed on energy consumption basis and AP un – metered consumers who are currently paying a flat rate per BHP per month. As per CoS estimates of the Commission the AP consumers are paying just about 6% of the CoS. However, as per the Commission order that the entire revenue gap in the AP consumer category is bridged by way of AP Subsidy from the State Government and no consumer category is cross – subsidizing the AP consumers.

## 7. SUMMARY

The key aspects of the state are discussed below :-

1. **Tariff Hikes:** In line with increasing gap between ACS and ARR the tariffs have been hiked every year from 2010-11 to 2013-14.
2. **Subsidy:** The trend in subsidy pay-out with respect to subsidy booked was 100% till FY 2009-10. However, Subsidy payout has decreased marginally in 2010-11 and 2011-12
3. **Past Financial Baggage:** 8.5% Tax Free Special Bonds of the State Government (Power Bonds) were issued by State Government in August 2003 to be discharged completely by April 2016. The bonds were issued to the tune of Rs. 2, 022 Crores. The total outstanding at the end of 2011-12 was Rs. 808 Crores
4. **Operational Efficiency:** The cost of supply of Discoms has been increasing over the years especially due to the increase in power purchase costs and interest burden. AT&C losses are decreasing but are still at a higher level. The distribution loss reduction plan aims to bring losses at 12.2% by FY 2021-22 prepared under the FRP by Haryana Discoms. **Efficiency gains need to be pushed forward- Tariffs are already high after increases in FY 13 and 14.**
5. **Power Purchase Cost:** State should optimize power purchase and a power sale given it has a relative surplus.
6. **States Guarantees:** for the sector are significant and account for ~8% of Total Revenues of the state
7. **Financial Restructuring Plan:** The financial restructuring plan for Haryana has been approved by the government and the banks. The restructuring amount eligible under the scheme is Rs. 14,764 crore. 50% of short-term liabilities stand at Rs 7,366 crore as of 1<sup>st</sup> March, 2012.
8. **Revenues from the sector to the state:** Total Revenue (Rs. 169 Crores) from the Power sector is less than the total expenditure on the sector (Rs. 4394 Crores). The revenues of the State Government from the taxes imposed on the distribution of electricity are to the tune of Rs.155 Crores. Income of HERC in 2011-12 was 3.2 Cores as against expenditure of 3.1 Crores. The expenditure of the Commission is met mainly by Grants from the State Government



## X HIMACHAL PRADESH

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The economy of Himachal Pradesh is currently the third fastest growing economy in India. Himachal Pradesh has been ranked fourth in the list of the highest per capita incomes of Indian states<sup>9</sup>. The abundance of perennial rivers enables Himachal to sell hydroelectricity to other states such as Delhi, Punjab, and Rajasthan. The economy of the state is highly dependent on three sources: hydroelectric power, tourism, and agriculture.

The Himachal Pradesh State Electricity Board (HPSEB) was constituted in accordance with the provisions of Electricity Supply Act (1948) in the year 1971. HPSEB was responsible for all the three function of power sector viz. Generation, Transmission and Distribution of electricity, until 2006, when Himachal Pradesh Power Corporation Limited (HPPCL) a separate Generation Company was created for execution of new projects in State sector.

In June 10, 2010, HPSEB was unbundled and the functions of generation, distribution and trading of electricity was transferred to Himachal Pradesh State Electricity Board Limited (HPSEBL) and the function of evacuation of power by transmission lines to Himachal Pradesh Power Transmission Company Limited (HPPTCL), vide the Himachal Pradesh Power Sector Reforms Transfer Scheme, 2010.

With a hydro power potential of 23,000 megawatt (MW), out of which just 8,368 MW has been harnessed, Himachal Pradesh accounts for 25 per cent of the country's total hydro power potential<sup>10</sup>. The state also boasts of a high level of village electrification; about 17,480 of 17,495 villages had been electrified by the end of March 2013.

#### 1.2. GENERATION MIX

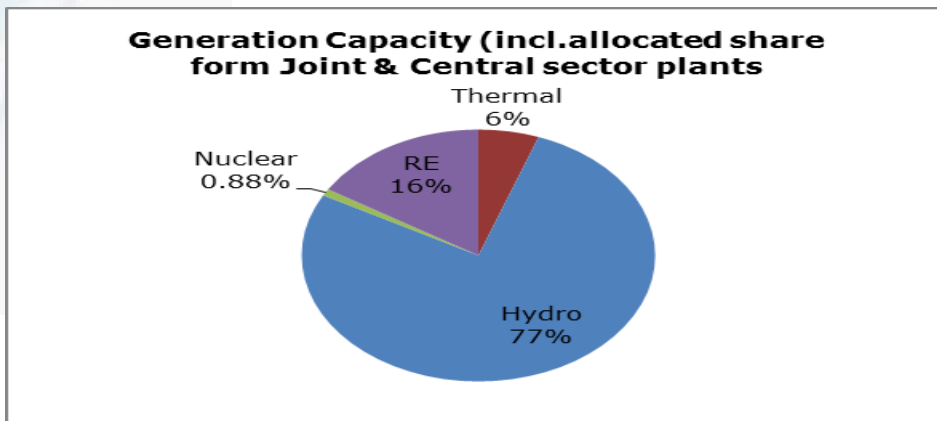
The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Himachal Pradesh was ~3865 MW. It has grown by mere 4% from Feb 2013 from the level of 3,714 MW . Out of total capacity as on Feb 2014, large hydro based power capacity accounted for ~77% followed by renewable energy (16% ) and Thermal (~6%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

<sup>9</sup> Indian Brand Equity Foundation (IBEF)

<sup>10</sup> Indian Brand Equity Foundation (IBEF)

**Figure X-1: Generation Capacity Mix as on Feb 2014 – Himachal Pradesh**



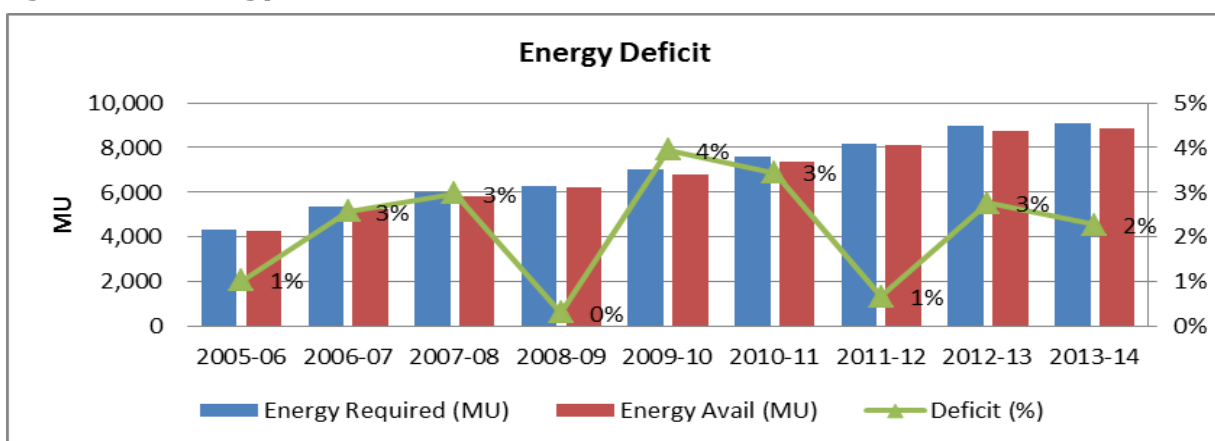
Source: CEA

**1.3. POWER SUPPLY POSITION**

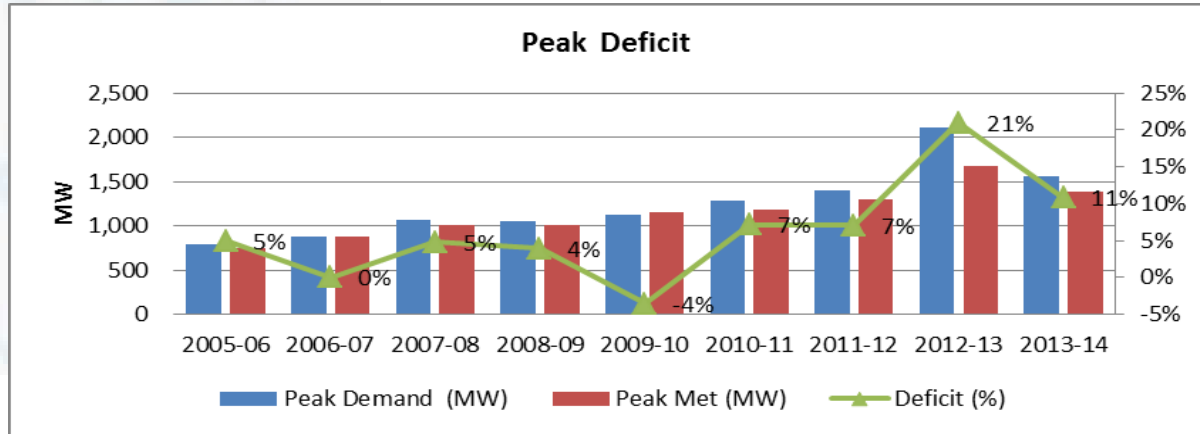
The energy deficit in Himachal Pradesh has remained in the range from 0% to 4% over the span of nine years. The energy deficit in FY 2013-14 was 2%. However, the peak deficits in the state have grown post FY 2010-11. The peak deficits in FY 2010-11 was 7% have continued to increase to 21% in FY 2012-13, however in FY 2013-14 the deficit has reduced to 11%. The peak deficits in the state is due to increase in the load growth, due to increasing Industrial and commercial hubs in the state, however the capacity addition have slowed due to delay in execution of hydro power plants, owing to environment and forest clearance.

The trend of energy and peak deficit observed in Himachal Pradesh over the years is highlighted in the figure below:

**Figure X-2: Energy Deficit – Himachal Pradesh**



Source: CEA

**Figure X-3: Peak Deficit –Himachal Pradesh**

Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF HIMACHAL PRADESH

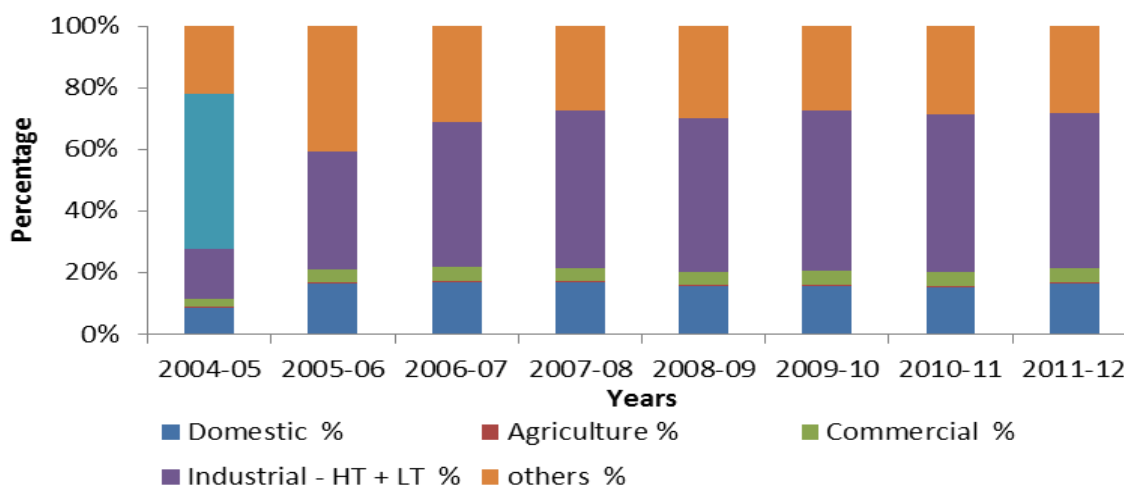
Himachal Pradesh State Electricity Board Limited (HPSEBL) is the sole company responsible for the distribution and supply of electricity in the state.

In 2011-12, industrial sales dominated the consumer sales mix with a share of ~50%, followed by domestic (17%) and Commercial (4.6%). The other and agricultural sales accounted for ~28% and 0.4% of sales mix in Himachal Pradesh. Hence, half of the sales in Himachal is towards industries. The share of industrial sales have grown from 33% in FY 2004-05 to 50% in FY 2011-12, the industrial sales have registered a sales growth at CAGR of 15.9%.

The share of domestic sales have marginally reduced from 18% in FY 2004-05 to 17% in FY 2011-12, the domestic sales have registered a sales growth 8.2%.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure X-4: Historical Trend in Consumer Sales Mix – Himachal Pradesh**



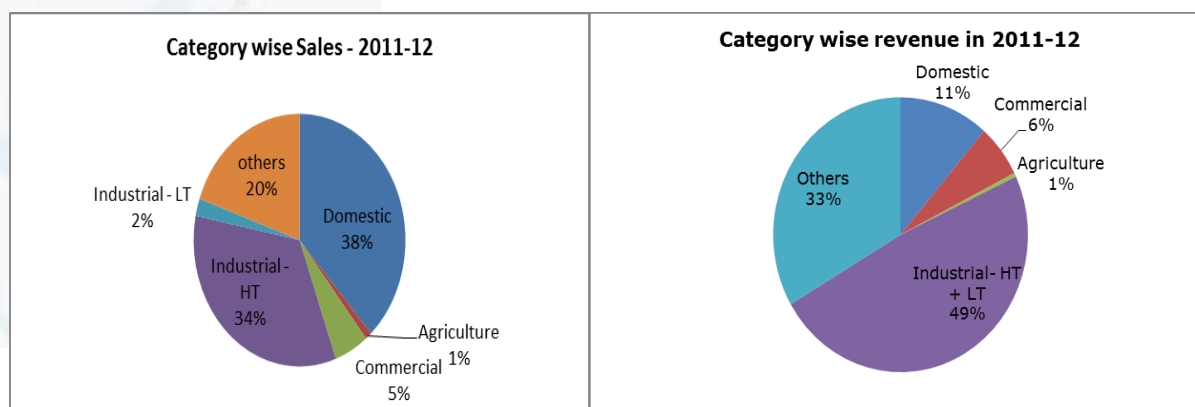
Source: PFC

The overall sales have registered a CAGR of 9% over the span of eight years.

In terms of revenue contribution, industries contributed to 49% of revenue, followed by others (33%), domestic (11%) and commercial (6%).

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure X-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 – Himachal Pradesh**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) Losses in Himachal have improved over the years. The AT&C loss in FY 2011-12 was 12.2% which was 22% in FY 2004-05, and is among the lowest in the country. However, the collection efficiency in the state has shown fluctuating trends, in FY 2011-12, collection efficiency was all time low to the tune of 93%. The collection efficiency has remained in the range of 100% to 93%.

**Table X-1: Year on Year Trend in AT&C losses and Collection Efficiency – Himachal Pradesh**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	22%	17.1%	13.5%	17.2%	12.9%	18.5%	15.7%	12.2%
Collection Efficiency	95%	100%	101%	96%	101%	95%	98%	93%

Source: PFC

One of the major reasons for low AT&C losses is dominant industrial sales, which is at high voltage levels and hence leads to low AT&C losses. HPSEBL has also framed circle-wise targets for reduction in T&D and AT&C losses and is incentivizing the best performing circles. The commission for the second control period has approved the T&D trajectory of 14%, 13.5%, and 12.5% for FY 12, FY 13, and FY 14 respectively. HBSEPL, has in the past achieved better than the targets set by the commission.

## 2.3. TRENDS IN DISTRIBUTION COST

The major cost component of distribution cost in Himachal Pradesh in FY 12 was power purchase cost, which accounted for 60% share in the total cost, followed by O&M (25%), the high O&M cost is due the fact that distribution utility in Himachal is also responsible for the generation assets of the state.

The per unit cost, break-up for different cost components for the state of Himachal Pradesh is provided in the table below:-

**Table X-2: Year on Year Trend Distribution Cost Breakup – Himachal Pradesh**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.34	1.73	1.95	2.63	3.09	3.19	3.40	3.68
O&M (R&M + A&G + EC)	0.74	0.73	0.82	1.04	1.09	1.19	1.29	1.56
Interest	0.23	0.20	0.21	0.30	0.27	0.26	0.23	0.34
Depreciation	0.08	0.09	0.09	0.15	0.15	0.16	0.17	0.27
Other cost	-0.03	0.06	0.12	-0.04	0.03	-0.09	0.14	0.32

Source: PFC

The power purchase cost in the state in FY 2011-12, was Rs 3.86 per unit, which is less compared to other states in India. The state procurement of power is majorly from hydro sources and free power entitlement of Government of Himachal Pradesh (GoHP) which is sold to the utility at a price of Rs 2.69 per unit<sup>11</sup>. The state also procures and sells power through the banking arrangement to meet the winter deficit of the state.

## 2.4. REVENUE REALIZATION

The tariff realization in the state has increased in FY 11 and FY 12. This is because of tariff revisions approved by the commission to the tune of 12% and 9% in FY 11 and FY 12 respectively. In FY 11, the tariff revisions were done for the select consumers categories, however in FY 12 the tariff was revised for all the consumers.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table X-3: Historical Trend Consumer Category Wise Revenue Realization – Himachal Pradesh**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.36	1.96	2.28	2.35	2.61	2.62	2.35	2.98
Agriculture	2.80	4.40	6.30	6.30	5.52	5.14	3.90	4.72
Commercial	3.83	4.47	4.94	4.70	5.02	5.08	5.34	5.89
Industrial HT + LT	2.84	3.03	3.04	3.17	3.46	3.49	3.63	4.21
Others	2.86	3.36	4.23	4.84	5.66	5.73	4.26	5.19

Source: PFC

The tariff realization from the industrial consumers is less as compared to the other states, given that the state to increase its industrial hub has provided promotional policies of cheap land and electricity. Tariff was further increased by 11% in FY 13, which is expected to increase the tariff realization.

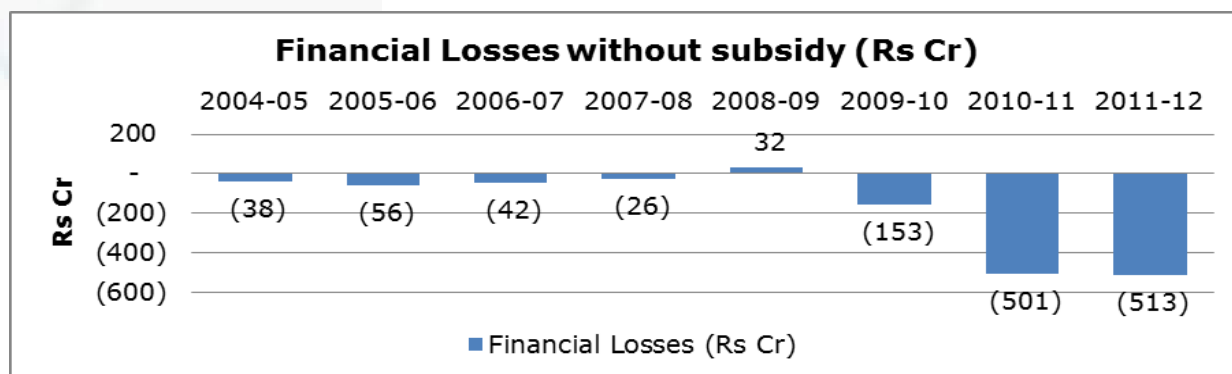
<sup>11</sup> Source : Tariff order for HPSEBL for FY 12

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses (without subsidies) of the distribution utility have increased post unbundling, due to the increase in the operational and power purchase cost. The increase in the operational cost was due to increase in employee and depreciation cost post unbundling.

**Figure X-6: Historical Trend Financial Losses (w/o) subsidies – Himachal Pradesh**



Source: PFC

However, the tariffs have been revised in FY 11 and FY 12, but the revisions were not commensurate with the increase in distribution cost post unbundling. Hence, the utility have reported a significant increase in the cost post unbundling.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The subsidy burden has remained negligible from past five years i.e. from the period of FY 08 to FY 12 as per PFC data. However, the GoHP have been providing subsidies to the consumer categories, which are below poverty line as reported in the tariff orders of the distribution utility. The subsidies booked in FY 06 were Rs 77 cr and Rs 96 Cr in FY 07.

The figure below provides the subsidy booked v/s subsidy received for the distribution utilities in the state

**Table X-4: Historical Trend Subsidies Booked v/s Subsidies Received – Himachal Pradesh**

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Subsidy Booked (Rs Cr)	0	77	96	0	0	0	0	0
Subsidy Received (Rs Cr)	0	77	96	0	0	0	0	0

Source: PFC

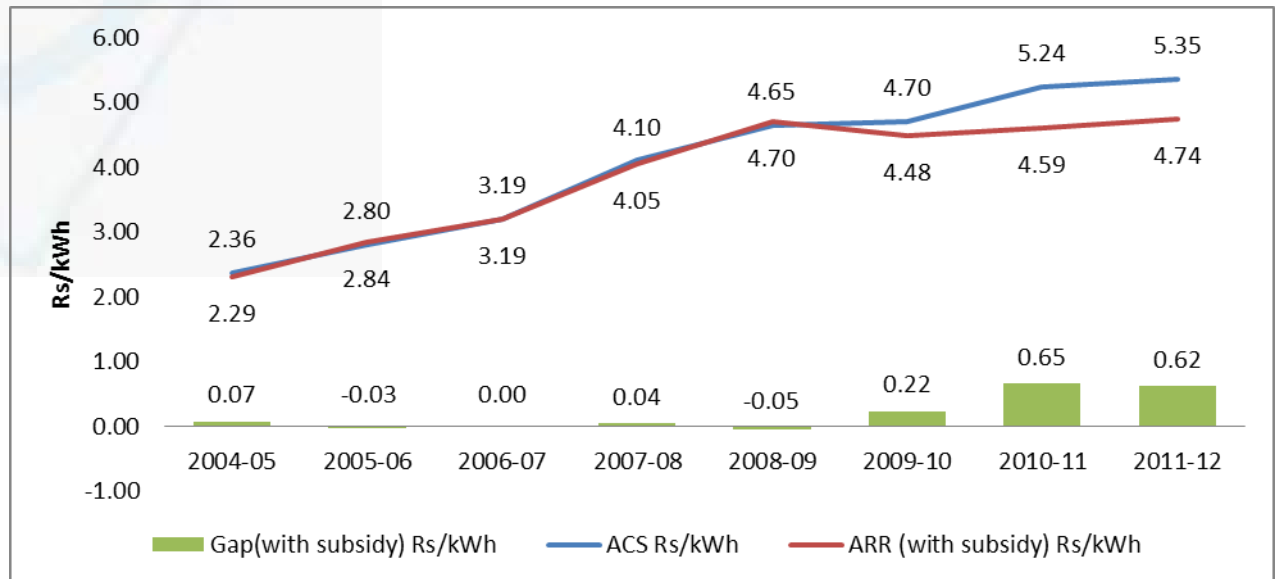
The trend in subsidy pay-out with respect to the subsidy booked has always been 100% in the state. The subsidy received in FY 2011-12 as per the PFC data is nil, however as per CAG accounts the subsidy received is to power sector is Rs 140 crs.

#### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has increased over the years. The gap was Rs 0.07 per unit in FY 2004-05 and Rs 0.62 per unit in FY 2011-12. The gap had reduced to almost nil in FY 2005-06 and FY

2006-07 due to subsidy received from GoHP. The cost of supply post unbundling i.e post FY 2010 has increased substantially, however the tariff hikes have been inadequate to cover the gap between ACS and ARR.

**Figure X-7: Historical Trend ACS v/s ARR (with subsidy) – Himachal Pradesh**



Source: PFC



## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The tax revenue from the power sector forms 3% of the total tax revenue of the state government in 2011-12. The details for the same are provided in the table below.

**Table X-5: Tax Revenue from Power Sector – Himachal Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	39	302	186
Total Tax Revenue	3,436	5,358	6,106
Power sector Tax Revenue / Total state Tax Revenue	1%	6%	3%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The tax revenue from the sector has increased substantially from Rs 39 Cr in FY10 to Rs 186 Cr in FY12.

The Non-Tax revenue from power sector is through **dividends, interest on loans and advances, Royalty/Cess on water for power generation, T & D, Rural Electrification** etc. The non tax revenue from power sector accounted for 60% non-tax revenues of the state in 2011-12. The details for the same are provided in the table below.

**Table X-6: Non-Tax Revenue from Power Sector –Himachal Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	1,234	1,093	1,146
Total Non-Tax Revenue	1,784	1,695	1,915
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	69%	64%	60%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The Non tax revenue from the power sector has decreased since FY10 along with the contribution to total state non tax revenue. Hence, the revenue from power sector forms a 17% of total revenues.

**The overall Revenue generated from the power sector is to the tune of Rs ~1322.Cr.**

## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table X-7: Expenditure on Power Sector – Himachal Pradesh**

Categories	2009-10	2010-11	2011-12
RS Cr			
Capital expenditure	211	160	207
Revenue Expenditure	189	797	151
Total Power Sector Expenditure	399	957	357

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

**The income generated from Power sector has been more than the expenditure on power sector.**

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table X-8: Guarantees as a Percentage of Total Revenues – Himachal Pradesh**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Power Sector Guarantees given by State Govt.	1,387	1,122	1,060
Total Revenues of the State	5,220	7,053	8,022
Guarantees as a %age of Total Revenues of State	27%	16%	13.21%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The guarantees to power sector accounted for a significant portion of state revenue over the years. However, it decreased from 27% of the state revenues in FY10 to 13.21% in FY12.

The table below depicts the three year average share of different utilities in sector guarantees Table X-9: Utility wise Breakup of Guarantees – Himachal Pradesh

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
				Rs Cr
HP Electricity board	1,274	1,010	947	91%
HP Transmission Corporation	113	113	113	9%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily declined due to decrease in Guarantees given to HP Electricity board. Over the span of three years, HP Electricity board in the Power Sector Guarantees has accounted for a significant ~91%.

### Subsidy

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table X-10: Utility wise Breakup of Guarantees – Himachal Pradesh**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
				Rs Cr
Tariff Roll Back	140	140	140	100%
Power Sector subsidy (% of total subsidy)	140	140	140	10.7%

Over the span of three years, the subsidies solely went towards Tariff Roll Back. The subsidy given to Power sector accounted for a share of ~11% of the total state subsidy.

### 4.4. POWER BONDS

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 10 Cr.

#### 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is calculated by a summation of the total Expenditure of the state government on the sector including Capital and Revenue expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid(Net of Receipts) by the State Government.*

**Table X-11: Financing Requirement of Power Sector (2011-12) – Himachal Pradesh**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	357
Loans And Advances made by the State Government (Net of Recoveries)	472
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.44
Total Power Sector Financing during the year	830
Sector Financing Requirement as a % age of total revenues of state	10%
GSDP nominal	41,939
Sector Financing Requirement as a % age of GSDP	1.98%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	(513)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	17%
Sector Financing Requirement as a % age of GSDP including financial losses	3.20%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12*

The financing requirement for the Power sector in the state was estimated to be 10% of the revenue generated by the state and 1.98 % of the Gross State Domestic Product. Considering the Financial losses of Discoms in the year, the financing requirement of the sector increases to 17% of the State revenue and 3.20% of the GSDP

The sector financing requirement is lesser than the revenue generation by the sector. Hence the sector productivity or returns from investment is significant. However, the Discom losses are substantial and it increases the burden of sector on the state. The state investment in the Discom sector is negligible and the expenses on the segment are only the assistance in the form of guarantees and subsidies. It is important for the sector to invest in strengthening the infrastructure of the Transmission and Distribution segments.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Himachal Pradesh Electricity Regulatory Commission (HPERC) constituted under the Electricity Regulatory Commission Act, 1998 came into being in December 2000 and started functioning with effect from 06th January, 2001.

Some of the key aspects have been discussed below: -

### **5.1. FINANCIAL INDEPENDENCE OF REGULATOR**

The Commission receives budget from the State Government annually in the shape of Grant-in-aid for carrying out its various functions. Rs.90.00 lacs were allotted to this Commission for the year 2011-12. The total income of the Commission for the financial year 2011-12 works-out to Rs.392.66 lacs, whereas the expenditure for the relevant year was Rs.295.61 lacs, thereby the excess of income over expenditure as disclosed by the Income and Expenditure Account of the year ended 31.03.2012 works-out to Rs.97.05 lacs.

### **5.2. STATUS OF IMPORTANT REGULATIONS**

The state regulator has been proactive in notifying the MYT regulations; the regulator is currently in the second control period of its MYT framework. HP SERC has introduced Multi-Year-Tariff framework and have notified Terms and Conditions for Determination of Tariff in 2009 for the control period of three years viz. FY 2009 to FY 2011. HP SERC, have also notified the MYT regulations in 2012 for the second control period from FY 12 to FY 14.

### **5.3. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions were done in FY 2010-11 after several years wherein tariffs were hiked to the tune of 12%. Thereafter commission has approved a tariff hike in FY 2012 and FY 13 by 11% and 13% respectively. However, the tariff revisions in the state have not been commensurate with the increase in the distribution cost.

## 6. SUMMARY

The key aspects of the state are discussed below;-

- 1. Low AT&C Losses :** The state AT&C & T&D losses are among the lowest in the country. The AT&C losses in the state in FY 2011-12 was ~12%.
- 2. Inadequate Tariff Revisions:** The tariff revisions were done in FY 2010-11 after several years wherein tariffs were hiked to the tune of 12%. Thereafter commission has approved a tariff hike in FY 2012 and FY 2013 by 11% and 13% respectively. However, the tariff revisions in the state have not been commensurate with the increase in the distribution cost.
- 3. Subsidy:** The subsidy burden has remained negligible from past five years i.e. from the period of FY 08 to FY 12 as per PFC data. The subsidies booked in FY 06 were Rs 77 cr and Rs 96 Cr in FY 07.
- 4. Financial Losses:** The financial losses (without subsidies) of the distribution utility have increased post unbundling, due to the increase in the operational cost and power purchase cost. The increase in the operational cost was due to increase in employee and depreciation cost.
- 5. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 10% of the revenue generated by the state and 1.98 % of the Gross State Domestic Product. Considering the Financial losses of Discoms in the year, the financing requirement of the sector increases to 17% of the State revenue and 3.20% of the GSDP

## **XI JAMMU & KASHMIR**

### **1. INTRODUCTION**

#### **1.1. BACKGROUND – POWER SECTOR OVERVIEW**

The power sector in Jammu & Kashmir comes directly under the jurisdiction of the state government. The Electricity Act, 2010 is specific to the state of Jammu & Kashmir. The state government has been successfully able to implement some of the important legislations of the Electricity Act like formation of independent regulator, implementation of MYT framework and Open Access regulations.

The Jammu & Kashmir Power Development Department (Power Department) is the sole transmission and distribution utility in the State of Jammu and Kashmir. The Government of Jammu & Kashmir, vide GO no. 264 PDD of 2012 dated 5<sup>th</sup> September 2012, has ordered for unbundling of JKPDD and setting up of one transmission company, two distribution companies (one each for Jammu and Kashmir divisions) and one trading company with the function of a holding company. In line with the above order, GoJK has ordered for setting up of the following companies vide GO no. 285 PDD of 2012 dated 21st September 2012:

- Jammu & Kashmir State Power Transmission Company Limited
- Jammu & Kashmir State Power Trading Company Limited
- Jammu Power Distribution Company Limited
- Kashmir Power Distribution Company Limited
- Jammu & Kashmir Power Development Corporation, responsible for Generation in the state.

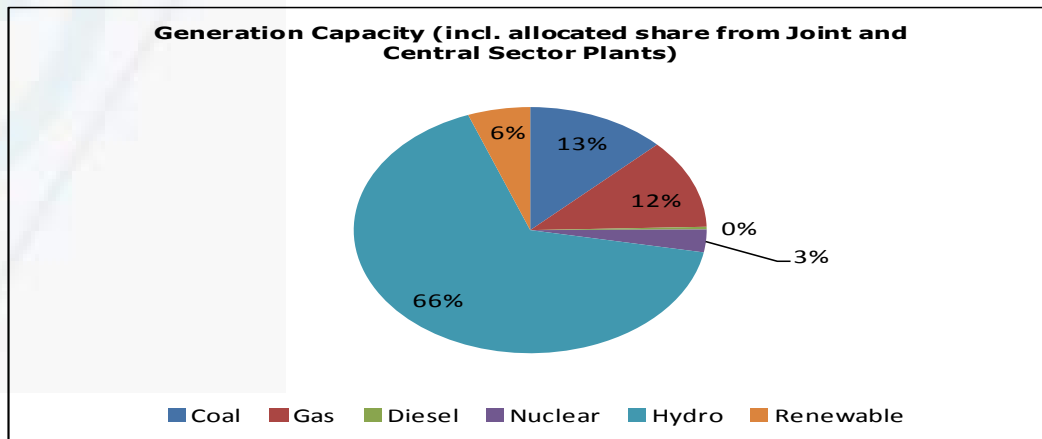
The power sector is confronted with immense problems including deficit in production and supply and huge arrears within the state, particularly from the public sector undertaking and government departments. Hence, in order to improve the financial health of the state Power Sector the planning commission has approved non-planned revenue expenditure aimed at improving the persistent operational inefficiencies in the sector.

#### **1.2. GENERATION MIX**

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants), for Jammu & Kashmir was 2,578.74MW, out of which hydro-based capacity accounted for ~66% of the total installed capacity; followed by coal (~13%) and gas (~12%). Renewable based capacity accounted for ~6% of the overall capacity mix in the state.

Figure below presents the generation capacity mix in the state of Jammu & Kashmir.



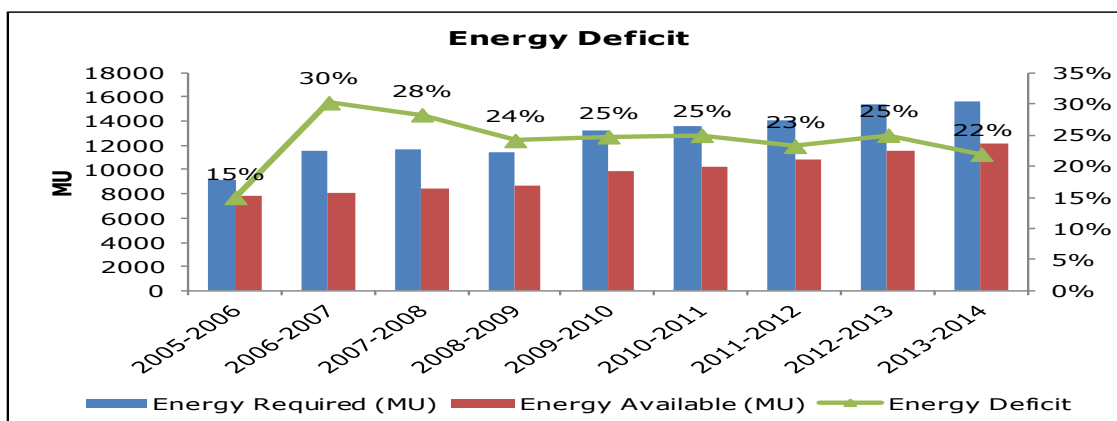
**Figure XI-1: Generation Capacity Mix - Jammu & Kashmir**

Source: CEA

### 1.3. POWER SUPPLY POSITION

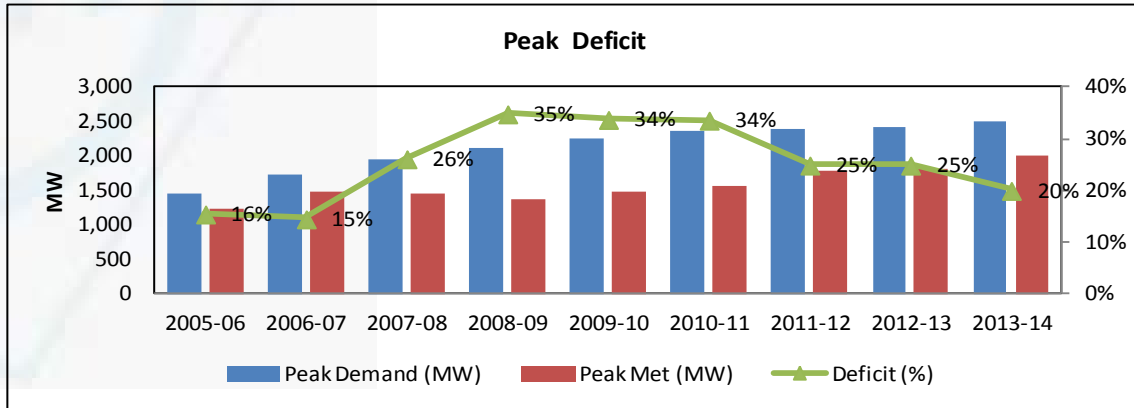
Jammu & Kashmir has been witnessing consistent power supply shortage. The energy deficit has remained more than 20% from FY 2006-07. The peak deficit increased from 16% in FY 2005-06 to 25% in FY 2012-13. The peak deficit increased substantially in FY 2007-08 to 26% and 35% in FY 2008-09 as compared to 15% in FY 2006-07. The increasing energy and peak deficit in the state is due to slow rate of capacity addition compared to increase in demand in the state. Further, low Plant Load Factor (PLF) of hydro power plants caused by poor/weak monsoons has contributed to the high energy and peak deficit in the state.

However, the energy and peak deficit decreased to 22% and 20% in FY 2013-14 from 25% and 24.98% in FY 2012-13, on account declining growth rate in the energy demand. The trend of energy deficit observed in Jammu & Kashmir over the years is presented in the figure below:

**Figure XI-2: Historical Trend in Energy Deficit – Jammu & Kashmir**

Source: CEA

The trend of peak deficit observed in Jammu & Kashmir over the years is presented in the figure below:

**Figure XI-3: Historical Trend in Peak Deficit – Jammu & Kashmir**

Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF JAMMU & KASHMIR

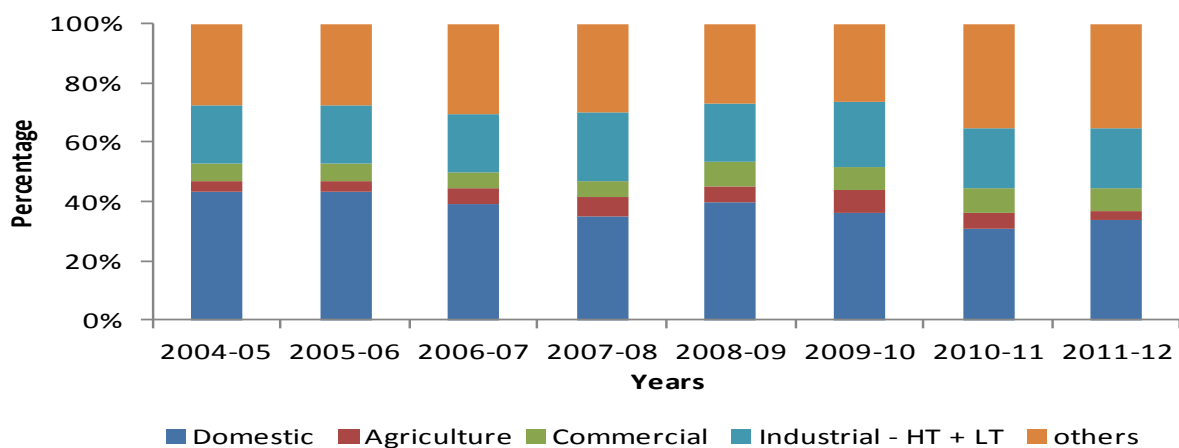
The Jammu & Kashmir Power Development Department (PD) carries out the distribution activity in the state of Jammu & Kashmir. The PD caters to more than 1.7 million consumers in the state, with ~1.5 million domestic consumers in the state.

In 2011-12, domestic consumer sales dominated the sales mix with a share of 34%, followed by industries (20%). The energy sales to consumer categories like Government Departments and Public/Private Water Works also contribute a significant share in the overall sales mix in the state.

The share of domestic sales have reduced over the years while the share of industrial sales have increased. The share of domestic sales have reduced from 36% in 2005-06 to 25% in 2011-12 and the industrial sales have increased marginally from 40% in 2005-06 to 42% in 2011-12.

The figure below illustrates the year on year trend in the consumer mix for the state of Jammu & Kashmir.

**Figure XI-4: Historical Trend Consumer Sales Mix – Jammu & Kashmir**

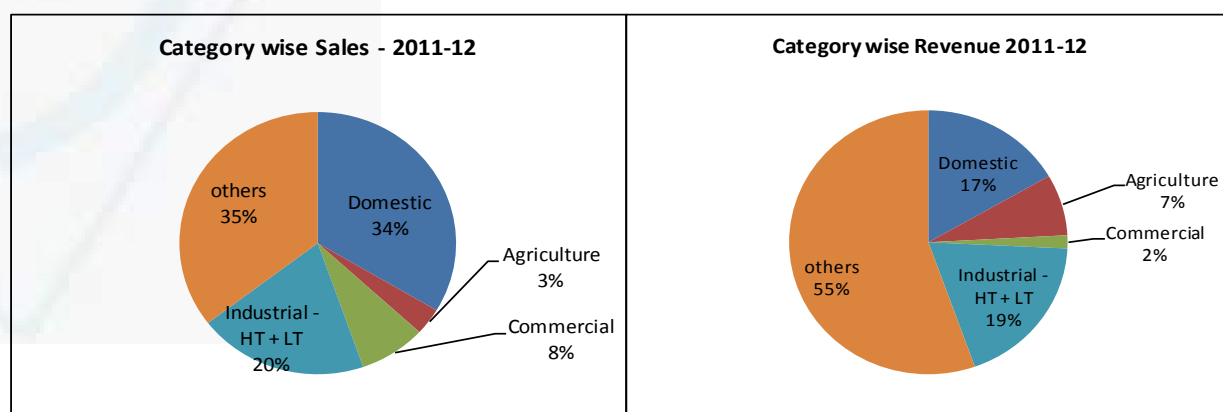


Source: PFC

The overall sales has registered a CAGR of ~1% from FY 05 to FY 12; wherein sales to commercial and industrial consumers have registered a comparatively higher CAGR of ~5% and 2% in the same period.

In terms of revenue contribution, industries contributed ~19% of the revenue, followed by domestic and commercial categories with a share of 17% and 7% respectively. Further, segments like Private Water Works and Other Segments contributed ~55% of the revenue. This clearly indicates that domestic consumer category is cross subsidized by segments like Private Water Works.

**Figure XI-5: Comparative Analysis Consumer Sales and Revenue Mix (w/o subsidy) in 2011-12 – Jammu & Kashmir**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Jammu & Kashmir distribution utilities have historically remained extremely high, on account of poor collection efficiency and high levels of line losses, due to low HT/LT ratio (0.57) in 2011-12. The loss levels have remained in the range of 63% and 73% from FY 06 to FY 12. The above loss estimation is based on the demand estimation for the unmetered sales that constitute more than 50% of the connections in the state, resulting in high levels of electricity theft, The table below illustrates the year on year trend on commercial losses and collection efficiency of the state PD.

**Table XI-1: Historical Trend AT&C losses and Collection Efficiency - Jammu & Kashmir**

Year	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	68%	63%	65%	72%	69%	70%	73%
Collection Efficiency (%)	60%	63%	66%	70%	76%	76%	68%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost, accounting for ~84% of the overall distribution costs. The per unit cost break-up for different cost components for the state of Jammu & Kashmir is provided in the table below:-

**Table XI-2: Historical Trend in Distribution Cost Breakup - Jammu & Kashmir**

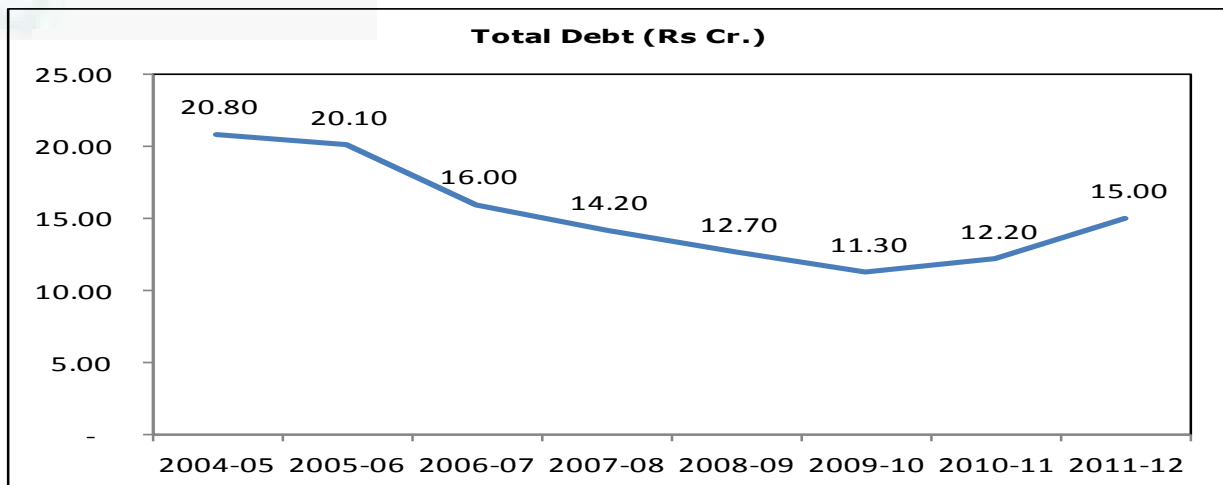
Cost Component (Rs per kWh)	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.88	2.27	1.88	2.21	2.06	2.59	2.78
O&M (R&M + A&G + EC)	0.26	0.19	0.29	0.40	0.32	0.38	0.41
Interest	0.05	0.03	0.03	0.02	0.02	0.02	0.01
Depreciation	0.08	0.07	0.07	0.08	0.08	0.08	0.09
Other cost	0.03	0.03	0.00	0.00	0.00	0.02	0.02

Source: PFC

It can be observed that power purchase cost per unit has increased over the years, on account of decreased power availability from hydro based power plants, resulting in increased quantum of power purchased from coal based plants.

The percentage share of interest costs have also decreased from ~2.0% in FY 05 to ~0.4% in FY 12, on account of decreasing debt subscribed by the power department. The figure below highlights the decreasing trend in the overall debt taken by the power department.

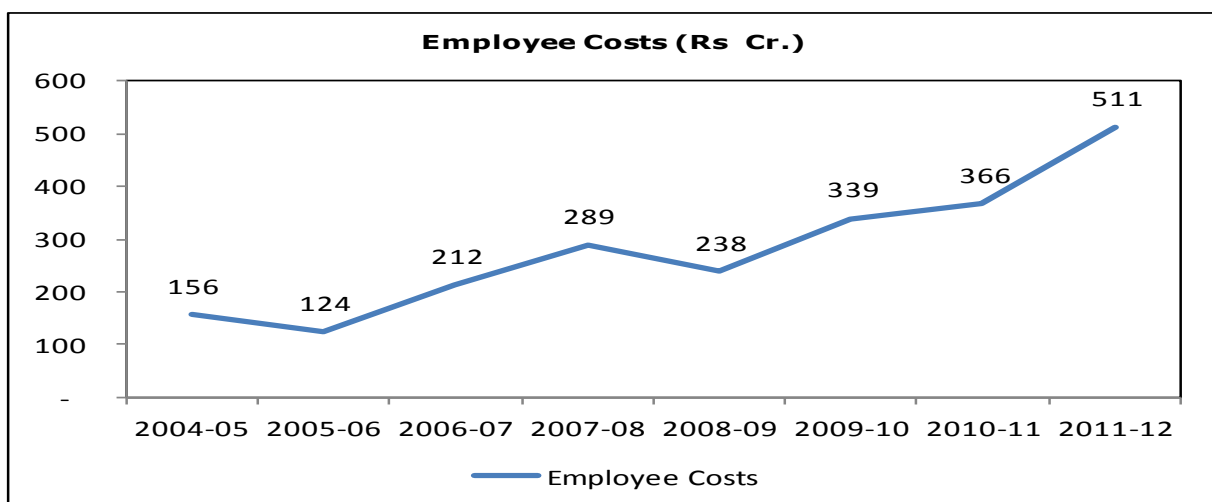
**Figure XI-6: Historical Trend in Debt taken by the Power Department – Jammu & Kashmir**



Source: PFC

Although, the per unit cost employee cost has reduced from FY 09 to FY 12, the quantum of employee cost has increased significantly in the same period, on account of increased arrears towards the implementation of the 6<sup>th</sup> Pay Commission in FY 09. The figure below highlights the increasing trend in the employee cost over the years.

**Figure XI-7: Historical Trend in Employee Cost – Jammu & Kashmir**



Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. The tariff hikes in the state have been sporadic, with tariff hikes in FY 2008-09 and FY 2011-12.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XI-3: Historical Trend in Consumer wise Average Revenue Realization - Jammu & Kashmir**

Years	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	0.90	0.90	0.91	1.51	1.42	1.41	1.61
Agriculture	2.31	2.26	2.33	2.28	1.51	1.29	1.41
Commercial	1.85	1.87	1.92	2.61	1.64	2.31	2.69
Industrial LT + HT	1.22	1.21	1.25	2.14	2.46	2.57	2.84
Others	2.13	2.14	2.13	4.13	4.01	4.04	4.40

Source: PFC

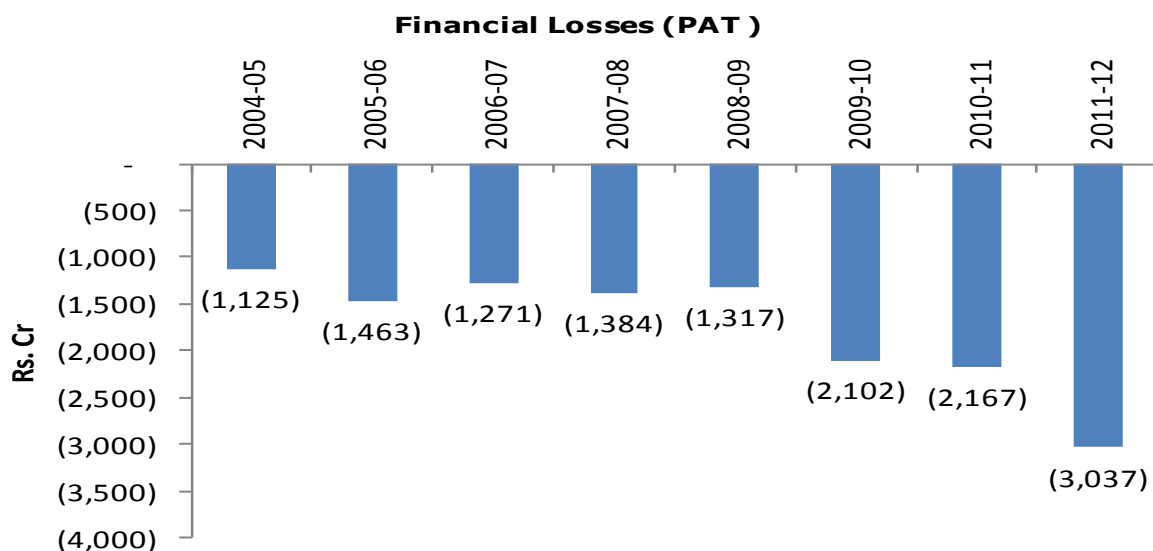
The average revenue realization for domestic consumers continues to remain low, on account of cross subsidization from industrial. Further, high levels of commercial losses reported due to electricity theft.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Jammu & Kashmir has increased substantially over the years. Further, the tariff levels does not reflect the actual cost to serve in the state. The figure below depicts the year on year trend in the profit/ (loss) booked by the state PD

**Figure XI-8: Historical Trend in Financial Losses (w/o subsidy) - Jammu & Kashmir**



Source: PFC

The loss levels increased significantly in FY 12, on account increased power purchase costs combined with high levels of commercial losses reported in that year.

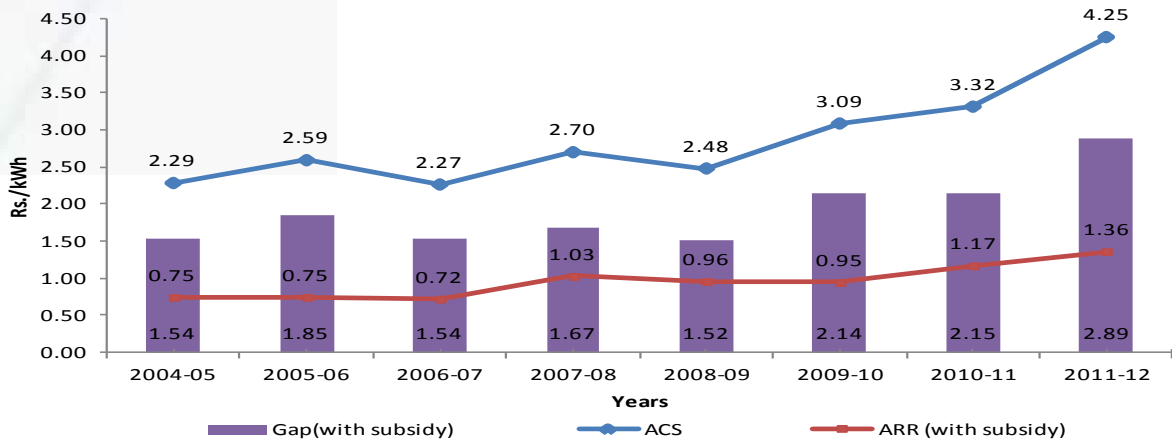
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The power department has not booked any subsidies from FY 05 to FY 12.

### 3.3. ACS v/s ARR

The gap between average cost of supply and average revenue realized has remained very high over the years. The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure XI-9: Historical Trend in ACS v/s ARR - Jammu & Kashmir**



Source: PFC



## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector constituted ~2.2% of the total tax revenue in the state in FY2011-12. The details for the same are provided in the table below:

**Table XI-4: Tax Revenue from Power Sector - Jammu & Kashmir**

Revenue	2009-10	2010-11	2011-12
RS Cr			
Tax Revenue From Power Sector	120	148	179
Total Tax Revenue	4,942	6,550	8,241
Power sector Tax Revenue / Total state Tax Revenue	2.44%	2.25%	2.2%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **Royalty/CESS on water for power generation, transmission and distribution, Rural Electrification etc.** The Non-Tax revenue, which is Rs 1007 Cr in 2011-12, contributes a significant ~50% of the total non-tax revenues. The details for the same are provided in the table below:

**Table XI-5: Non-Tax Revenue from Power Sector - Jammu & Kashmir**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	115	822	1,007
Total Non-Tax Revenue	955	1,093	2,002
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	12.05%	75.21%	50%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The Non tax revenue from the sector has increased significantly over the three years along with increase in sector's contribution in state non tax revenues i.e. from 12.05% in FY10 to a significant 50% in FY12.

In case of J & K, electricity is supplied by Jammu and Kashmir Power Development Department (JKPDD) and therefore non tax revenue comes from power tariff revenue from sale of electricity to consumers.

The overall revenue generated from the power sector increased from Rs 235 Cr in FY2010 to Rs 1186 Cr in FY2012.

#### 4.2. EXPENDITURE ON POWER SECTOR

The details of the expenditure made on the power sector by the state in the year 2011-12 are provided in the table below:

**Table XI-6: Expenditure on Power Sector - Jammu & Kashmir**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital Expenditure	1,035	NA	534
Revenue Expenditure	2,755	NA	3,768
Total Expenditure	3,790	NA	4,303

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The capital expenditure incurred on power sector has decreased since FY10 primarily on account of decrease in investments under T&D. The revenue expenditure incurred on the power sector has increased since FY10 primarily on account of increase in the expenses under Hydel Generation and Rural electrification.

Further, it can be observed that the state power sector has not been self sufficient to carry out its operations as revenue from tax and non-tax revenue is less than the revenue expenditure made by the state towards the power sector.

The above grants were approved from the Planning Commission aimed at improving the financial and operational parameters in the state of Jammu & Kashmir. The restructure plan aims at improving the loss levels, introduce accountability and metering levels. However, the level of non-planned expenditure has increased in FY 13 and FY 14, indicating the persistent inefficiencies in the power sector.

#### 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The state government guarantees constituted a significant ~19.10% of the overall state revenue in 2011-12. The same has been depicted in the table below:

**Table XI-7: Guarantees as a Percentage of Total Revenues - Jammu & Kashmir**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	2,777	2,550	1,956
Total Revenues of the State	5,897	7,643	10,242
Guarantees as a %age of Total Revenues of State	47.08%	33.37%	19.10%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

The guarantees given to power sector in proportion to the revenues generated by the state has decreased substantially i.e. from ~47% of state revenues in 2009-10 to 19.10% in 2011-12.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XI-8: Guarantees Utility wise Breakup - Jammu & Kashmir**

Particulars	2009-10	2010-11	2011-12	Aggregate Share in Sector Guarantees (%)
Rs Cr				
Jammu & Kashmir Power Development Department	229	229	229	9%
Jammu & Kashmir Development Corporation	2,547	2,321	1,727	91%

Source: Audited C&AG Accounts for the state 2011-12, 2010-11, 2009-10

Over the span of three years, Jammu & Kashmir Development Corporation accounted for a share of 91% of sector guarantees.

The sector did not receive any subsidy from state government.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 320 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XI-9: Power Sector Financing (2011-12) - Jammu & Kashmir**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	4,303
Loans And Advances made by the State Government (Net of Recoveries)	(167)

Particulars	2011-12 Rs. Cr
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	(2,465)
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0
Total Power Sector Financing during the year	4,111
Sector Financing Requirement as a % age of total revenues of state	40%
GSDP nominal	40,771
Sector Financing Requirement as a % age of GSDP	10.08%
Financial Profit/ (Losses) of PD during the year (With Subsidy realised)	(3,037)
Sector Financing Requirement (including financial losses of PD ) as a % age of total revenues of state	70%
Sector Financing Requirement (including financial losses of PD ) as a % age of GSDP	17.53%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

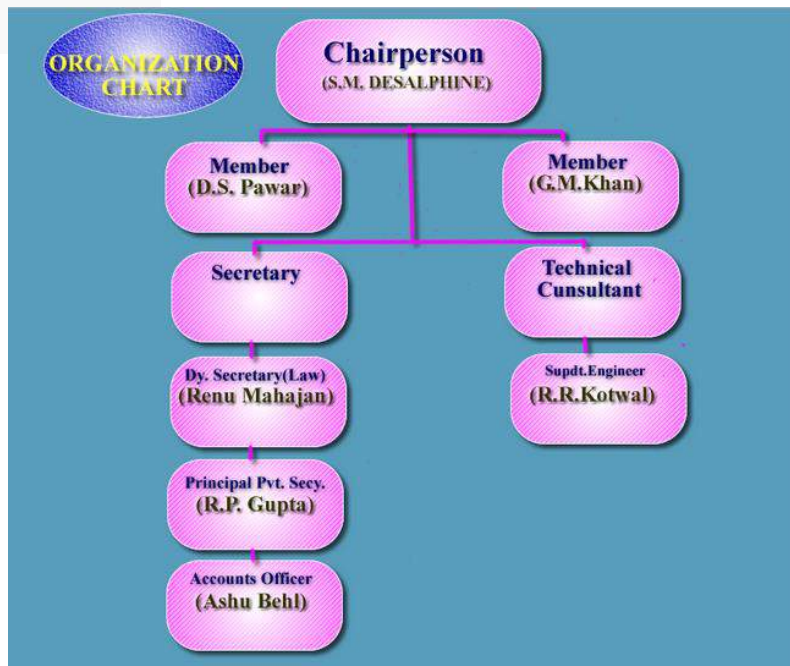
The financing requirement for the Power sector in the state was estimated to be 40% of the revenue generated by the state and 10.08 % of the Gross State Domestic Product. Considering, the financial losses of PD in the year, the financing requirement of the sector increases to 70 % of the State revenue and 17.53 % of the GSDP.

The major portion of state investments made towards power sector went to Transmission & Distribution. The major portion of Revenue expenditure on power sector went towards improvement of operational parameters and modernization of the power sector in the state. The substantial Power Department losses have increased the burden of the sector on state finances. Hence, there is a need for further investments to build and strengthen the infrastructure.

## 5. REGULATORY EFFECTIVENESS

In accordance with the legislature passed in Jammu and Kashmir, the Jammu & Kashmir State Electricity Regulatory Commission was established in 11<sup>th</sup> April 2000. The figure below presents the current organization structure of JKSERC.

**Figure XI-10: Organization Structure - Jammu & Kashmir State Electricity Regulatory Commission**



Source: JKSERC

### 5.1. BUDGETING

The status of budgeting information is not available in public domain.

### 5.2. STAFFING

The office of the Commission consists of permanent employees besides officials on deputation and on contract basis. The current total working strength of the Commission is 9 (including the chairman and two members).

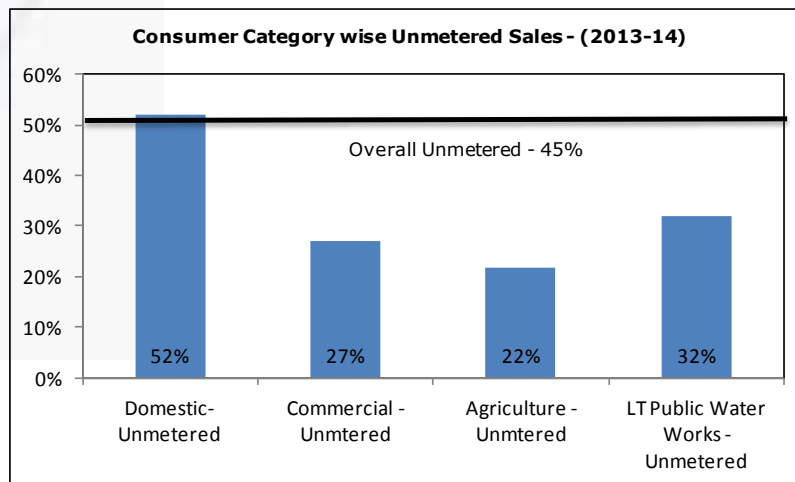
### 5.3. MYT REGULATION

The MYT has been implemented for the first control period (FY 14 to FY 16). The commission had selected a first control period (three years). The primary focus of the MYT in the state was to improve the level of metering along with efficient tariff setting mechanism.

### 5.4. LEVEL OF METERING

The major proportion of the domestic consumer category continues to be unmetered. Further, considerable proportion of commercial, agriculture and public water works consumer category are also unmetered. The figure below presents the overall and consumer category wise unmetered connections in the state.

**Figure XI-11: Historical Trend in Agriculture Metering (FY 10 – FY 12) - Jammu & Kashmir**



Source: MYT Tariff Order FY 14 – FY 16

The electricity theft is especially pertinent in the domestic consumer category, that has high percentage of un-metered connections, which has resulted in high AT&C losses in the state.

### **5.5. OPEN ACCESS**

Jammu & Kashmir State Electricity Commission notified, the Open Access Regulations vide 12, 13, 15 and 16 of the J&K SERC (Open Access in Intra-State Transmission and Distribution) Regulation, 2006, on January 25, 2006. Further, the information related to the number of applications received/approved and the volume of power traded is available in public domain

The state's Electricity Act was implemented in 2010, although the state regulator has implemented many provisions of the Act like implementation of Open Access, MYT framework and the commission continues to be sufficiently staffed, the power sector in the state has not benefited largely with the provisions enacted.

## 6. SUMMARY

1. **Demand Supply Gap:** The state has witnessed high levels of deficit levels. Further, the power department procures low quantum of power from the short-term market. The power department can contemplate purchasing the surplus power available in the short-term market to reduce the deficit levels in the state.
2. **High levels of Unmetered Connections:** High percentage of connections in the state remains unmetered, resulting in incorrect demand estimation in the state. The energy sales to the unmetered category constitute a significant proportion in the overall sales mix, resulting in electricity thefts and other commercial losses.
3. **High Levels of AT&C Losses:** The levels of AT&C losses in the state are unsustainably high. The high line losses due to high percentage share of LT consumers, combined with electricity theft in unmetered categories.
4. **High Financial Losses:** The financial losses have increased over the years. The high levels of AT&C losses combined with insufficient tariff revisions are the primary causes for the high levels of losses in the state.
5. **High Dependence on Grants Planning Commission:** The Power Department from the state had received grants from the planning commission aimed at improving the overall operational efficiency. Although, the power projects receipt in the state has increased in FY 13 and FY 14; the quantum of non-planned revenue expenditure has increased during the same period.

**Although, the current financial health of the power sector pose a high risk on the state finances, with high levels of unmetered connection leading to electricity theft and improper billing.**

## XII JHARKHAND

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The state of Jharkhand was carved out of Bihar on 15th November 2000 by virtue of promulgation of Bihar Reorganization Act, 2000. Owing to its proximity to the coal belt, cheap land, availability of water and labor, state is ideally suited for power generation. This is particularly true as transporting coal is costlier than transmitting power to any part of the country. However, despite the above factors, power infrastructure in the state remains poor. Jharkhand State Electricity Board (JSEB) still operates as a vertically integrated entity.

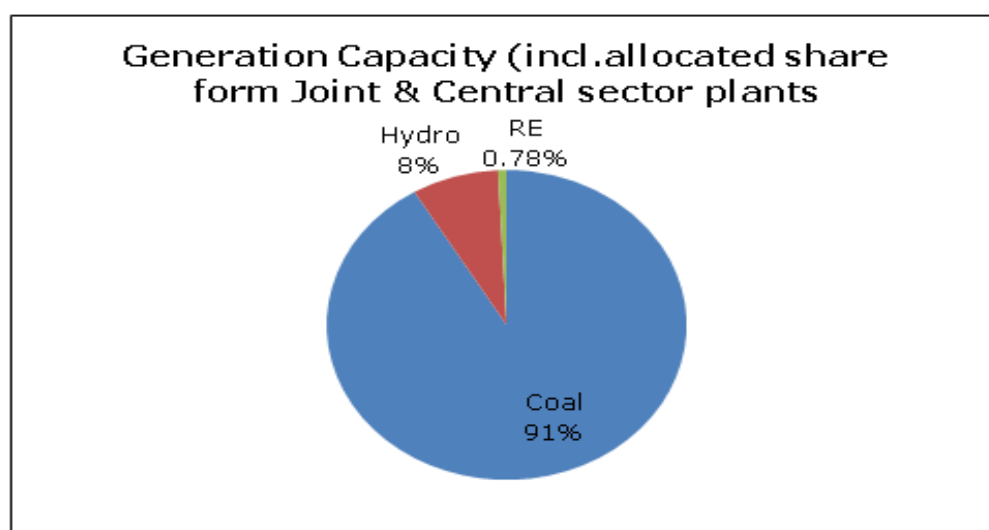
Overall performance of power sector in the state has been poor. The operating performance of the generating stations in the state is inefficient with high auxiliary consumption levels, low capacity utilization and poor renovation and modernization of plants. The state faces high levels of AT&C losses due to inadequate metering and poor commercial practices, also T&D network are in very poor state. There is lack of transparency and quality of data is poor which makes relying on reported figures of JSEB hard. There is strong dependence on the state government for finances.

#### 1.2. GENERATION MIX

As on February 2014, Jharkhand's total generation installed capacity (including allocated share in Joint & Central Sector plants) was 2579 MW out of which coal based power capacity accounted for 91% followed by Hydro (~8%). **The capacity addition (incl.procurment from Central & JV plants) has grown by 14% from last year, showing a significant increment in investments in capacity addition.**

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XII-1: Generation Capacity Mix - Jharkhand**



Source: CEA



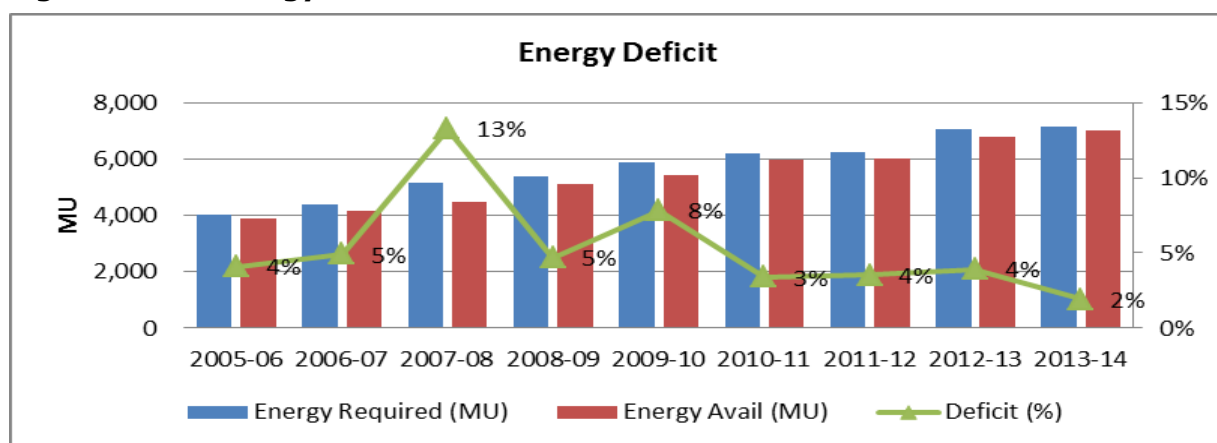
### 1.3. POWER SUPPLY POSITION

The energy availability in Jharkhand has grown at a CAGR 7% over the span of nine years, and energy availability at 9%. The Indian flagship programs like RGGVY and R-APDRP are running on a fast track mode in the state under which, around 67% of the villages have been electrified so far.

Jharkhand energy deficits has been in the range of 2 -5% in the last 9 years, except in 2007-08 & 2009-10. In 2007-08 the energy deficit was 13% and 8% in 2009-10 respectively. The peak deficit in the state has shown a decreasing trend from 16% in FY 2011-12 to 4% in FY 2013-14, this is because of increase in capacity addition coupled with lower demand in the state for the FY 2013-14.

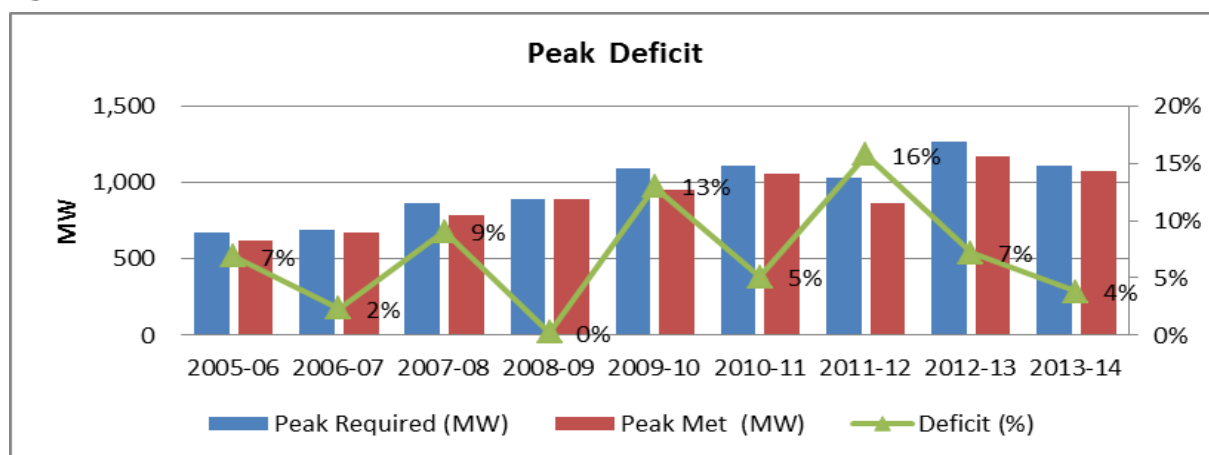
The trend of energy and peak deficit observed in Jharkhand over the years is highlighted in the figure below:

**Figure XII-2: Energy Deficit - Jharkhand**



Source: CEA

**Figure XII-3: Peak Deficit - Jharkhand**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

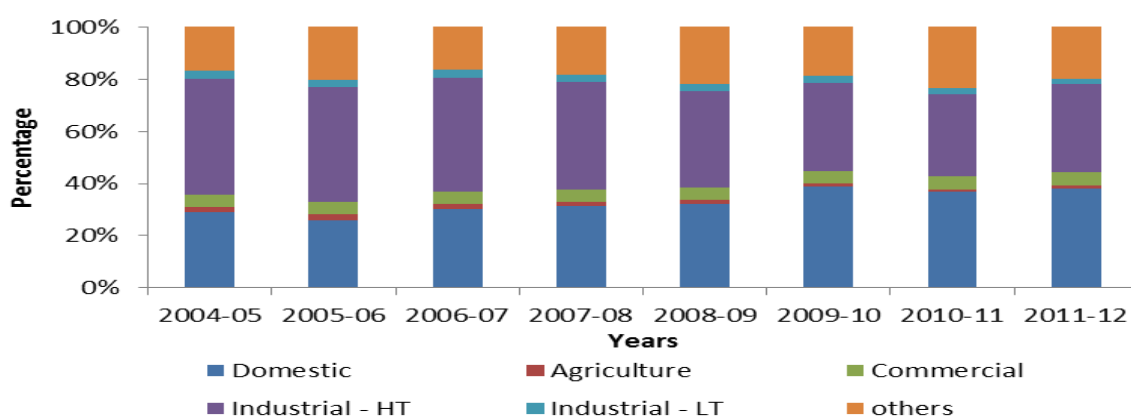
### 2.1. CONSUMER SALES MIX OF JHARKHAND

In FY 2011-12, domestic sales dominated the sales mix with a share of ~38%, followed by industrial –LT (34%) and other<sup>12</sup> category sales (~19%). The commercial and agricultural sales in the state accounted for 5% and 1% respectively.

The share of domestic sales have increased from 29% in FY2004-05 to 38% in FY 2011-12, the domestic sales have registered a CAGR of 15.2% over the span of seven years and is highest among all the consumer categories. This is due to the increasing electricity access in the state under the flagship programme of rural electrification.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XII-4: Historical Trend in Consumer Sales Mix - Jharkhand**



Source: PFC

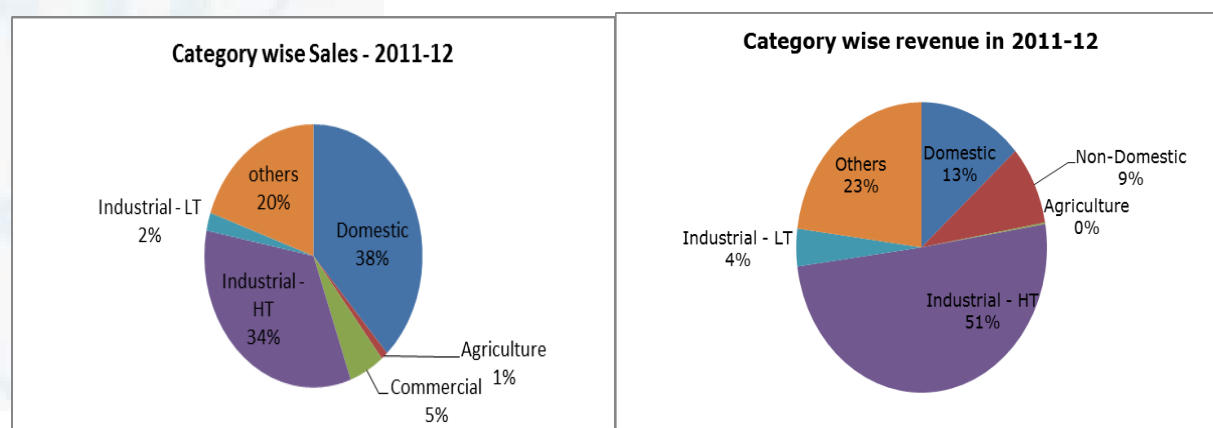
The industrial sales as a percentage total sales have reduced over time from 48% in FY 2004-05 to 34% in FY 2011-12. The industrial sales have grown at a CAGR of 5.5% which is lowest among all the other consumer categories.

In terms of revenue contribution, industries contributes to 51% of the total revenues, followed by others (23%), domestic (13%) and commercial/ non domestic (9%). This clearly indicates that domestic category is cross subsidized by the industrial and commercial categories.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

<sup>12</sup> The other category comprises of sales to Railways, Public Lighting, Public Water works, Bulk Supply and Interstate categories

**Figure XII-5: Comparative Analysis of Consumer Sales and Revenue Mix (w/o subsidies) 2011-12 - Jharkhand**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Jharkhand distribution utility have remained high over the years. The AT&C losses in the state are higher than the national average.

The table below highlights the year on year trends in AT&C Losses and collection efficiency.

**Table XII-1: Year on Year Trend in AT&C losses and Collection Efficiency - Jharkhand**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	63%	52.1%	54.4%	58.2%	54.2%	10.4%	46.8%	42.8%
Collection Efficiency (%)	60%	63%	66%	70%	76%	137%	68%	71%

Source: PFC

The major reasons for high losses in the state are due to (i) pertinent theft of electricity (ii) weak distribution infrastructure due to increasing LT network in the state and (iii) high unmetered consumers in the state. The high AT&C and T&D losses in the state is an area of concern, in this regards state regulatory commission has set the loss reduction trajectory and have set a target of to achieve the T&D loss level of 15% by the end of FY 2016-17. However, keeping in view the huge target of rural electrification, release of Kutir Jyoti connection and expansion of LT network a huge loss reduction seems unachievable.

To achieve it, the Commission has directed the distribution utility to formulate a task force for supervising the losses in the state and also carry out energy audit of its system and provide quarterly reports to the Commission regarding the progress of energy audit.

The HT/LT ratio has increased over the years; however is still lower than the best performing states indicating that there is scope for improvement in this area. HT LT ratio has improved from 0.63 in 2005-06 to 0.70 in 2009-10.

Hence, in terms of operations efficiency, the Jharkhand discoms need to speed up their loss reduction measures and achieve metering of high un-metered domestic and rural consumers in the state.

### 2.3. TRENDS IN DISTRIBUTION COST

The distribution cost of JSEB has grown at a CAGR of 17.56% over the span of seven years and power purchase cost which forms the major cost component of distribution cost, has grown at a CAGR of 14.72%. The power purchase cost in Jharkhand is lower compared to other states given the state proximity to the coal belt.

The per-unit cost break-up for different cost components for the state of Jharkhand is provided in the table below:-

**Table XII-2: Year on Year Trend Distribution Cost Breakup - Jharkhand**

Cost Component	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.92	1.51	1.65	1.88	2.55	2.91	3.39	2.48
O&M (R&M + A&G + EC)	0.34	0.26	0.26	0.30	0.45	0.48	0.44	0.32
Interest	0.32	0.37	0.54	0.57	0.80	0.92	0.52	0.40
Depreciation	0.11	0.04	0.04	0.05	0.07	0.07	0.07	0.09
Other cost	0.68	0.41	0.27	0.51	0.35	0.01	0.01	1.87

Source: PFC

The power purchase cost has been steadily increasing from FY 06 to FY 11, attributed to steep growth in per unit power purchase cost for NTPC plants allocated to JSEB, which is beyond the control of the state distribution utility. However, the prices have slightly dropped in FY 12, as Coal India Limited, shifted its coal pricing policy from UHV based to GCV, hence there was slight drop in the steam coal prices for power sector.

However, in FY 12, the other cost has increased substantially against FY 11. The interest burden of the state has remained high over the years, from FY 09 to FY 11.

### 2.4. REVENUE REALIZATION

Tariff realizations from different consumer category have not increased commensurate to increasing power purchase cost. No tariff hikes were observed for several years and tariffs were increased only in FY 12. However, in FY 2012-13, the commission considered no tariff revisions.

The table below shows the revenue realization from different consumer categories over the years.

**Table XII-3: Historical Trend Consumer Category Wise Revenue Realization - Jharkhand**

Years	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.03	1.20	-	0.98	0.91	0.74	0.93	1.21
Agriculture	0.34	0.25	-	0.42	0.43	0.45	0.54	0.62
Commercial	4.15	4.23	-	4.11	4.18	4.32	4.63	5.76
Industrial HT	4.72	4.40	-	4.32	4.33	4.31	4.58	5.14

Industrial LT	4.12	4.64	-	4.68	4.71	4.66	5.13	6.46
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Source: PFC; data for FY 07 has not been reported by PFC

The revenue realization for the domestic category is low, which clearly indicates that the domestic consumers in the state are being cross subsidized from Industrial and commercial consumers. High AT&C losses in the state have led to low realization of revenues from sale of power.

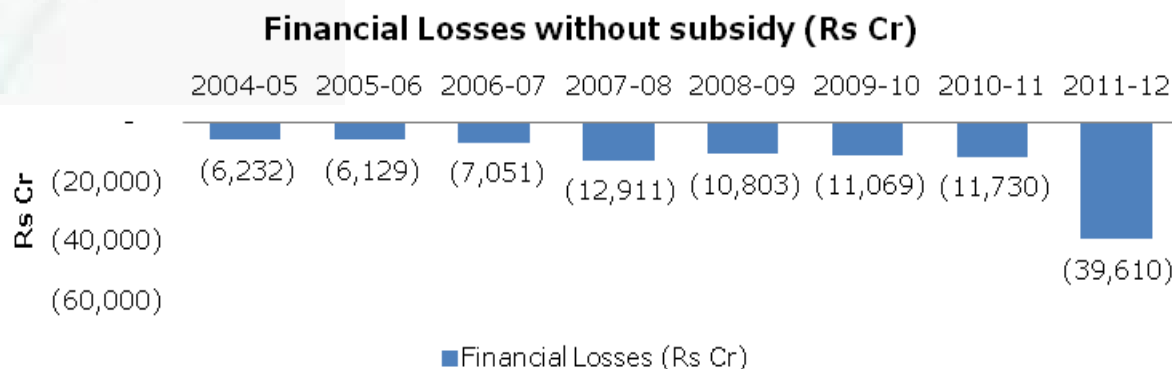
Increase in distribution cost, inadequate tariff hikes, and high AT&C losses over the years have resulted in deterioration of the financial position of the distribution utility of the state.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses (without subsidies) of state has increased every year given the increasing distribution cost, high losses, and no frequent tariff hikes.

**Figure XII-6: Historical Trend Financial Losses (w/o) subsidies – Jharkhand**



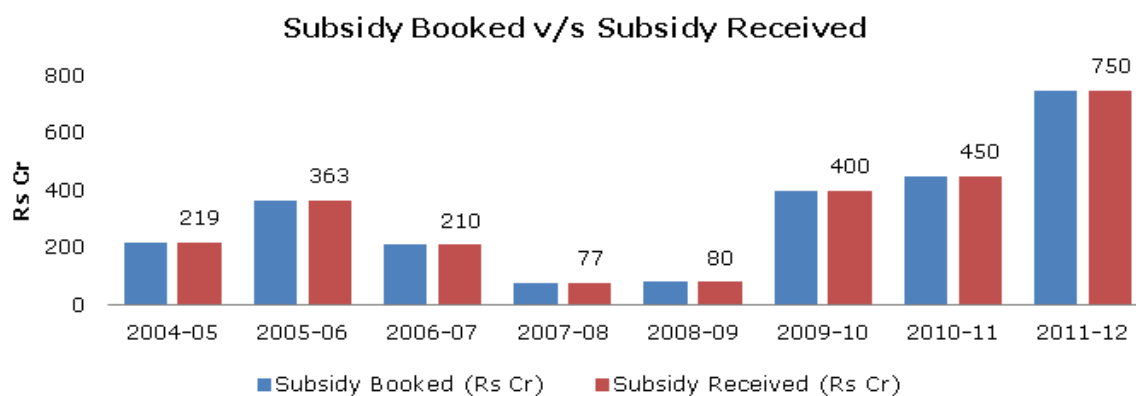
Source: PFC

The tariff revised in FY 2011-12, was not commensurate with the increase in distribution cost, as explained the other cost has substantially increased in FY 12. Thus explains the sudden increase in the losses in FY 2011-12. The subsidies provided are also not able to bridge the gap of revenues and cost, the same has been discussed in the subsequent section.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The subsidy burden on state government has remained high over the years. The subsidy accounted for 14% of total revenues in FY 2004-05 and 24% in FY 2011-12. The figure below highlights the subsidy booked v/s subsidy received for the distribution utility in the state.

**Figure XII-7: Historical Trend of Subsidies Booked v/s Subsidies Received – Jharkhand**



Source: PFC

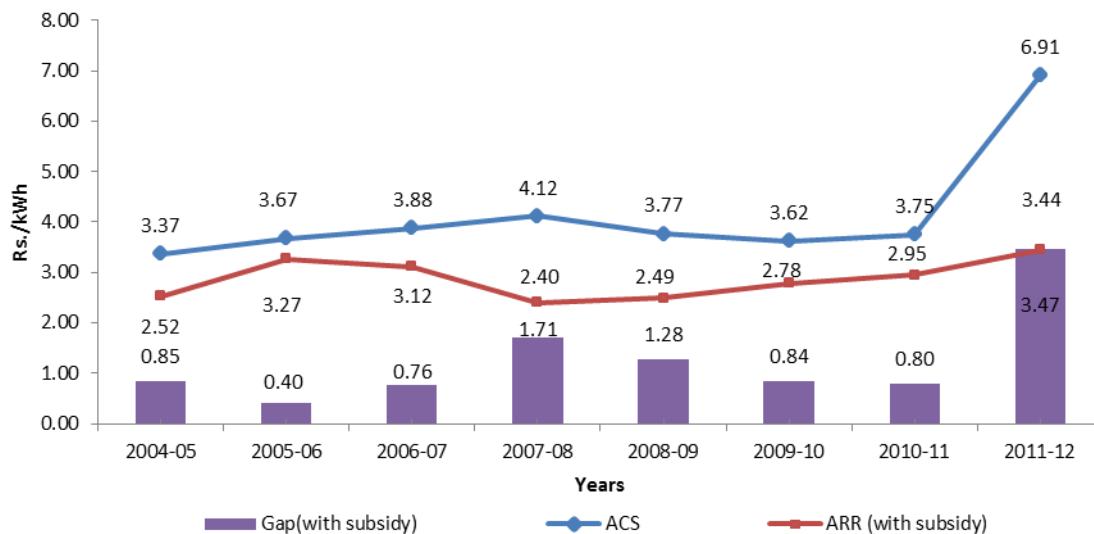
The trend in subsidy pay-out with respect to the subsidy booked has always been 100% in the state. However, even with the high levels of subsidies the revenue gap still persists given the high AT&C losses in the state.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized has increased from Rs 0.85 per unit in FY 2004-05 to Rs 3.44 per unit in FY 2011-12. The utility showed low gap in FY 2005-06 and FY 2006-07 given the high subsidies received from the state government.

The figure below provides the historical trend of ACS v/s ARR

**Figure XII-8: Historical Trend ACS v/s ARR (with subsidy) – Jharkhand**



Source: PFC

Despite the tariff hikes in in FY 2011-12, the gap has not reduced much, due to significant increase in other cost. The tariff revisions have not been adequate and increasing cost of supply has been the major challenge given expansion of distribution network in rural areas of the state in the agricultural and rural sales in the state.

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms less than 1% of the total tax revenue. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The table below provides the total tax revenue of state and share of power sector in it.

**Table XII-4: Tax Revenue from Power Sector - Jharkhand**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	NA	NA	72.76
Total Tax Revenue	NA	NA	14,123.82
Power sector Tax Revenue / Total state Tax Revenue	NA	NA	0.52%

Source: Audited CAG reports for the state: 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **Dividends, Interest on Loans and Advances, Royalty/Cess on water for power generation, T n D, Rural Electrification etc.** The Non Tax revenue from the power sector is provided under the head of General Receipts in the CAG accounts. The Non Tax revenue, which is only Rs 0.15 Cr, forms an insignificant portion of the total non-tax revenues. The detail for the same is provided in the table below.

**Table XII-5: Non-Tax Revenue from Power Sector - Jharkhand**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	NA	NA	0.15
Total Non-Tax Revenue	NA	NA	3,038.22
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	NA	NA	0%

Source: Audited CAG reports for the state: 2011-12, 2010-11, 2009-10

**The overall income generated from power sector, in the year 2011-12, is ~Rs. 72.91 Cr, which is insignificant relative to the total revenues of state.**



## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on the power sector made by the state Government under various heads.

**Table XII-6: Expenditure on Power Sector - Jharkhand**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	NA	NA	0
Revenue Expenditure	NA	NA	859.83
Total Expenditure	NA	NA	859.83

Source: Audited CAG reports for the state: 2011-12, 2010-11, 2009-10

The capital expenditure by the state Government in FY 2011-12, is nil highlighting no expense is being done to improve the power sector infrastructure in the state.

**The quantum of expenditure on Power sector exceeds the Revenue generated from Power sector in the year.**

## 4.3. POWER BONDS

Power Bonds were issued in 2004-05 & 2005-06. Outstanding balance in the beginning of 2006-07 was Rs. 2115.32 Cr. The total outstanding balance at the end of 2011-12 was Rs. 846.13 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 420 Cr.

## 4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

There are no guarantees given by the State Government to Power sector.

### Subsidy

The subsidies extended to power sector were Rs 784 Cr in FY 2011-12, out of which Rs 750 Cr were extended towards Jharkhand State Electricity Board.

## 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement, which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and*

*Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XII-7: Financing Requirement for the Power Sector (2011-12) – Jharkhand**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	859.83
Loans And Advances made by the State Government (Net of Recoveries)	164.95
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	211.53
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.003
Total Power Sector Financing during the year	1236.31
Sector Financing Requirement as a % age of total revenues of state	7%
GSDP nominal	91,421.00
Sector Financing Requirement as a % age of GSDP	1.35%
Financial Profit/(Loss) of Discoms during the year (with Subsidy Realized)	(3,211)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	26%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	4.86%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12*

The financing requirement for the Power sector in the state was estimated to be 7%% of the revenue generated by the state and 1.35% of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 26% of the State revenue and 4.86% of the GSDP.

## 5. FINANCIAL RESTRUCTURING PLAN

Increase in power purchase costs, inadequate tariff hikes, almost free supply of electricity to the agricultural sector and low subsidy realization from the state government has deteriorated the financial position of the utilities in the state. In this context, distribution utility of Jharkhand adopted the FRP of the central government. The status and likely outlook of FRP in the state is discussed in the section below.

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

Given below is the status of the financial restructuring plan's (Fry's) implementation in the state.

**Table XII-8: Status of FRP – Jharkhand**

Particulars	Jharkhand
<b>Accumulated Losses as on cutoff date</b>	10880 cr.
<b>STL (eligible under the scheme)</b>	5710 cr.
<b>Bonds issued by Discoms to participating lenders</b>	2855 cr. – likely to be issued by end of March, 14
<b>Tariff petition for 2014-15</b>	MYT filed in Jan 13, not finalized
<b>Operational losses to be funded (2013-14)</b>	1871 cr.
<b>Road-Map for private participation in distribution</b>	Started in Ranchi and Jamshedpur
<b>Status of liquidation of regulatory assets</b>	Being examined
<b>Status of preparation of time bound plan for metering of all category of consumers</b>	Being Prepared
<b>Status of enactment of State Electricity Distribution Responsibility Bill</b>	Under Progress

Some of the key parameters relevant to FRP implementation have been shown in the table below for Jharkhand

### 5.2. FRP OUTLOOK

In this report, key parameters for all the states mentioned above have been looked at in order to comment on the likeliness of the state to meet key eligibility conditions set forth by the FRP and be eligible for the central grants incentive scheme.

The color scheme used in the tables for each state in this section, refer to the color key provided here:

	Area of concern
--	-----------------

	Can be better
	Good

Jharkhand has recently unbundled its operations in March, 2014. The erstwhile JSEB reported a financial loss (without subsidy) of Rs.3211 Cr. in 2011-12, translating into a financial gap of Rs.4.28/kWh.

With reference to the letter number 1544, dated 21<sup>st</sup> July 2014, submitted by the Department of Energy, Government of Jharkhand, to Ministry of Power, the DISCOM has requested for the entire amount of STL of Rs. 5710 Cr to be financed by debt, with Rs. 3000 Cr to be financed by Power Finance Corporation and Rs 2710 by Bank of India in consortium with other banks.

As per the notified scheme, the bonds to be issued by Discoms were to be taken over by the respective State Government. However, in the current scenario, it is proposed that the entire amount will be serviced through debt only, which is in deviation from the FRP scheme. The matter is pending with the Ministry of Power.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Jharkhand

**Table XII-9: Historical Parameters – Jharkhand**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	52%	54%	58%	54%	10%	47%	43%	n.a	n.a
<b>Tariff Hikes</b>	-	-	-	-	-	-	Yes	-	n.a
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	14%	20%	17%	19%	21%	12%	8%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.99	1.06	1.82	1.38	1.14	1.30	4.28	n.a	n.a

Source: PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have remained very high over the years due to persisting power thefts, weak distribution infrastructure, and high level of unmetered consumers in the state. A >3% annual reduction in AT&C losses from 47% (2010-11 benchmark value) is required for the utility to benefit from the central grants incentive.
- Before being revised once in 2011-12, tariffs were not revised for a period of more than 8 years. This is one of the biggest areas of concern for JSEB. Without frequent and substantial tariff revisions, the Discom would not be able to benefit from any of the financial incentives that are part of the FRP.

- The subsidy received-booked ratio has been high, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed.
- The share of Interest expenses has been significant. The moratorium on principal repayments of 50% STL will help reduce the interest burden to some extent in the short term.
- The ACS-ARR Gap needs to be reduced to by 25% annually from the Rs. 1.30/kWh 2010-11 in order to be eligible for the central grants incentive. In order to achieve this reduction, both tariff revisions and operational efficiency improvements are essential in Jharkhand. Assuming the AT&C losses are reduced by 3% in a year, the financial gap will come down by around 16 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same power as in 2010-11<sup>13</sup>

Unlike in the past few years, frequent and substantial tariff revisions coupled with consistent reduction in AT&C losses is the only way that Jharkhand can benefit from the FRP scheme and improve its financial health in the long term.

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<sup>13</sup> In order to estimate gap reduction, 2010-11 data has been taken for Jharkhand because the ACS in 2011-12 is very high due to a huge increase in 'other cost' component.

## 6. ASSESMENT OF REGULATORY EFFECTIVENESS

The reforms in Jharkhand State were introduced by the mandates of the Electricity Act, 2003. However, with the exception of the setting up of the Jharkhand State Electricity Commission, the progress of reforms has been slow. Electricity reforms in Jharkhand power sector are far from complete and many stumbling blocks remain.

Some of the problems at the start of the reforms were:

- The power sector in Jharkhand suffered from capacity shortages, frequent blackouts and poor reliability
- Less than full cost recovery together with theft and uncollected bills put a severe strain on the financial health of the sector, reducing its capacity to invest and sustain the power system
- Losses at the Jharkhand State Electricity Board funded by large subsidies were a major drain on the state budget
- Commitment: Cooperation and commitment of government officials was essential for smooth functioning of the system

### 6.1. FINANCIAL INDEPENDENCE/AUTONOMY

The primary source of income for the SERC's include grant from the state government and their own revenue generated through fees for annual license, fees for fling application etc. If the SERC's are significantly dependent on state grants for their operations vis-a-vis their ability to generate revenue implies that they are financially dependent on the state government, hence might not be able to undertake independent decisions, and may get be influenced by the decisions of the State Government.

The Jharkhand State Electricity Commission is dependent on the state government funding and the comparison with other states is provide in the table below.

The table below highlights the dependence of state electricity regulatory commission

**Table XII-10: State Government funding as a percentage of income of SERC – Jharkhand compared with other states.**

S. No.	States	State Government funding as a percentage of income of SERC's
1	Haryana	100%
2	Meghalaya	80%
3	Karnataka	72%
4	Manipur and Mizoram	71%
<b>5</b>	<b>Jharkhand</b>	<b>58%</b>
6	Gujarat	0%
7	Maharashtra	0%

## 6.2. STATUS OF IMPORTANT REGULATIONS :

JSERC have notified MYT regulations for distribution and transmission in 2011 and for generation utilities in FY 2012-13 which is the first control period for generation utilities.

**Table XII-11: Status of Important Regulations - Jharkhand.**

States	MYT - Control Period	Control Period No.1
Jharkhand	Generation = First control period, 4 years; Distribution = First control period, 4years; Distribution = First control period, 4years. Submitted on 02.08.2012 for approval.	FY 2012-13 to FY 2015-16

Source: CEA

Jharkhand State Electricity Regulatory commission issued the Jharkhand State Electricity Regulatory Commission (Open Access in Intra-State Transmission & Distribution) Regulations in 2005.

## 6.3. FREQUENCY OF TARIFF REVISIONS:

The tariff revisions in the state have not been frequent over the past several years. The tariff revisions in the state have been approved by regulator in FY 2011-12 The distribution utility in Jharkhand has filled a tariff hike to the tune of 51% in FY 2011-12, and to the tune of 36% In FY 2012-13. However, the tariff hike in was only approved in FY 2011-12.

## 7. SUMMARY

The key aspects of the state are discussed below :-

1. **Power Supply Position:** The power supply position in the state has improved in the recent past; however, this is the situation when state has achieved only 67% of electrification.
2. **Tariff Hikes:** There have been no tariff revisions in the past several years. The tariff revisions in the state have been approved by regulator only FY 2011-12.
3. **Subsidy:** The subsidy burden for the state power sector is very high. It has grown from 14% of total revenues to 24% over span of seven years. The subsidy payout trend has been 100% all over the years.
4. **Past Financial Burden:** Power Bonds were issued in 2004-05 & 2005-06. Outstanding balance in the beginning of 2006-07 was Rs. 2115.32 Cr. The total outstanding balance at the end of 2011-12 was Rs. 846.13 Cr
5. **Financial Restructuring Plan :** The state has adopted for the FRP, and distribution utility of the state is likely to issue bonds to the tune of Rs 2855 Cr. However, seeing the past performance of the distribution utility, the key area of concern for the state is are high AT&C losses and the increasing gap the utility.
6. **High AT&C Losses :** AT&C losses in the state has been very high. The AT&C losses in 2011-12 were around 42% which is significantly higher than the national average. This is due to poor distribution infrastructure, thefts and unmetered consumers are the main reasons for the dismal performance of the utility on the operational side.
7. **Revenues from the sector to the state:** Total Revenue (Rs. 72.91 Cr) from the Power sector is less than the total expenditure on the sector (Rs. ~859 Cr) the expenditure in the sector has increased due to improving capacity addition in the recent past.

**JSEB has consistently been making losses since inception due to very low operating efficiency and its inability to recover costs. As a result, there has been increasing dependence on the State Government for support.**



## XIII KARNATAKA

### 1. INTRODUCTION

#### **1.1. BACKGROUND – POWER SECTOR OVERVIEW**

In 1970, with the establishment of Karnataka Power Corporation Limited, the transmission business was separated from the generation and distribution business, which was carried out by Karnataka Electricity Board (KEB).

The Government of Karnataka initiated the power sector reforms in 1997 with the announcement of reform policy. The policy aimed at attracting private investments, establishing a regulatory mechanism to promote competition, improved operational efficiency and cost reduction, and encouraging energy conservation.

In pursuance of the policy statement, the State Government issued the Karnataka Power Sector Reform Act, 1999, which provided for the establishment of the Karnataka Electricity Regulatory Commission (KERC). The erstwhile KEB was unbundled into Karnataka Power Transmission Corporation Limited (KPTCL) that took over the functions of KEB and a generating company of Vishweshwaraiah Viduyt Nigam Limited (VVNL).

In June 2002 KPTCL was further unbundled into KPTCL (transmission company) and four distribution companies (DISCOMs) namely:

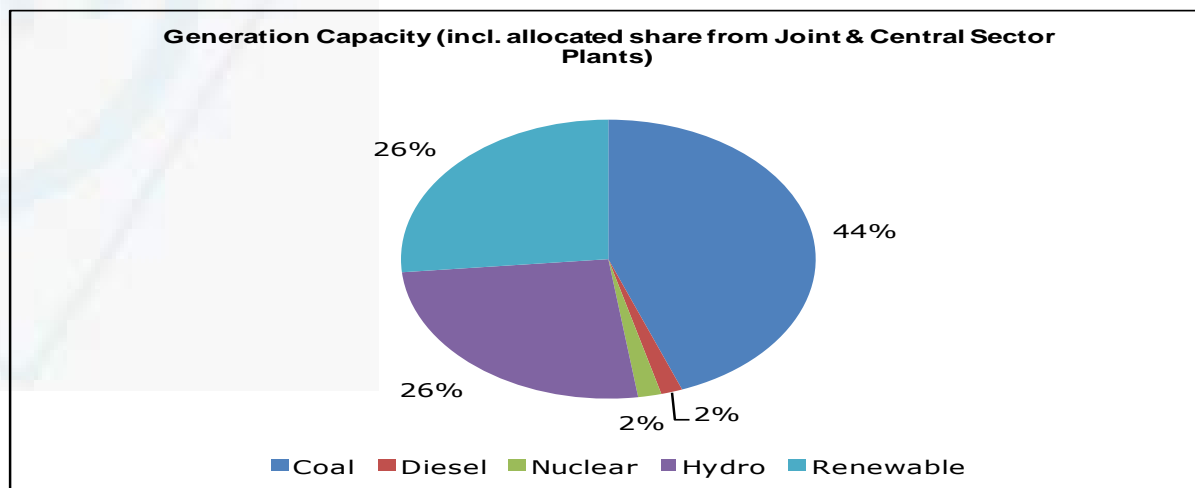
- Bangalore Electricity Supply Company (BESCOM), which took over the city of Bangalore Urban, Bangalore Rural, and four contiguous districts;
- Mangalore Electricity Supply Company (MESCOM) by carving out the Mangalore Zone of the former KEB with ten districts; Subsequently this has been split into two Discoms;
- Gulbarga Electricity Supply Company (GESCOM) with operational responsibility for five districts; and;
- Hubli Electricity Supply Company (HESCOM), with seven districts falling under the Hubli Zone.

Further in 2005, a fifth DISCOM, Chamundeshwari Electricity Supply Corporation Limited (CESC), was carved out of MESCOM and to manage the distribution of electric power for the five districts. The five districts under CESC jurisdiction are Mysore, Chamarajanagar, Mandya, Hassan and Madakeri.

#### **1.2. GENERATION CAPACITY MIX**

The total installed capacity in February 2014 (including allocated share in Joint & Central Sector plants) for Karnataka was 13,997 MW out of which Coal based power capacity accounted for ~44% followed by Hydro (~26%) and Renewable (~26%). Diesel and Nuclear based capacity accounted for a combined share of ~4%.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure XIII-1: Generation Capacity Mix - Karnataka**

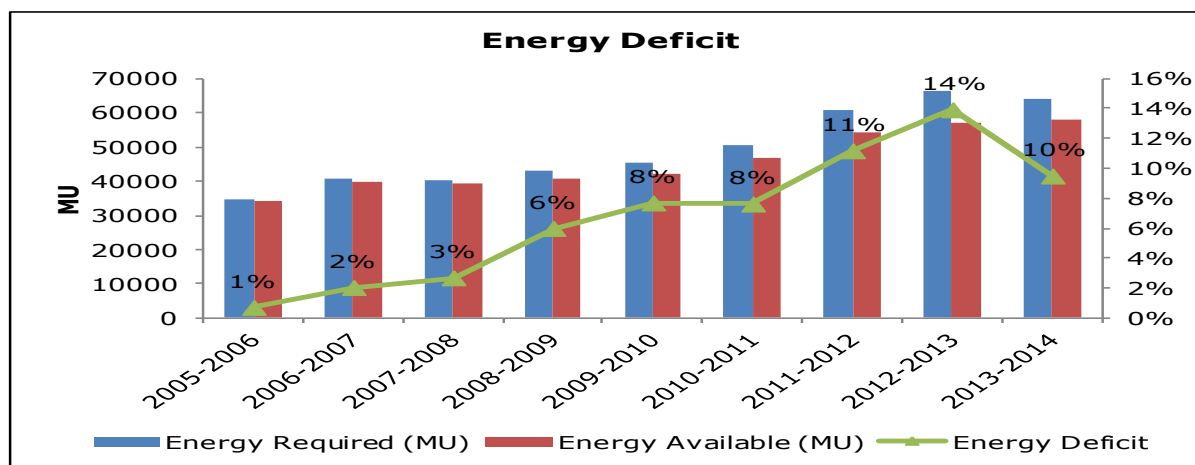
Source: CEA

### 1.3. POWER SUPPLY POSITION

Historically, the state of Karnataka has witnessed high levels of energy and peak deficit, resulting in regular load shedding across most parts of the state. The energy deficit in the state increased from ~1% in FY 06 to ~14% in FY 13. Simultaneously, the peak deficit levels increased from ~7% in FY 06 to ~19% in FY 13. The decreasing PLFs of hydro-based plants due to poor/weak monsoon and limited transmission corridor available between NEW (North Eastern Western) and South grid added with the rapid level of commercialization in the urban pockets of the state increased the deficit levels in the state.

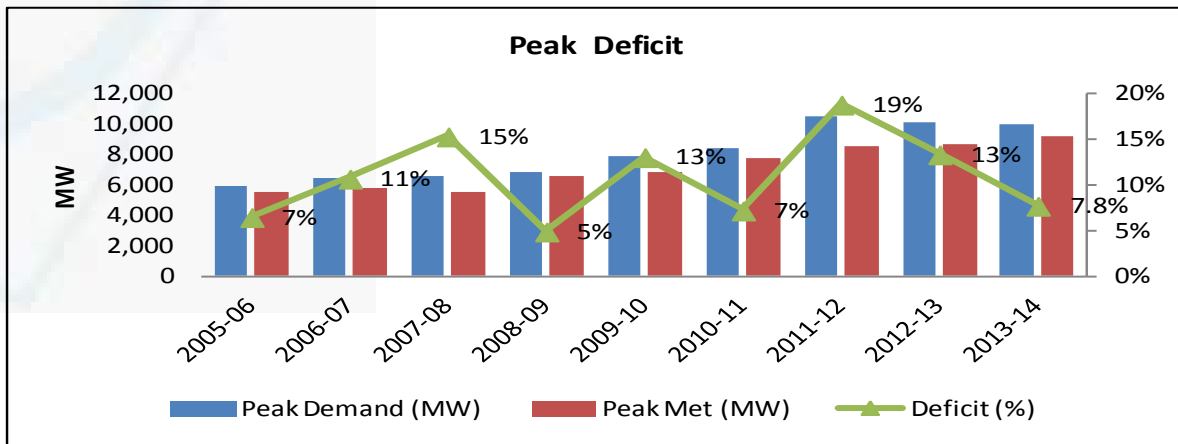
However, with the integration of Southern Grid with the National Grid in January 2014 and coupled with decline in energy demand, the energy and peak deficit is expected to decrease. Energy deficit and peak deficit in FY 2013-14 was 9.5% and 7.8% respectively.

The trend of energy and peak deficits observed in Karnataka over the years is highlighted in the figure below:

**Figure XIII-2: Historical Trend in Energy Deficit - Karnataka**

Source: CEA

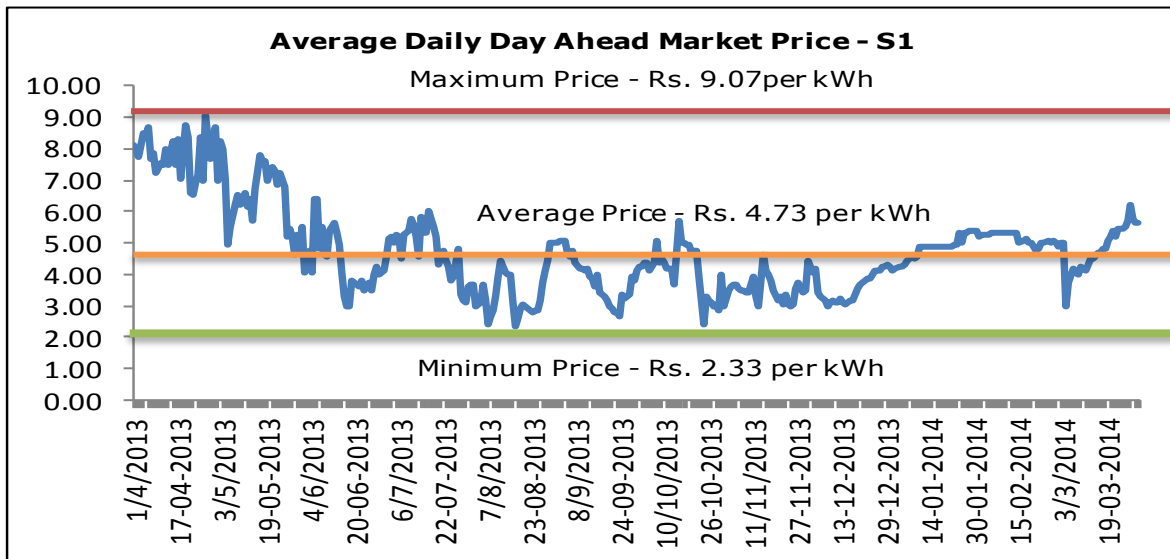
**Figure XIII-3: Historical Trend in Peak Demand and Peak Met - Karnataka**



Source: CEA

Further, the above deficit levels in the state are expected to reduce further in short to medium term, on account of huge stranded capacity and low prevalent prices in the short term market. The figure below presents the average daily short-term prices prevalent in IEX in FY 14.

**Figure XIII-4: Average Daily Short Term Prices IEX – S1 Region (2013-14)**



Source: IEX

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF KARNATAKA

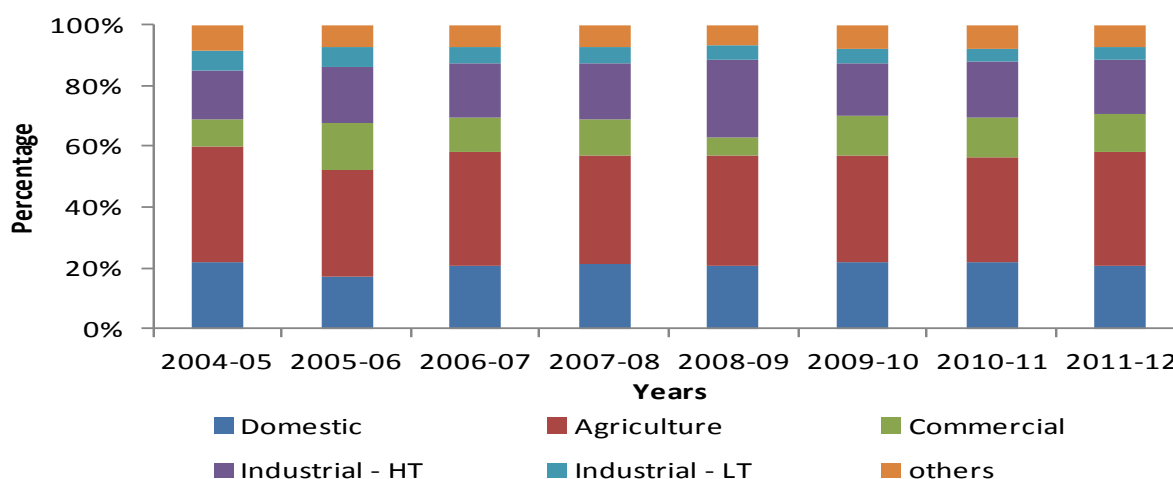
The distribution activity in the state of Karnataka is segregated into five distribution utilities. The state DISCOMs in the state caters to more than 18 million consumers, with ~43% of the consumers served by BESCOM.

In 2011-12, agriculture share dominated the sales mix with a share of 37%, followed by industries (22%) and domestic (21%) consumer categories

The share of agricultural sales have marginally reduced over the years while the share of commercial sales have increased. The share of agricultural sales have reduced from 38% in 2004-05 to 37% in 2011-12 and the commercial sales have increased from 9% in 2004-05 to 13% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XIII-5: Historical Trend Consumer Sales Mix - Karnataka**



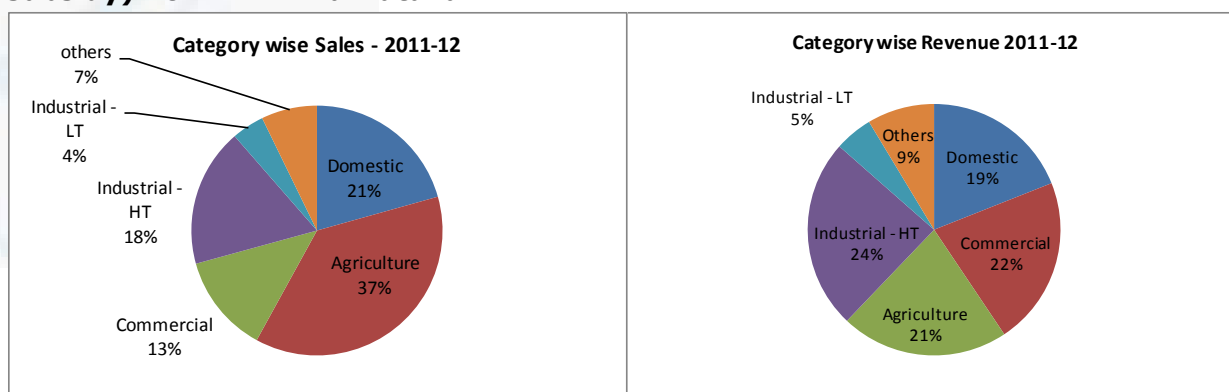
Source: PFC

The overall sales have registered a CAGR of 11% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of 17.2% followed by the industrial (high tension) category with a CAGR of 12.6%.

In terms of revenue contribution, industries contributed ~29% of the revenue, followed by commercial and domestic categories with a share of 22% and 21%, respectively. Although, in 2011-12, agriculture revenue contributed ~21% share to the overall revenue, which was significantly higher than ~10% share in 2009-10. This clearly indicates a significant reduction in both agricultural subsidy and cross-subsidiation from industrial and commercial consumers.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XIII-6: Comparative Analysis Consumer wise Sales and Revenue Mix (w/o subsidy) 2011-12 – Karnataka**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The current levels of Aggregated Technical & Commercial losses (AT&C) for Karnataka distribution utilities are better, compared to the national average. Further, the loss levels in the state have reduced significantly from 34% in FY 05 to 25% in FY 12.

**Table XIII-1: Historical Trend AT&C losses and Collection Efficiency - Karnataka**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	34%	38%	33%	32%	25%	25%	24%	25%
Collection Efficiency (%)	90%	85%	91%	87%	93%	91%	91%	90%

Source: PFC

The loss levels have reduced significantly from FY 09 due to investments in programmes like Rural Load Management System (RLMS), Extensive E&I works, involving re-conducting and augmentation of Distribution Network. The improvement in collection efficiency from FY 09 has further reduced the AT&C loss levels in the state. The box below depicts some of the initiatives undertaken by the state DISCOMs to reduce the distribution losses are:

### Box XIII-1: Initiatives undertaken by state DISCOMs to reduce AT&C losses

1. Balancing of loads on all the three phases in the LT circuit.
2. Upgrading the existing conductors in the HT/LT network.
3. Optimum utilization of transformer capacity by loading them to rated capacity.
4. Replacement of electro-mechanical meters by more accurate ETV meters for power installations.
5. Shifting the transformers to load centers.
6. The meter reading schedules of consumer meters are synchronized with that of DTC meters to arrive at more accurate loss values.
7. Replacing all MNR/faulty meters.
8. Replacement of electro-mechanical and high precision electromechanical meters by ETV meters for power installations.
9. Increase in the vigilance activity.
10. Fixing meters to all DTC s for energy audit purpose.

Source: Approved tariff orders – 2012-13

Further, losses have also reduced due to the investment undertaken in the development of HT lines over the years. HT/LT ratio improved from 0.49 in 2005-06 to 0.53 in 2009-10.

### 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost, accounting for ~83% of the overall distribution costs.

The per-unit cost, break-up for different cost components for the state of Karnataka is provided in the table below:-

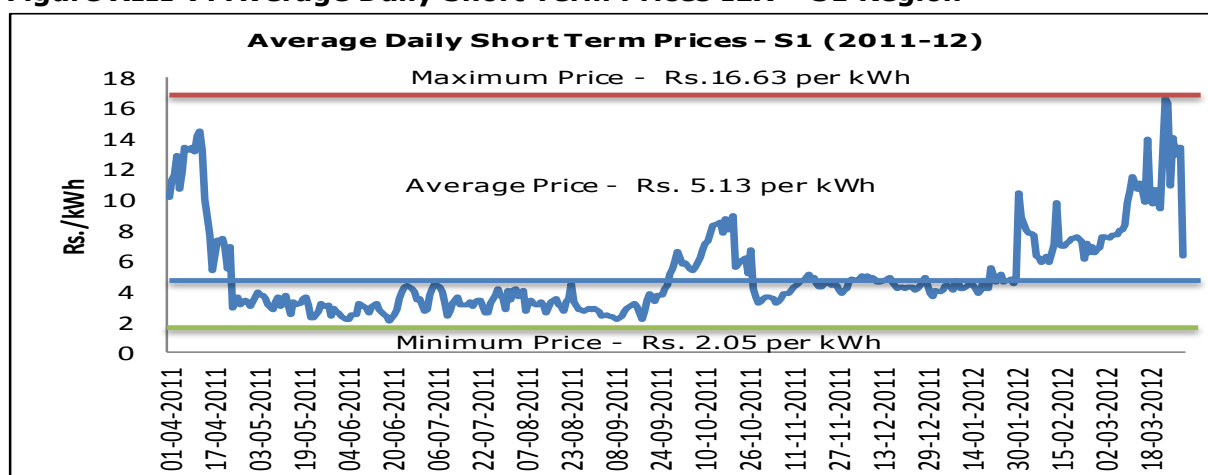
**Table XIII-2: Historical Trend in Distribution Cost Breakup - Karnataka**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	2.16	2.05	2.19	2.36	2.82	2.71	3.04	2.99
O&M (R&M + A&G + EC)	0.28	0.33	0.26	0.31	0.31	0.34	0.37	0.39
Interest	0.04	0.08	0.11	0.14	0.13	0.18	0.19	0.16
Depreciation	0.09	0.09	0.06	0.04	0.05	0.09	0.08	0.09
Other cost	0.03	0.11	0.05	0.09	0.06	0.03	-0.12	-0.01

Source: PFC

The power purchase cost has increased in recent years on account of reduced PLFs of the hydro based generation that constitutes ~26% of the generation capacity. Hence, in order to meet the increasing demand of the state, the state DISCOMs had to procure power from the expensive short-term markets. The figure below illustrates the trend in short-term prices the year 2011-12.

**Figure XIII-7: Average Daily Short Term Prices IEX – S1 Region**

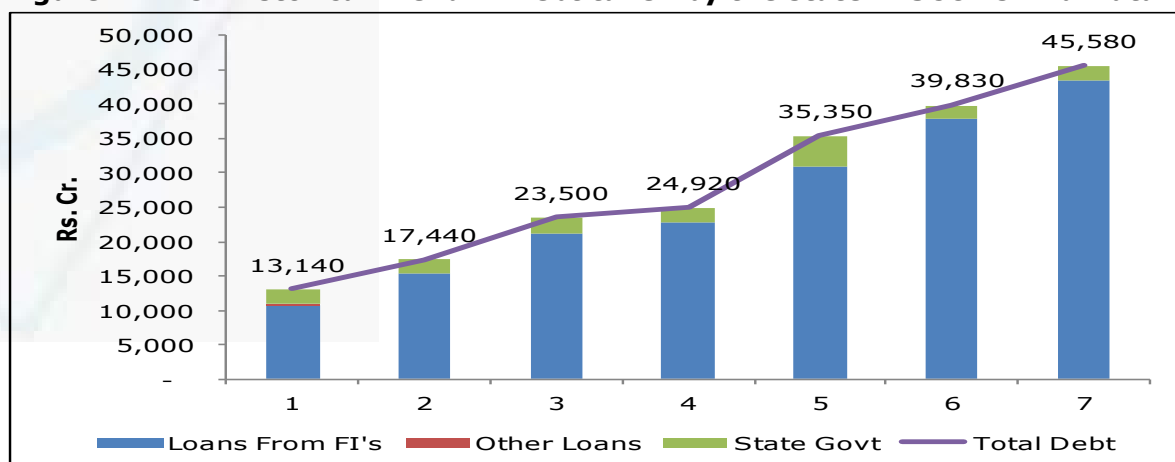


Source: IEX

The year on year trend in the state debt has increased over the years. Further, the average interest rates for debt procurement have increased significantly to 8.79% in FY 11 and FY

12 from 7.31% and 6.65% in FY 08 to FY 10 and FY 06 to FY 07 respectively.<sup>14</sup> The figure below illustrates the year on year trend of debt undertaken by the state DISCOMs.

**Figure XIII-8: Historical Trend in Debt taken by the state DISCOMs– Karnataka**



Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. No tariff hikes were observed for several years (FY 05 to FY 10) and tariffs were increased in FY 11 and FY 12 wherein tariffs were hiked by 4% and 7% respectively.

The table below depicts the average Tariff Realization in Karnataka in Major Consumption Categories

**Table XIII-3: Historical Trend in Consumer Wise Average Revenue Realization - Karnataka**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	3.10	3.67	3.23	3.23	3.24	3.30	3.48	3.86
Agriculture	0.49	0.68	0.59	0.70	0.62	0.95	2.32	2.42
Commercial	6.14	4.61	6.14	6.18	12.63	6.42	6.72	7.14
Industrial HT	4.51	4.60	4.60	4.62	3.26	4.90	5.45	5.73
Industrial LT	4.40	4.60	4.61	4.28	4.29	4.48	4.57	4.89

Source: PFC

Agricultural and Bhagya Jyothi/Kutir Jyothi consumers are being subsidised by the state government and the share of the state government subsidies accounts for ~7% of the total revenues. However, due to low subsidy payout and increasing power purchase costs, the state commission, increased the tariff for the agriculture consumers in FY 11 and FY 12, which earlier were completely subsidized by the state government.

The tariff revisions are not frequent in the state; however, utilities are being provided fuel surcharge through Fuel Adjustment Cost (FAC) as approved by the commission, on account of fuel price variations

<sup>14</sup> Approved MYT FY 08-10 and MYT FY 11-13 for all the state DISCOMs

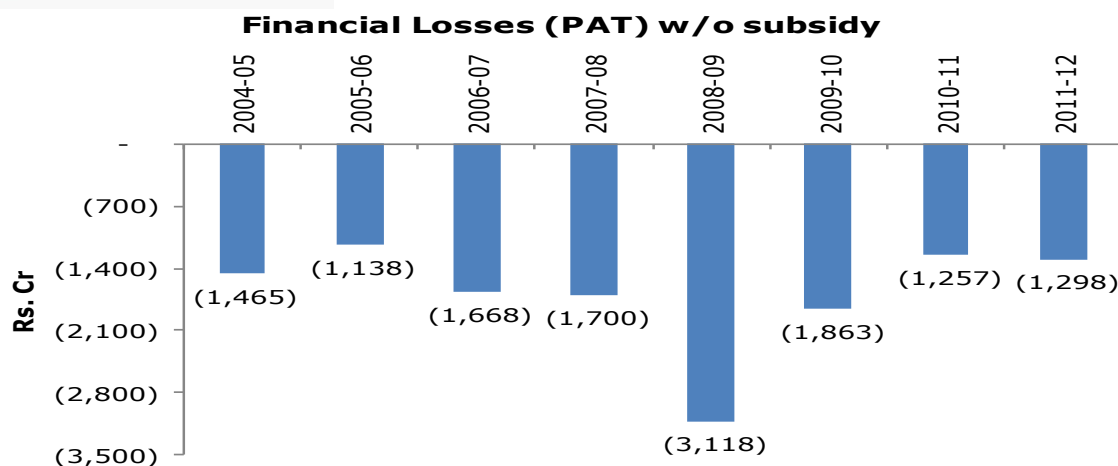
### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Karnataka have increased over the years.

The figure below depicts the year on year trend in the profit/ (loss) booked by the state DISCOMs

**Figure XIII-9: Historical Trend in Financial Losses (w/o subsidy) - Karnataka**



Source: PFC

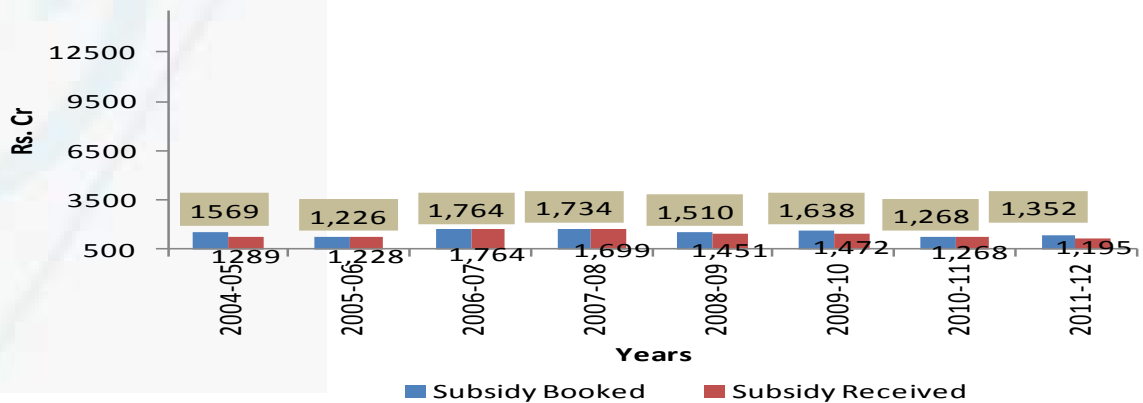
The losses decreased in FY 2011 and FY 12 due to increase in tariff for different categories of consumers. However, low realization of subsidy booked contributed to financial deterioration of the distribution utilities. In 2011-12, the state DISCOMs reported a profit (with subsidy booked) of Rs. 54 Cr.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

In 2011-12, the subsidy contributed ~7% of the total revenues of the state DISCOMs compared to ~19% in 2005-06. The subsidy booked has reported an annual decline of 2% over the span of seven years, compared to the ACS that has registered a CAGR of 5% over the same period. The figure below depicts the year on year trend in subsidies booked and received by the state utility.



**Figure XIII-10: Historical Trend in Subsidy Booked v/s Subsidy Received - Karnataka**



Source: PFC

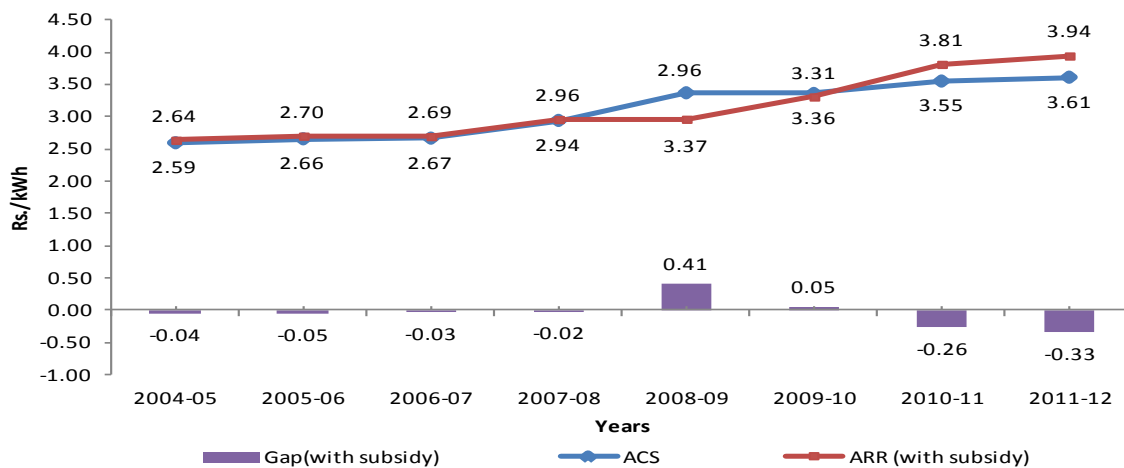
As shown in the figure above, the amount of subsidies booked by the state has decreased significantly over the years. This is primarily on account of implementation of fixed charges to the agricultural category and certain sections of domestic category in FY 11 and FY 12. It can be observed, that in all the years, amount of subsidy realised was less than the amount of subsidy booked for most of the years.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has remained marginal over the years. This is primarily due to the full cost-recovery tariff approach being followed by the Commission.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure XIII-11: Historical Trend in ACS v/s ARR (with subsidy) - Karnataka**



Source: PFC

The revenue gap was extremely high in 2008-09, on account of increase in power purchase cost and no tariff hike in that year.

## 4. STATE EXPEOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~1% of the total tax revenue in the state in 2011-12. The details for the same are provided in the table below:

**Table XIII-4: Tax Revenue from Power Sector - Karnataka**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	679	663	654.24
Total Tax Revenue	37,939	47,979	5,7551.00
Power sector Tax Revenue / Total state Tax Revenue	2%	1%	1%

Source: Audited CAG Reports on state: 2011-12, 2010-11, 2009-10

Over the span of three years, the tax from power sector revenue and contribution to the total state Tax Revenue has decreased.

The non-tax revenue from power sector is through **Royalty/CESS on water for power generation, transmission and distribution, Rural Electrification etc.** The non-tax revenue, which is Rs 5.31 Cr, forms 0.13% of the total non-tax revenues of the state government in 2011-12. The details for the same are provided in the table below.

**Table XIII-5: Non-Tax Revenue from Power Sector - Karnataka**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	60	48	5.31
Total Non-Tax Revenue	3,334	3,358	4,086.86
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	2%	1%	0.13%

Source: Audited CAG Reports on state: 2011-12, 2010-11, 2009-10

The Non tax Revenue and the sector contribution in the total state non tax revenue has decreased over the span of three years over the years.

### 4.2. EXPENDITURE ON POWER SECTOR

The details of the expenditure made on the power sector by the state are provided in the table below:

**Table XIII-6: Expenditure on Power Sector - Karnataka**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	1,750	1,381	1,081.64
Revenue Expenditure	2,352	4,460	5,326.07
Total Expenditure	4,103	5,841	6,407.71

Source: Audited CAG Reports on state: 2011-12, 2010-11, 2009-10

There has been an increase in the revenue expenditure since FY10 whereas the capital Expenditure on the sector has declined. the overall expenditure on power sector has increased since FY10.

Further, it can be observed that the state power sector is dependent on state government subsidies to carry out its operations, as the revenue expenditure far exceeded the revenue from tax and non-tax exceeded the revenue.

The expenditure on power sector has been more than the revenues generated from the sector over the years.

#### **4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table XIII-7: Guarantees as a Percentage of Total Revenues - Karnataka**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	469	330	260.00
Total Revenues of the State	41,272	51,338	61,638
Guarantees as a %age of Total Revenues of State	1.14%	0.64%	0.42%

Source: Audited CAG Reports on state: 2011-12, 2010-11, 2009-10

Over the span of three years, the guarantees given to the Power sector has decreased. The state government guarantees constituted a marginal ~0.42% of the overall state revenue in 2011-12.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XIII-8: Breakup of Utility wise Guarantee (2011-12) - Karnataka**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Karnataka Power Corporation Limited	323	181	110.00	58%
Hubli Electricity Company Limited	0	77	150.00	21%
Karnataka Power Transmission Corporation Limited	147	72	0	21%

Source: Audited CAG Reports on state: 2011-12, 2010-11, 2009-10

Over the span of three years Karnataka Power Corporation Limited accounted for an aggregate share of 58% of the state revenues. The guarantee assistance to Hubli Electricity Company Limited has increased since FY10.

### **Subsidy**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table XIII-9: Power Sector Subsidy as a Percentage of overall subsidy (2011-12) - Karnataka**

Utility	2009-10	2010-11	2011-12
Rs Cr			
Power Sector subsidy/ Total Subsidy	2,341	4,442	5,303

Source: Audited CAG Reports on state: 2011-12

The power sector received ~68% of the overall subsidy given by the state government over the span of three years. In 2011-12, ~ Rs 1,195 Cr (subsidy received), is directed towards the state DISCOMs to cover the under-recovery and losses by the state DISCOMs.

## **4.4. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XIII-10: Power Sector Financing Requirement (2011-12) – Karnataka**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	6407.71.07
Loans And Advances made by the State Government (Net of Recoveries)	21.07
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Recoveries)	1.92
Total Power Sector Financing during the year	6430.70
Sector Financing Requirement as a % age of total revenues of state	10.43%
GSDP nominal (Rs lakhs)	286410.00
Sector Financing Requirement as a % age of GSDP	2.25%
Financial Profit/(Loss) of Discoms during the year (with Subsidy Realised)	(103)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	10.6%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	2.28%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

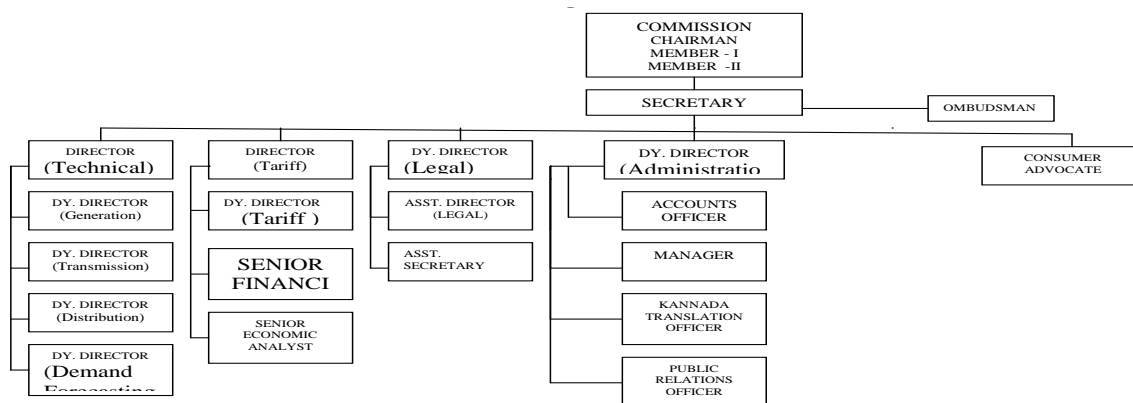
The financing requirement for the Power sector in the state was estimated at 10.43% of the revenue generated by the state and 2.25% of the Gross State Domestic Product. However, the financial losses of DISCOMs in 2011-12, increased the financing requirement of the sector to 10.6% of the State revenue and 2.28 % of the GSDP.

## 5. REGULATORY EFFECTIVENESS

In accordance with the provisions of the Karnataka Electricity Reform Act 1999, the Karnataka Electricity Regulatory Commission was established in 1999 and began functioning from 15<sup>th</sup> November 1999.

The figure below presents the current organization structure of KERC.

**Figure XIII-12: Organization Structure - KERC**



Source: KERC Annual Report

### 5.1. BUDGETING

The state regulatory commission, KERC, is dependent on state government grants and subsidies to carry out its operations. In 2011-12, state government provided a grant of Rs 4.08 Cr to the commission. The commission generated ~Rs. 1.54 Cr from application, licence fee. Hence, grants constitute ~72% of the overall revenue of the state commission. Further, the surplus of ~1.59 Cr was deposited in personal deposit account of the treasurer.

### 5.2. STAFFING<sup>15</sup>

The office of the Commission consists of permanent employees besides officials on deputation and on contract basis. The total working strength of the Commission as at the end of the financial year 2011-12 is 50.

In 2011-12, the commission consisted of:

- 4 permanent employees
- 20 Officials on deputation basis
- 23 Officials on contract basis, and;

<sup>15</sup> KERC Annual Report 2011-12

- 03 Consultants on contract basis

Another important aspect that needs to be considered is that 92% of the staff especially the technical staff is on deputation or on contract basis. Deputation is generally done from another government department or from the utility itself, which again limits the true independence of the staff of SERC's.

### 5.3. MYT REGULATION

The MYT has been implemented for the third control period. The commission had selected a control period of three years for all the three MYTs. The state utilities have shown improvement in operational and financial parameters (viz. reduction in AT&C losses, higher revenue realization through regular tariff increase, reduction in revenue gap) through implementation of the MYT framework.

### 5.4. TARIFF REVISION

The tariff revision in the state has been very sporadic. The state did not revise tariff from FY 06 to FY 10. The tariff has increased regularly from FY 11 to FY 13. The tariff revision strategy has supported the DISCOMs to significantly reduce the distribution losses during the same period. The table below depicts the historical trend in tariff revision in the state.

**Table XIII-11: Historical Trend in Tariff Revision - Karnataka**

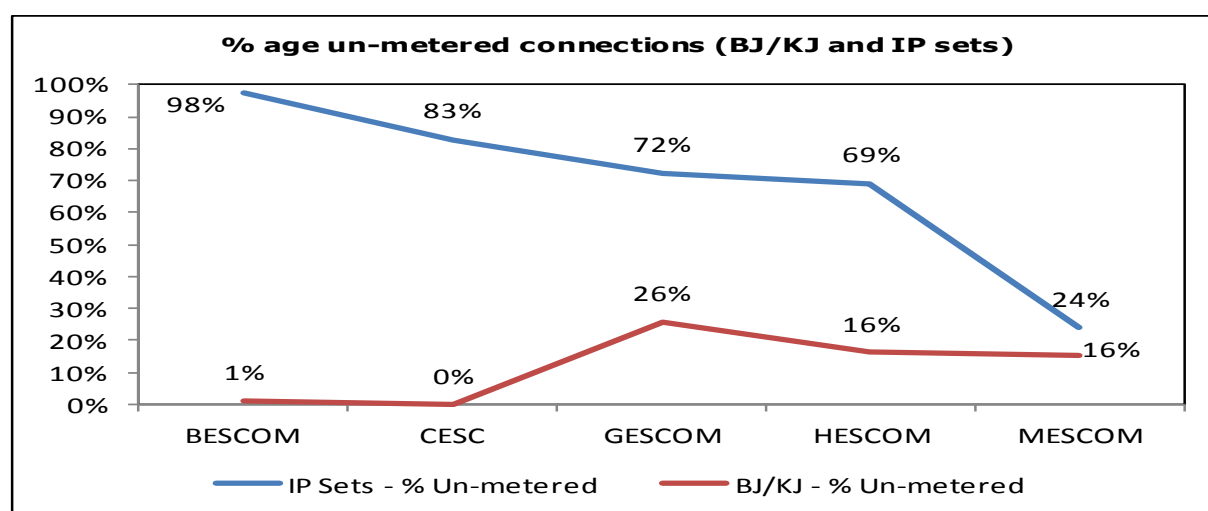
	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
Average Tariff Revisions	0%	0%	0%	0%	0%	4%	7%	3%

Source: Approved Tariff Orders of DISCOM for that year

### 5.5. LEVEL OF METERING

The two major consumer segments that continue to be unmetered by the state DISCOMs are BJ/KJ consumers (urban and rural BPL consumers) and agriculture consumers. In the year 2011-12, ~76% and ~13% of the agriculture and BJ/KJ consumers were unmetered. The figure below presents the DISCOM wise percentage of unmetered connections for the above two categories.

**Figure XIII-13: Percentage unmetered consumers in 2011-12 - Karnataka**



Source: Annual Report of DISCOMs.

### 5.5.1. AGRICULTURE METERING

The state commission has approved a consumption norm for the irrigation pump (IP) sets derived by the actual consumption per IP set as indicated in the monthly reports furnished by state distribution utilities up to December of the financial year.

**Table XIII-12: Agriculture Consumption Norm**

DISCOM	Weighted Average Consumption Norm
BESCOM	7534 units/installation/year
CESC	8613 units/installation/year
GESCOM	9708 units/installation/year
HESCOM	8210 units/installation/year
MESCOM	3916 units/installation/year

Source: Approved Tariff Order 2012-13 for the respective DISCOMs

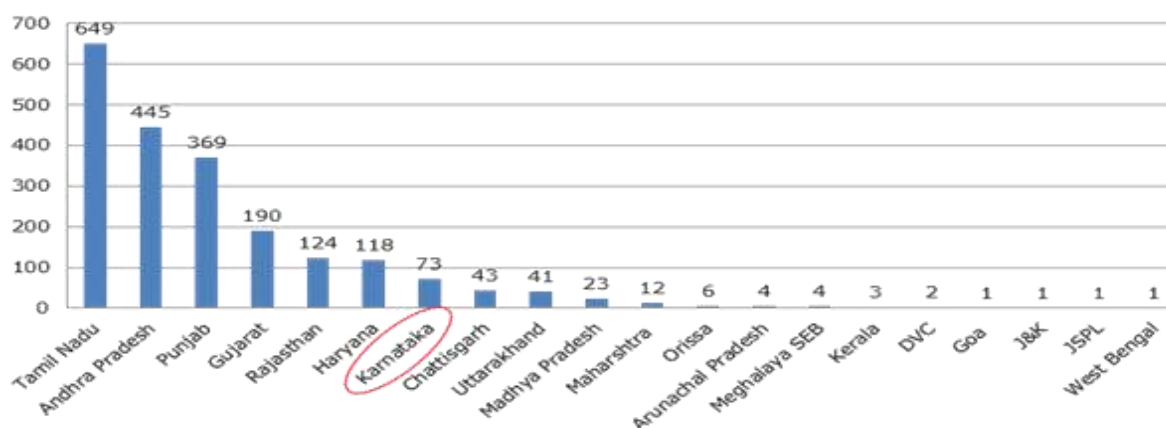
The consumption has been projected for 6 hours, three phase supply to the irrigation pump sets.

### 5.6. OPEN ACCESS

Open access regulations were issued by KERC 2004 as 'Open Access Regulations, 2004'. Further amendments on the regulations allowed open access to the High Tension consumers in the state. In accordance with the Act, OA is permitted both at Central and State level involving CTU and STU networks. Seeking access to the above requires allocation of transmission capacity for the required volume to be transferred from an injecting location to a drawee location. This access to network has been classified into two broad categories namely Inter-state and Intra-State

The tariff and non-tariff barriers in the form of banking charge, levy withdraw and again levy of cross subsidy surcharge, different commercial arrangement having different technical requirement in terms of Meters, Feeder lines, scheduling restrictions etc., creates an atmosphere of uncertainty and hence limit entry of investors. The impact of above limitations, barriers and power deficit situation is evident from the fact that the State has poor participation in terms of listed OA consumers on IEX

**Figure XIII-14: Open Access Consumers - Karnataka**



Source: IEX



## 6. SUMMARY

- 1. Demand Supply Gap:** The deficit levels in the state have been on the higher side, resulting in load shedding for various consumer categories in the state. However, with the integration of Southern Grid with the NEW grid, the deficit levels are expected to reduce.
- 2. Level of Metering:** The distribution utilities cater to high percentage share of unmetered agriculture consumers. This has resulted in incorrect demand estimates for the consumer categories.
- 3. Reduction in AT&C Loss Levels:** As noted by the state commission, the state DISCOMs have successfully been able to attain the set AT&C loss targets. The implementation of RAPDRP programme along with improved metering in the state has led to overall reduction of the AT&C losses in the state.
- 4. Subsidy:** The agriculture and certain categories of domestic consumers are subsidized the state government. The level of subsidy has reduced in FY 11 and FY 12, with tariff increase for the above tow consumer categories. Further, the tariff for agriculture consumers is one of the highest in the country.
- 5. Marginal Financial Gap:** Financial gap is marginal, on account of subsidy received from the state government, indicating an effective financial management by the state DISCOMs.
- 6. Regulatory Effectiveness:** Although, the state has been able to implement the policy reforms initiated over the last decade, the impact of the reforms have been limited. Although, the state utilities have improved the operational and financial parameters, viz. reduction in AT&C loss level, reduction in financial gap, the state utilities continues to face the difficulty of high percentage share of agriculture un-metered connections. Further, the level of privatization in the state has been limited to the generation sector.

**The sector operations pose a low risk on state finances, because of the recently adopted strategy of better recovery from agriculture customers.**

## XIV KERALA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Kerala is a leading agricultural state in the country and the largest producer of rubber, pepper, coconut and coir. In 2011–12, the state contributed 87.3 per cent and 79.1 per cent to India's total rubber and pepper production, respectively.

The state's gross state domestic product (GSDP) rose at a compound annual growth rate (CAGR) of 13.8 per cent between 2004–05 and 2011–12. Karnataka has a wide range of fiscal and policy incentives for businesses under the Industrial and Commercial Policy and has well-drafted sector-specific policies. Besides, it has a well-developed social, physical and industrial infrastructure and virtual connectivity, as well as good power, airport, IT and port infrastructure.

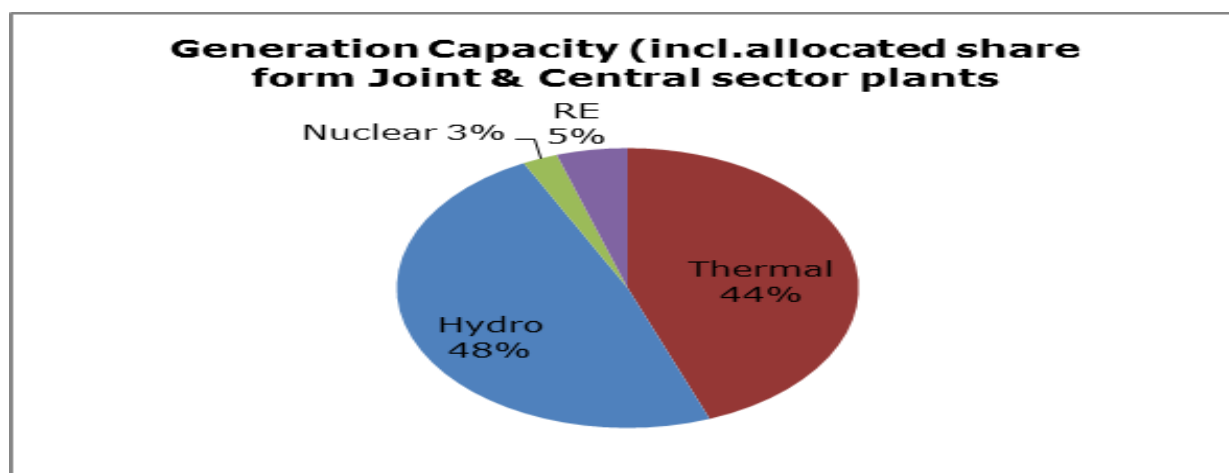
The Power sector in Kerala is yet to be unbundled and still functions as a vertically integrated entity, however, the utility is operationally efficient have over the years have remained profitable.

#### 1.2. UNDER THE KERALA STATE ELECTRICITY BOARD GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Kerala was ~3891 MW. It has grown by mere 1% from Feb 2013 from the level of 3,853 MW. Out of total capacity as on Feb 2014, hydro based power capacity accounted for ~48% followed by thermal which included Coal, Gas & Diesel (44%) and renewable energy (~5%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XIV-1: Generation Capacity Mix as on Feb 2014 – Kerala**



Source: CEA

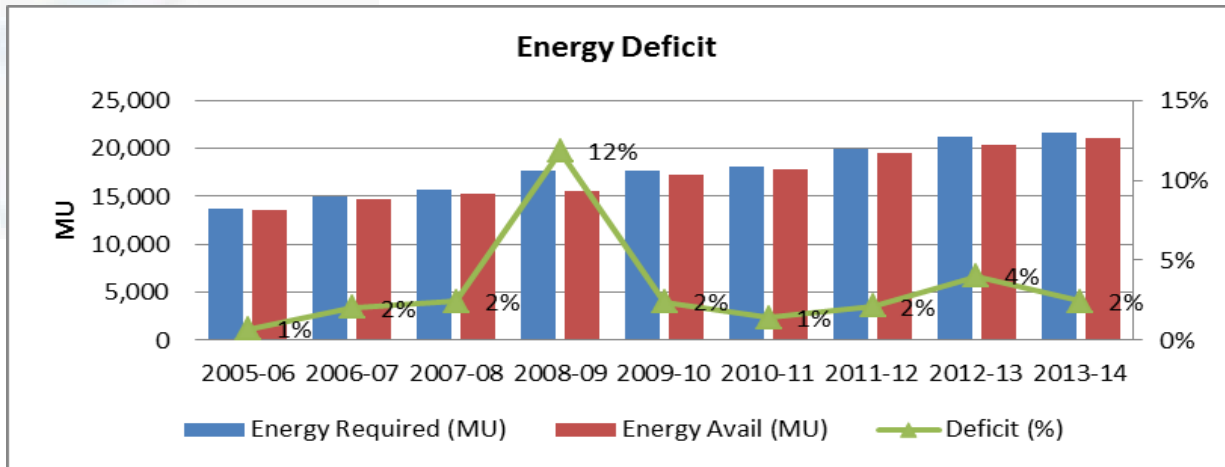
#### 1.3. POWER SUPPLY POSITION

The energy deficits in Kerala have remained in the range from 1% to 4% over the span of nine years except in FY 2008-09, when it was highest (12%). The energy deficit in FY 2013-14 was 2%. The peak deficit in Kerala has reduced from 14% in FY 2008-09 to 2%

in FY 2013-14. The energy demand and energy availability in the state has both grown at a CAGR of 6% in the state.

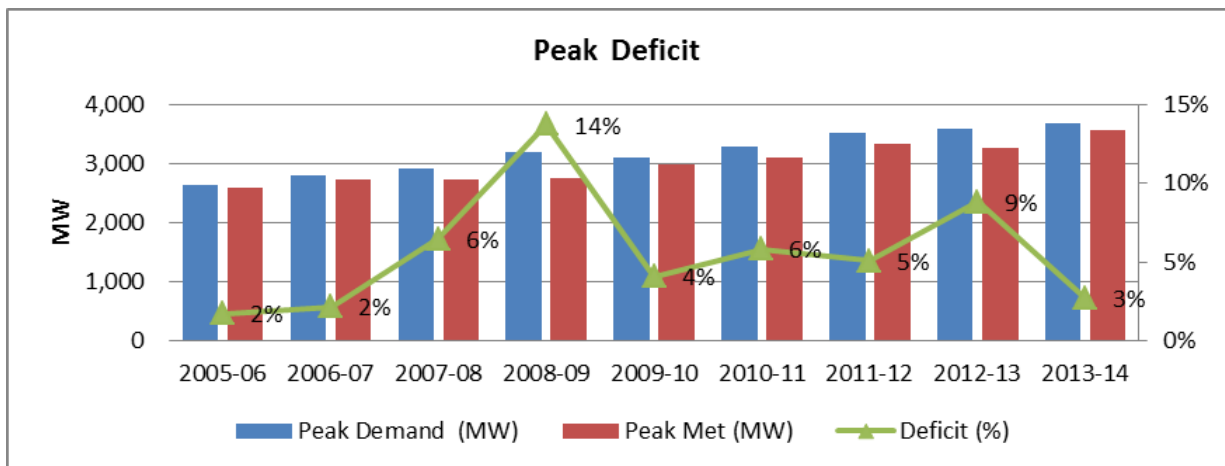
The trend of energy and peak deficit observed in Himachal Pradesh over the years is highlighted in the figure below:

**Figure XIV-2: Energy Deficit – Kerala**



Source: CEA

**Figure XIV-3: Peak Deficit –Kerala**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF KERALA

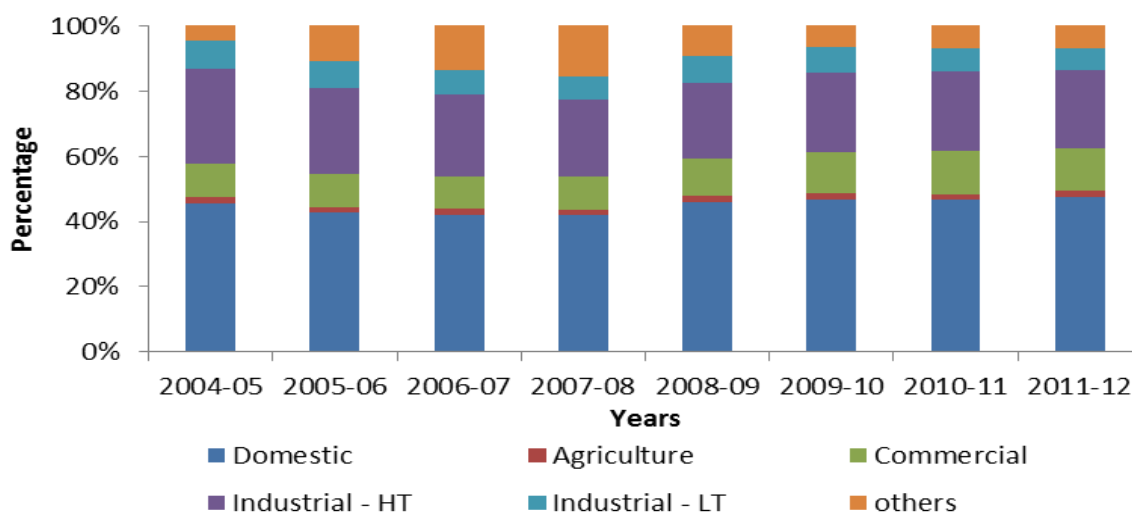
Kerala State Electricity Board Limited (KSEB) is the sole company responsible for the distribution and supply of electricity in the state.

In 2011-12, domestic sales dominated the consumer sales mix with a share of ~47%, followed by industrial HT (~24%) and Commercial (13%). The other and agricultural sales accounted for ~6.9% and 1.8% of sales mix.

The share of domestic sales have reduced from 45% in FY 2004-05 to 47% in FY 2011-12, the domestic sales have registered a sales growth 8.8%.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XIV-4: Historical Trend in Consumer Sales Mix – Kerala**



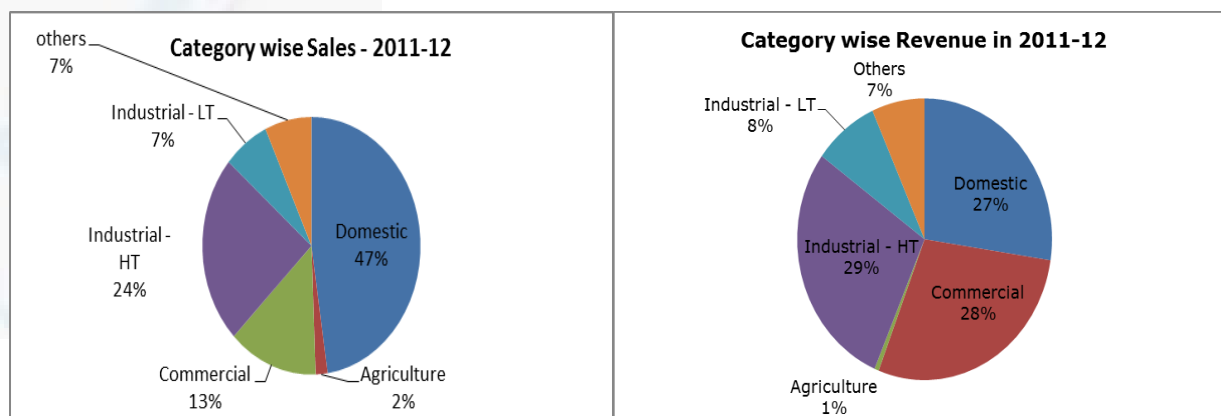
Source: PFC

The overall sales have registered a CAGR of 8% over the span of eight years and the commercial sales have registered the CAGR of 12.3%, and is highest among all the consumer categories.

In terms of revenue contribution, industrial consumer accounted to 29% of revenue, followed by commercial (28%), domestic (27%) and others (7%).

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XIV-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 – Kerala**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) Losses in Kerala have improved over the years. The AT&C loss in FY 2011-12 was 12.2% which was 32% in FY 2004-05, and is among the lowest in the country. The collection efficiency in the state has also improved since FY 2009-10, the collection efficiency has remained in the range of 97% to 99%.

**Table XIV-1: Year on Year Trend in AT&C losses and Collection Efficiency – Kerala**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	32%	23.6%	23.3%	21.5%	21.6%	14.9%	14.1%	12.2%
Collection Efficiency	92%	96%	95%	95%	93%	98%	97%	99%

Source: PFC

The state has achieved low AT&C losses given the following efforts:

- **Faulty meter replacement:** KSEB had replaced 10.21 lakhs faulty meters during the year 2009-10 and 7.10 lakhs faulty meters during the year 2010-11 with good quality meters.
- **Expanding HT Lines** KSEB has added 3398 km of 11 kV lines and 7837 km of LT lines during the year 2009-10. Further, KSEB has added 3644 km of 11kV lines and 6978.69km of LT lines during the year 2010-11.

However, the distribution utility in Kerala is now finding it difficult to improve its HT/LT ratio. According to KSEB, the T&D loss level is 16.09% for the year 2010-11 and further loss reduction can be achieved mainly through improving HT-LT ratio. But due to public resistance to drawing of HT lines, procuring land for installing substations and transformer points etc, KSEB is facing difficulties in improving the HT-LT ratio further.

## 2.3. TRENDS IN DISTRIBUTION COST

The major cost component of distribution cost in Kerala in FY 12 was power purchase cost, which accounted for 57% share in the total cost, followed by O&M (29%), the high O&M cost is due the fact that distribution utility in Kerala is also responsible for the generation assets of the state.

The per-unit cost, break-up for different cost components for the state of Kerala is provided in the table below:-

**Table XIV-2: Year on Year Trend Distribution Cost Breakup – Kerala**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	0.99	1.15	1.20	1.72	2.70	2.58	2.92	3.49
O&M (R&M + A&G + EC)	0.62	0.77	0.33	0.90	1.15	1.30	1.59	1.78
Interest	0.37	0.39	0.29	0.26	0.25	0.18	0.20	0.25
Depreciation	0.25	0.29	0.30	0.34	0.34	0.34	0.37	0.37
Other cost	0.13	0.20	1.07	0.87	0.20	0.30	0.16	0.28

Source: PFC

The power purchase cost in the state in FY 2011-12, was Rs 3.49 per unit, which is less compared to other states in India as the state is rich in procurement from Hydro based generation. The power purchase cost and the generation cost has been increasing over the years, due to increase in the cost of thermal sources.

## 2.4. REVENUE REALIZATION

The tariff realization in the state is for different consumer categories is low, and is not commensurate with the increasing distribution cost. The state did not have any tariff revisions from the past several years hence; the tariff realization is low in the state.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XIV-3: Historical Trend Consumer Category Wise Revenue Realization – Kerala**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.76	1.71	1.67	1.72	1.92	1.83	1.98	1.99
Agriculture	0.99	1.00	1.05	1.04	1.33	1.09	1.16	1.08
Commercial	6.69	6.62	6.61	6.68	7.44	7.46	7.23	7.44
Industrial HT	3.92	3.91	3.94	4.01	4.80	4.14	4.25	4.18
Industrial LT	4.15	4.14	4.14	4.15	4.60	4.09	4.38	4.20
Others	2.40	2.80	4.12	5.44	5.83	3.52	4.24	3.34

Source: PFC

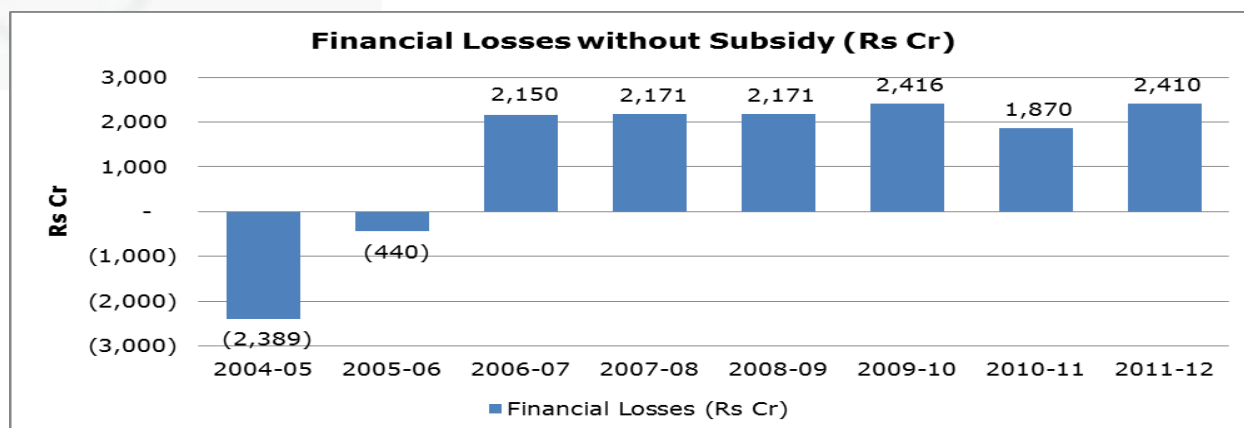
It can be inferred from the above table that the domestic category in the state is being cross subsidised with the industrial and commercial consumers. However, with the efficient performance of the state distribution utility, the state financial performance has improved over the years.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses (without subsidies) of the distribution utility has improved over the years, given the efficient operations of the distribution utility in Kerala. The utility has shown a profit of Rs 2150 Cr in FY 2006-07, which has increased to Rs 2410 Cr in FY 2011-12.

**Figure XIV-6: Historical Trend Financial Losses (w/o) subsidies – Kerala**



Source: PFC

The distribution utility in Kerala has shown an average profit margin of 4% over the span of six years.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The subsidy burden has remained negligible from past five years i.e. from the period of FY 08 to FY 12 as per PFC data. However, the GoK have been providing subsidies, as per the CAG accounts of the state<sup>16</sup>. The subsidies booked in FY 05 were Rs 343 cr and Rs 145 Cr in FY 06, however, the subsidy realized were nil in the respective years. In FY 2010-11 the utility has received a subsidy of Rs 54 Cr.

The figure below provides the subsidy booked v/s subsidy received for the distribution utilities in the state

**Table XIV-4: Historical Trend Subsidies Booked v/s Subsidies Received – Kerala**

	2004 -05	2005 -06	2006 -07	2007 -08	2008 -09	2009 -10	2010 -11	2011 -12
Subsidy Booked (Rs Cr)	343	145	0	0	0	0	54	0
Subsidy Received (Rs Cr)	-	0	0	0	0	0	54	0

Source: PFC

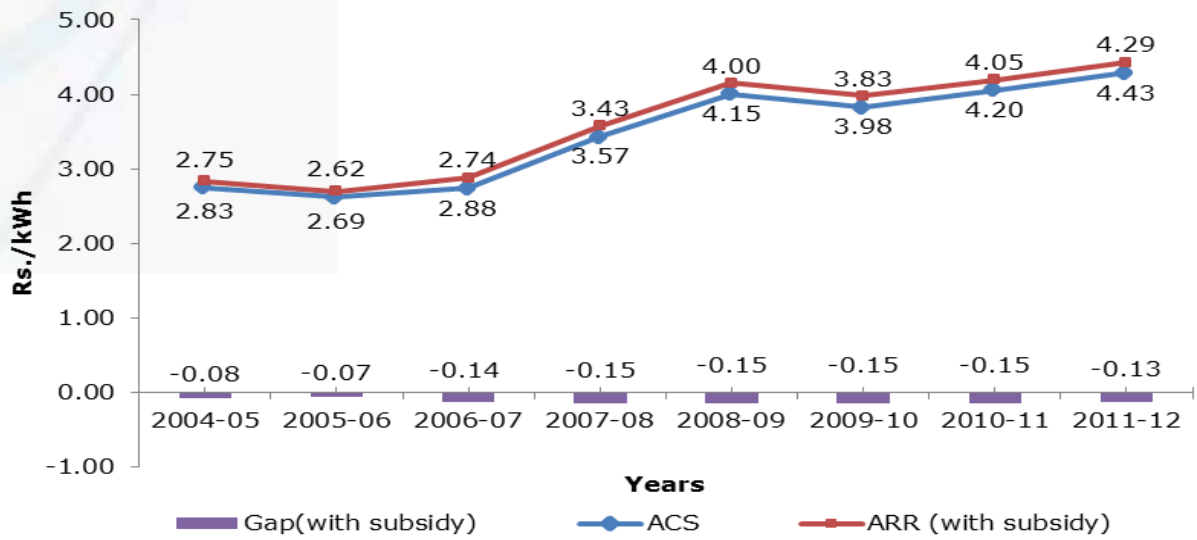
The trend in subsidy pay-out with respect to the subsidy booked has been poor in the state.

<sup>16</sup> Have been discussed in the subsequent chapter

### 3.3. ACS v/s ARR

The utility is profitable (with subsidies) and have shown no gaps over the period of assessment.

**Figure XIV-7: Historical Trend ACS v/s ARR (with subsidy) – Kerala**



Source: PFC



## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms less than 1% of the total tax revenue. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details for the same are provided in the table below.

**Table XIV-5: Tax Revenue from Power Sector – Kerala**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	25	21	21
Total Tax Revenue	22,024	26,864	31,709
Power sector Tax Revenue / Total state Tax Revenue	0.11%	0.08%	0.07%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The tax revenue from the power sector has decreased over the years. The contribution of tax revenue from sector in total state tax revenue has been less than 1% since FY10.

**The power sector did not generate any non tax revenue over the years.**

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table XIV-6: Expenditure on Power Sector – Kerala**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	0	8	0.05
Revenue Expenditure	69	134	98
Total Power Sector Expenditure	69	142	98

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Revenue expenditure has formed the major portion of total expenditure on Power sector. The variations in expenditure have been on account of variation in expenditure towards Non conventional energy sources and the general expenditure.

**The quantum of expenditure towards power has been more than the quantum of revenue generated from power sector.**

#### 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table XIV-7: Guarantees as a Percentage of Total Revenues – Kerala**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	253	168	120
Total Revenues of the State	23,876	28,794	34,301
Guarantees as a %age of Total Revenues of State	1.06%	1%	0.35%

Source: CAG Audited Accounts for the state – 2011-12

The guarantees towards power sector in Kerala has accounted for a share of ~1% of the state revenues over the years. There has been a significant decrease in the guarantees given to the Power sector over the years i.e. 1.06% in FY2010 to 0.35% in FY2012.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XIV-8: Utility wise Breakup of Guarantees– Kerala**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
KSEB	0	168	120	99%
Bond issue	253	0	0	1%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Guarantees towards KSEB accounted for a major share in total sector guarantees i.e. 99% over the span of three years.

#### Subsidy

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years  
**Table XIV-9: Utility wise Breakup of Guarantees – Kerala**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
				Rs Cr
KSEB towards Power Tariff Concessions	0	100	55	97%
New and Renewable Energy	0.6	1	3	3%
Power Sector subsidy (% of total subsidy)	0.6	101	58	8%

Source: CAG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

KSEB accounted for a share of 97% in the subsidy payments made towards Power sector over the span of three years. The power sector accounted for aggregate share of 8% in total state subsidy.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 230 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is calculated by a summation of the total Expenditure of the state government on the sector including Capital and Revenue expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid(Net of Receipts) by the State Government.*

**Table XIV-10: Financing Requirement of Power Sector (2011-12) – Kerala**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	98
Loans And Advances made by the State Government (Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	116
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.07

Total Power Sector Financing during the year	214
Sector Financing Requirement as a % age of total revenues of state	1%
GSDP nominal	210107
Sector Financing Requirement as a % age of GSDP	0.13%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	241
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	0.08%
Sector Financing Requirement as a % age of GSDP including financial losses	(0.01)%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated to be 1% of the revenue generated by the state and 0.13 % of the Gross State Domestic Product. Considering, the financial profits of Discoms in the year, the financing requirement of the sector decreases to 0.08% of the State revenue and 0.01 % of the GSDP

The relatively low financing requirement of the sector along with Discom profit reflects the competent financial performance of state utility. The quantum of expenditure substantially exceeds the revenue generation. Hence, the contribution of the sector to state revenue is very low despite the good performance. Therefore the power sector must take measure to increase the productivity of the sector.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Kerala Electricity Regulatory Commission (KERC) constituted under the Electricity Regulatory Commission Act, 1998 came into being in 2002. The state regulator has been proactive in determining the retail tariff by issuing tariff order since 2003.

Some of the key aspects have been discussed below: -

### **5.1. STATUS OF IMPORTANT REGULATIONS**

KERC has approved the Multi Year Regulations in 2006, however, the KSEB has failed to comply with the MYT regulations and have not filed MYT tariff petition with the KSERC. The Commission is of the opinion that, filing of MYT petition need not be insisted as the Board as it is still functioning as a single entity. The same has to be filed once the KSEB completes the unbundling process. The state has approved the Open Access Regulations and has determined the Cross Subsidy Surcharge.

### **5.2. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions in the state have not happened for the past several years, until FY 2012-13 where the tariff revisions have been approved to the tune of 24%. Though the state is in profitable position however, going forward with the increase in employee and power purchase cost, the tariff revisions are must for the state.

## 6. SUMMARY

The key aspects of the state are discussed below;-

- 1. Low AT&C Losses:** The state AT&C & T&D losses are among the lowest in the country. The AT&C loss in the state in FY 2011-12 was ~12%.
- 2. Inadequate Tariff Revisions:** The tariff revisions were done in FY 2012-13 after a gap of several years wherein tariffs were hiked to the tune of 24%. However, the tariff revisions in the state have not been commensurate with the increase in the distribution cost, but operational efficiencies of the utility have kept financial position of utility healthy.
- 3. Financial Health of Utility:** The financial losses (without subsidies) of the distribution utility has improved over the years, given the efficient operations of the distribution utility in Kerala. The utility has shown a profit of Rs 2150 Cr in FY 2006-07, which has increased to Rs 2410 Cr in FY 2011-12, with a profit margin of 4% over a span of six years.
- 4. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 1% of the revenue generated by the state and 0.13 % of the Gross State Domestic Product. Considering, the financial profits of Discoms in the year, the financing requirement of the sector decreases to 0.08% of the State revenue and 0.01 % of the GSDP

## XV MADHYA PRADESH

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The State of Madhya Pradesh is located in the central India. The state has an agrarian economy. The state has the largest reserves of diamond and copper in India. Other major mineral reserves include those of coal and coal-bed methane.

The Government of Madhya Pradesh initiated power sector reforms in the year 1999 by establishing State Electricity Regulatory Commission and subsequently enacting Madhya Pradesh Vidyut Sudhar Adhiniyam 2000. This Act provided for unbundling of the state electricity board into: Madhya Pradesh Power Generating Company Limited (MPPGCL), responsible for Thermal & Hydro generation; Madhya Pradesh Power Transmission Company Limited (MPPTCL), responsible for transmission business; Madhya Pradesh Poorv Ksherta Vidyut Vitran Company Limited (MPPKVVCL), Madhya Pradesh Madhya Kshetra Vidyut Vitran Company Limited (MPMKVVCL), Madhya Pradesh Paschim Vidyut Vitran Company Limited (MPPKVVCL) for undertaking distribution eastern, central and western part of the state. Before these Companies could be registered Chhattisgarh was carved out of Madhya Pradesh in November 2000 and the generation, transmission, and distribution assets located in Chhattisgarh were transferred to the new state. The above five companies were registered in November 2001 but they started functioning from July 2002 under operation & management contract with Madhya Pradesh State Electricity Board (MPSEB).

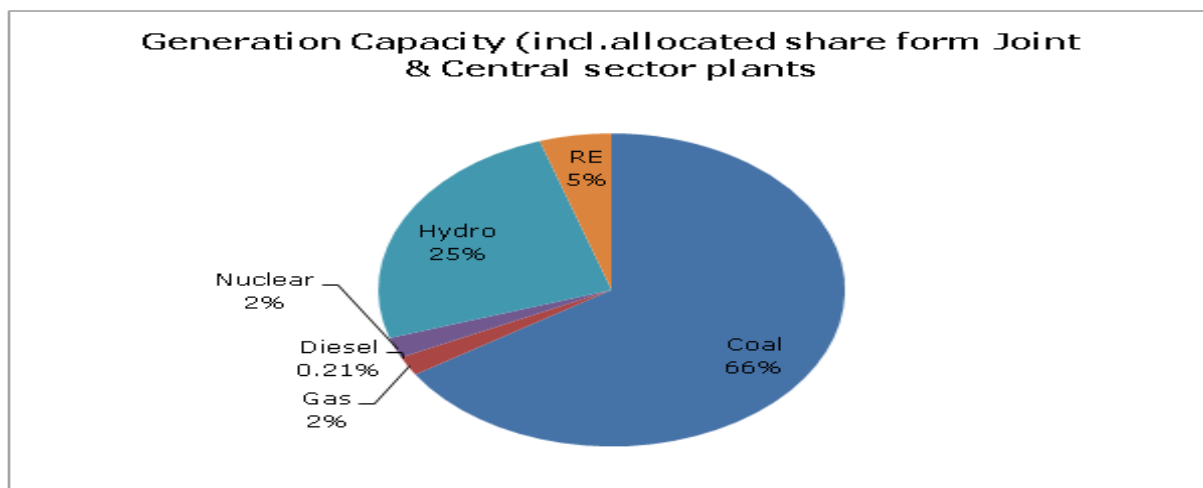
#### 1.2. GENERATION MIX

As on February 2014, Madhya Pradesh's total generation installed capacity (including allocated share in Joint & Central Sector plants) is 12,902 MW out of which Coal based power capacity accounted for 66% followed by hydro (25%). Renewable Energy Resources accounted for 5% of the total share.

**The capacity addition (incl.procurment from Central & JV plants) has grown by 30% from last year, showing a significant increment in investments in capacity addition.**

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XV-1: Generation Capacity Mix – Madhya Pradesh**



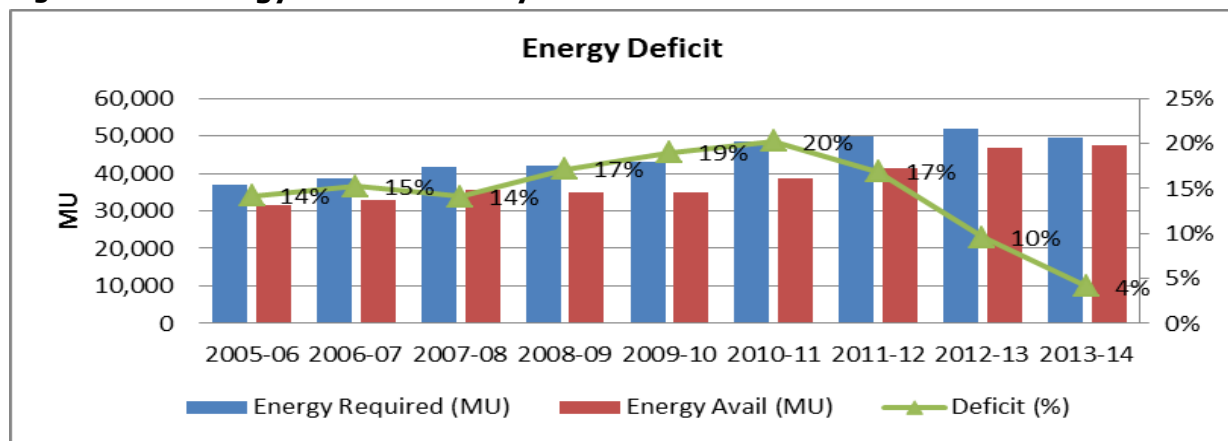
Source: CEA

### 1.3. POWER SUPPLY POSITION

Madhya Pradesh has witnessed significant supply deficits for several years on account of load growth and lack of adequate capacity. However, the energy and peak deficits in the state have continuously reduced post FY 2010-11. The energy deficit has reduced from 14% in FY 2005-06 to 4% in FY 2013-14. The peak deficit has substantially reduced from 22% in FY 2005-06 to 0% in FY 2013-14. The reduction in energy and peak deficit is due to high capacity addition coupled with low energy demand in FY 2013-14. The increased investment in capacity addition in state has led to a surplus generation capacity in MP.

The trend of energy deficit observed in Madhya Pradesh over the years is highlighted in the figure below:

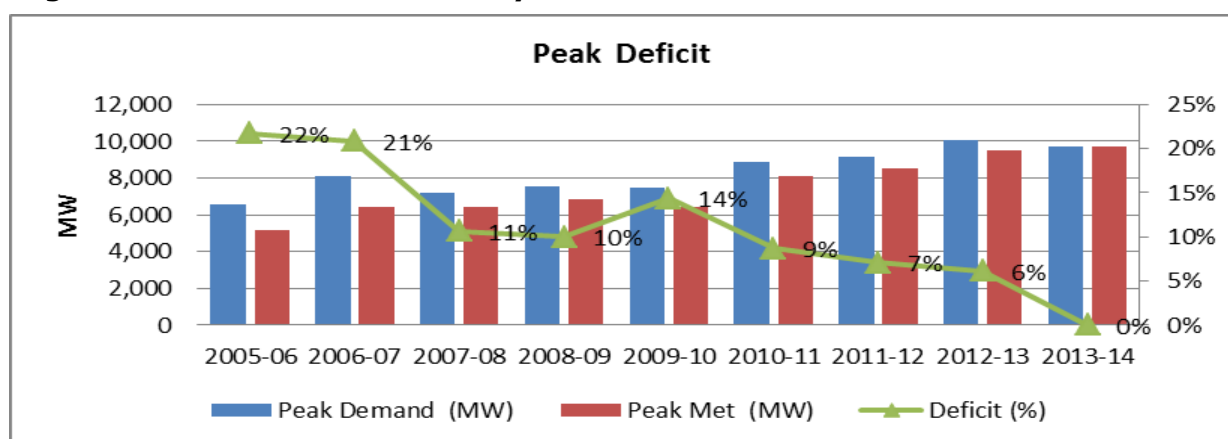
**Figure XV-2: Energy Deficit – Madhya Pradesh**



Source: CEA

The trend of peak deficit observed in Madhya Pradesh over the years is highlighted in the figure below

**Figure XV-3: Peak Deficit – Madhya Pradesh**



Source: CEA



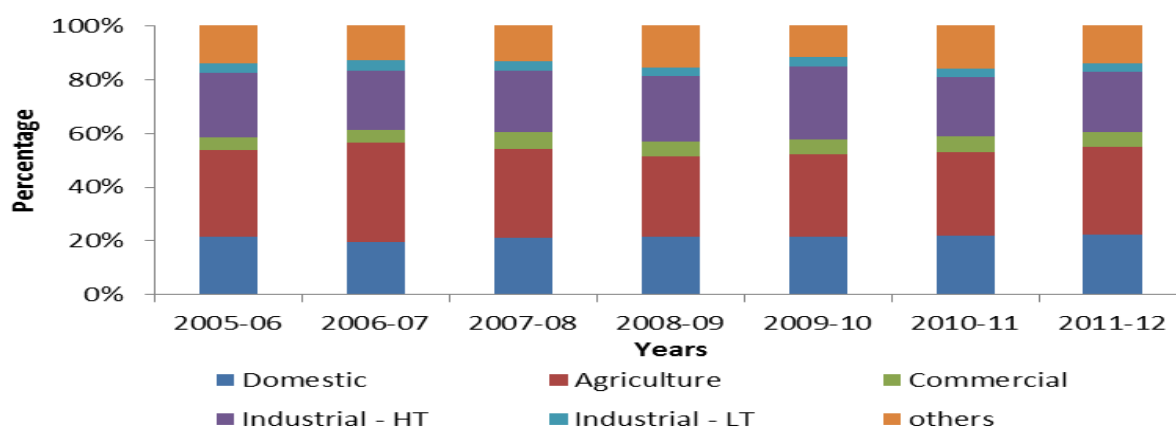
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF MADHYA PRADESH

The sales mix in Madhya Pradesh has remained same over the years. In FY 2011-12, agricultural sales dominated the sales mix with a share of 32%, followed by Industrial (25%) and Domestic (22%). As per the approved tariff order in FY 2013-14, percentage of DTR's provided with meter are mere 13.76% ; and 35% of domestic rural connections are un-metered. This has led to huge commercial losses in the distribution segment in Madhya Pradesh which is discussed in the subsequent section.

The historical trend in the consumer mix for the state is given in figure below:-

**Figure XV-4: Historical Trend in Consumer Sales Mix – Madhya Pradesh**

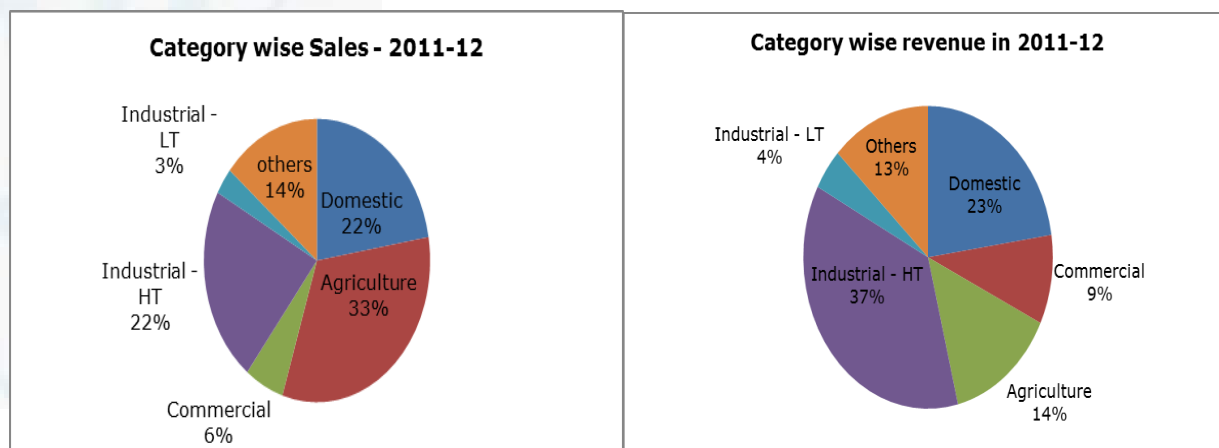


Source : PFC

The total sales in MP have grown at a CAGR of 11%, over the span of seven years, however commercial sales have registered a CAGR of 14.1%, which is highest among all consumer sales.

In terms of revenue contribution, industries contributes to 41% of revenues, followed by domestic and agricultural categories with a share of 23% and 14% respectively. While the commercial contributes to 9% of total revenues.

The figure below compares the sales mix in FY 2011-12 and the revenue realized from the different category of consumers in FY 2011-12.

**Figure XV-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 – Madhya Pradesh**

Source : CEA

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses in Madhya Pradesh have remained high from past seven years. The High commercial and technical losses are due to the high dominance of agricultural sales and high unmetered sales for both domestic and agricultural consumers. Out of total domestic rural connections state has 35% of them as unmetered; and 14% of agricultural Distribution Transformer (DTR) are metered.

The distribution utilities have failed to achieve distribution loss targets given by the commission for FY 2012. The trends observed in the collection efficiency are also on lower side relative to other states.

**Table XV-1: Year on Year Trend in AT&C losses and Collection Efficiency - Madhya Pradesh**

Year	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	44.4%	45.7%	46.8%	46.6%	41.0%	37.3%	38.3%
Collection Efficiency (%)	93%	86%	87%	84%	86%	87%	91%

Source: PFC

The state regulatory commission in its tariff order for FY 2013-14, has provided the loss reduction trajectory for each DISCOMs, which seems to be difficult given current levels of losses. The loss levels for FY 2013-14, FY 2014-15 and FY 2015-16 are 23%, 20%, 23% for East, West and Central distribution utility respectively.

To achieve loss targets the state regulatory commission has directed to the state utility to prepare and implement appropriate loss reduction strategies and schemes. Meterization at various levels of the distribution network such as feeder/ DTR metering and consumer metering is of prime importance to locate high loss areas to take action to curb losses.

Although HT/LT ratio has increased over the years, however is still lower than the best performing states indicating that there is scope for improvement. HT LT ratio has improved from 0.63 in 2005-06 to 0.70 in 2009-10.

Hence, in terms of operations efficiency, the MP discoms need to speed up their loss reduction measures and achieve metering of consumers in the state.

### 2.3. TRENDS IN DISTRIBUTION COST

The distribution cost in Madhya Pradesh has grown at a CAGR of 17% over the period of six years and power purchase cost, which forms a major cost component of distribution cost (~77% in FY 2011-12) has grown at a CAGR Of 18%. The percentage share of power purchase cost in total distribution cost is marginally low compared to other states like Maharashtra, Haryana, and Uttar Pradesh. This is because of the Madhya Pradesh's geographical location nearer to Mahanadi Coal Fields (MCL) and also due to its rich hydro power generation resources.

The per unit cost break-up for different cost components for the state of Madhya Pradesh is provided in the table below:-

**Table XV-2: Year on Year Trend Distribution Cost Breakup - Madhya Pradesh**

Cost Component	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.89	1.96	2.09	2.57	2.78	2.73	3.07
O&M	0.31	0.34	0.37	0.45	0.62	0.54	0.50
Interest	0.04	0.05	0.07	0.09	0.13	0.32	0.11
Depreciation	0.09	0.10	0.07	0.08	0.09	0.08	0.08
Other cost	0.14	0.09	0.09	0.12	0.27	0.20	0.22

Source: PFC

The power purchase quantum in FY 2011-12 have increased by 15% and the cost by 22%. The state has reached a stage where it has surplus generation capacity, hence one of the reasons for high power purchase cost, has been towards the payment of capacity charge for the surplus capacity. In order to reduce the burden on the finances of distribution utilities the commission has also prescribed the mechanism for recovery of Fuel Charge Adjustment (FCA) on quarterly basis so that uncontrollable costs because of variation in the variable charges are recovered/ adjusted on timely basis.

### 2.4. REVENUE REALIZATION

The revenue realization has improved in the last two years, i.e. FY 2011 & FY 2012, given the timely increase in the tariffs. The revenue realization from Industrial and Commercial consumers is highest in the state and post FY 2009-10 has been increasing. Tariff realization from agriculture categories have not increased commensurate with increasing power purchase cost.

The table below shows the revenue realization from different consumer categories over the years.

**Table XV-3: Historical Trend Consumer Category Wise Revenue Realization - Madhya Pradesh**

Years	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	3.90	4.59	2.91	3.01	3.44	3.62	3.89
Agriculture	0.60	0.73	1.41	1.45	1.44	1.48	1.65
Commercial	6.84	7.85	4.04	5.53	5.59	6.18	6.50
Industrial HT	6.41	9.04	4.94	4.83	4.47	6.04	6.27
Industrial LT	5.72	6.62	4.62	4.78	4.80	5.27	5.59

Source: PFC

The tariff revisions approved by the state regulatory commission, have been provided in the table below.

**Table XV-4: Trends of Tariff Revisions - Madhya Pradesh**

	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
Average Tariff Revisions	-	5%	0%	-	4%	11%	6%	7%

Source: Tariff Orders

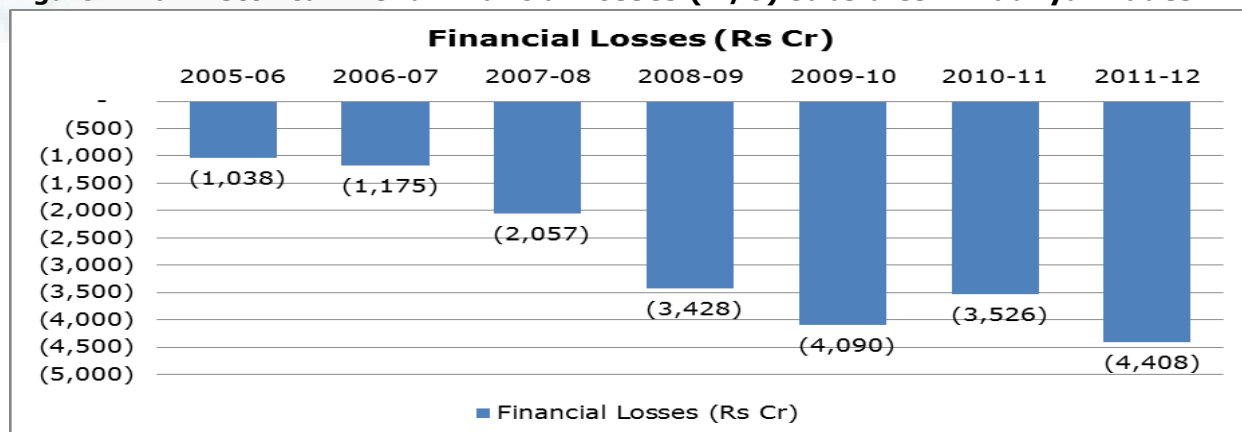
Although, there has been a timely increase in the tariffs, the increase has not been adequate given the poor operational efficiency of the utilities. This has led to deterioration in the financial health of the state distribution utility.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses without subsidies of state distribution utilities have increased every year. The losses have increased from Rs 1038 crores in FY 2005-06 to Rs 4,408 Cr in FY 2011-12. However, in FY 2010-11 the financial losses have reduced to steep tariff hike in of 11%.

**Figure XV-6: Historical Trend Financial Losses (w/o) subsidies – Madhya Pradesh**



Source: PFC

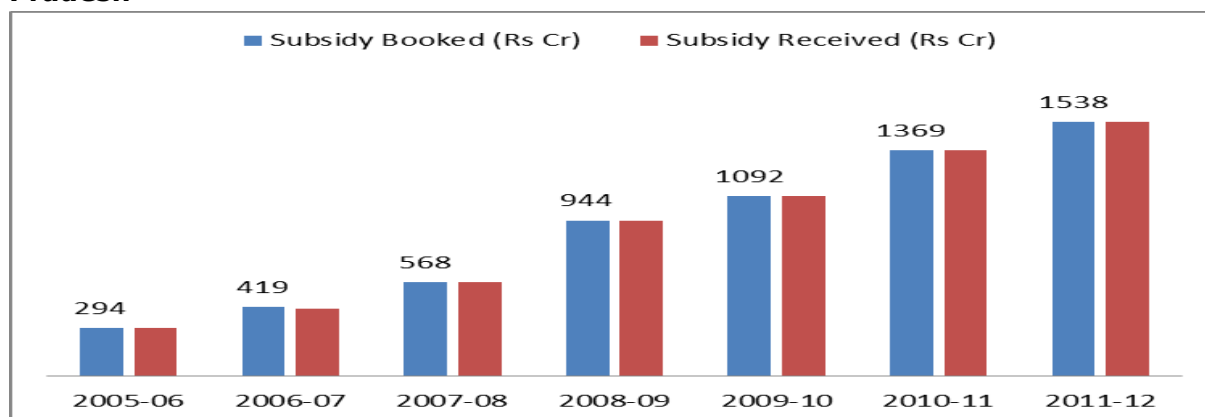
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The distribution utilities in Madhya Pradesh are dependent on huge financial subsidies for agricultural and some rural domestic consumer categories.

The subsidy levels in state have increased over the years. The subsidy in FY 2005-06 accounted for 5% of the total revenues and in FY 2011-12 it accounted for 11%. The subsidies are provided by the state government primarily for the agriculture and rural domestic consumers.

The graph below highlights the subsidy booked v/s subsidy received for the distribution utilities in the state

**Figure XV-7: Historical Trend Subsidies Booked v/s Subsidies Received – Madhya Pradesh**



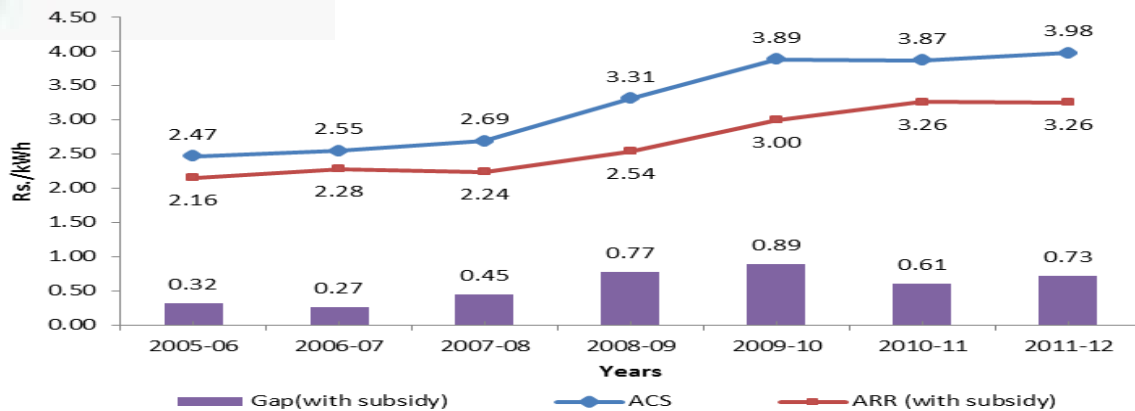
Source: PFC

The trend in subsidy pay-out with respect to the subsidy booked has always been 100% in the state. Even with the high subsidy payouts in the state the distribution utilities still have high revenue gaps.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized has increased every year till 2009-10. The gap has reduced in FY 2010-11 due to tariff hikes approved by the commission.

**Figure XV-8: Historical Trend ACS v/s ARR (with subsidy) – Madhya Pradesh**



Source : PFC

The poor distribution operations, inadequate tariff revisions have led to huge burden of subsidies and guarantees on the state state finances.

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector accounts for ~4% of the total revenues of the state.

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government.

The details of tax income has been provided in the table below

**Table XV-5: Tax Revenue from Power Sector - Madhya Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	2,146	1,476	1,773.32
Total Tax Revenue	28,350	37,058	45,192.58
Power sector Tax Revenue / Total state Tax Revenue	8%	4%	4%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The tax revenue from power sector as well as the contribution of sector in state tax revenues has decreased over the years.

The non-tax revenue from power sector is through **dividends, interest on loans and advances, Royalty/cess on water for power generation, T n D, Rural Electrification** etc. On the Non Tax revenue part, which is 455.95 Cr in 2011-12 forms 6% of the total non-tax revenues, which is a significant portion of state revenues. The Non –Tax revenue from the Power sector appear as other receipts in the CAG state accounts. The details for the same are provided in the table below.

**Table XV-6: Non-Tax Revenue from Power Sector - Madhya Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	1,082	397	455.95
Total Non-Tax Revenue	6,382	5,720	7,482.73
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	17%	7%	6%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Non tax revenue from power sector as well as the contribution of sector in state non tax revenues has decreased substantially over the years.

**The overall income generated from power sector decreased from Rs 3229 Cr in FY 2009-10 to Rs 2229.26 Cr in FY2011-12, which formed a ~4% of the total revenues of the state.**

## 4.2. EXPENDITURE ON POWER SECTOR

The total expenditure by State Government in the FY 2011-12, under various heads is provided in the table below.

**Table XV-7: Expenditure on Power Sector - Madhya Pradesh**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	1,976	410	1,025.83
Revenue Expenditure	1,689	1,653	2,070.86
Total Expenditure	3,665	2,063	3,096.68

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The revenue expenditure has increased over the span of three years whereas capital expenditure has decreased. The major portion of Capital expenditure has been T&D and Thermal generation whereas for revenue expenditure it has been general expenses. .

**The total expenditure for Madhya Pradesh power sector has decreased from Rs 3665 Cr in 2009-10 to Rs ~ 3096 Cr in 2011-12; hence, the quantum of expenditure towards power has been significantly higher than the quantum of revenue generated from power sector.**

## 4.3. POWER BONDS

8.5% Tax Free Special Bonds of the State Government (Power Bonds) were issued by State Government in August 2003 to be discharged completely by April 2016. The bonds were issued to the tune of Rs. 2, 022 Cr. The total outstanding at the end of 2011-12 was Rs. 808 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 530 Cr.

## 4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

The guarantees extended by State Government towards power sector in Madhya Pradesh, forms a substantial amount. The total guarantees outstanding in FY 2011-12 were Rs ~52,675 Cr, which accounted for 6.27% of total revenues of state.

The table below depicts the sector guarantees relative to the total revenue of the state.

**Table XV-8: Guarantees as a Percentage of Total Revenues - Madhya Pradesh**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Guarantees given by State Govt.	232	3,417	3,301.93



Total Revenues of the State	34,732	42,778	52,675.30
Guarantees as a %age of Total Revenues of State	1%	8%	6.27%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

There has been an increase in guarantees towards the power sector from 1% in 2009-10 to 6.27% in 2011-12.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XV-9: Utility wise Breakup of Guarantees - Madhya Pradesh**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
MPSEB	0	232	205.87	6%
M.P.Power Generating Company	0	2,222	2,037.54	61%
M.P. Power Transmission Company	79	216	252.36	8%
M.P.East Region Power Distribution Company	48	293	214.18	8%
M.P.Central Region Power Distribution Company	52	269	248.41	8%
M.P. Western Region Power Distribution Company	54	185	343.55	8%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily risen due to increase in Guarantees towards MP Power Generating Company.

Over the span of three years, the share of Genco in the Power Sector Guarantees has accounted for a significant ~61%%.

**Subsidy**

The table below depicts the share of utilities in subsidies given to Power sector and share of sector in total state subsidy.

**Table XV-10: Power Sector Subsidy as a Percentage of overall subsidy - Madhya Pradesh**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
Rs Cr				
Power Sector	1,807	1,535	1,551	100%
Power Sector subsidy/ Total Subsidy	1,807	1,535	1,551	72%

Source: Audited CAG Accounts for the state 2011-12, 2010-11, 2009-10

Over the span of three years, the Subsidy given to Power sector has decreased and hence the three year average share of sector subsidy in total state subsidy has been 72%

**4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement, which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XV-11: Power Sector Financing Requirement (2011-12) - Madhya Pradesh**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	3,096.68
Loans And Advances made by the State Government (Net of Recoveries)	5,954.49
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)*	360.71
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.38
Total Power Sector Financing during the year	9,412.27
Sector Financing Requirement as a % age of total revenues of state	18%

Particulars	2011-12 Rs Cr
GSDP nominal	201290
Sector Financing Requirement as a % age of GSDP	4.68%
Financial Profit/(Loss) of Discoms during the year (with Subsidy realized)	(2,870)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	23%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	6.10%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 18% of the revenue generated by the state and 4.68 % of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 23% of the State revenue and 6.10 % of the GSDP.

## 5. ASSESMENT OF REGULATORY EFFECTIVENESS

The key aspects are discussed below :

### 5.1. STATUS OF MYT REGULATIONS

The state has notified all the important regulations viz. MYT regulations. MYT's first control period for Distribution was from 2007-08 to 2009-10 and second control period from 2010-11 to 2012-13.

**Table XV-12: Status of MYT Regulations - Madhya Pradesh**

States	Control Period	Control Period No.1	Control Period No.2
Madhya Pradesh	First control period = 3 years; for Generation, Transmission and Distribution	FY 2007-08 to FY 2009-10	FY 2010-11 to FY 2012-13

### 5.2. STATUS OF OPEN ACCESS IMPLEMENTATION :

As on March 2013, Madhya Pradesh has 23 number of open access consumers in power exchange which is among the lowest in India. Cross subsidy surcharge in Madhya Pradesh ranges from Rs 0.81 at 33kV level and Rs 1.22/kWh at 133 kV level. In terms of implementation of open access in the state commission in its order has directed the utilities as follows: -

*"The Commission has noticed with strong sense of dismay the lethargy and indifference with which the applications for short term open access by consumers of 1 MW and above are treated by the Discoms. The Commission would like to make it absolutely clear that it is the right of every consumer of 1 MW and above to obtain electricity through open access at the time and for the period of his choosing. Any hesitation on the part of Discoms to obstruct or otherwise hinder open accessibility of electricity would be dealt with severely."*

### 5.3. FREQUENCY OF TARIFF REVISIONS:

The costs of the utilities have been increasing significantly in the last few years, adding to the gap. The regulatory commission has only increased the tariffs in the recent past and that have not been commensurate with increasing cost of power.

**Table XV-13: Trends of Tariff Revisions - Madhya Pradesh**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	-	-	5%	0%	-	4%	11%	6%	7%	1%

Source: Tariff orders

The commission has also being allowing the regulatory assets for basically to avoid tariff shocks to consumers. This is not an unhealthy trend. This actually allows deferring of burden on the consumers, as well as, time and scope for the Licensee to improve its performance and altogether obviate the burden currently being envisaged.

#### **5.4. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION**

In 2011-12, agricultural sales in Madhya Pradesh accounted for 33% of total sales. The approach followed for determination of agriculture sales is the Compound Annual Growth Rates (CAGRs) CAGR (for small, medium and long term) approach along with correction factor to account for any State/ Central Govt schemes, pending connections.

The analysis of the data, appropriate/reasonable growth rates are assumed for future consumer/ sale forecasts from the past CAGRs of the Category/Sub-category. The forecast also considers the impact of schemes/ plans of licensees such as RGGVY as stated above. The Commission had emphasized the importance of energy accounting and meterisation and hence, Discoms are directed to prepare and implement appropriate loss reduction strategies and schemes. Meterisation at various levels of the distribution network such as feeder/ DTR metering and consumer metering is of prime importance. The Commission, has however, noted with deep concern that not much headway has been made in this direction by the distribution licensees during the past years. While there appears to be some progress with regard to feeder meterisation, meterisation of agricultural DTRs and individual un-metered domestic connections remains neglected.

The Commission is of the firm view that all consumers should be metered individually or at least in group in case of agriculture consumers. The present regime of billing on benchmark consumption to either domestic or agriculture consumers has no incentive for energy saving by the consumers.<sup>17</sup>

The State Govt. has announced a flat rate payment scheme for the year 2013-14 for agriculture pump consumers. Under this scheme the consumer shall make payment at a flat rate per HP twice a year in advance in the months of April and October and the balance amount shall be paid by the State Govt. as subsidy. This scheme includes un-metered agriculture consumers. In view of the features of this scheme, it has now become imperative that Discoms should provide meters expeditiously on agricultural predominant DTRs to ensure that supply to agriculture consumers is measured and that proper energy audit is possible.

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<sup>17</sup> Approved Tariff Order of 2012-13

## 6. SUMMARY

The level of Distribution losses, billings and collections remains an important issue. There is a significant gap between the actual cost of the Distribution Licensees and the tariffs allowed to them by the MPERC. The key aspects of the state are discussed below:-

1. **Energy Supply Position:** The energy supply position in the state has improved, and the peak deficit in the state is zero, because of significant capacity addition coupled with reduced energy and peak demand. The state has reached a surplus level of its power generation capacity.
2. **Tariff Hikes:** The tariff hikes have been timely in the state , however, the hikes have not been commensurate with the increase in the power purchase cost. The significant tariff hikes have been approved in 2010-11 to the tune of 11%. However, tariff hikes have been low in subsequent year, hence increasing the gap of distribution sector of state.
3. **Subsidy:** The subsidy trends have doubled in a span of six years. The state subsidy payout trend has been 100% all over the years. The subsidies are primarily towards agriculture and rural domestic consumers.
4. **Past Financial Baggage:** 8.5% Tax Free Special Bonds of the State Government (Power Bonds) were issued by State Government in August 2003 to be discharged completely by April 2016. The bonds were issued to the tune of Rs. 2, 022 Crores. The total outstanding at the end of 2011-12 was Rs. 808 Crores.
5. **Operational Efficiency:** The distribution utilities are having high levels of losses in terms of technical and commercial losses due to high level of unmetered sales and increasing distribution network in the rural/remote areas under rural electrification program.
6. **States Guarantees:** The guarantees for the sector are significant and account for 6.27 % of Total Revenues of the state.
7. **Revenues from the sector to the state:** Total Revenue (Rs. ~2229 Crores) from the Power sector is less than the total expenditure on the sector (Rs.~ 3096 Crores) The expenditure in the sector have increased due to improving capacity addition in the recent past. The revenues from the power sector in Madhya Pradesh forms a significant amount in tax and non-tax revenues.

**The sector operations pose a high risk on state finances due to large level of subsidy and deficit exposure.**

## XVI MAHARASHTRA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Located in the Western part of India, Maharashtra is India's third largest state, stretching over 307,690 sq km. Maharashtra has a population of 112 million as on 2011 census, making it the second most populous state in India. Maharashtra is one of the most economically advanced states in the country, and is the leading hub for financial services as well as manufacturing industries in the country. It is also a state where power shortages are the most severe. After a decade of chronic underinvestment in its power sector, Maharashtra is now gearing up for rapid growth in the electricity sector through massive investments through the value chain.

As the State Utility was in huge disarray it became inevitable to unbundle the oversized Maharashtra State Electricity Board (MSEB). Hence on June 6, 2005 the SEB was dissolved and four companies came into the existence:

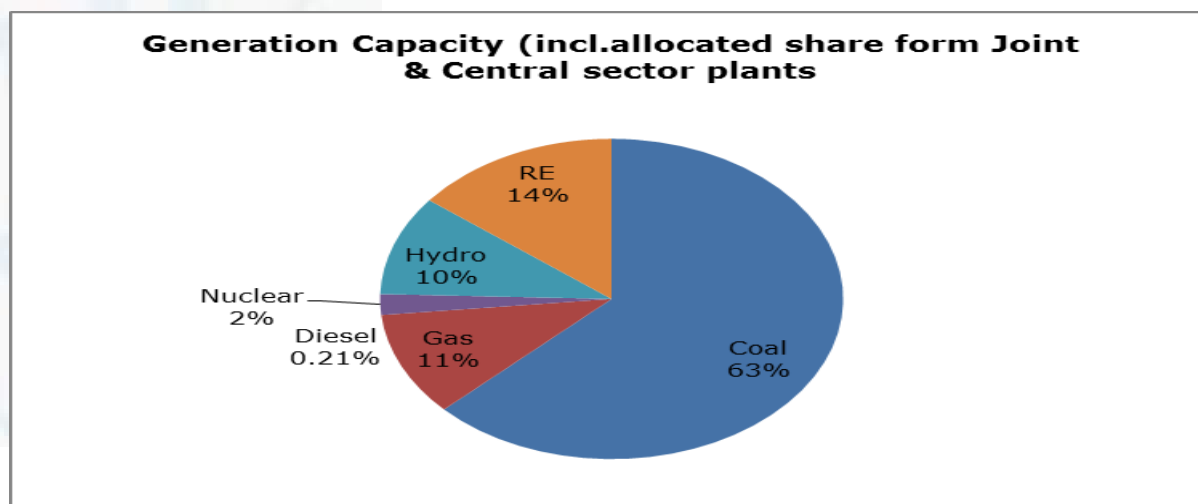
- Maharashtra State Electricity Distribution Company (MSEDCL/Mahadiscom or Mahavitaran)
- Maharashtra State Electricity Transmission Company (MSETCL/Mahatransco or Mahapareshan)
- Maharashtra State Electricity Generation Company (MSPGCL/Mahagenco or Mahanirmiti)
- MSEB Holding Company

Apart from these State sector entities which supply power to the entire State of Maharashtra except the State capital - Mumbai, historically, generation, transmission and distribution networks in the city of Mumbai were developed and owned by private licensees such as The Tata Power Company Ltd (TPC) and Reliance Energy Ltd. (REL). Moreover, in the island city of Mumbai (i.e., the metropolitan area excluding its suburbs) the retail supply of electricity has been the responsibility of a local municipal authority namely Brihan-Mumbai Electricity Supply and Transport Undertaking (BEST). The State also has a rural electric co-operative society - Mula- Pravara Electric Co-operative Society (MPECS) in Ahmednagar district.

#### 1.2. GENERATION MIX

As on February 2014, Maharashtra's total generation installed capacity (including allocated share in Joint & Central Sector plants) was 33,043 MW out of which coal based capacity accounted for 63% followed by RE based generation (14%), gas (11%), and hydro (10%). The capacity addition (incl. procurement from Central & JV plants) has grown by 15% from last year, showing a significant increment in capacity addition and procurement from central sector plants.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure XVI-1: Generation Capacity Mix – Maharashtra**

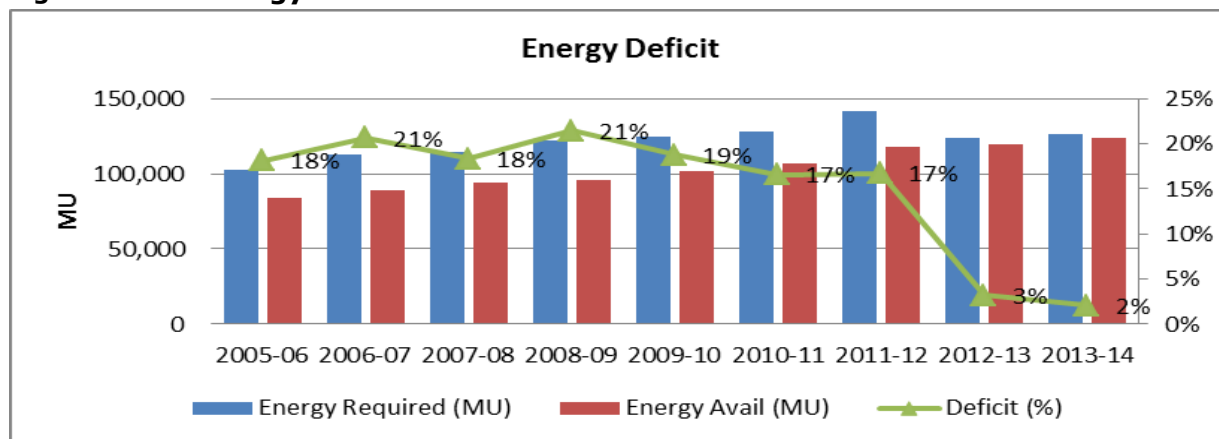
Source: CEA

### 1.3. POWER SUPPLY POSITION

Maharashtra has been witnessing significant energy and peak deficit for several years on account of load growth and lack of adequate capacity addition. However, the deficit has fallen to all time low in last two financial years, because of increased capacity addition coupled with low demand in the state.

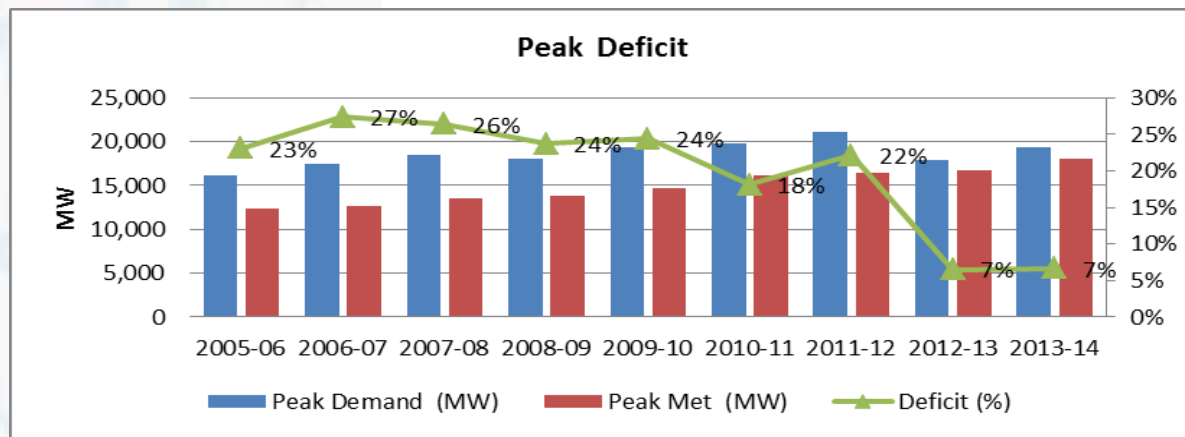
The energy deficits in the state have decreased from 18% in FY 2005-06 to 2% in FY 2013-14 and the peak deficits have reduced from 23% in FY 2005-06 to 7% in FY 2013-14.

The trend of energy and peak deficit observed in Maharashtra over the years is highlighted in the figure below:

**Figure XVI-2: Energy Deficit - Maharashtra**

Source: CEA



**Figure XVI-3: Peak Deficit – Maharashtra**

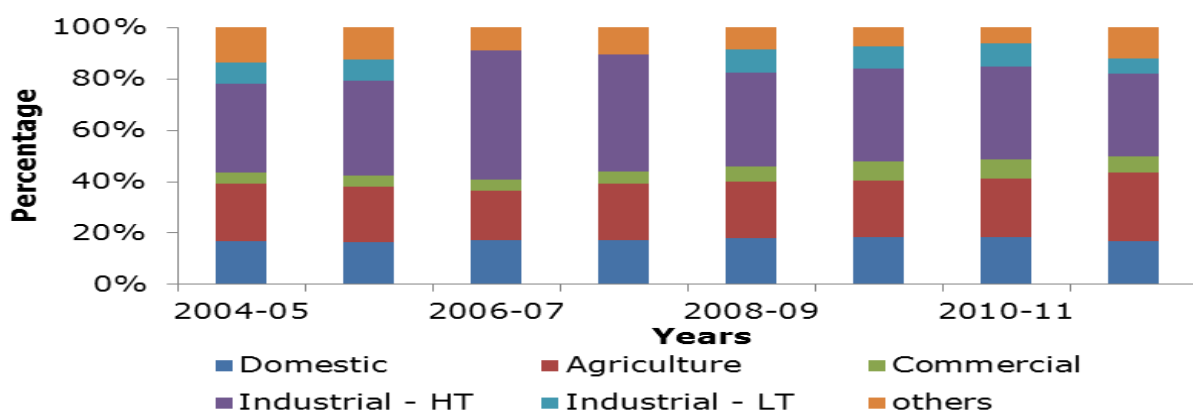
Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF MAHARASHTRA

The sales mix in Maharashtra is presented for the regions of state distribution utilities and exclude private distribution companies. In FY 2011-12, industries dominated the sales mix with a share of 38%, followed by agricultural and domestic sales with share of 27% and ~16% respectively. However, share of Industrial sales in total sales have fallen from 2004-05 levels of 43% to 38% in FY 2011-12, on the other hand agriculture sales as a percentage of total sales have grown from 22% in 2004-05 to 27% in FY 2011-12, this is because of increasing rural electrification and increasing metering in the state.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XVI-4: Historical Trend in Consumer Sales Mix – Maharashtra**

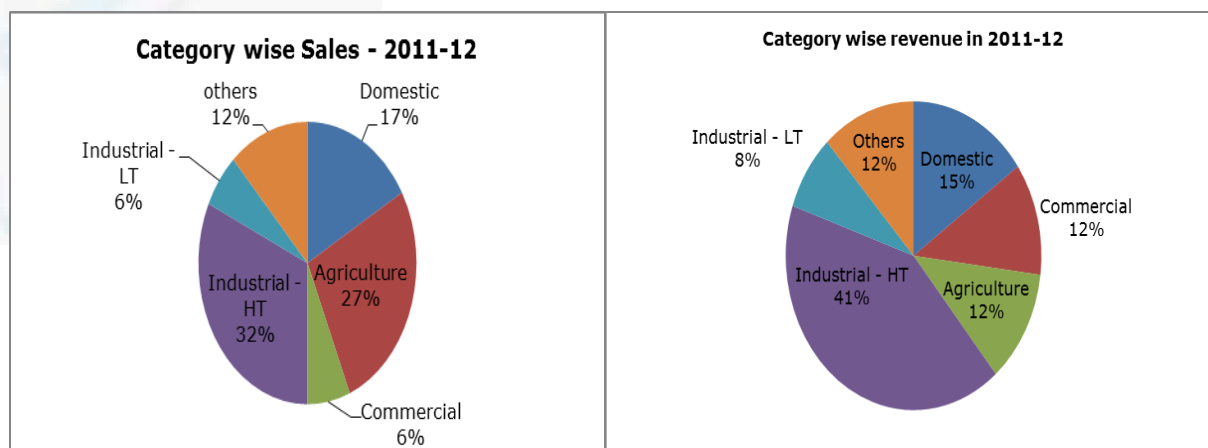
Source: PFC

The sales in state have grown at a CAGR of 6.4% over the span of seven years, whereas, commercial sales have registered the CAGR of 15.7%, which is highest among all the consumer categories.

In terms of revenue contribution, industries contributed 49% of revenue, followed by domestic, commercial and agricultural categories with a share of 15%, 12% and 12%, respectively.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XVI-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Maharashtra**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Maharashtra state distribution utilities have shown an improving trend, it has improved from 33% in 2005-06 to 21.6% in 2011-12. Over the years AT&C losses (%) has improved as more investments were being done on the HT lines. The trends of collection efficiency, however needs more improvement.

**Table XVI-1: Year on Year Trend in AT&C losses and Collection Efficiency - Maharashtra**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	28%	33.2%	34.6%	31.3%	31.2%	25.0%	23.3%	21.6%
Collection Efficiency	109%	91%	93%	90%	88%	94%	93%	93%

Source: PFC

The reasons for high losses are due to theft, pilferage, defective meters, unmetered agriculture consumers, and errors in meter reading<sup>18</sup>. The state increasing distribution network under rural electrification program is through long 11kV and LT lines. These LT lines are contributing significantly in technical losses, due to far flung rural nature of agriculture consumers across the state.

As per the order of MERC in FY 2010-11 the un-metered agricultural consumers accounted for 49% of total agriculture consumers.

The non-availability of quality agencies for meter reading and tendency on the part of the consumer not to keep the metering installation in order, increases the errors in meter readings.

<sup>18</sup> As reported by distribution utility (MSEDCL), source Tariff order of MSEDCL for FY 2011-12, & FY 2012-13

**To reduce the high losses in the Bhiwandi, MSEDCL implemented a Franchisee Model which proved to be very successful and a trend setter in power distribution sector of the country. Accordingly a few more franchisees were allotted areas and review on loss reduction was being taken regularly. On these lines, MSEDCL is planning to hand over some more high loss making areas of MSEDCL through distribution franchisee model.**

Although HT/LT ratio increased over the years, they are still lower than the best performing states indicating that there is scope for improvement in this area. HT LT ratio has improved from 0.47 in 2001 to 0.50 in 2009-10.

In spite of agricultural consumption increasing over the last few years, losses have fallen indicating that the changes in reported agricultural consumption are not used to mask losses.

### **2.3. TRENDS IN DISTRIBUTION COST**

Similar, to other states in India, purchase cost forms the major cost component of distribution in Maharashtra. The power purchase cost accounts for ~80% of the total distribution cost and have remain constant from past seven years (refer table below).

The per unit cost break-up for different cost components for the state of Maharashtra is provided in the table below:-

**Table XVI-2: Year on Year Trend Distribution Cost Breakup – Maharashtra**

<i>Cost Component</i>	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
<i>Power Purchase Cost</i>	2.16	2.33	2.32	2.76	2.96	3.36	3.68
<i>O&amp;M (R&amp;M + A&amp;G + EC)</i>	0.29	0.37	0.33	0.47	0.35	0.33	0.35
<i>Interest</i>	0.06	0.08	0.08	0.11	0.11	0.13	0.19
<i>Depreciation</i>	0.08	0.07	0.07	0.09	0.10	0.12	-0.05
<i>Other cost</i>	0.05	0.06	0.04	0.08	0.16	0.17	0.12

Source: PFC

The power purchase cost has increased by 21% in past two years i.e. FY 2011 and FY 2012. MSEDCL has three primary sources of firm power i.e. Maharashtra State Power Generation Company Limited (MSPGCL), Central Generating Stations (CGS), and Ratnagiri Gas Power Private Limited (RGPPL). Apart from this MSEDCL also have share in private power plants viz Tata UMPP. As, major portion of power procurement (74%) is from thermal sources, hence power purchase cost is vulnerable to price volatility.

However, as the power purchase cost is not in control of the utility, in that case variation in the fuel cost (variable charge) of power purchase, MSEDCL able to pass on the corresponding increase to the consumers through the existing FAC mechanism, subject to the stipulated ceiling of 10% Energy Charges.

MSEDCL, has entered into Long-term power procurement from imported coal based power plants under Case 2 and Case 1 bidding viz. Tata Mundra UMPP and Adani Mundra. However, due to change in Indonesian coal pricing regulations, and subsequent approval of compensatory tariff by CERC over and above the agreed tariff under the PPA, would further increase the power purchase cost of the MSEDCL.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has increased with increasing power purchase cost due to timely and frequent tariff revisions approved by regulatory commissions.

The table below shows the revenue realization from different consumer categories over the years.

**Table XVI-3: Historical Trend Consumer Category Wise Revenue Realization - Maharashtra**

Years	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	2.96	3.15	3.42	3.08	3.51	3.75	4.20	4.43
Agriculture	1.75	1.98	2.13	1.73	1.94	1.97	2.00	2.15
Commercial	4.80	4.99	5.33	5.54	7.13	7.17	7.92	8.97
Industrial HT	3.43	3.75	4.16	4.27	4.75	5.12	5.53	6.32
Industrial LT	3.43	3.64	-	-	3.30	3.61	4.24	6.24

Source: PFC

The tariff realization from agriculture consumers is highest in the country and realization has increased over time. The frequent tariff revisions in the state have led to an increase in revenue realization in each consumer category. The tariff revision over the years is provided in the table below:-

**Table XVI-4: Historical Trend of Tariff Revisions - Maharashtra**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
Average Tariff Revisions	-	-	8.5%	5.6%	6.8%	4.2%	1%	3%	18%

Source: Tariff Order

The commercial and industrial tariffs in MSEDCL are one of the highest in the country. Thus MSEDCL has a lot of industrial and commercial consumers who opt for Open Access from power exchange.

The frequent tariff revisions and improvement in AT&C losses have led to improving the financial health of the state.

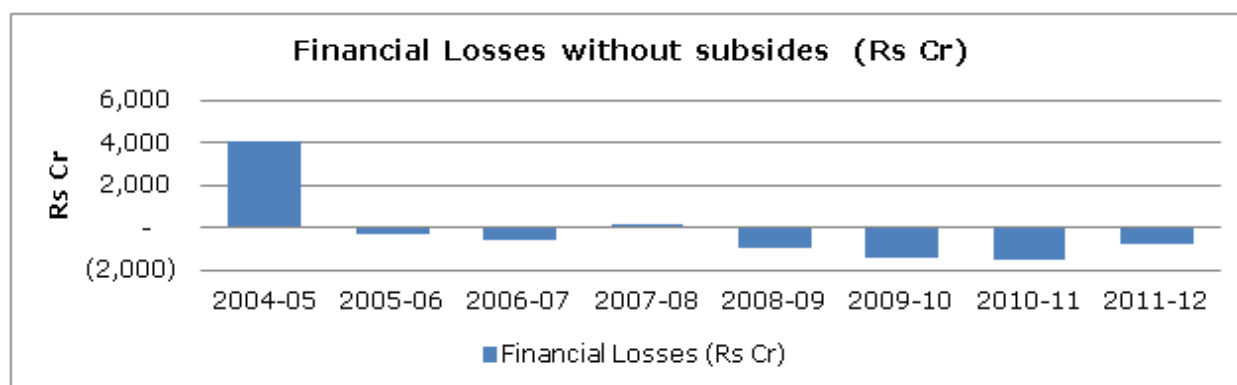
### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses without subsidies of state distribution utility has increased every year after FY 2008-09 till FY 2010-11. However, the Discom has consistently been in losses from 2005 to 2011; however the magnitudes of losses have not been very high. In 2007-08, the Discom showed a small profit of Rs 116 crores.

In 2009-10, a subsidy of Rs 400 Cr was given to MSEDCL. Before 2009-10, practically no subsidies were given by the government.

**Figure XVI-6: Historical Trend Financial Losses (w/o) subsidies – Maharashtra**



Source: PFC

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The subsidy burden has remained negligible from past five years i.e. from the period of FY 05 to FY 09. The large amount of subsidies was booked in FY 10 which was the election year in the state.

**Table XVI-5: Historical Trend Subsidies Booked v/s Subsidies Received Maharashtra**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Subsidy Booked (Rs Cr)	0.68	0.33	-	-	-	400.00	28.00	-
Subsidy Received (Rs Cr)	0.68	0.33	-	-	-	400.00	28.00	-

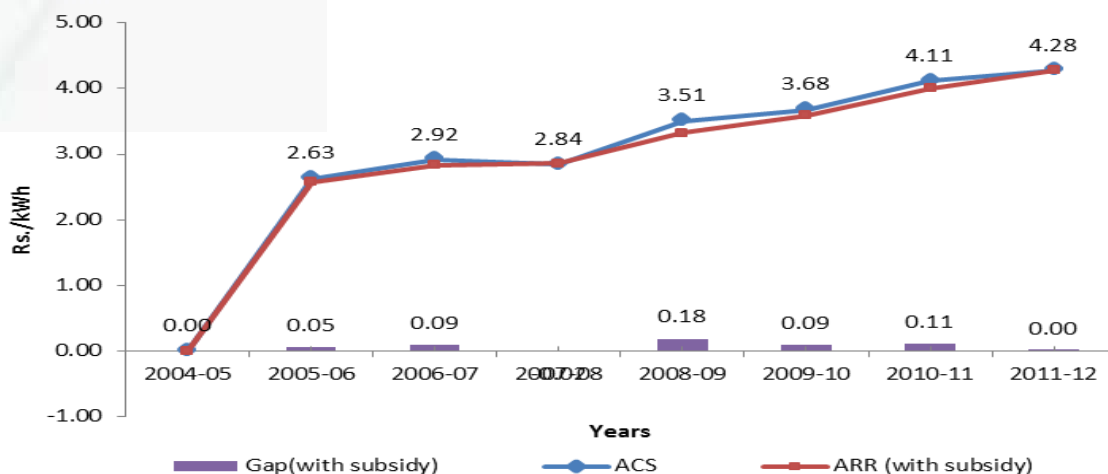
Source: PFC

The trend in subsidy pay-out with respect to the subsidy booked has always been 100% in the state. As, the tariff realization from agricultural consumers is highest among the other agricultural dominated states in the country, hence subsidy payout is less.

### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized has remained constant from 2004-05 level. The gap in FY 2008-09 was highest i.e. 0.18. The gap was further reduced as subsidy was paid in FY 2009-10. The frequent tariff revisions in the state and pass on of the fuel variation as discussed above had led to almost nil gap between ACS and ARR.

**Figure XVI-7: Historical Trend ACS v/s ARR (with subsidy) – Maharashtra**



Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms 5% of the total revenues of the state in 2011-12.

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government.

**Table XVI-6: Tax Revenue from Power Sector - Maharashtra**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	3,289	4,730	4,831
Total Tax Revenue	67,354	86,447	1,00,952
Power sector Tax Revenue / Total state Tax Revenue	5%	5%	5%

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

The tax revenue generated by power sector along with the sector contribution in total state tax revenue has increased over the years.

The non-tax revenue from power sector is through **dividend, interest from loans and advances, Royalty/cess on water for power generation, T n D, Rural Electrification** etc. The Non Tax revenue part, which is 725.48 Cr, forms 8.9% of the total non-tax revenues, a significant portion of state revenues 2011-12. The details for the same are provided in the table below.

**Table XVI-7: Non-Tax Revenue from Power Sector - Maharashtra**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	457	485	725
Total Non-Tax Revenue	8,353	8,225	8,168
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	5%	6%	8.9%

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

The non tax revenue generated by power sector along with the sector contribution in total state not tax revenue has increased since FY10

**The total revenue generated from power sector, has increased from Rs 3746 Cr in FY10 to Rs ~5556 Cr in FY2012.**

## 4.2. EXPENDITURE ON POWER SECTOR

The total expenditure by State Government in the FY 2011-12, under various heads is provided in the table below.

**Table XVI-8: Expenditure on Power Sector - Maharashtra**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital Expenditure	1,707	2,105	1,861.98
Revenue Expenditure	4,138	3,619	5,526.72
Total Expenditure	5,845	5,724	7,388.70

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

The overall expenditure on Power sector has increased from Rs 5,845 Cr in FY10 to Rs 7388.70 Cr in FY2012. The rise in Revenue expenditure is mainly on account of increased expense under T&D.

**The total expenditure of the states is Rs ~7388 Cr, which is more than the total revenues from power sector.**

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

The table below depicts the sector guarantees relative to total revenue of the state.

**Table XVI-9: Guarantees as a Percentage of Total Revenues - Maharashtra**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Guarantees given by State Govt.	12,878	1,921	1,921
Total Revenues of the State	75,707	94,672	1,09,119.50
Guarantees as a %age of Total Revenues of State	14%	2%	1.76%

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

Over the span of three years the guarantees to the power sector has decreased from 14% of state revenue in FY10 to 1.76% in FY12.

The guarantees in Maharashtra towards the Power sector are a marginal 1.76% of the total revenues of the state in 2011-12.

The table below depicts the three year average share of different utilities in sector guarantees:



**Table XVI-10: Utility wise Breakup of Guarantees - Maharashtra**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees %
				Rs Cr
Maharashtra State Electricity Transmission Co. Ltd.	11,255	423	423	44%
Maharashtra State Power Generation Co. Ltd.	873	678	678	26%
Maharashtra State Electricity Distribution Co. Ltd.	0	609	609	21%
Ratnagiri Gas and Power Private Ltd.	750	210	210	9%

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily declined due to decrease in Guarantees towards the transmission sector.

Over the span of three years, Transmission sector accounted for a share of 44% in the Power Sector Guarantees.

In 2011-12, the share of Generation sector was highest in the Guarantee for the Power sector followed by distribution utilities.

### **Subsidy**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table XVI-11: Power Sector Subsidy as a Percentage of overall subsidy - Maharashtra**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
				Rs Cr
Transmission and Distribution-	3,354	3,131	5,162.98	99.99%
Maharashtra Energy Development Agency	1	0	0	0.01%
Power Sector subsidy (% of total subsidy)	3,356	3,131	5,162.98	50.45%

Source: Audited CAG Account – 2011-12, 2010-11, 2009-10

Over the span of three years, the subsidies to T&D have risen, accounting for 99% of total subsidy given to the power sector by the state government. The sector accounts for a significant share in total state subsidy i.e. ~ 51% over the years.

In 2011-12, the entire subsidy payments for Power sector went to Transmission and Distribution. The subsidy for Power sector accounted for a significant proportion of the total Subsidy payment made by State Government. However, as per the PFC reported data the subsidy payout in 2011-12 is nil.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 200 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XVI-12: Power Sector Financing Requirement (2011-12) - Maharashtra**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	7388.70

Particulars	2011-12 Rs Cr
Loans And Advances made by the State Government (Net of Recoveries)	4.42
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0
Total Power Sector Financing during the year	7393.13
Sector Financing Requirement as a % age of total revenues of state	7%
GSDP nominal	805031.00
Sector Financing Requirement as a % age of GSDP	0.92%
Financial Profit/Loss of Discoms during the year (with subsidy realized)	(808.00)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	8%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	1.02%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 7% of the revenue generated by the state and 0.92 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 8% of the State revenue and 1.02 % of the GSDP.

## 5. ASSESMENT OF REGULATORY EFFECTIVENESS

### 5.1. FINANCIAL INDEPENDENCE OF SERC

The primary source of income for the SERC's include grant from the state government and their own revenue generated through fees for annual license, fees for fling application etc. If the SERC's are significantly dependent on state grants for their operations vis-a-vis their ability to generate revenue implies that they are financially dependent on the state government, hence might not be able to undertake independent decisions, and may get be influenced by the decisions of the State Government.

It has been observed that many of the SERC's are dependent on the state government grants for meeting their expenditures, However, Maharashtra State Electricity Regulatory Commission, is among the states which is not dependent on the Government grants.

The table below highlights the State Government funding as a percentage of income of SERC.

**Table XVI-13: State Government Funding as a percentage of income of SERC- Maharashtra compared with other major states**

S. No.	States	State Government funding as a percentage of income of SERC's
1	Haryana	100%
2	Meghalaya	80%
3	Karnataka	72%
4	Manipur and Mizoram	71%
5	Jharkhand	58%
6	Goa and union territories	52%
7	Tripura	42%
8	Andhra Pradesh	34%
9	Himachal Pradesh	23%
10	Uttar Pradesh	5%
11	West Bengal	0%
12	Odisha	0%
<b>13</b>	<b>Maharashtra</b>	<b>0%</b>

### 5.2. STATUS OF IMPORTANT REGULATIONS :

**Table XVI-14: Status of Key Regulations – Maharashtra**

Regulatory Measure	Progress
Multi Year Tariff	On 4 February, 2011, the Commission notified the Maharashtra Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2011 (hereinafter referred to as the "MYT Regulations, 2011"). These Regulations were to be

	applicable for determination of Tariff from 1 April, 2011 and onwards up to FY 2015-16 for all existing and future Generating Companies, Transmission Licensees and Distribution Licensees in the State of Maharashtra.
Open Access Regulations	The Open access regulations were issued in 2005 MERC (Maharashtra Electricity Regulation Commission) through an Order dated 5th September 2006 had determined <b>Cross Subsidy Surcharges (CSS)</b> to be zero which was applicable for Open Access Consumers from September 2006 to September 2011. However, the post that the CSS range from Rs 2.75 per kWh to Rs 1.65 per kWh.

Source: Tariff Orders and Specific Regulations

### 5.3. STATUS OF OPEN ACCESS IMPLEMENTATION :

As on March 2013, Maharashtra has 12 number of open access consumers in Indian Energy Exchange which is among the lowest in India. Cross subsidy surcharge in Maharashtra ranges from Rs 2.75/kWh for 122 kV level to Rs 1.65/kWh at 22 kV level as compared to other states Cross Subsidy Surcharge Maharashtra has higher CSS. However, implementation of Open Access in Maharashtra has been an issue, Government of Maharashtra has been denying Open Access to a consumer (from buying from outside the state) fearing that utility will face operational and financial difficulties if industries were granted OA through IEX. Since, as discussed above that the industrial and commercial consumers tariffs in Maharashtra are among the highest, thus it is cheap for the consumers to buy power from exchange, however, it will led to financial loses to distribution utilities.

### 5.4. FREQUENCY OF TARIFF REVISIONS:

The Commission in all the tariff orders has approved tariff which are reflective of the average cost of supply. Therefore, no revenue gap has been left uncovered for MSEDCL. There has been adequate tariff increase to cover the revenue gap of the respective year. The table below presents the trends of tariff revisions in Maharashtra.

**Table XVI-15: Trends in Tariff Revisions – Maharashtra**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	-	-	8.5%	5.6%	6.8%	4.2%	1%	3%	18%	NA

### 5.5. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION

The consumption of unmetered Agriculture consumers is decided based on consumption of metered Agriculture consumers. The consumption of metered Agriculture consumers is fixed on basis of their meter readings and the consumption of unmetered Agriculture consumers is fixed by considering the index calculated on basis of consumption of metered Agriculture consumers whose usage is generally appropriate and its load. The said methodology has been approved by the Commission. Due to increase in actual meter readings and increase in index, there is increase in unmetered agriculture consumption (955 units/ HP for FY 2009-10 and 965 units/ HP for FY 2010-11).

For approval of sales to unmetered category, the Commission has considered the recorded consumption of metered consumers based on which a zone-wise consumption norm in hrs/hp/annum has been computed. This zone-wise consumption norm has been applied for projecting unmetered agricultural consumption.

## 6. SUMMARY

The energy and peak deficits in Maharashtra have remained high over the years. However, in recent past due to huge generation capacity addition coupled with low demand has led to a good power supply position in the state. The distribution utilities given the expansion of agricultural sales the losses are still at high levels. The state electricity regulator has been proactive in the state by frequently revising the tariff to cover the revenue gaps. Hence, the state has low subsidy burden and have minimal gap between ARR and ACS. As the losses in the state will improve, the gap will further reduce over time.

The major parameters of the state's performance are provided below :-

1. **Tariff Hikes:** MERC has remained proactive in tariff revisions. The frequent tariff revisions in the state, have kept the ARR and ACS almost nil over the years.
2. **Subsidy:** The distribution utilities in Maharashtra do not have a history of receiving government support in terms of subsidies payout. However, trend of subsidy payment in Maharashtra is nil except the major subsidy of 400 cr was paid in the election year.
3. **Operational Efficiency:** The cost of supply of Discoms has been increasing over the years especially due to the increase in power purchase costs; however, the tariff hikes and utilities interventions to reduce losses have kept the operations at satisfactory levels. The AT&C losses in the state are improving, however still are at a higher level. This is due to increasing rural electrification and large LT lines in the states.
4. **Distribution Franchisee Model :** The distribution franchisee model in Bhiwandi, has proved to be successful, other states in India have also tried to replicate the model.
5. **States Guarantees:** The state guarantees in the power sector accounts for ~1.76% of Total Revenues of the state.
6. **Revenues from the sector to the state:** Total Revenue (Rs. ~5556 Crores) from the Power sector is less than the total expenditure on the sector (Rs. ~7388 Crores) The expenditure in the sector have increased due to improving infrastructure in transmission capacity.
7. **Regulatory Effectiveness:** The regulator in Maharashtra has been proactive in approving tariff revisions and notification of second generation reforms. However, implementation has been a issues, especially implementation of Open Access in the state.

**On the whole, the state finances face a low risk on account of power sector, however, un- metering remains the concern for the state.**

## XVII MANIPUR

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

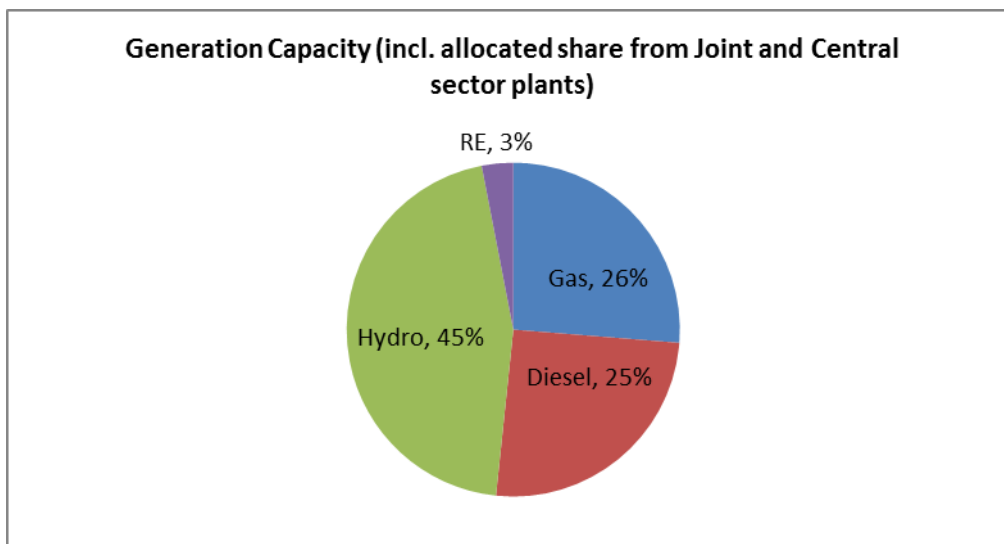
The Central Government constituted a Joint Electricity Regulatory Commission on 18<sup>th</sup> January 2005 for the states of Manipur and Mizoram to bring in efficiency in tariff determination and functioning of the power department of the respective states. Power generation, transmission and distribution in Manipur is taken care by the Electricity Department of the State Government. Under the Power Sector Reform Program, the state is working towards unbundling of its Electricity Department. In the latest tariff order, it is reported that from 1<sup>st</sup> February 2014 onwards, Manipur State Power Distribution Company Limited (MSPDCL) and Manipur State Power Company Limited (MSPCL) would run and manage the power sector in the state. Their effectiveness and efficiency post establishment would be seen in the days to come.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Manipur was 178.8 MW. It has grown by 13% from Feb 2013 level of 157.8 MW. Out of the total capacity as on Feb 2014, Hydro power capacity accounted for a share of ~45% followed by Gas (~26%) and Diesel based generation (~25%). RE based capacity accounted for a share of ~3%.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XVII-1: Generation Capacity Mix as on Feb 2014 - Manipur**



Source: CEA

#### 1.3. POWER SUPPLY POSITION

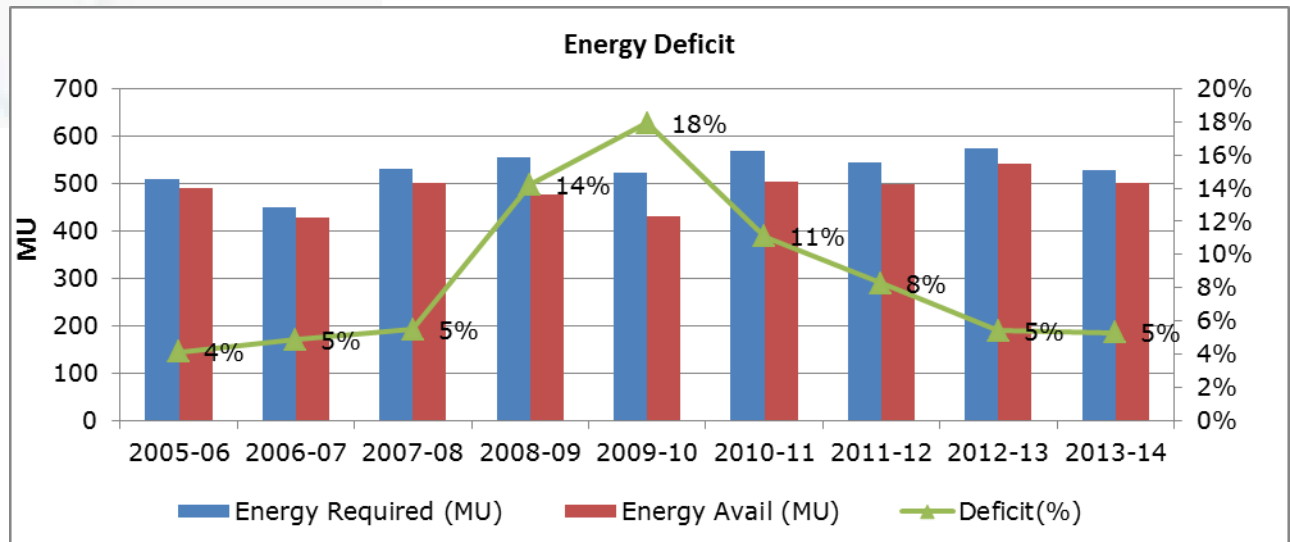
Manipur Power Department has very less generation capacity as compared to the requirement of the state. Moreover, the domestic plants run at a very low plant load factor. As a result, the state largely depends on power allocations from Central Generating Stations (CGS) for meeting its energy requirements. The power supply position in the state



is scant with power supply being poor and irregular. The state witnesses frequent load shedding and power cuts. Energy deficit in the state was 5% in 2013-14, while the peak deficit was 1%. The energy and peak deficit have been highest during 2008-09 and 2009-10, because of increasing cost of procuring power and no increase in tariff, leading to power cuts or otherwise sale of power to other states under UI.

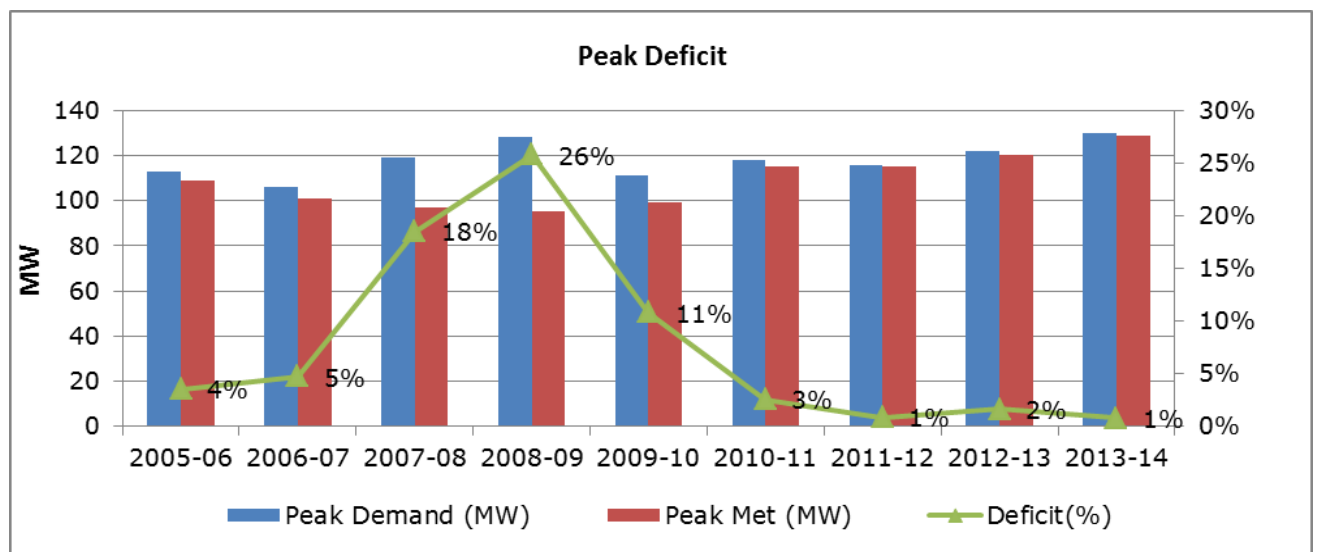
The trend of energy and peak deficit observed in Manipur over the years is highlighted in the figure below:

**Figure XVII-2: Energy Deficit - Manipur**



Source: CEA

**Figure XVII-3: Peak Deficit - Manipur**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

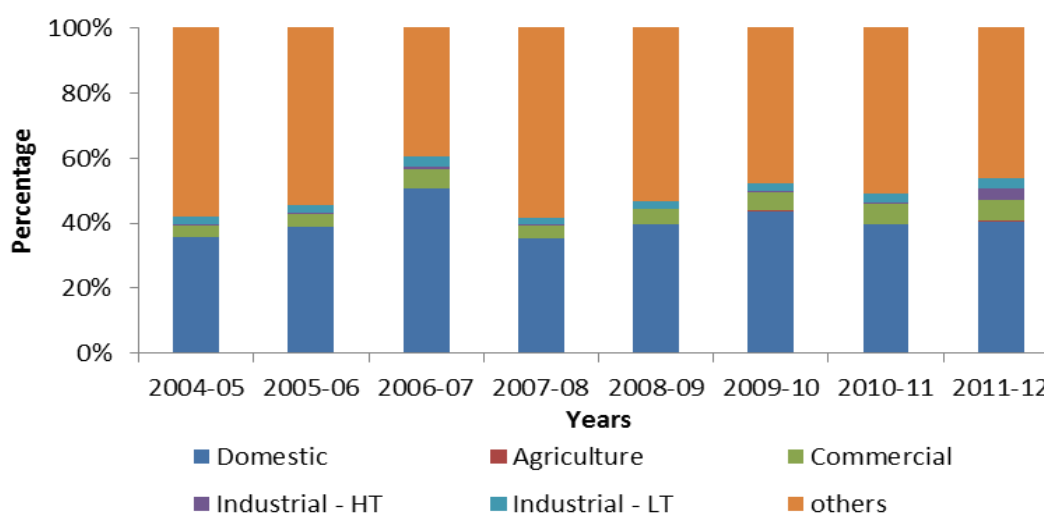
### 2.1. CONSUMER SALES MIX OF MANIPUR

The electricity department of the state government is responsible for power distribution across all consumer categories in the state.

In FY 2011-12, domestic sector dominated the sales mix with a share of 41%, followed by commercial category (6%). The share of domestic category has increased from 36% in 2004-05 to 41% in 2011-12 and commercial sales have increased from 4% in 2004-05 to 6.3% in 2011-12. Inter state sales of 24.24% in FY 2011-12 is accounted under others in Figure XVII-5 below.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XVII-4: Historical Trend in Consumer Sales Mix - Manipur**

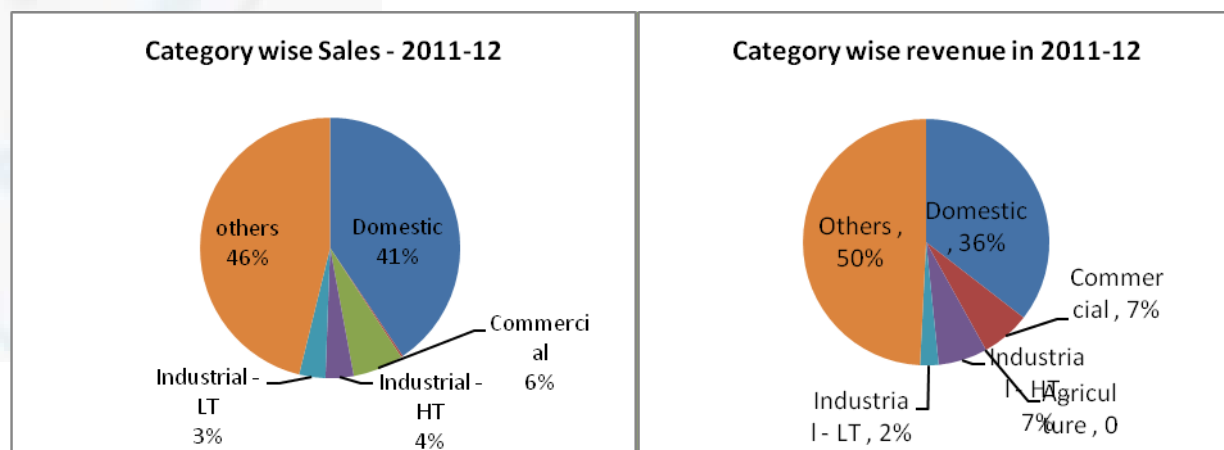


Source: PFC

The overall sales have registered a CAGR of 7% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of 13% followed by the domestic category with a CAGR of 7%.

In terms of revenue contribution, domestic category contributed more than 35% of revenue, followed by commercial category with a share of 7% (Refer Figure I-5 below).

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XVII-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Manipur**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) loss for Manipur State Electricity Department has been historically high because of the large share of domestic category consumers in the overall sales mix, requiring low tension and wide spread lines for household consumption.

Moreover, there has been lack of proper metering of consumers which further increases the losses and brings down the collection efficiency.

Refer to the table below for the trend observed over the years in collection efficiency and AT&C losses

**Table XVII-1: Year on Year Trend in AT&C losses and Collection Efficiency - Manipur**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	89%	-	-	-	81.3%	47.6%	40.2%	44.8%
Collection Efficiency	23%	-	-	-	43%	107%	113%	86%

Source: PFC

However, there have been efforts to upgrade the year old aging components with efficient ones under schemes like R-APDRP. As a result, the state has witnessed an increasing collection efficiency and reduction in Transmission and Distribution losses over the past few years.

## 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of distribution cost. The power purchase cost accounts for 55% of the total distribution cost (Refer table below).

The per-unit cost break-up for different cost components for the state of Manipur is provided in the table below:-

**Table XVII-2: Year on Year Trend Distribution Cost Breakup - Manipur**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.2	2.9	4.4	2.5	3.0	2.4	2.9	4.6
O&M (R&M + A&G + EC)	0.7	1.0	1.0	1.0	1.2	1.2	1.6	1.8
Interest	0.2	0.3	0.0	0.1	0.3	0.2	0.2	0.2
Depreciation	0.7	0.8	1.0	0.7	0.7	0.7	0.2	1.8
Other cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: PFC

It can be observed that power purchase cost per unit has increased over the years. This is because, fuel cost have been increasing over the years. Also increase in inter-state transmission charges by the PGCIL is another reason for increase in the cost.

Power purchase cost significantly increased in FY 07 and later in FY 12 because of the assembly elections in the state during those years. This led to procurement of costly power from outside the state in order to avoid any power outages.

Depreciation significantly increased in FY12 because of an increase in capital expenditure of upto 750% from the previous year. (Source: PFC)

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. Tariff hikes have not been reported quite often. Recently, tariffs were increased in FY 11 and FY 13 wherein there was a hike of 10% and 7.5% respectively.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XVII-3: Historical Trend Consumer Category Wise Revenue Realization - Manipur**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	0.88	0.83	0.70	2.97	3.08	2.60	2.76	2.53
Agriculture	-	-	-	-	-	-	-	0.00
Commercial	2.50	1.54	1.54	3.08	4.29	3.13	3.04	2.96
Industrial HT	0.00	0.00	0.00	5.00	-	-	5.00	5.33
Industrial LT	1.43	1.43	0.00	2.86	2.86	2.86	2.73	1.43
Others	2.32	2.07	2.67	3.13	4.78	3.81	2.99	3.08

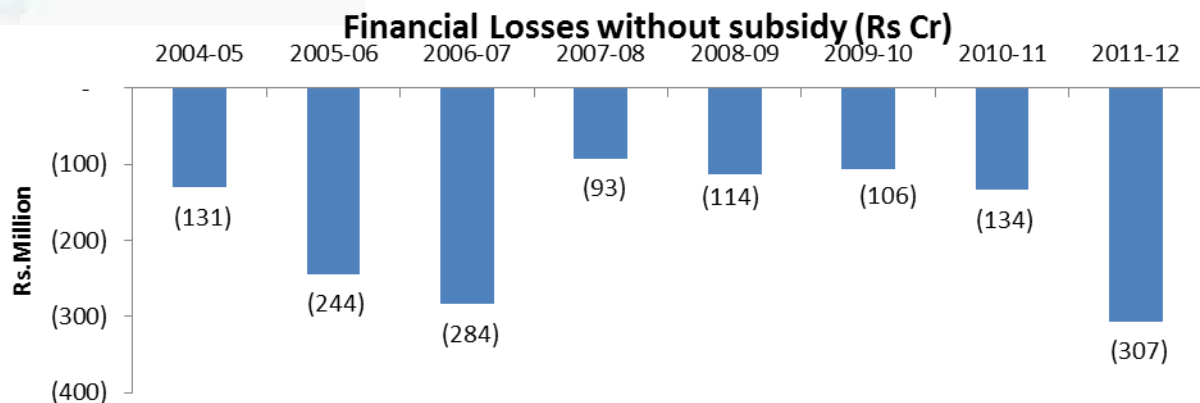
Source: PFC

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Manipur has increased over the years. As discussed earlier, this is mainly because of lack of metering, inadequate tariff revisions, increasing power purchase cost/transmission charges, lack of feeder, transformer and sub-station metering, etc.

**Figure XVII-6: Historical Trend Financial Losses (w/o) subsidies – Manipur**



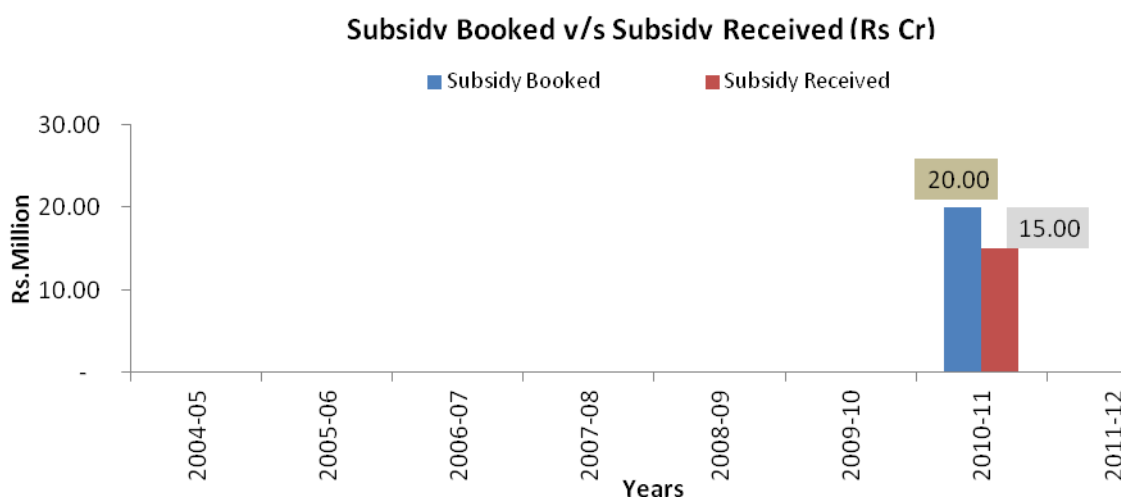
Source: PFC

However, with the implementation of IT systems under R-APDRP, the losses are expected to decrease.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The figure below provides the subsidy booked v/s subsidy received for the State Electricity Department

**Figure XVII-7: Historical Trend Subsidies Booked v/s Subsidies Received – Manipur**



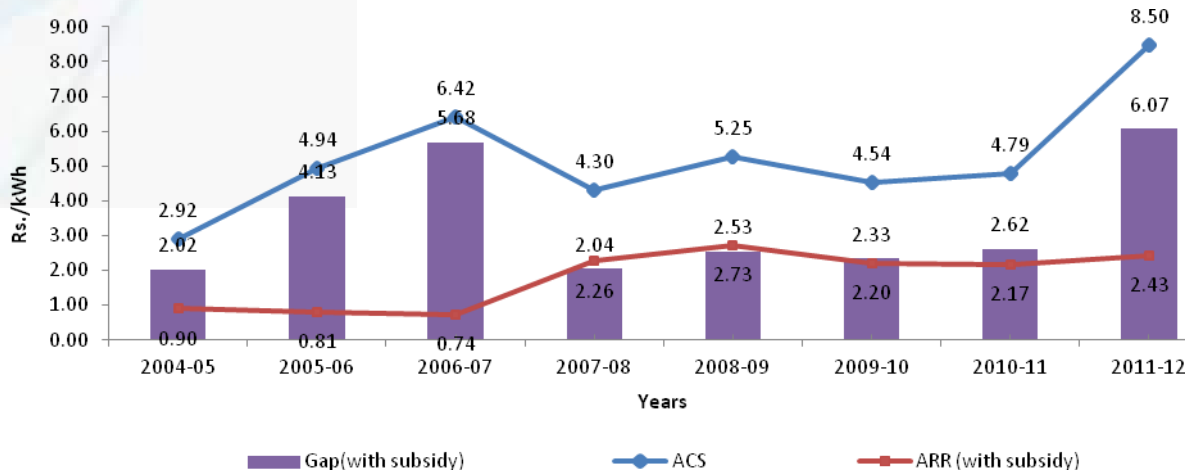
Source: PFC

There was a subsidy received by the Electricity Department from the state government on account of the increasing gap between ARR and ACS as reported in the tariff order 2010-11.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has been high. The highest gap was in 2006-07 and 2011-12. On both these years, there has been a substantial increase in PPC because of the state assembly elections.

**Figure XVII-8: Historical Trend ACS v/s ARR (with subsidy) – Manipur**



Source: PFC

The gap between ACS and ARR has been highest in the country. A reason why the state is now focusing on reforms and corporatization of the sector

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 3.4. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms a negligible portion of the total tax revenue. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details for the same are provided in the table below.

**Table XVII-4: Tax Revenue from Power Sector - Manipur**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0	0	0.34
Total Tax Revenue	794	1,258	1,522
Power sector Tax Revenue / Total state Tax Revenue	0%	0%	0.0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **dividends, interest on loans and advances, royalty/cess on water for power generation, rural electrification, T & D etc.** The details for the same are provided in the table below.

**Table XVII-5: Non-Tax Revenue from Power Sector - Manipur**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	104	88	107
Total Non-Tax Revenue	240	260	312
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	43%	34%	34.2%

Source: C&AG Audited Accounts for the state – 2011-12

The non tax revenue from Power sector has increased marginally from FY10 level. However, the contribution of sector in the total state non tax revenue decreased from 43% in FY10 to ~34 % in FY12.

The major portion of Non Tax revenue appears as general receipts in the CAG accounts 2011-12. The overall income generated from the power sector is to the tune of **~Rs 107 Cr.**

### 3.5. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table XVII-6: Expenditure on Power Sector - Manipur**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	301	309	195
Revenue Expenditure	168	212	273
Total Power Sector Expenditure	468	520	469

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The capital expenditure under Hydel generation has decreased over the years whereas revenue expenditure on the same has increased. Moreover, there has been a decline in capital investments in T&D in FY12.

The major portion of state investment was driven towards Transmission and Distribution and that of revenue expenditure were made towards Hydel generation.

**The quantum of expenditure on Power sector has been more than the revenue generated from the power sector.**

### 3.6. POWER BONDS

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 30 Cr.

### 3.7. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

In 2011-12, no guarantees/subsidies were reported towards the Power sector

### 3.8. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*



**Table XVII-7: Financing Requirement of Power Sector (2011-12) - Manipur**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	469
Loans And Advances made by the State Government (Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	361
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0.14
Total Power Sector Financing during the year	830
Sector Financing Requirement as a % age of total revenues of state	45%
GSDP nominal	7535
Sector Financing Requirement as a % age of GSDP	11.01%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	(307)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	62%
Sector Financing Requirement as a % age of GSDP including financial losses	15.08%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 40% of the revenue generated by the state and 10.08 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 70 % of the State revenue and 17.53 % of the GSDP.

The major portion of state investments made towards power sector went to T n D. The major portion of Revenue expenditure on power sector went towards Hydel generation.

Even though, the source of Non-Tax revenue is rural electrification, the state expenditure on the segment is a marginal portion.

The substantial Discom losses have increased the burden of the sector on state finances. Hence, there is a need for further investments to build and strengthen the infrastructure.

## **4. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Central Government constituted a Joint Electricity Regulatory Commission (JERC) for the states of Mizoram and Manipur on 18<sup>th</sup> January, 2005 and it started its operations from 24<sup>th</sup> January, 2008. The first tariff order was issued by the commission on 15<sup>th</sup> March 2011 for FY 2011-12. The commission has been working towards improving the power sector scenario in the state with active reforms. The recent notifications include MYT regulations, 2014 and standard of performance for Distribution and Transmission Licensees regulations, 2014

The key aspects of regulatory effectiveness have been discussed below -

### **4.1. STATUS OF MYT REGULATIONS**

The Commission has notified MYT Regulations in FY 2013 for the first control period covering years from FY 2014 to FY 2016. However, its implementation is not carried forward by the commission because of lack of requisite and reliable data with the Electricity Department of the state

### **4.2. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions in the state have not been frequent. The gap between ARR and ACS is one of the highest in the country. The latest major tariff revision which took place was in FY 11 and FY 13, to the tune of 10% and 7.5% respectively.

## 5. SUMMARY

With effective capacity addition and developmental programs, the energy deficits in the state have decreased over the years. However, since most of the power generation in the state is from hydro energy, there is irregularity in its generation because of its seasonal nature and dependence on monsoons. Till date, the state meets most of its requirements through firm allocations from central generating stations. Because of a large share of domestic consumers, which is further increasing and spread across the state, the power department is responsible to set up a vast network to meet their requirement. With this, there is a need to improve the system efficiency and metering level.

- 1. Power purchase cost:** Manipur largely depends on power procurement from outside states for meeting its domestic requirements. As of now, the power purchase cost constitutes a major portion of the overall cost and has been constantly increasing w.r.t demand.
- 2. Tariff revisions:** Even though there have been tariff revisions on FY 2010-11 and FY 2012-13, it hasn't been in tune to the increasing power purchase cost leading to increasing gap between ACS and ARR.
- 3. Financial Losses :** The distribution financial losses without subsidies in Manipur has increased over the years from Rs 93 Cr in FY 2007-08 to Rs 307 Cr in FY 2011-12. Major reason for such losses is the lack of proper metering, billing and IT infrastructure
- 4. Regulatory reforms:** The regulator for the states of Mizoram and Manipur would need to work on managing the performance of the respective Electricity department as per the standard of performance for Distribution and Transmission Licensees regulations, 2014 in order to facilitate further implementation of regulations on MYT and Open access.
- 5. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 45% of the revenue generated by the state and 11.01% of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector increases to 62% of the State revenue and 15.08% of the GSDP.

## XVIII MEGHALAYA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Within the provisions of the Electricity Act, 2003, The Meghalaya State Electricity Regulatory Commission (MSERC) was established on May 2004 as a statutory body responsible for tariff determination and regulation of power sector operations in the state. In the same lines and under the Meghalaya Power Sector Reforms Transfer Scheme 2010, the Meghalaya State Electricity Board was unbundled into four corporations, namely, the Meghalaya Energy Corporation Limited (MeECL)-The holding company, Meghalaya Power Distribution Corporation Limited (MePDCL), Meghalaya Power Generation Corporation Limited (MePGCL) and Meghalaya Power Transmission Corporation Limited (MePTCL). The restructuring of the board was an attempt by the state government to improve the performance of the utilities and to bring about better accountability and transparency.

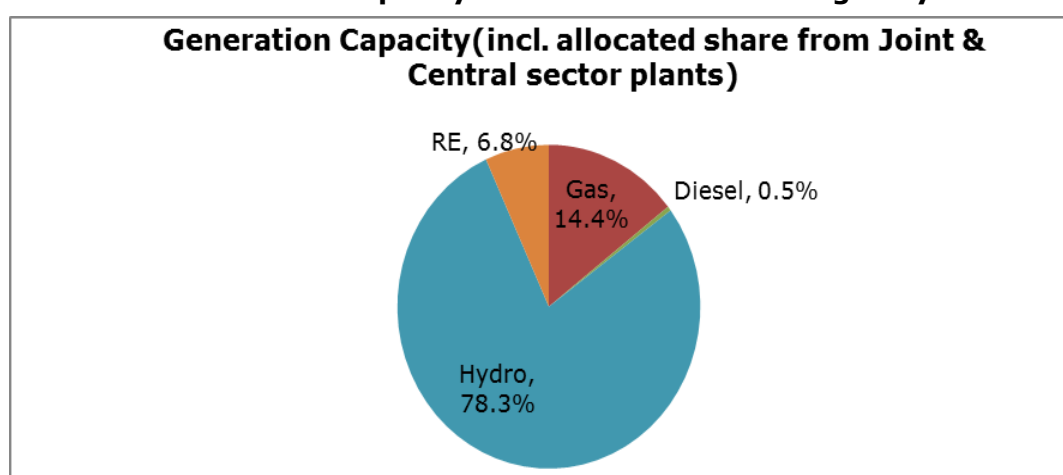
Further, In an effort to bring in more clarity in tariff determination and to promote an incentive/disincentive mechanism, the commission issued a notification on 1<sup>st</sup> Jan 2013, to shift from the present ARR scheme to MYT scheme, wherein all the utilities and licensees shall submit their MYT petitions by 30<sup>th</sup> November 2014 for the first control period covering the financial years FY 2014 - FY 2016

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Meghalaya was 455.27 MW, an increase of 21% from Feb 2013 level of 373.62 MW . Out of total capacity as on Feb 2014, Hydro accounted for the highest (~78.3% ) followed by Gas (~14.4%) and RE (~6.8%)

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XVIII-1: Generation Capacity Mix as on Feb 2014- Meghalaya**



Source: CEA

#### 1.3. POWER SUPPLY POSITION

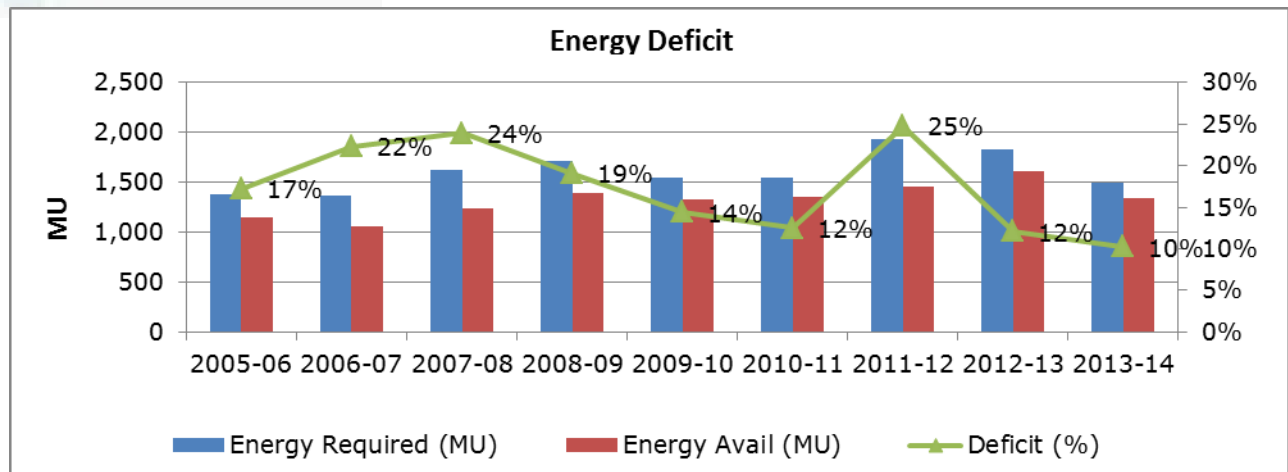
Power supply position in the state has been poor over the years. A major reason for this is lack of substantial capacity addition in the state. It is estimated that hydro potential in Meghalaya is around 3,000 MW out of which less than 7% has been utilized so far. As a

result, the supply has remained more or less constant. The state is largely supported by hydro power and due to decreasing rainfall, the power supply situation has further worsened, leading to routine load shedding. The state also procures power from central power stations to meet its growing demand. However, there has been a lack of proper transmission network infrastructure for wheeling and distribution of inter-state power.

The 12<sup>th</sup> Five year plan intends to bring about some improvement to the present condition of power supply shortage in the state with few hydro projects under construction.

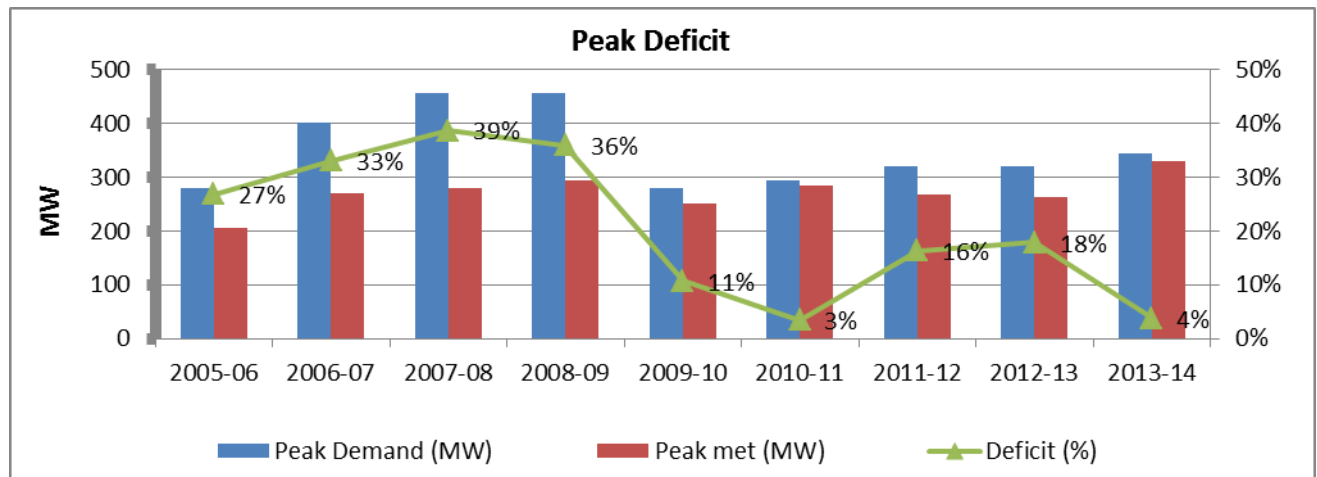
The trend of energy and peak deficit observed in Meghalaya over the years is highlighted in the figure below:

**Figure XVIII-2: Energy Deficit - Meghalaya**



Source: CEA

**Figure XVIII-3: Peak Deficit - Meghalaya**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF MEGHALAYA

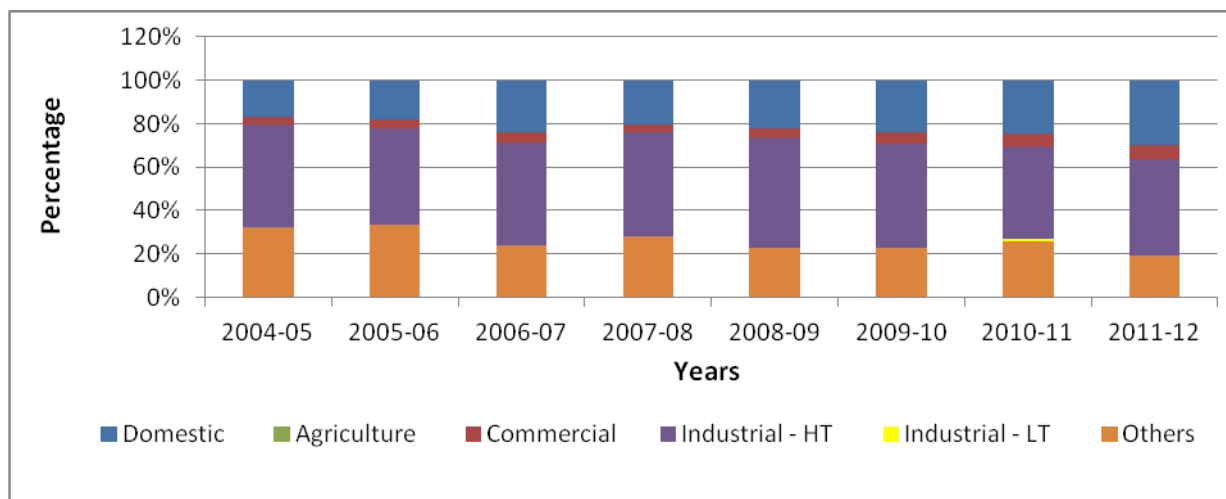
After the restructuring, the power distribution function is carried out by MePDCL across different consumer categories in the state.

In FY 2011-12, Industrial HT sector dominated the sales mix with a share of 44%, followed by Domestic category (30%).

The share of domestic consumers has increased over the years. This is a result of urbanization and high disposable income in the state, leading to more usage of electrical appliances. The share of domestic sales have increased from 17% in 2004-05 to 30% in 2011-12 and the industrial-HT sales has remained between 45-50% over the years.

The historical trend of consumer sales mix for the state is given in the figure below:-

**Figure XVIII-4: Historical Trend in Consumer Sales Mix - Meghalaya**



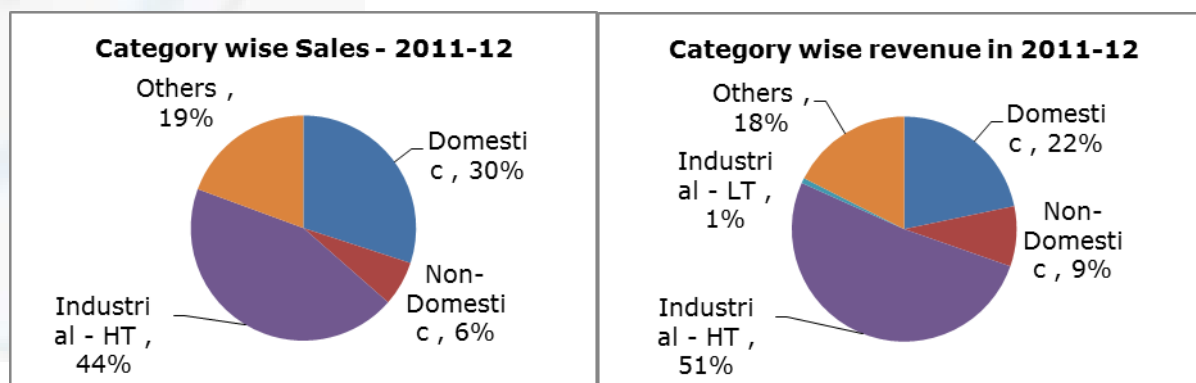
Source: PFC

The overall sales have registered a CAGR of 2% over the span of seven years wherein the sales of domestic category have registered a higher CAGR of 12% followed by the industrial category with a CAGR of approximately 2%.

In terms of revenue contribution, industries contributed more than 49% of revenue, followed by domestic and commercial categories with a share of 20% and 7%, respectively.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XVIII-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Meghalaya**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Meghalaya distribution utility have increased over the years, except a slight decrease in FY 2012

The higher share of domestic consumers with sale of power at low and medium voltage has led to increasing technical and commercial losses.

The loss level has decreased in FY12 due to improvements in metering of customers by MeECL. Around 38% unmetered consumers across all categories have been reported from the previous level of 59%. The MeECL is making an effort to achieve 100% metering by not allowing any new connection to a consumer without meters.

**Table XVIII-1: Year on Year Trend in AT&C losses and Collection Efficiency – Meghalaya**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	38%	38%	39%	40%	43%	49%	52%	45%
Collection Efficiency	84%	105%	99%	96%	82%	77%	75%	77%

Source: PFC

The increase in AT&C losses in FY 2009-10 and FY 2010-11 is because of part payment of the bills by the members of the Byrnihat Industries Association (BIA), Ri Bhoi district, which is the major industrial area in the state and accounts for high consumption.

## 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of distribution cost. The power purchase cost accounts for ~60% of the total distribution cost (Refer table below).

The per-unit cost break-up for different cost components for the state of Meghalaya is provided in the table below:-

**Table XVIII-2: Year on Year Trend Distribution Cost Breakup - Meghalaya**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	0.95	1.50	1.90	1.43	1.48	1.66	2.03	2.91
O&M (R&M + A&G + EC)	0.59	0.76	0.80	0.85	0.95	1.08	1.07	1.21
Interest	0.24	0.35	0.42	0.54	0.64	0.77	0.42	0.50
Depreciation	0.09	0.10	0.10	0.09	0.10	0.19	0.18	0.18
Other cost	(0.09)	0.34	(0.26)	(0.37)	(0.28)	(0.44)	0.06	-

Source: PFC

It can be observed that power purchase cost per unit has increased over the years. Power purchase cost increased most significantly in FY12 and FY 11 due to decreased power availability from domestic hydro plants and increased purchase of power from public and private power companies.

According to the chief minister of the state, the outstanding dues of Meghalaya towards central and state power companies against power purchases has accumulated to a staggering Rs. 470 crore. (Source: BS, dated 17<sup>th</sup> April 2014)

## 2.4. REVENUE REALIZATION

The tariff rates for different consumer category have not increased against the increasing power purchase cost. Significant tariff hike was witnessed in the year FY06, while the years after that haven't seen much hike. With lack of tariff hike in the recent years especially in FY 11 and FY 12, there has been a huge backlog and subsequently, the State Government has requested for a whopping 90% tariff hike for the financial year 2014-15. The MSERC has approved for a 15% increase though.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XVIII-3: Historical Trend Consumer Category Wise Revenue Realization - Meghalaya**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.80	4.01	2.20	2.45	2.68	3.06	2.88	2.48
Agriculture	-	-	-	-	-	-	-	-
Commercial	4.00	5.00	4.25	5.38	5.45	5.96	5.32	4.61
Industrial HT	2.34	2.12	2.77	2.81	3.80	5.01	4.03	3.98
Industrial LT	-	-	-	-	-	-	4.29	-
Others	1.90	2.87	2.86	3.37	4.24	3.29	2.33	3.10

Source: PFC

Lack of necessary tariff hikes, lack of utilization of hydro and renewable potential, unfavorable weather conditions and increasing outstanding payments has led to a very poor financial position of the state power sector calling for an immediate tariff hike and improved utilization of available resources.

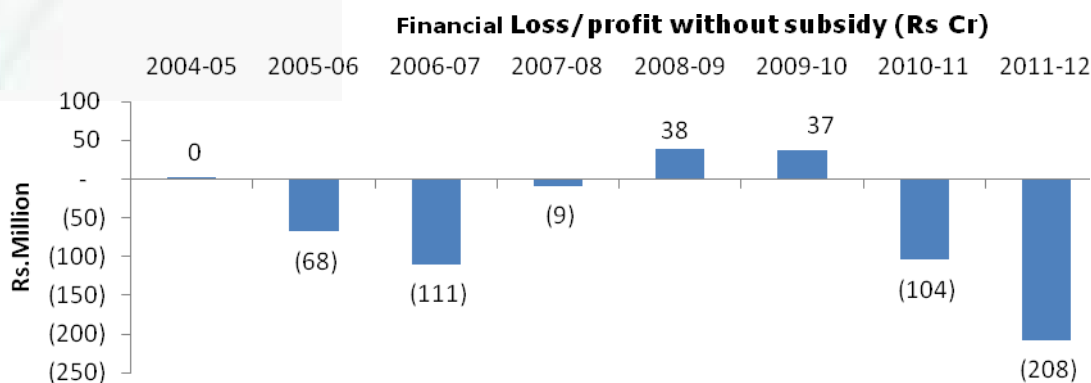


### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Meghalaya has increased over the years. As discussed earlier, major reason for this is the increasing power purchase cost and inadequate tariff revisions over the years.

**Figure XVIII-6: Historical Trend Financial Losses (w/o) subsidies – Meghalaya**



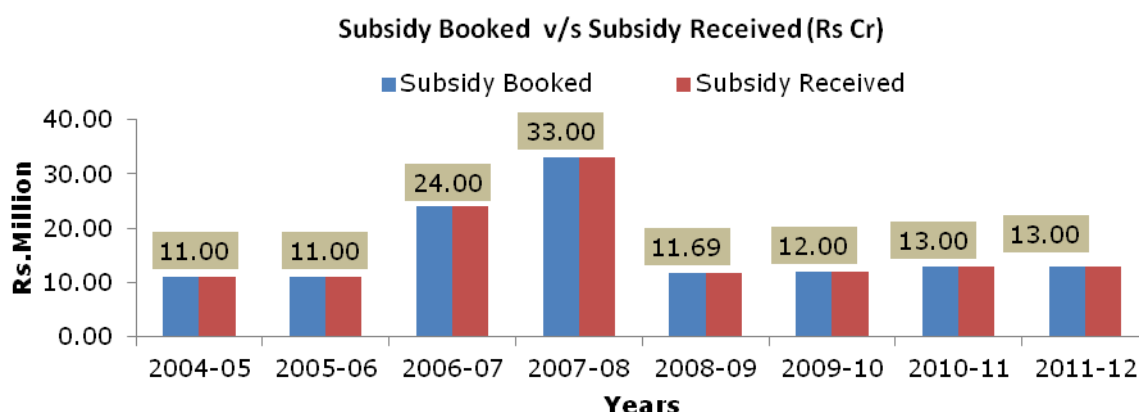
Source: PFC

The losses had decreased in FY 08 till FY 10 due to the commission's effort of bringing in revised tariff for different consumer category and carrying out a truing up process for the distribution company.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

The subsidy burden of the State Government increased in the year 2006-07 and 2007-08 so as to cover the increase in cost during those years. The figure below provides the subsidy booked v/s subsidy received for the distribution utilities in the state

**Figure XVIII-7: Historical Trend Subsidies Booked v/s Subsidies Received – Meghalaya**

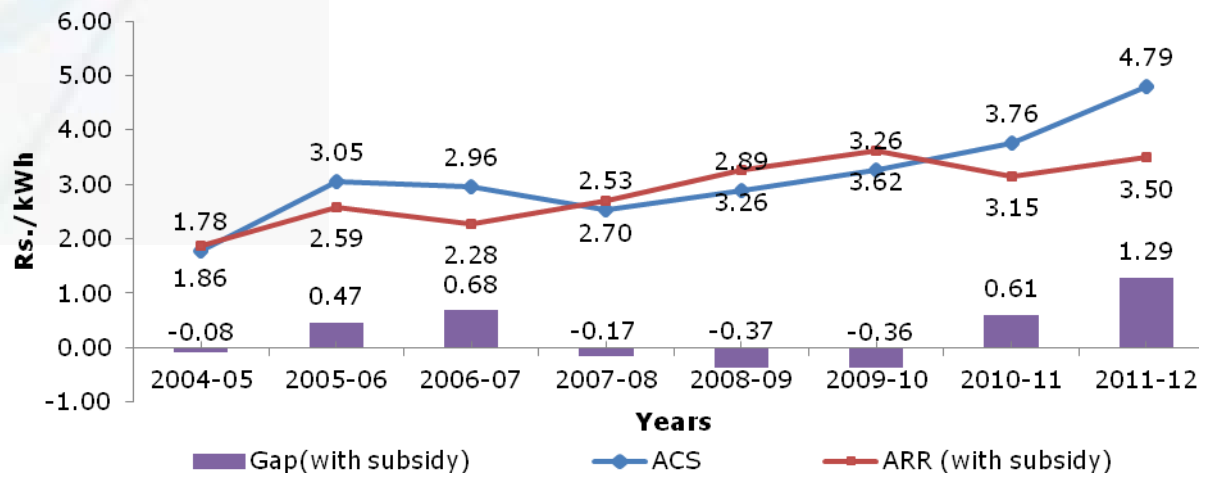


Source: PFC

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has widened in the years FY2011-FY2012 due to lack of tariff hike

**Figure XVIII-8: Historical Trend ACS v/s ARR (with subsidy) – Meghalaya**



Source: PFC

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector forms less than 1% of the total tax revenue, the tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details of the same are given below.

**Table XVIII-4: Tax Revenue from Power Sector - Meghalaya**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0	0	0.87
Total Tax Revenue	1057	1468	1,741.7
Power sector Tax Revenue / Total state Tax Revenue	0.00%	0.02%	0.0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **royalty/cess on water for power generation**. The details for the same are provided in the table below.

**Table XVIII-5: Non-Tax Revenue from Power Sector - Meghalaya**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	0	0	-
Total Non-Tax Revenue	275	302	368.25
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0	0%	0.0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The power sector did not generate any Non-tax revenue over the years. The overall revenue generated from power sector has increased from Rs 0.05 Cr in 2009-10 to Rs 0.87 Cr in 2011-12.

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.

**Table XVIII-6: Expenditure on Power Sector - Meghalaya**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	0	0	-
Revenue Expenditure	123	114	166
Total Power Sector Expenditure	123	114	166

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Over the span of three years there has been no state investment in Power sector. The revenue expenditure incurred on power sector has increased from the FY10 level primarily due to increase in general expenses.

In 2011-12, the expenditure on power sector far exceeded the revenues generated from the sector.

### 4.3. POWER BONDS

8.5% Meghalaya Government Power Bonds was issued by State Government in 2003-04 to be redeemed by 2016. The outstanding balance as on 1st April 2006 was Rs 13.99 Cr. The total outstanding balance at the end of 2011-12 was Rs. 5.60 Cr. As per RBI 'State Finance Report' 2014, there is no outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014.

### 4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The table below depicts the guarantees given to power sector relative to the total revenue of the state

**Table XVIII-7: Guarantees as a Percentage of Total Revenues - Meghalaya**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	650	1,101	1,292
Total Revenues of the State	1,332	1,769	2,110
Guarantees as a %age of Total Revenues of State	49%	62%	61%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

As shown above, the guarantees constitute a significant share of total revenues of the state over the three years.

Guarantees given by the state government has increased substantially from the FY10 level i.e. 49% of the state revenue in FY10 to 61% in FY12

### Subsidy

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table XVIII-9: Subsidy - Meghalaya**

Particulars				2011-12 Rs Cr	Average Share in Sector Subsidy %
					Rs Cr
Assistance to Electricity Boards	18	13	13	13	100.00%
Power Sector subsidy (% of total subsidy)	18	13	13	13	40%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The Subsidy payments to Power Sector were given as assistance to Electricity boards.

Over the span of three years, the proportion of subsidy payments made towards Power Sector, of the total state subsidy payments accounted for a share of 40%.

## **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.

**Table XVIII-10: Financing Requirement of Power Sector (2011-12) - Meghalaya**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	166
Loans And Advances made by the State Government (Net of Recoveries)	29
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net Of Receipts)*	1.4
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net Of Receipts)	0.46
Total Power Sector Financing during the year	197
Sector Financing Requirement as a % age of total revenues of state	9%
GSDP nominal	11085
Sector Financing Requirement as a % age of GSDP	1.77%
Financial Profit /(Losses) of Discoms during the year	(195)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	19%
Sector Financing Requirement as a % age of GSDP including financial losses	3.53%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated to be ~9% of the revenue generated by the state and 1.77 % of the Gross State Domestic Product. Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to a significant 19% of the State revenue and 3.53% of the GSDP.

The financing requirement of the sector is significantly higher than the revenues generated from the sector. Also considering the guarantees, the burden of state rises substantially, whereas the sectors revenue generating capacity is minimal compared to the level of financing requirement. This can be attributed to the negligible or no expenditure as investments. It reflects the poor performance of power sector in the state and the high level of burden on the state finances.

It is suggested that the State must invest in building and strengthening the infrastructure of Power Sector to enhance the revenue generating capacity of the sector.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Government of Meghalaya constituted the Meghalaya State Electricity Regulatory Commission (MERC) on March, 2005 and it became operational from June, 2006. MSERC has been proactive in implementing reforms in the state with recent notifications of MYT regulations, 2013 and Open Access Regulations, 2012.

The key aspects of regulatory effectiveness have been discussed below -

### **5.1. STATUS OF MYT REGULATIONS**

The Commission has notified MYT Regulations in FY 2013 for the first control period covering years from FY 2014 to FY 2016. However, its implementation is not carried forward by the commission because of lack of requisite and reliable data with the MePDCL.

### **5.2. STATUS OF OPEN ACCESS IMPLEMENTATION**

The Commission notified the Open Access Regulations on 27<sup>th</sup> April 2012 for consumers requiring more than 1MW, stating guidelines on open access wheeling charges, cross subsidy surcharge and additional surcharges. The Commission has approved the following costs for open access consumers for FY 2014-15:

- Wheeling charge of Rs.28,769/MW/Day
- Cross subsidy surcharge of Rs.0.95 per unit for IEHT consumers and Rs.1.05 per unit for IHT consumers.

### **5.3. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions in the state have not been frequent. The latest major tariff revision which took place was in FY 12, to the tune of 15%.

## 6. SUMMARY

The energy deficits in the state have increased over the years, given the low PLF's of hydro plants. This has further increased the power purchase cost of the state, as lower PLF's of state generation capacity have led to procurement of costly power from central power stations and other short term sources. The key parameters of the states are discussed below-

- 1. Unmetered sales:** In the absence of proper metering and lack of efficient revenue collection, there is uncertainty about revenue realization and AT&C losses. The state has however made ways to improve the revenue collection through proper metering under the RGGVY scheme in the recent years.
- 2. Inadequate Tariff Revisions:** No tariff hikes were observed in FY 11 and FY 12 against the increasing power purchase cost. As a result, there has been a huge outstanding due to central and other power stations.
- 3. Power purchase cost:** Meghalaya has a substantial share of hydro power in which majorly depends on proper weather conditions and monsoon. Weak monsoon over the years has led to low PLF which has forced the state to procure costly medium and short term power leading to increase in power purchase cost.
- 4. High Peak and Energy deficit:** There has been high energy and peak deficit in the state because of low capacity addition and infrastructure development. Moreover, lack of tariff revisions against increasing costs has led the distribution utility to cut power supply for hours in a day.
- 5. Financial Losses:** The distribution financial losses without subsidies in Meghalaya has increased over the years due to inadequate tariff revisions. The losses without subsidy have increased from Rs 68 Cr in 2005-06 to Rs 208 Cr in FY 2011-12.
- 6. States Guarantees:** for the sector are significant and account for ~61% of Total Revenues of the state
- 7. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 9% of the revenue generated by the state and approximately 2% of the Gross State Domestic Product. Considering the present situation and the increasing financial losses of Discoms in the year 2011-12, the financing requirement of the sector is expected to increase upto 19% of the State revenue and 4%(approx) of the GSDP.



## XIX MIZORAM

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

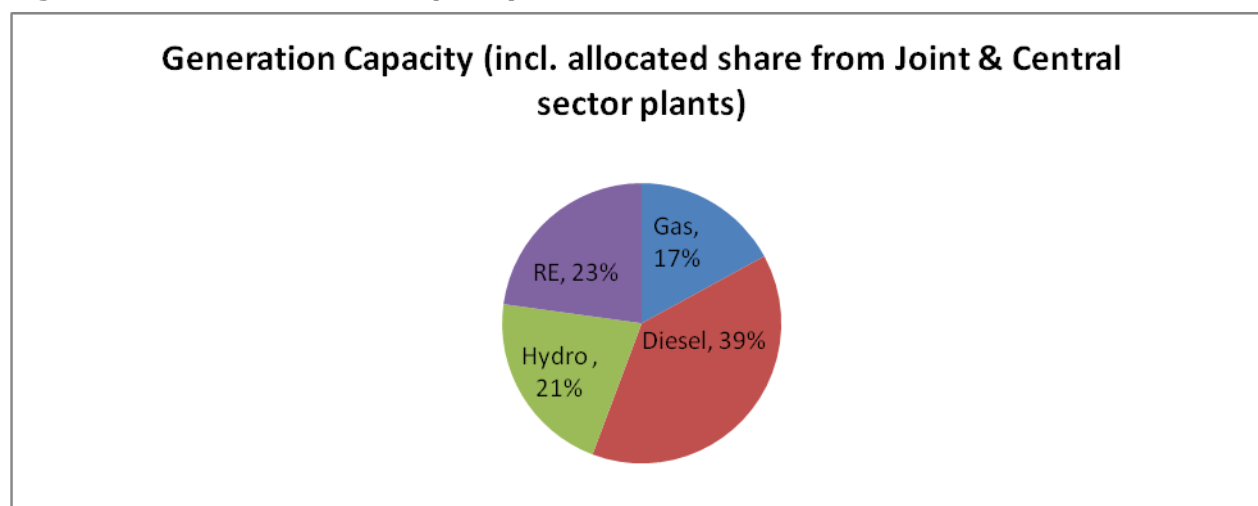
Power and Electricity Department of the state government is responsible for generation, transmission and distribution of electricity in the state of Mizoram. The state power operations are still carried by a single entity. This shows that the state has lacked progress in terms of effective reforms, restructuring and corporatisation of the department. PED Mizoram serves around 1.86 lakh consumers of various categories in the state. On 18<sup>th</sup> January 2005, the Joint Electricity Regulatory Commission was set up by the central government for the states of Manipur and Mizoram to promote transparency in the operations of the department.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Mizoram was 159.92 MW, an increase of 15% from Feb 2013 level of 138.92 MW . Out of total capacity as on Feb 2014, Diesel based generation accounted for the highest share (~39% ) followed by RE (~23%) and Hydro (~21%)

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XIX-1: Generation Capacity Mix as on Feb 2014- Mizoram**



Source: CEA

#### 1.3. POWER SUPPLY POSITION

Mizoram is largely dependent on outside sources for meeting its energy requirements. The state has firm share from NEEPCO, NHPC, NTPC and few gas based plants of Tripura, which account for close to 103.09 MW. Out of the domestic sources which account for 52.77 MW, the diesel generating plant of 0.50 MW is set aside for Lengpui Airport and heavy fuel plant of 22.92 MW at Bairabi is set aside for meeting emergency requirements. As a result, the state has only mini hydel plants as its domestic source, all of which account for a mere 29.35 MW.

Moreover, these plants have a seasonal generation, which makes it difficult for the state to meet its energy requirements.

The Energy deficit and peak deficit have decreased in the recent years because of efforts in generation, transmission and distribution.

**Generation:**

During the 11<sup>th</sup> and 12<sup>th</sup> five year plan, there has been considerable improvement in the capacity addition program. Following are the hydro projects commissioned/under construction during 11<sup>th</sup> and 12<sup>th</sup> five year plan:

- 3 MW Maicham-II SHP commissioned on 11/11/2009
- 12 MW Serlui 'B' SHP commission in the year 2010
- 60 MW Tuirial HEP and 210 MW Tuivai HEP expected to be completed by the end of 12<sup>th</sup> five year plan.

The total hydro potential of the state is expected to be 4500 MW, out of which less than 1% has been utilized so far. Hence, the state aims to improve its domestic generation capacity in future.

**Transmission:**

The state has also improved the transmission line capacity in the state for wheeling of grid power from outside state and further transmission of power within the state during the 11<sup>th</sup> five year plan. At the end of the 10<sup>th</sup> plan, total 132 KV line was 419.072 KMs, which increased to 638.37 KMs by 11<sup>th</sup> plan. The state is further working towards 400 KV line in the 12<sup>th</sup> plan

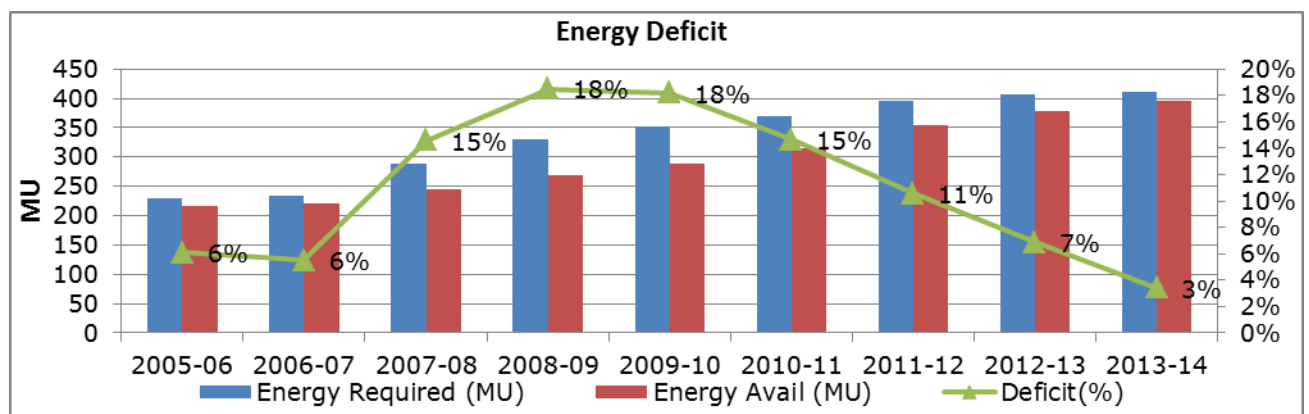
**Distribution:**

There has been an effort to incorporate IT systems, metering and SCADA under R-APDRP

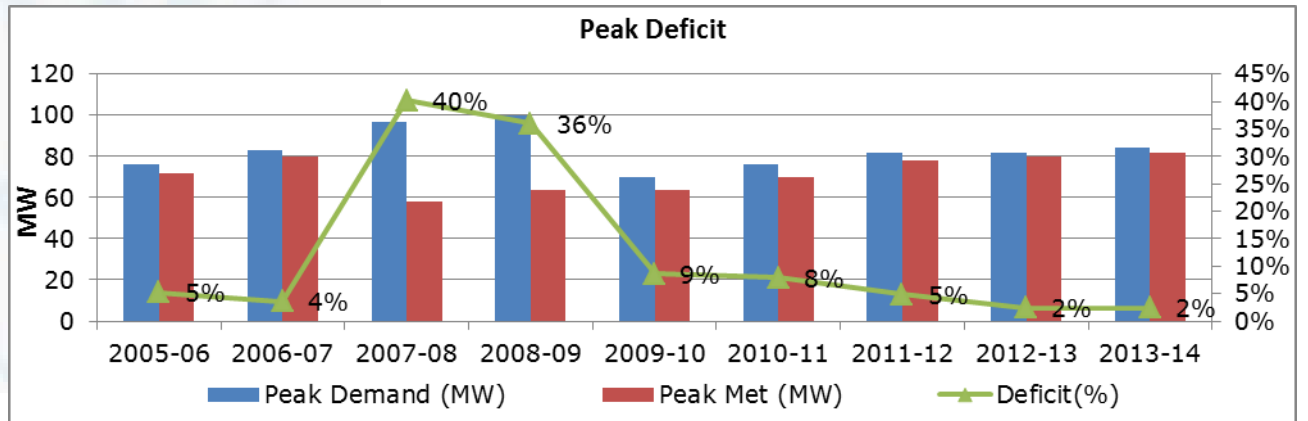
With these, the energy and peak deficit in the state has also reduced over the years.

The trend of energy and peak deficit observed in Mizoram over the years is highlighted in the figure below:

**Figure XIX-2: Energy Deficit - Mizoram**



Source: CEA

**Figure XIX-3: Peak Deficit - Mizoram**

Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF MIZORAM

Power and Electricity Department (PED) of the state government is the sole entity responsible for power distribution across different consumer categories.

In FY 2011-12, domestic sector dominated the sales mix with a share of 54%, followed by commercial category (6%). The share of domestic category has increased from 28% in 2004-05 to 54% in 2011-12. Inter state sales in FY 2011-12 accounted for 20.25% and is accounted under others in Figure I-5 below.

The historical trend of consumer sales mix for the state is given in the figure below:-

**Figure XIX-4: Historical Trend in Consumer Sales Mix - Mizoram**



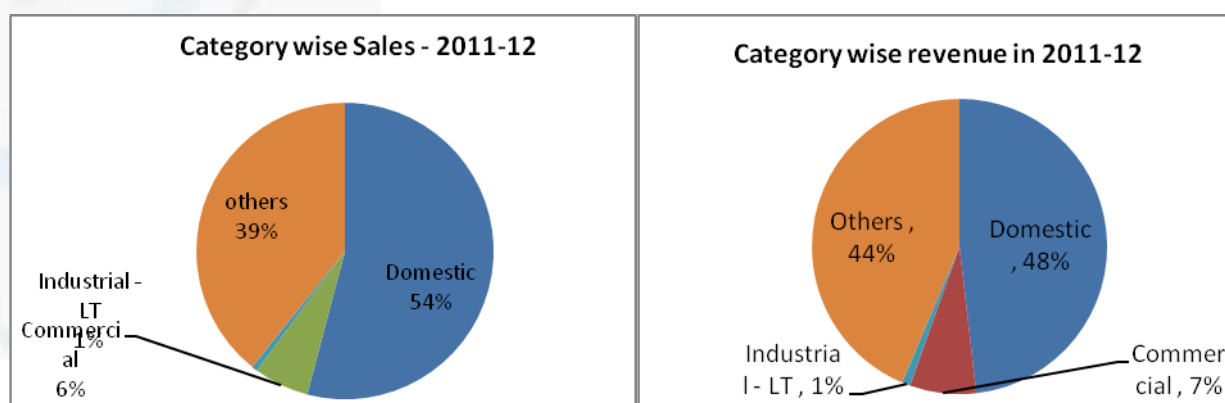
Source: PFC

The overall sales have registered a CAGR of 4% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of approximately 12% followed by the domestic category with a CAGR of 7.45%.

In terms of revenue contribution, domestic consumers contributed 48% of revenue, followed by commercial category with a share of 7%

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XIX-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Mizoram**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Mizoram Power and Electricity Department distribution have been high because of the uneven distribution of population across the remotest areas and mountainous terrain which has led to a vast network of LT lines

The higher share of domestic consumers and consumers under Kutir Jyoti scheme with sale of power at low and medium voltage has majorly contributed to higher technical and commercial losses.

The collection efficiency has been high over the years

**Table XIX-1: Year on Year Trend in AT&C losses and Collection Efficiency - Mizoram**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	25%	22.3%	55.9%	17.9%	41.1%	39.0%	41.0%	30.0%
Collection Efficiency	95%	105%	62%	122%	102%	102%	87%	109%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of distribution cost. The power purchase cost has accounted for an average of ~50-60% of the total distribution cost over the years (Refer table below).

The per-unit cost break-up for different cost components for the state of Mizoram is provided in the table below:-

**Table XIX-2: Year on Year Trend Distribution Cost Breakup - Mizoram**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.97	2.43	2.64	3.00	3.00	2.47	3.11	2.93

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
O&M (R&M + A&G + EC)	0.65	0.42	0.89	1.56	1.85	2.03	3.05	2.77
Interest	0.26	0.17	0.30	0.39	0.70	1.59	0.37	0.03
Depreciation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other cost	0.00	0.02	0.00	0.00	0.10	0.09	0.03	0.92

Source: PFC

It can be observed that the power purchase cost per unit has increased till 2009, with a slight decrease in FY 10 because of the operation of new hydro plants in that year. It however increased in FY 2011 due to the increasing demand. Further, there has been a reduction in 2012 because of the development of intra-state grid infrastructure in that year. One of the reasons for fluctuations in power purchase cost can be attributed to the seasonal generation capacity by the domestic hydro based power plants leading to purchase of power from outside sources.

## 2.4. REVENUE REALIZATION

Tariff hike was observed in 1<sup>st</sup> February 2011 with an increase of 10.73%, which is reflective in FY12 below. The commission further approved a hike of 9.72% for FY 2012-13.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XIX-3: Historical Trend Consumer Category Wise Revenue Realization - Mizoram**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.65	1.98	-	2.50	2.43	1.86	1.61	3.10
Agriculture	-	-	-	-	-	0.00	-	-
Commercial	1.43	2.86	-	3.33	3.00	3.33	3.33	4.21
Industrial HT	-	-	-	-	-	-	-	-
Industrial LT	5.00	5.00	-	5.00	5.00	5.00	0.00	5.00
Others	1.13	2.61	-	3.42	4.10	4.30	2.99	3.87

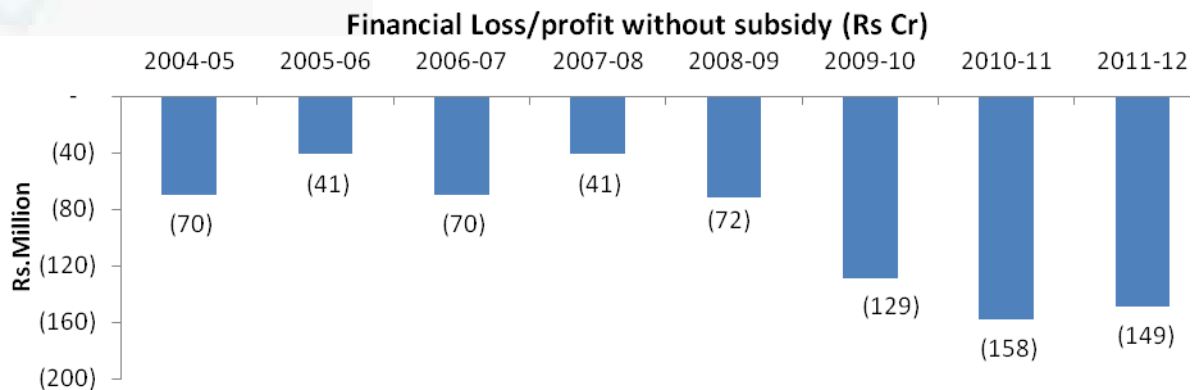
Source: PFC

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Mizoram has increased over the years. As discussed earlier, major reason for this is the increasing share consumers under low and medium voltage, lack of effective metering and in-adequate tariff revisions.

**Figure XIX-6: Historical Trend Financial Losses (w/o) subsidies – Mizoram**



Source: PFC

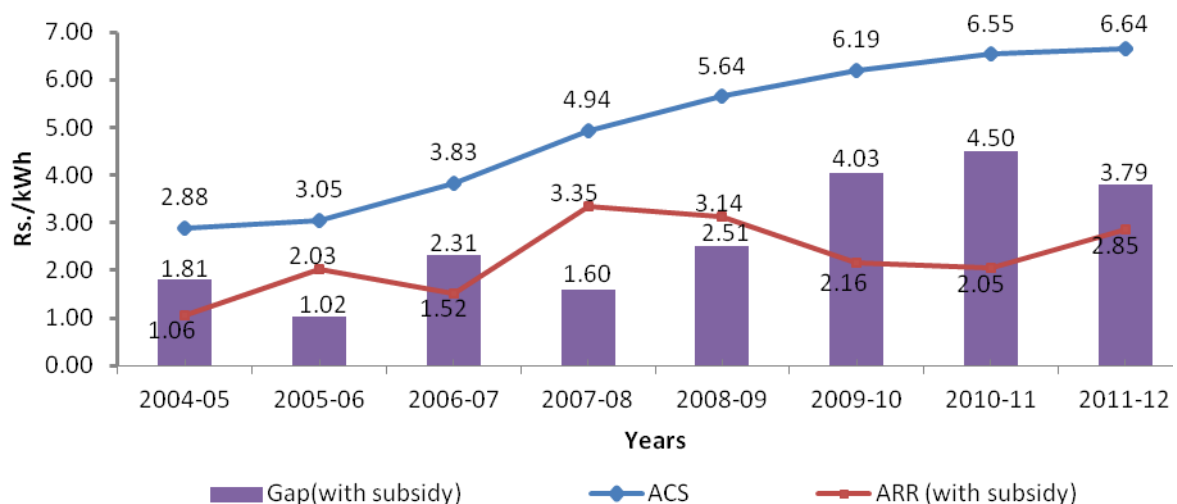
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There has been no subsidy booked/received reported.

#### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has remained high and ever increasing. This is primarily due to lack of tariff revisions against increasing power purchase cost to meet the increasing demand.

**Figure XIX-7: Historical Trend ACS v/s ARR (with subsidy) – Mizoram**



Source: PFC

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power sector has been a negligible portion of the total tax revenue of the state. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government.

**Table XIX-4: Tax Revenue from Power Sector - Mizoram**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0	0	-
Total Tax Revenue	502	582	1,007
Power sector Tax Revenue / Total state Tax Revenue	0	0%	0.0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **dividends, interest on loans and advances, royalty/cess on water for power generation, rural electrification, T & D etc.** The details for the same are provided in the table below.

**Table XIX-5: Non-Tax Revenue from Power Sector - Mizoram**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	64	71	110
Total Non-Tax Revenue	127	147	168
Power sector Non-Tax Revenue / Total state Non-Tax Revenue	50.4%	0.5	65.2%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Non Tax revenue from T & D constitutes the major portion of Non Tax revenue of the sector over the years. The total revenue generated from the power sector has increased from Rs 64 Cr in 2009-10 to Rs 110 Cr in 2011-12.

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector made by the state government.



**Table XIX-6: Expenditure on Power Sector - Mizoram**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	84	72	76
Revenue Expenditure	171	198	289
Total Power Sector Expenditure	254	271	365

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The major portion of state investment has been driven towards Transmission and Distribution as other expenditure. The major portion of Revenue expenditure on power sector has been towards Hydel generation. The revenue expenditure increased by ~46% from 2010-11 which was majorly due to increase in expenditure under Hydel generation – purchase of Power.

The quantum of expenditure on Power sector exceeds the revenue generated from the power sector.

### **4.3. POWER BONDS**

8.5% Power Bonds Government of Mizoram were issued by State Government in 2003-04 to be redeemed by 2016. The outstanding balance as on 1st April 2006 was Rs. 45.57 Cr. The total outstanding balance at the end of 2011-12 was Rs. 20.5 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 10 Cr.

### **4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

In 2011-12, no guarantees/subsidies were reported to the power sector.

### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government..*

**Table XIX-7: Financing Requirement of Power Sector (2011-12) - Mizoram**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	365
Loans And Advances made by the State Government (Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net Of Receipts)*	5
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net Of Receipts)	0
Total Power Sector Financing during the year	370
Sector Financing Requirement as a % age of total revenues of state	32%
GSDP nominal	5,017
Sector Financing Requirement as a % age of GSDP	7.37%
Financial Profit /(Losses) of Discoms during the year	149
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	44%
Sector Financing Requirement as a % age of GSDP including financial losses	10.34%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 32 % of the revenue generated by the state and 7.37 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 19% of the State revenue and 4.40 % of the GSDP.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Central Government constituted a Joint Electricity Regulatory Commission (JERC) for the states of Mizoram and Manipur on 18<sup>th</sup> January, 2005 and it started its operations from 24<sup>th</sup> January, 2008. The first tariff order was issued by the commission on 12<sup>th</sup> January 2011 for FY 2011-12. The commission has been working towards improving the power sector scenario in the state with active reforms. The recent notifications include MYT regulations, 2014 and standard of performance for Distribution and Transmission Licensees regulations, 2014

The key aspects of regulatory effectiveness have been discussed below -

### ***5.1. STATUS OF MYT REGULATIONS***

The Commission has notified MYT Regulations in FY 2014 for the first control period viz., FY 2015-16. However, its implementation is not carried forward by the commission because of lack of requisite and reliable data with the P&E department of the state

### ***5.2. FREQUENCY OF TARIFF REVISIONS***

The latest major tariff revision which took place was in FY 2010-11 and FY 2012-13, to the tune of 10% and 11% respectively

## 6. SUMMARY

With effective capacity addition and developmental programs, the energy deficits in the state have decreased over the years. However, since most of the power generation in the state is from hydro energy, there is irregularity in its generation because of its seasonal nature and dependence on monsoons. Till date, the state meets most of its requirements through firm allocations from central generating stations. Because of a large share of domestic consumers, which is further increasing and spread across the state, the power department is responsible to set up a vast network to meet their requirement. With this, there is a need to improve the system efficiency and metering level.

- 1. Power purchase cost:** Mizoram has a substantial share of hydro power in its generation based capacity. There is further capacity addition being done in the state hydro power generation. With that in line, we expect the power purchase cost to decrease in the future. As of now, the state meets most of its requirements through procurement from CGS and power purchase cost constitutes a major portion of the overall cost.
- 2. Tariff revisions:** Even though there have been tariff revisions on 2010 and 2012, it has't been in tune to the increasing power purchase cost leading to increasing gap between ACS and ARR.
- 3. Financial Losses :** The distribution financial losses without subsidies in Mizoram has increased over the years form Rs 41 Cr in FY 2007-08 to Rs 149 Cr in FY 2011-12. Major reason for such losses is the lack of proper metering, billing and IT infrastructure
- 4. Regulatory reforms:** The regulator for the states of Mizoram and Manipur would need to work on managing the performance of the respective power department as per the standard of performance for Distribution and Transmission Licensees regulations, 2014 in order to facilitate further implementation of regulations on MYT and Open access.
- 5. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 32% of the revenue generated by the state and 7.37% of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector increases to 44% of the State revenue and 10.34% of the GSDP.

## XX NAGALAND

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

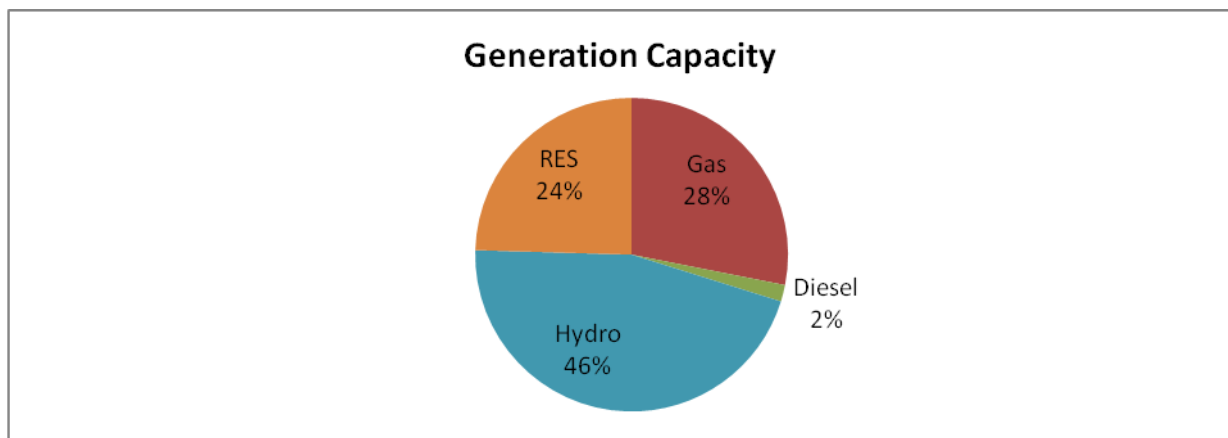
Department of Power, Nagaland (DPN) is responsible for the generation, transmission, distribution of power and maintenance of transmission and distribution network in the State. The state has low power generation capacity and is primarily dependent on allocation of power from Central Generating Stations. The major source of power supply is from North Eastern Electric Power Corporation Limited (NEEPCO). The other sources of power procurement are NTPC, NHPC etc.

#### 1.2. GENERATION MIX

As on February 2014, Nagaland's total generation installed capacity (including allocated share in Joint & Central Sector plants) of 117 MW out of which 46% came from Hydro based generation, followed by Gas (28%) and RES (24%). The capacity has not increased during the last year.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure XX-1: Generation Capacity Mix as on Feb 2014- Nagaland**

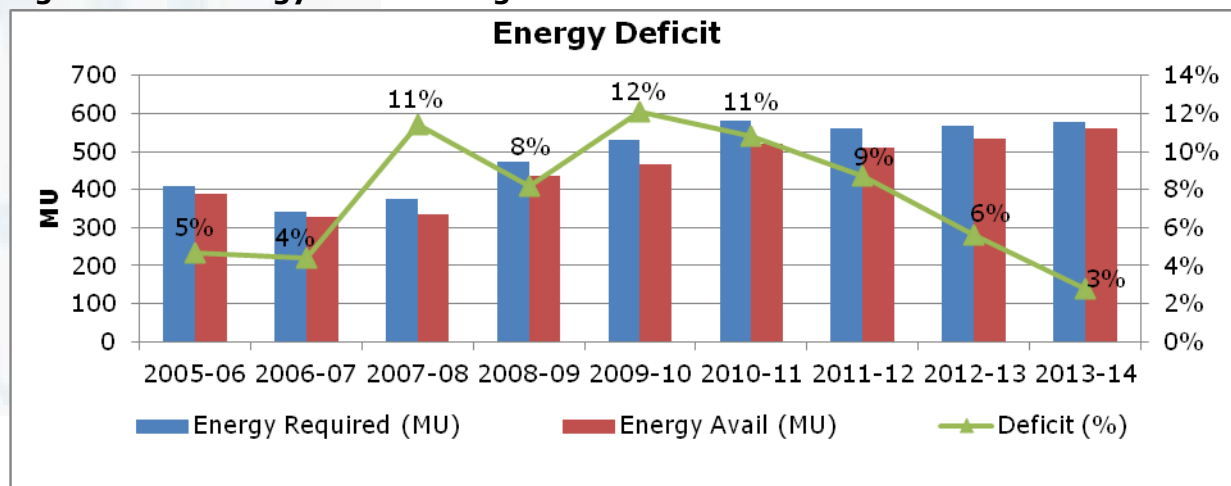


Source: CEA

#### 1.3. POWER SUPPLY POSITION

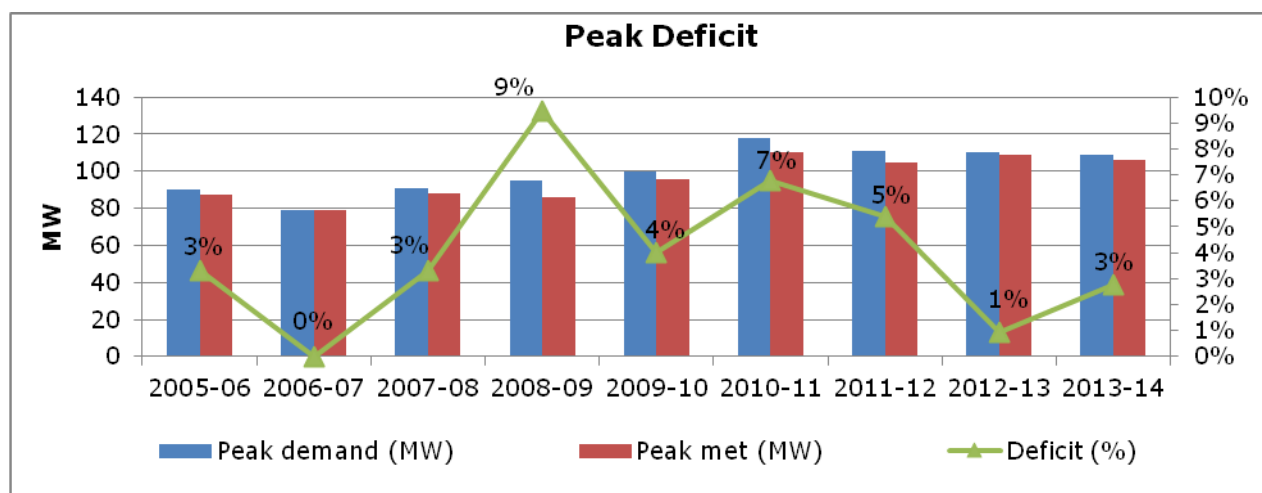
The energy and peak deficit has been reduced in recent years. The energy deficit reduced from ~12% in FY 2008-09 to ~3% in FY 2013-14. The peak deficit reduced from ~9% in FY 2008-09 to ~3% in FY 2013-14.

The trend of energy deficit observed in Nagaland over the years is highlighted in the figure below:

**Figure XX-2: Energy Deficit – Nagaland**

Source: CEA

The trend of peak deficit observed in Nagaland over the years is highlighted in the figure below

**Figure XX-3: Peak Deficit – Nagaland**

Source: CEA

However, power outages are a major cause of concern in the state along with the issue of voltage fluctuation and transformer failure.

To mitigate the problem the problem of outages, the Power Sector Authorities in the state are pursuing for establishing Hydroelectric Power project as well as smaller hydro projects and other renewable source generation projects.

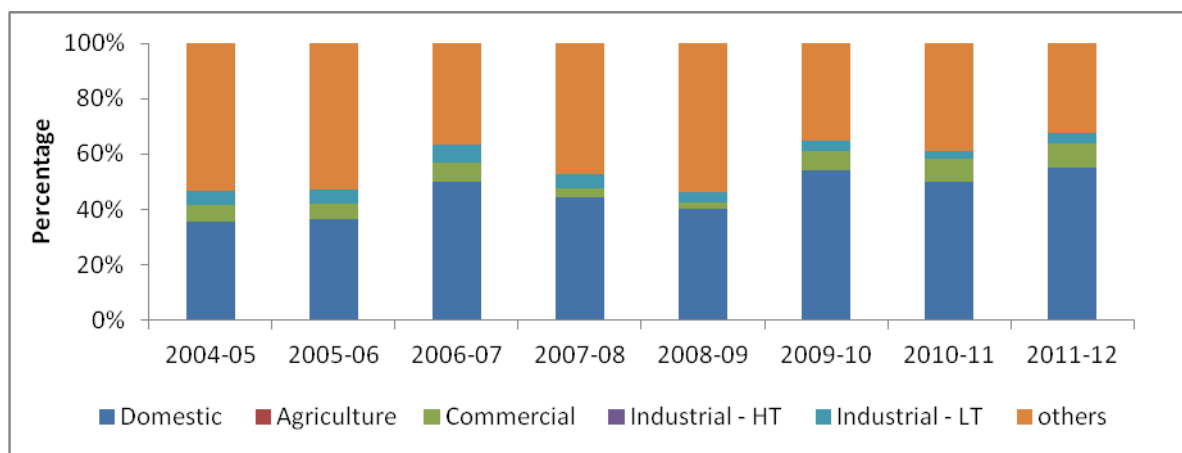
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF NAGALAND

In FY 2011-12, the Domestic consumers dominated the sales mix, with a share of ~55% followed by commercial (9.1%). The others category accounted for 32.3 % of the sales mix. The share of Domestic category increased from 36 % in 2004-05 to 55 % in 2011-12 and share of commercial category increased from 6% in 2004-05 to 9.1% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XX-4: Historical Trend in Consumer Sales Mix – Nagaland**



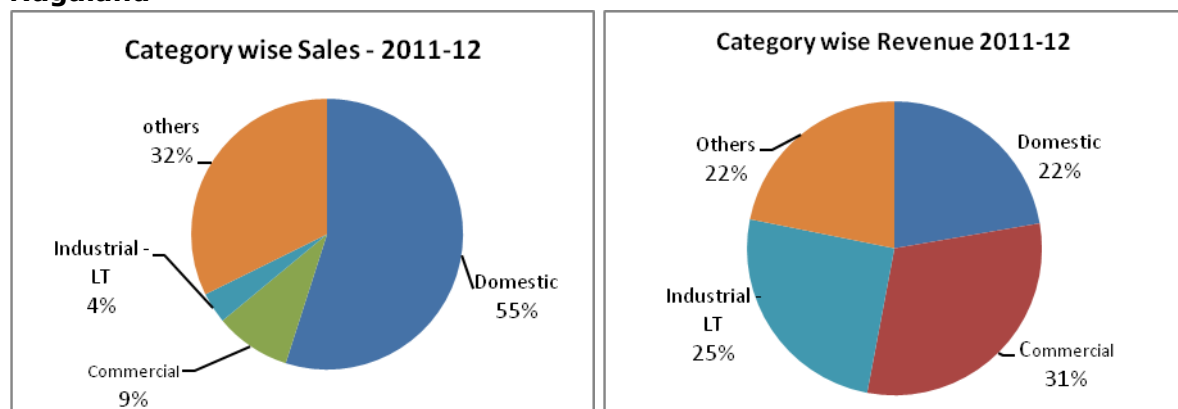
Source: PFC

The overall sales have increased at a CAGR of ~6% over a span of seven years wherein the sales of commercial and domestic category have registered a higher CAGR of 13%.

On the revenue front Commercial category accounted for 31% share in total revenues, followed by Industries and Domestic with a share of 25% and 22% respectively.

The figure below presents the comparative analysis of consumer sales and revenue mix for 2011-12

**Figure XX-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Nagaland**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for DPN have been relatively high however; it has reduced significantly from 43% in 2004-05 to 22% in 2011-12.

**Table XX-1: Year on Year Trend in AT&C losses and Collection Efficiency - Nagaland**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	43%	50.6%	52.7%	49%	44%	65%	49%	22%
Collection Efficiency	89%	83%	78%	79%	88%	53%	78%	124%

Source: PFC

The high level of losses are primarily due to unpaid electricity bills of public buildings and Government offices, theft, illegal tapings from electrical lines and meter tampering etc. It is reported (for FY 2012-13) that about 50% of total connections are with defective meters. However, high collection efficiency in 2011-12 adds to low AT&C losses in the state.

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost accounts for 65% of the total distribution cost. The average distribution cost in Nagaland has grown at a CAGR of ~10% over a span of seven years and power purchase cost has grown at CAGR of 13 %

The per unit cost break-up for different cost components is highlighted in the table below:-

**Table XX-2: Year on Year Trend Distribution Cost Breakup - Nagaland**

Cost Component	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.9	1.9	2.4	2.7	3.6	3.0	3.4	4.5
O&M (R&M + A&G + EC)	0.6	0.7	1.1	1.5	1.5	1.3	1.6	1.7
Interest	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.4
Depreciation	0.4	0.4	0.5	0.6	0.6	0.4	0.3	0.4
Other cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: PFC

The state of Nagaland is dependent upon Central Generating Station and hence it procures major portion of energy requirement from external sources like NEEPCO, NTPC, NHPC etc. Hence, the power purchasing cost is subject to fluctuation in the Coal and Gas prices.

## 2.4. REVENUE REALIZATION

**The tariff realizations have increased in FY 2011-12 for all categories of consumers.**

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XX-3: Historical Trend Consumer Category Wise Revenue Realization - Nagaland**



Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	2.38	2.53	2.68	2.54	2.55	2.10	2.13	3.40
Agriculture	3.57	3.57	3.57	3.33	3.33	3.48	3.75	4.69
Industrial LT	2.50	2.50	3.08	3.08	2.86	2.50	2.73	3.85

Source: PFC

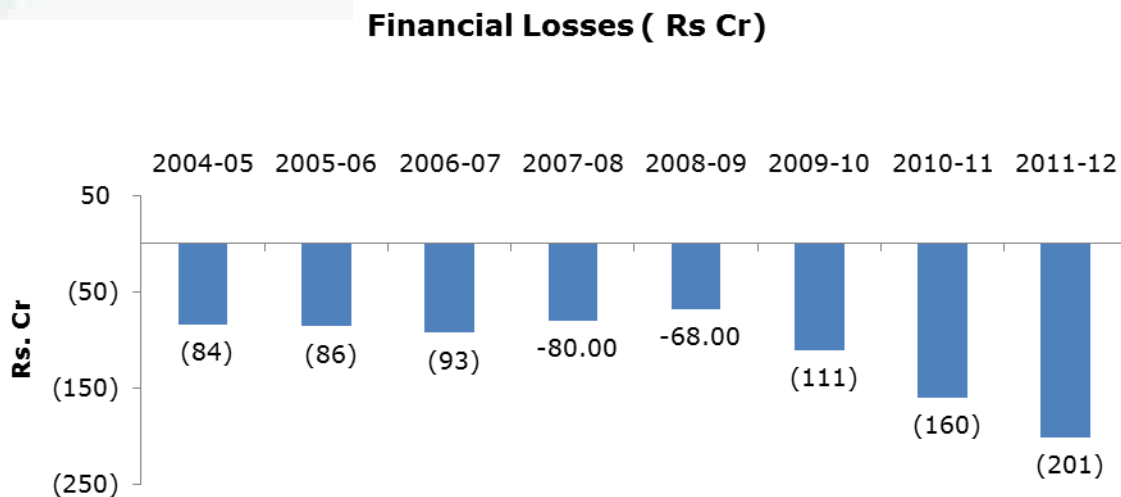
The revenue realization has improved in FY 2011-12. This is due to the tariff revisions to the tune of ~17% in the year.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The power department has accounted for losses in the past seven years which has worsened in last three years. The losses increased from Rs 68 Cr in FY 09 to Rs 201 Cr in FY 12.

**Figure XX-6: Historical Trend Financial Losses (w/o) subsidies – Nagaland**



Source: PFC

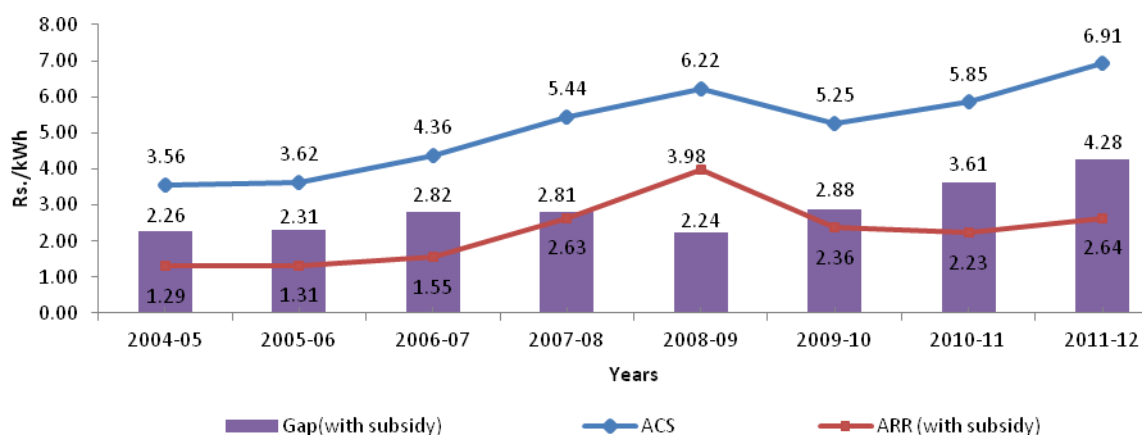
#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There is no history available of Subsidies given to DPN

#### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized has increased from Rs/kWh 2.26 in FY 2004-05 to Rs/kWh 4.28 in FY 2011-12.

**Figure XX-7: Historical Trend ACS v/s ARR (with subsidy) – Nagaland**



Source: PFC

The increase in gap is primarily on account of increase in Distribution cost and losses in the state.

## 5. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 5.1. INCOME FROM POWER SECTOR

#### Tax Revenue

The tax revenue from the power sector forms a negligible portion of the total tax revenue of the state. The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government.

**Table XX-4: Tax Revenue from Power Sector - Nagaland**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0.11	0.05	0.04
Total Tax Revenue	615	917	1,107
Power sector Tax Revenue / Total state Tax Revenue	0.02%	0.01%	0.0%

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

#### Non-Tax Revenue

The non-tax revenue from power sector is through **dividends, interest on loans and advances, royalty/cess on water for power generation, rural electrification, T & D etc.** The details for the same are provided in the table below.

**Table XX-5: Non-Tax Revenue from Power Sector - Nagaland**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	75	74	94
Total Non-Tax Revenue	126	183	233
Power sector Non-Tax Revenue / Total state Non- Tax Revenue	59.5%	40.4%	40.5%

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

Non Tax revenue from Transmission constitutes the major portion of Non Tax revenue of the sector. Since FY 10 there has been an increase in non tax revenue from the sector. However, the contribution of the sector to the state revenues has decreased from ~60% in 2009-10 to ~41% in 2011-12.

**The overall income generated from the power sector has decreased from Rs 94 Cr in 2009-10 to in ~Rs 74 Cr 2011-12**

## 5.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector in the state of Nagaland.

**Table XX-6: Expenditure on Power Sector - Nagaland**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	71	60	86
Revenue expenditure	170	222	294
Total expenditure	241	283	380

Source: State Government annual accounts from CAG 2011-12, 2010-11, 2009-10

The capital and revenue expenditure have risen over the span of three years primarily due to increase in investments under T&D and revenue expense under Thermal generation.

The major portion of state investment has been driven towards Transmission and Distribution. The major portion of Revenue expenditure on power sector went towards Thermal generation.

**The quantum of expenditure on Power sector exceeds the revenue generated from the power sector.**

## 5.3. POWER BONDS

**The details of outstanding balance of power bonds issued by the state are given below.**

The outstanding amount of 8.5% Tax Free Special Bonds of the State Government (Power Bonds) issued by State Government, as on 1st April 2009 was Rs 55.24 Cr. The balance outstanding as on 31st March 2012 was Rs 31.57 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 20 Cr.

## 5.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

In 2011-12, no guarantees were given to the power sector.

### Subsidy

In 2011-12, there were no subsidy payments to the power sector.

## 5.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and*

*Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XX-7: Power Sector Financing Requirement (2011-12) - Nagaland**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	380
Loans And Advances made by the State Government (Net of recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	(15)
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net Of Receipts)	0
Total Power Sector Financing during the year	365
Sector Financing Requirement as a % age of total revenues of state	27%
GSDP nominal	9,379
Sector Financing Requirement as a % age of GSDP	3.9%
Financial Profit/ (Losses) of Discoms during the year	(201)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	42%
Sector Financing Requirement as a % age of GSDP including financial losses	6%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated to be 27 % of the revenue generated by the state and 3.90 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 42 % of the State revenue and 6.04 % of the GSDP.

The substantial Discom losses have increased the burden of the sector on state finances. Hence, there is a need for investments to build and strengthen the infrastructure in the state.

## 5. ASSESSMENT OF REGULATORY EFFECTIVENESS

Under the provisions the Electricity Act, 2003, the Nagaland Electricity Regulatory Commission was established in 2008. It was formed as a One-member commission. However, it now faces the problem of inadequate manpower to operate efficiently and hence, operates with a functionally- deficient establishment.

### 5.1. STATUS OF MYT REGULATIONS

Not yet implemented.

The Commission is not in a position to introduce MYT Regime in the State mainly because of lack of requisite and reliable data. The present MIS and regulatory reporting system of the DPN is very inadequate for any such exercise at this stage.

### 5.2. STATUS OF OPEN ACCESS IMPLEMENTATION:

Not yet implemented

### 5.3. FREQUENCY OF TARIFF REVISIONS:

The tariff revisions were done in FY 2011-12. Thereafter, subsequent tariff revisions were accepted for the FY 2012-13 to the tune of 14% & FY 2013-14 to the tune of 7%.

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>Average Tariff Revisions</b>	0%	0%	0%	0%	0%	0%	0%	17%	14%	7%

Source: Tariff orders

## 6. SUMMARY

Key aspects of the state are summarized below :-

- 1. Energy and Peak Deficit:** There is a concern in state related to voltage fluctuations and transformer failure apart from the issue of load shedding.
- 2. Reforms:** The power sector in the state has yet not undergone the structural reforms and hence the state has a Power Department that is responsible for all the functions of the sector.
- 3. Under developed infrastructure:** The data collection and maintenance of data base of power sector is not efficient and credible in the state. DPN is directed to build accurate data and incorporate *Management information system* (MIS) to meet the requirements for ARR & Tariff petitions. Technical and commercial losses are yet to be segregated and quantified voltage wise. Moreover, there is a requirement of taking up corrective measures to reduce the losses. There is requirement to allocate funds for building up such an infrastructure.
- 4. Financial Losses:** DPN has been incurring losses for the past nine years. The prime concern here is the increase in cost, Collection efficiency and no tariff hikes. There has been tariff hike in FY 14. However, it was not sufficient to cover up all the losses. Moreover, there has been no state assistance in the form of subsidies for DPN to bring down the burden of losses.
- 5. Tariff Hikes:** The tariff hikes were approved in FY 2011-12 and hence there were revision in subsequent years. However, the revisions were not sufficient to cover up the Discom losses.
- 6. State Exposure to Power Sector:** The Financing requirement of the sector accounts for ~6% of the GSDP. However, the income generation from the sector in FY 2011-12 were very low compared to the requirement. Hence the burden on state finances is significant; however, the expenditure in the form of investments in T & D segment is extremely important.

## XXI ORISSA

### 1. INTRODUCTION

#### **1.1. BACKGROUND – POWER SECTOR OVERVIEW**

Orissa has been the pioneer among the Indian states to embark on a comprehensive reform for the electricity sector in the state. The primary aim of the reform was to deal with the fundamental issues underlying poor performance of the state utility as well as to restructure the power sector. The objective was to make power supply more efficient, meet the demands of a growing economy and develop an economically viable power industry, which will enable Orissa to attract private capital while safeguarding the interests of the consumers.

OSEB was unbundled in the year 1996 with the formulation of GRIDCO and OHPC. Further, on November 19, 1997 GRIDCO divided its distribution functions based on the four geographical zones viz. Western zone, North-Eastern Zone, Southern Zone and Central Zone forming four wholly owned subsidiaries (viz. Western Electricity Supply Company of Orissa Ltd (WESCO), North Eastern Electricity Supply Company of Orissa Ltd. (NESCO), Southern Electricity Supply Company of Orissa Ltd. (SOUTHCO) and Central Electricity Supply Utility (CESU, erstwhile Central Electricity Supply Company of Orissa Ltd. (CESU)) under the Companies Act, 1956.

Later in April 1999, the distribution business of GRIDCO was privatized when GRIDCO disinvested 51% of its share of its equity holding in Distribution Companies to Private Investors with financial and technical capabilities keeping a share holding of 39% with it and 10% share for Employees Welfare Trust. The distribution and supply business has since been undertaken by four Distribution Companies (DISCOMS) namely CESU, WESCO, NESCO and SOUTHCO. Three DISCOMS viz. WESCO, NESCO and SOUTHCO were taken over by Bombay Suburban Electric Supply (BSES) of Mumbai with effect from April 01, 1999, and CESU was taken over by the American Electricity Supply Corporation (AES) of USA with effect from September 01, 1999.

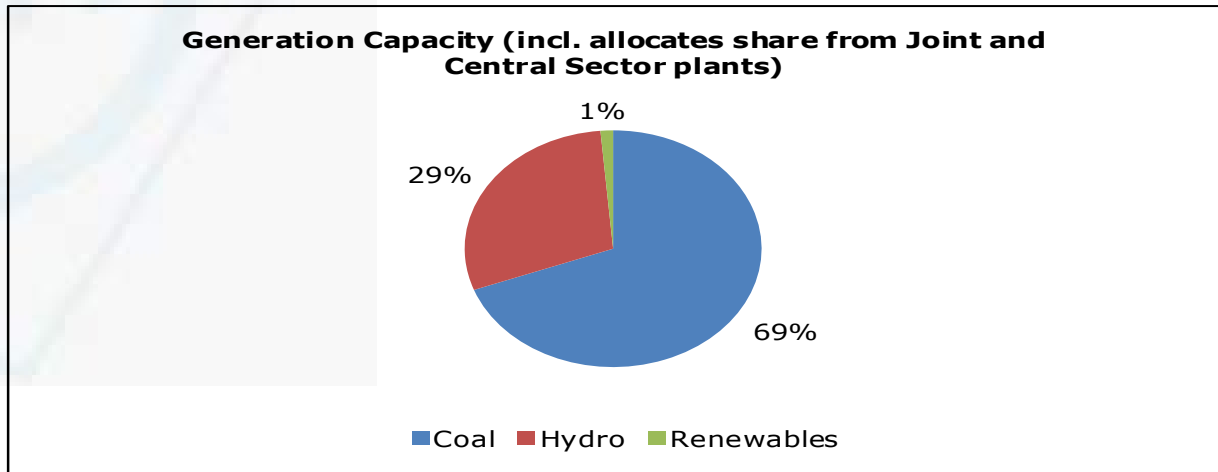
Under the existing legal set up, GRIDCO evacuates powers from the dedicated generating stations of OHPC and OGPC and delivers it at distribution licensee's end. The tariff determined by the Commission is applicable for sale of power by OHPC to GRIDCO.

#### **1.2. GENERATION MIX**

The total installed capacity in December 2013 (including allocated share in Joint & Central Sector plants) for Andhra Pradesh was 7,381 MW out of which Coal based power capacity accounted for ~69% followed by Hydro (~28%). RE based capacity accounted for a marginal share of ~1%.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.



**Figure XXI-1: Generation Capacity Mix (2012-13) - Orissa**

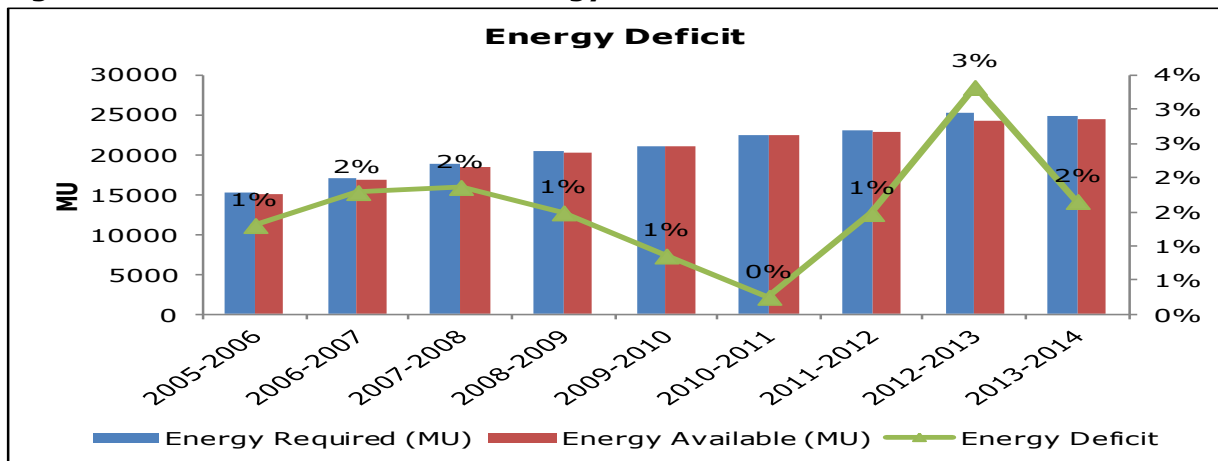
Source: CEA

### 1.3. POWER SUPPLY POSITION

Historically, the state of Orissa had witnessed low deficit levels, on account of high levels of generation capacity, which is supported by wide variety of generation mix.

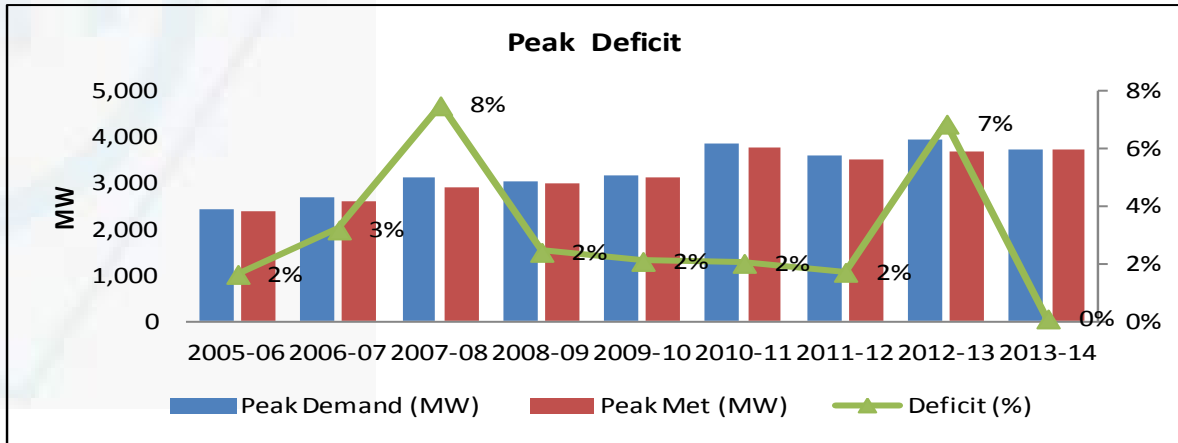
However, the peak deficit increased to ~7% in the year FY 13 from ~2% in the year FY 12, because the capacity addition was not able to match the increased demand in the state for that year. However, with the decline in the energy and peak demand the energy and peak deficits in the state reduced to ~2% and ~0% respectively, in FY 14.

The trend of energy and peak deficit observed in Orissa over the years is highlighted in the figure below:

**Figure XXI-2: Historical Trend in Energy Deficit – Orissa**

Source: CEA

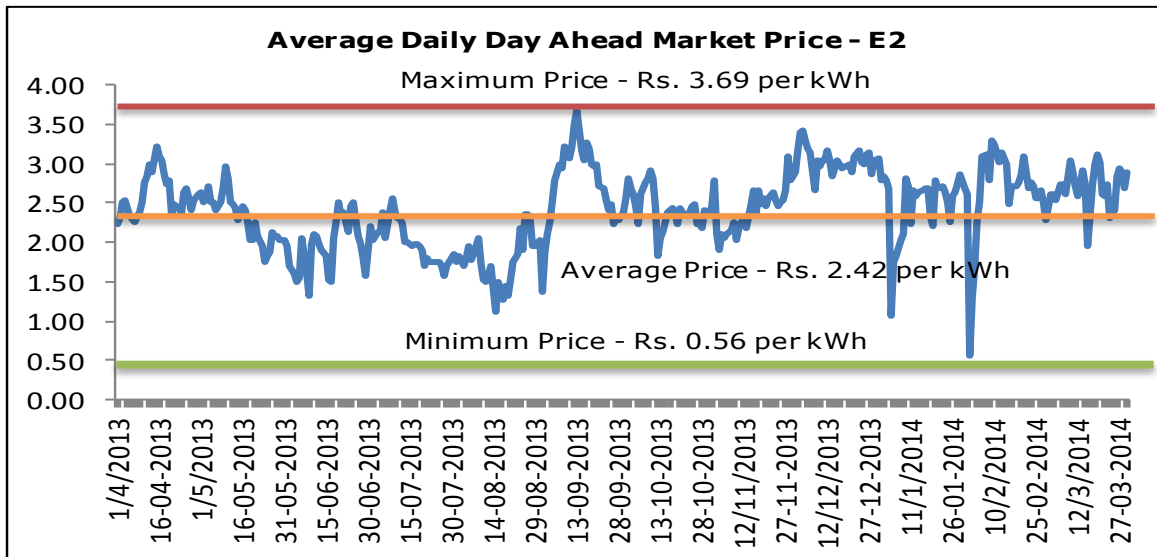
**Figure XXI-3: Historical Trend in Peak Demand and Peak Met – Orissa**



Source: CEA

Further, the above deficit levels in the state are expected to remain low for short to medium term, on account of huge stranded capacity and low prevalent prices in the short term market. The figure below presents the average daily short-term prices prevalent in IEX in FY 14.

**Figure XXI-4: Average Daily Short Term Prices IEX – S1 Region (2013-14)**



Source

e: IEX

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

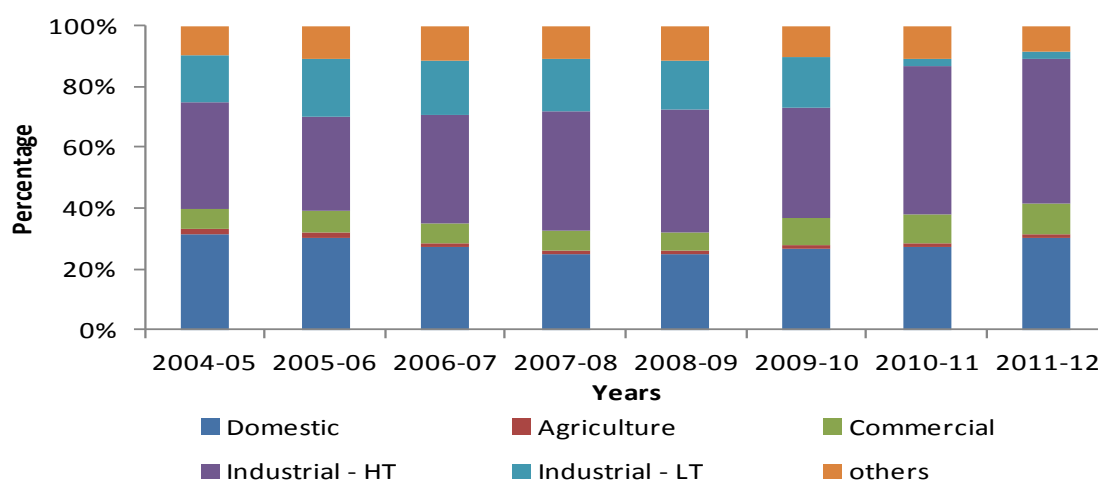
### 2.1. CONSUMER SALES MIX OF ORISSA

The DISCOMs in the state of Orissa caters to more than 3 million consumers in the state, with ~37% of the consumers served by CESU<sup>19</sup>.

In 2011-12, the industries dominated the sales mix with a share of 50%, followed by domestic (~30%) and commercial category(~10%). The share of agriculture sales mix is marginal with 1% share in the overall consumer sales mix in the state.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXI-5: Historical Trend Consumer Sales Mix – Orissa**



Source: PFC

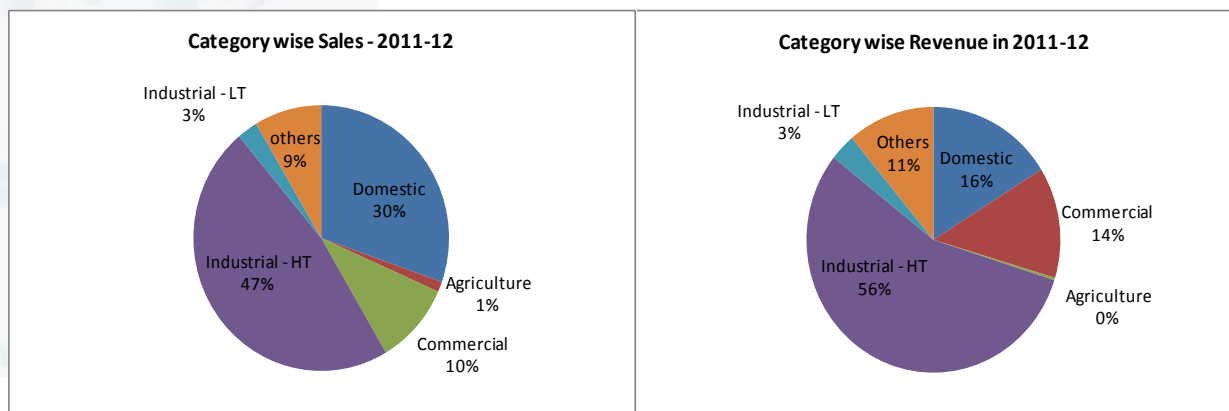
The overall sales have registered a CAGR of 8% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of 15% followed by the industrial and domestic categories with a CAGR of 8%.

In terms of revenue contribution, industries contributed ~59% of revenue, followed by domestic and commercial categories with a share of ~16% and ~14%, respectively, while agriculture contributed a meagre 0.3% of the revenue

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

<sup>19</sup> Source: Orissa Electricity Regulatory Commission

**Figure XXI-6: Comparative Analysis of Consumer sales and Revenue Mix 2011-12 – Orissa**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Orissa distribution utilities have historically remained on an extremely higher side compared to the national average. The loss levels reported by the state utilities are more than 40% for all the representative years.

The table below illustrates the year on year trend on commercial losses and collection efficiency of the DISCOMs.

**Table XXI-1: Historical Trend in AT&C Losses and Collection Efficiency - Orissa**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	43%	44%	40%	41%	42%	40%	46%	45%
Collection Efficiency (%)	94%	93%	98%	94%	93%	96%	88%	90%

Source: PFC

The primary reasons for high levels of AT&C losses are lack of any substantial measures taken by the DISCOMs to reduce the losses through reduction of thefts, collection of arrears, proper energy auditing and full scale metering.

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost constitutes the major share of distribution cost in the state. The power purchase cost was ~70%.

The table below illustrates the historical trend of distribution cost break in the state of Orissa.

**Table XXI-2: Historical Trend in Distribution Cost Breakup - Orissa**

Cost Component (Rs per kWh)	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.29	1.28	1.48	1.46	1.43	2.00	2.54
O&M (R&M + A&G + EC)	0.35	0.48	0.40	0.66	0.44	0.47	0.57
Interest	0.07	0.07	0.07	0.07	0.08	0.08	0.10

<i>Cost Component (Rs per kWh)</i>	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
<i>Depreciation</i>	0.09	0.08	0.06	0.05	0.05	0.04	0.05
<i>Other cost</i>	0.06	0.07	0.07	0.05	0.07	0.03	0.02

Source: PFC

The power purchase cost significantly increased in FY 11 and FY 12, on account of purchase of power from comparatively expensive independent power producers (viz. Sterlite Energy and Arati Steels Ltd.).

The per unit interest cost increased by ~25% in FY 12 because of increased debt undertaken by the distribution utilities, on account of capital expenditure loan provided by Government of Orissa towards improvement of AT&C losses and quality of supply in the state.

The table below depicts the interest liable on various loans undertaken by the DISCOMs in the year FY 11 and FY 12

Source	FY 11	FY 12
GRIDCO loan	0.00	0.00
World Bank loan	101.64	110.56
Power Bond – Differential Amount	77.13	77.13
APDRP Net of 50% grant (GoO)	11.02	12.05
REC/PFC (Counter Part Funding APDRP) and SI Scheme	15.02	15.56
Interest on security deposit	51.50	58.37
CAPEX (REC)	12.06	5.67
Govt. of Orissa Capex loan	0.00	19.35
Other interest and finance charges	0.00	19.01
Total interest before capitalisation	268.37	317.70

Source: Approved Tariff Order FY 2011 and FY 2012

## **2.4. REVENUE REALIZATION**

Tariff realization from different consumer category has remained proportionate to increasing power purchase cost. However, the DISCOMs are not report under-recovery on account of high levels of AT&C losses in the state. The tariff hikes in FY 11 and FY 12 wherein tariffs were hiked by 22% and 20% respectively, were applied to commensurate the increased power purchase costs.

The table below depicts the historical trend in consumer wise average realization in the state of Orissa

**Table XXI-3: Historical Trend in Consumer wise Average Realization - Orissa**

Years	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	1.17	1.16	1.95	2.00	1.94	2.33	2.37
Agriculture	0.95	0.89	1.15	1.31	1.85	1.12	1.10
Commercial	1.58	1.69	3.94	4.13	3.78	4.92	6.10
Industrial HT	2.21	1.98	2.80	2.81	3.25	4.08	5.25
Industrial LT	3.11	3.64	3.89	4.72	3.66	4.77	5.62

*Source: PFC*

Financial losses of the utilities are limited to the high levels of AT&C losses in the state. Tariffs have been hiked over the years to minimize the revenue gap, indicating that burden of the high levels of AT&C losses are borne by the consumer through tariff increase.

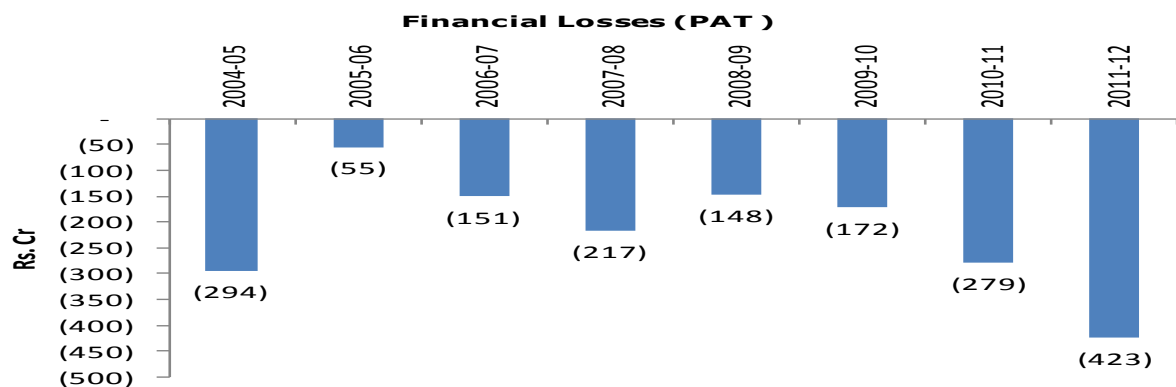
### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses in Orissa have increased from Rs 148 Cr in FY 09 to Rs 423 Cr in FY 12.

The figure below depicts the year on year trend in financial losses registered by the utilities.

**Figure XXI-7: Historical Trend in Financial Losses (w/o subsidy) - Orissa**



Source: PFC

Although, the loss levels declined from FY 05 (Rs 294 Cr) to FY 10 (Rs 172 Cr), further increase in power purchase costs in the year FY 11 and FY 12 resulted in increased loss levels of Rs 279 Cr and Rs 423 Cr respectively.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

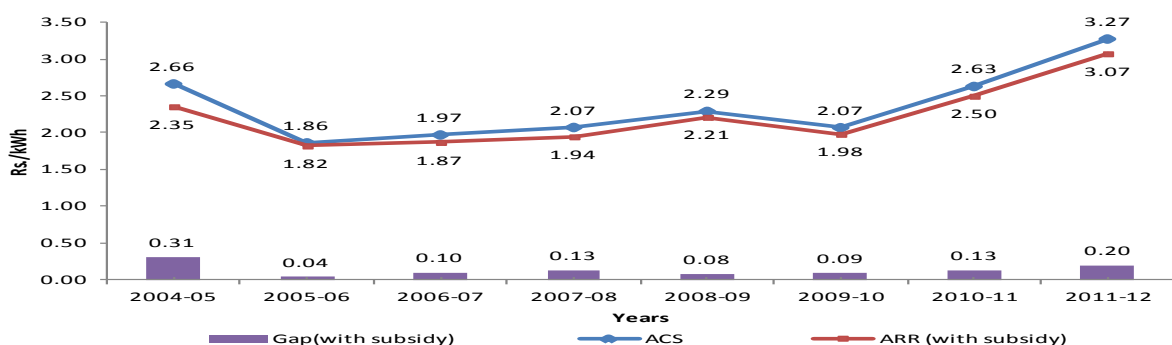
The DISCOMs have not booked subsidies from FY 05 to FY 12.

#### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized has increased in last few years in spite of tariff increase. This is primarily due to the prevalent high AT&C loss levels in the state.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure XXI-8: Historical Trend in ACS v/s ARR - Orissa**



Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~2% of the total tax revenue in the state in 2011-12. The details for the same are provided in the table below:

**Table XXI-4: Tax Revenue from Power Sector - Orissa**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	460	458	552
Total Tax Revenue	17,501	21,690	25,672
Power sector Tax Revenue / Total state Tax Revenue	2.63%	2.11%	2%

Source: Audited CAG for the state: 2011-12, 2010-11, 2009-10

Even though there has been an increase in tax revenue from Power sector, the contribution to the state level tax revenue has declined since FY10.

The non-tax revenue from power sector is through **Royalty/cess on water for power generation, transmission and distribution, Rural Electrification** etc. The Non Tax revenue which is Rs 3.37 Cr forms only 0.05% of the total non-tax revenues in 2011-12. The details for the same are provided in the table below.

**Table XXI-5: Non-Tax Revenue from Power Sector - Orissa**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	2.7	2.1	3.37
Total Non-Tax Revenue	3,212	4,780	6,443
Power sector Non-Tax Revenue / Total state Non- Tax Revenue	0.08%	0.04%	0.05%

Source: Audited CAG for the state: 2011-12, 2010-11, 2009-10

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector by the state government



**Table XXI-6: Expenditure on Power Sector - Orissa**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	9	83	181.10
Revenue Expenditure	95	205	23.70
Total Expenditure	104	289	204.80

Source: Audited CAG for the state: 2011-12, 2010-11, 2009-10

The capital account has risen since FY10 primarily on account of increase in investments in T&D. The revenue expenditure has declined substantially especially from the FY11 level primarily due to decrease in expenditure under Rural Electrification.

It can be observed that the power sector in the state has been self-sufficient, on account of higher revenue generated by the power sector compared to the revenue expenditure made on the power sector by the state government.

#### **4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

The state government guarantees constituted a ~7.61% of the overall state revenue, towards the loan taken by the DISCOMs in 2011-12. The same has been depicted in the table below:

The table below depicts the sector guarantees relative to the total revenue of the state.

**Table XXI-7: Guarantees as a Percentage of Total Revenues - Orissa**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Power Sector Guarantees given by State Govt.	568	1,815	2,442.45
Total Revenues of the State	20,713	26,470	32,114.82
Guarantees as a %age of Total Revenues of State	2.74%	6.86%	7.61%

Source: Audited CAG for the state: 2011-12, 2010-11, 2009-10

In 2011-12, the majority share of the guarantee (~92%) towards power sector is pledged towards the loan taken by the state trading company, GRIDCO.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XXI-8: Guarantees Utility wise Breakup - Orissa**

Particular	2009-10	2010-11	2011-12	Average Share in state Guarantees (%)
RS Cr				
GRIDCO	151	1,498	2,239.79	81%
OPTCL	301	217	122.33	13%
OPGCL	9	2	0	0%
OHPC	107	97	80.33	6%

Source: Audited CAG for the state: 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily risen due to increase in Guarantees towards GRIDCO. Over the span of three years, GRIDCO accounted for a major share of 81%.

The power sector in the state has booked no subsidy from the state government over the years.

#### **4.4. POWER BONDS**

The outstanding amount of 8.5% Tax Free Special Bonds of the State Government (Power Bonds) issued by State Government, as on 1st April 2005, was Rs 1102.40 Cr, to be redeemed by 2016. The balance outstanding as on 31st March 2012 was Rs 441.15 Cr. The details regarding the year of issue and redemption of bonds have not been mentioned in the available CAG accounts. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 220 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XXI-9: Power Sector Financing Requirement (2011-12) - Orissa**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	204.80

Particulars	2011-12 Rs Cr
Loans And Advances made by the State Government (Net of Recoveries)	207.70
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	110.28
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	7.42
Total Power Sector Financing during the year	530.19
Sector Financing Requirement as a % age of total revenues of state	2%
GSDP nominal	130669.00
Sector Financing Requirement as a % age of GSDP	0.41%
Financial Profit /(Losses) of Discoms during the year (with subsidy realised)	(423)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	3%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	0.73%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated at 2% of the revenue generated by the state and 0.41% of the Gross State Domestic Product. Further, the losses reported by the DISCOMs have increased the financing requirement of the sector to 3% of the total revenue in the state and 0.73% of the state GSDP.

However, it is observed the power sector in Orissa is self-sufficient and is able to generate sufficient revenues for the state government, but the financial losses reported in the state can critically impact the financial health of the state finances in future.

## 5. REGULATORY EFFECTIVENESS

### 5.1. BUDGETING

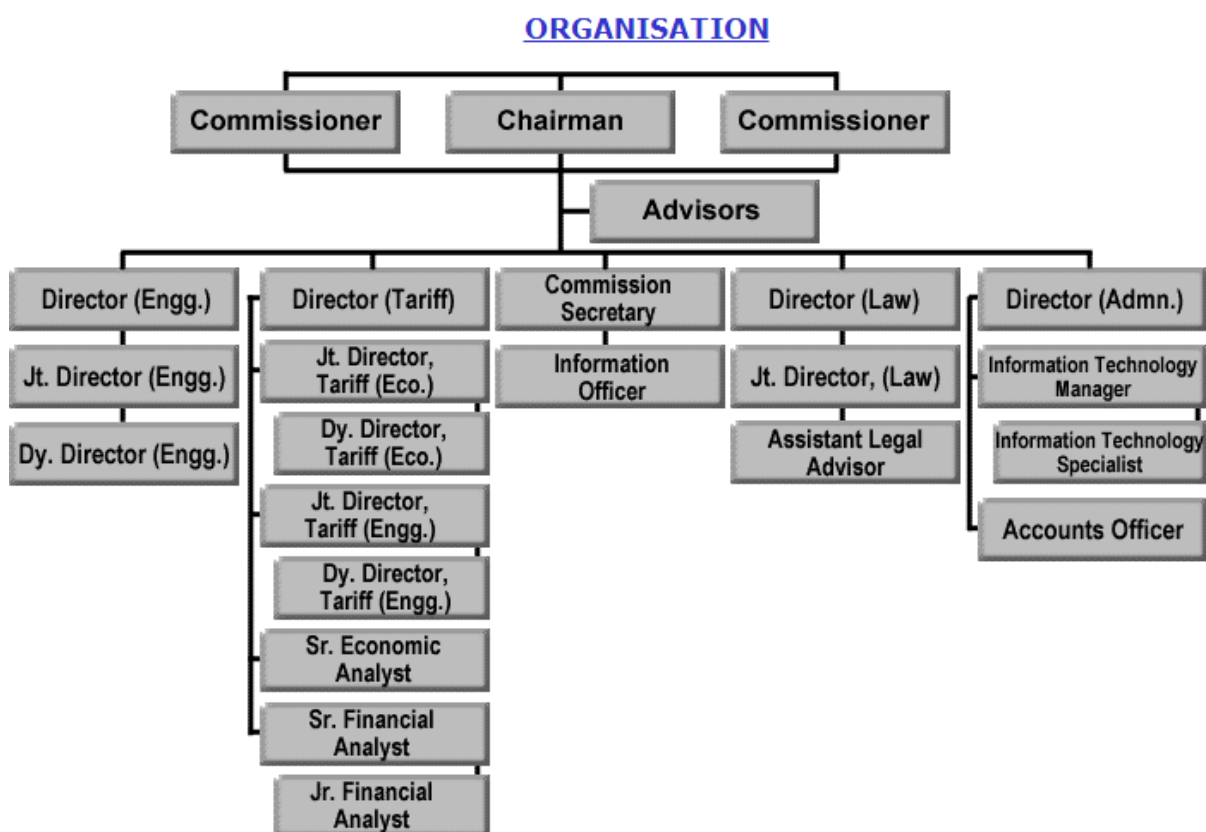
The state regulatory commission, OERC, is self-sufficient in its operations. The primary source of income is license and petition fees from licensees, IPPs, open access consumers, etc, on submission of petitions, review of order, renewal of annual license, etc. The state reported a surplus of Rs. 3.24 Cr in the year FY 12<sup>20</sup>, which was invested towards deposit payments in banks.

### 5.2. STAFFING

The staff of the commission is appointed through direct recruitment, contract or deputation basis. Further, the staffing is divided into technical and non-technical staff. In 2011-12, 43% of the position in the commission was towards the technical staff.

The figure below presents the organization chart of the state regulatory commission

**Figure XXI-9: Organizational Structure - OERC**



Source: OERC

Another important aspect that needs to be considered is that the staff especially the technical staff is on deputation or contract basis. Deputation is generally done from another government department or from the utility itself, which again limits the true independence of the staff of SERC's.

<sup>20</sup> Annual Report OERC – 2011-12.

### 5.3. MYT REGULATION

The MYT has been implemented for the third control period. The commission had selected a control period of three years for the first MYT. Subsequently, for the next two MYTs a control period of five years was selected. Although, the impact of the MYTs to improve the date regime was not substantial as the state continues to report high levels of AT&C loss levels.

### 5.4. TARIFF REVISION

The state DISCOMs had no tariff increase from FY 06 to FY 10. The tariff increased significantly from FY 11 to FY 14. The inefficient tariff setting mechanism was one of the major reasons for high level of transmission and distribution losses. The table below depicts the historical trend in tariff revisions in the state of Orissa.

**Table XXI-10: Historical Trend in Tariff Revisions - Orissa**

	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	0%	0%	0%	0%	22%	20%	36%	9%

Source: Approved Tariff Orders of the State DISCOMs for that year

### 5.5. LEVEL OF METERING

The commission has reviewed the status of metering of 33/11 KV feeders, distribution transformers and consumers at the end of every two months. The progress as reported by DISCOMs are as under, as on September 2010:

**Table XXI-11: Level of Metering across the DISCOMs (as on Sept. 2010) - Orissa**

Feeder Metering Position	CESU	NESCO	WESCO	SOUTHCO	Total
No. of No of 33 KV feeders	111	64	88	159	422
No of 33 KV feeder metering	111	63	88	159	421
No of 33 KV feeder metering left	0	1	0	0	1
No. of No of 11 KV feeders	609	428	484	425	1946
No of 11 KV feeder metering	609	86	469	425	1589
No of 11 KV feeder metering left	0	342	15	0	357
No of 33/11 KV transformers	347	266	262	221	1096
No of 33/11 KV transformers metering	81	0	0	30	111
No of 33/11 KV transformers left	266	266	262	191	985
No of distribution transformers	22984	25709	19475	15336	83504
No of distribution transformers metering	8832	569	12558	9236	31195
<b>Consumer Metering Position</b>					
Total number of consumers	1215128	670306	587707	659819	3132960
Total number of meters	1179363	622137	577680	653347	3032527
Total number of working meters	1069094	470295	532016	592225	2663630
Percentage of metered consumers	88%	70%	91%	90%	85%

(working)					
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Source: Tariff Order 2011-12

### **5.6. OPEN ACCESS**

Orissa State Load Despatch Center has been mandated with dealing of open access function in the state. Open access has started only a few years ago in the State, but has been well accepted by the players, essentially by the captive consumers. In year 2009-10, total of 314 captive consumers filed applications for Inter State Transmission System.

In 2011-12, the commission approved application for 104 numbers of applications and rejecting 23 applications. Further two intra-state open access was application was accepted by state commission.

## 6. SUMMARY

- 1. Privatization of the distribution utilities:** Orissa was the first state to embark upon the process of privatization of the state distribution companies. However, the reform was not accompanied by a multi-pronged strategy to reinforce all the pillars on which a successful distribution sector can be created. Additionally, due to lack of accurate baseline data, right from the beginning the DISCOMs incurred huge losses.
- 2. AT&C Losses:** The DISCOMs have continued to register high levels of AT&C losses in the state. The demand collection in the DISCOMs is a major challenge for all the distribution companies in the state. The state needs to implement robust IT mechanism for efficient demand collection. Further, the collection efficiency in the state also needs to be improved.
- 3. Limited Financial Gap:** The revenue gap has increased in recent years, on account of high levels of AT&C losses and increasing power purchase costs even though, the tariff increase is regular and substantial. This indicates that the financial burden of the AT&C losses is borne by the consumers in the state.
- 4. Regulatory Effectiveness:** Although, the state regulator commission in the state are self-sufficient to carry out its operations, the gaps in the implementation of the policy reforms persists, with the distribution utilities continue to be ineffective in improving the data regime in the state.

As stated earlier, Orissa was unable to implement the reforms successfully, due to inefficient implementation of the policy reforms by the distribution utilities. Further, on the generation side the state is well endowed with natural resources with significant hydro capacity as well as strong mineral base including that of coal to support its thermal plant.

**The power sector in the state pose a low risk to the state finances, although the pertaining high levels of losses in the state.**

## XXII PUNJAB

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

Punjab a northern state of the country, where the energy demand has registered a steady CAGR of 5.68% on account of industrialization and steady improvement in standards of living over the last decades. Further, the state was one of th

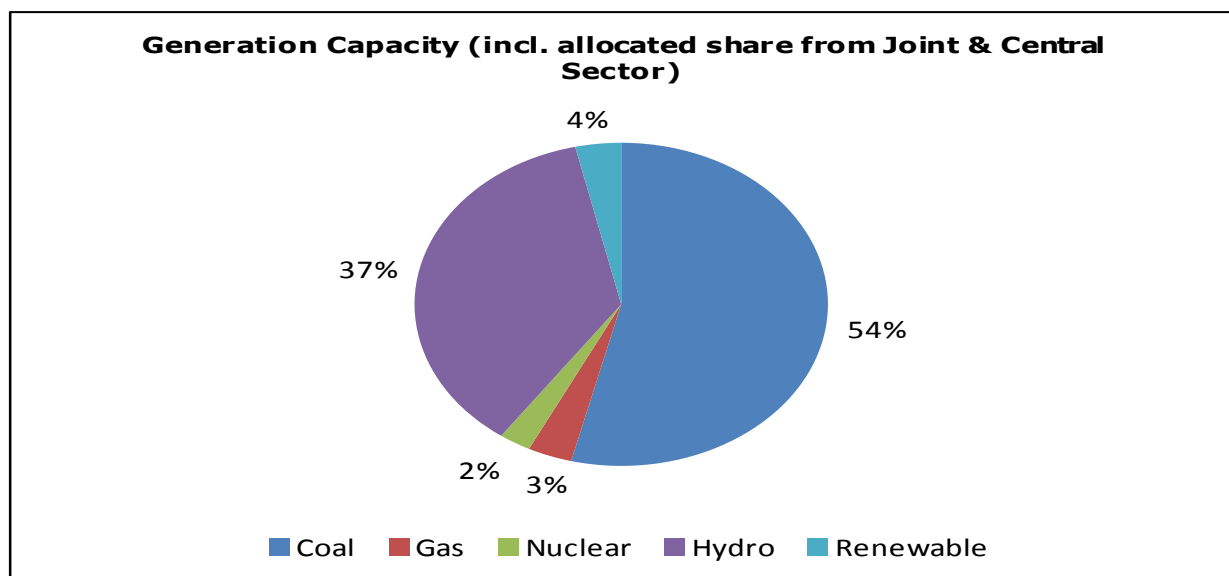
Prior to unbundling Punjab State Electricity Board (PSEB) functioned as a vertically integrated utility. The utility operation was unbundled in 16.4.2010 notification of Government of Punjab notification unbundled PSEB into two companies, viz. Punjab State Power Corporation Ltd. (POWERCOM) and Punjab State Transmission Corporation Ltd (TRANSCO).

#### 1.2. GENERATION MIX

The total installed capacity February 2014 (including allocated share in Joint & Central Sector plants) for Punjab was 8,332 MW out of which Coal based power capacity accounted for ~54% followed by Hydro (~37%). RE and gas based capacity accounted for a share of ~4% and ~3% respectively.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXII-1: Generation Capacity Mix - Punjab**



Source: CEA

#### 1.3. POWER SUPPLY POSITION

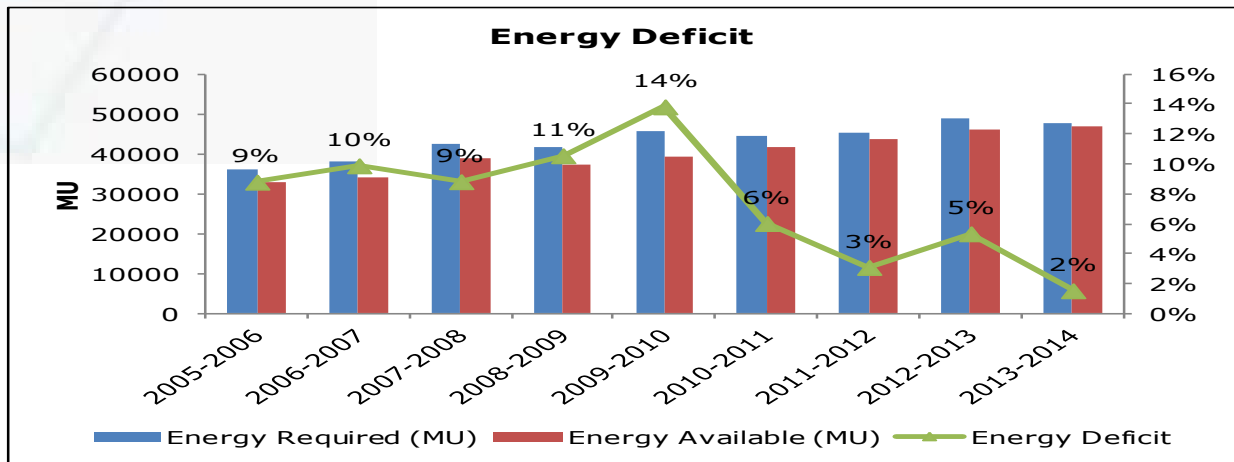
Punjab has been witnessing consistent power supply shortage. Although, the energy deficit has decreased from 14% in FY 2009-10 to 2% in FY 2013-14, the peak deficit has continued to remain high ~13% in 2013-14. The peak deficit increased substantially in FY 2011-12 to 21% and 30% in FY 2012-13 as compared to 16% in FY 2010-11.



Although, the state has been able to reduce the energy deficit through significant capacity addition from independent power producers in the state, the higher levels of peak deficit in the state are due to declining share of Bhakra Beas Management Board (BBMB), which continues to serve the base demand of the state.

The trend of energy deficit observed in Punjab over the years is presented in the figure below:

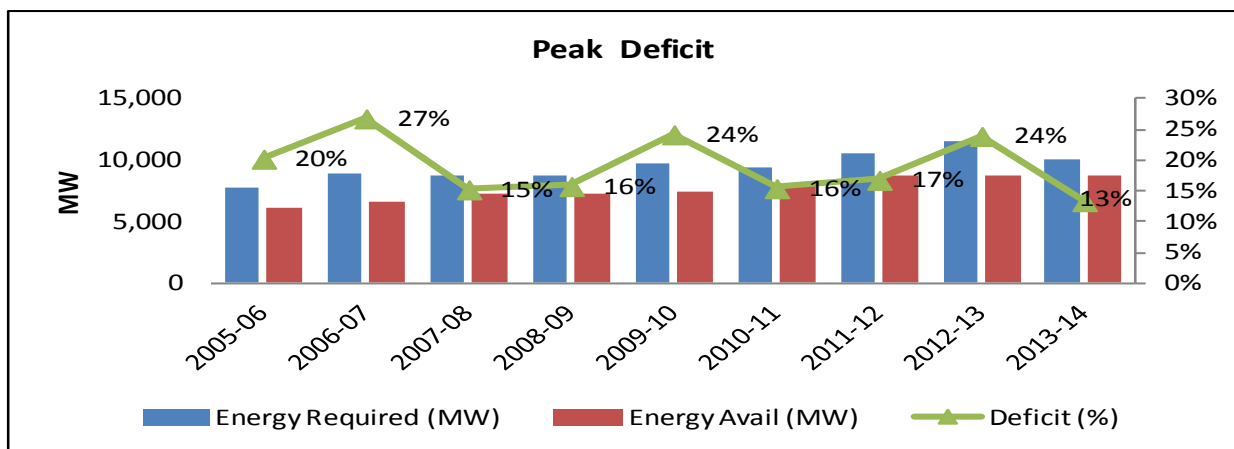
**Figure XXII-2: Historical Trend in Energy Deficit - Punjab**



Source: CEA

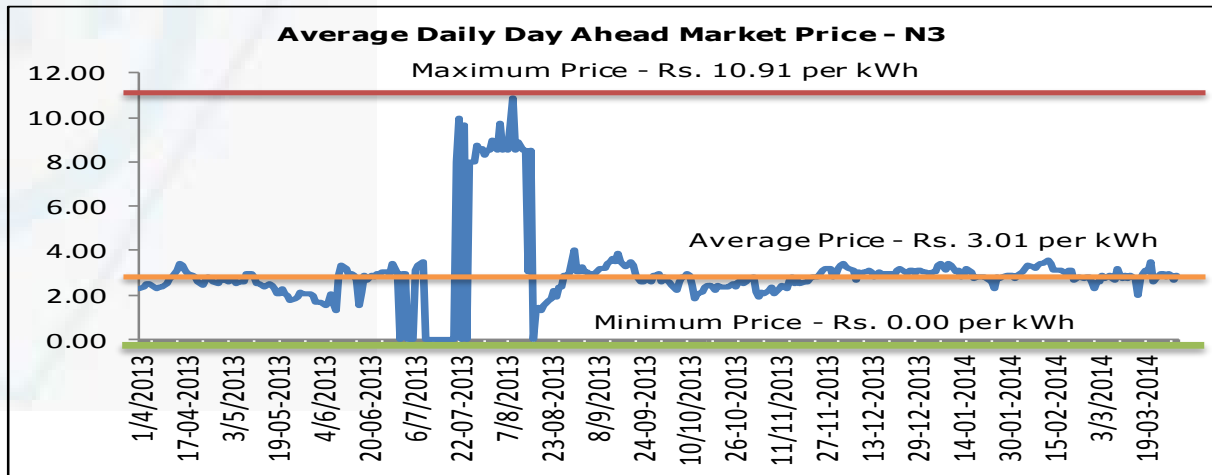
The trend of peak deficit observed in Punjab over the years is presented in the figure below:

**Figure XXII-3: Historical Trend in Peak Demand and Peak Met - Punjab**



Source: CEA

Further, the peak deficit levels in the state are expected to reduce further in short to medium term, on account of huge stranded capacity and low prevalent prices in the short term market. The figure below presents the average daily short-term prices prevalent in IEX in FY 14.

**Figure XXII-4: Average Daily Short Term Prices IEX – N3 Region (2013-14)**

Source: IEX

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF PUNJAB

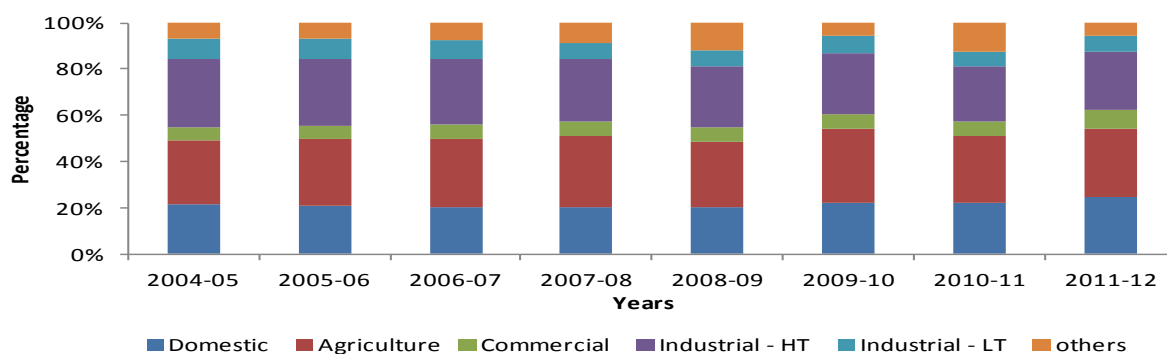
The state of Punjab was one of the last utilities to unbundle its operations. Prior to FY 11, the distribution activities were carried out by the bundled PSEB. After the unbundling the distribution activity in the state is carried out by Punjab State Power Corporation Ltd. (POWERCOM).

In 2011-12, share of agriculture sales dominated the sales mix with ~29%, followed by industrial - HT (25%) , domestic (23%) and commercial category (8%).

The share of agricultural and commercial sales have increased over the years while the share of industrial sales have decreased over the years. The share of agricultural and commercial sales have increased from 28% and 6% in 2004-05 to 29% and 9% in 2011-12. The industrial sales have decreased from 38% in 2004-05 to 32% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXII-5: Historical Trend in Consumer Mix – Punjab**

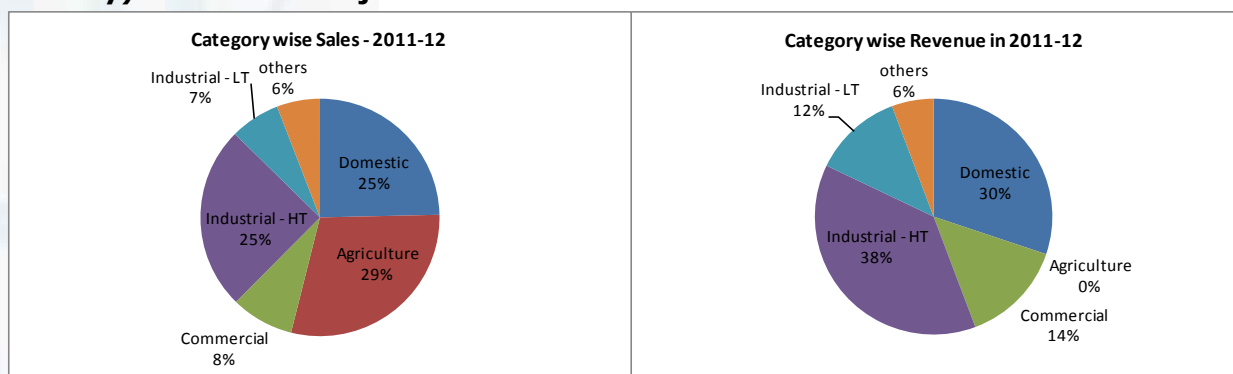


Source: PFC

The overall sales have registered a CAGR of 6% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of 12.1% followed by the domestic and agriculture categories with a CAGR of 8% and 7%.

In terms of revenue contribution, industries contributed for ~50% of revenue, followed by domestic and commercial categories with a share of 30% and 14%, respectively, while agriculture contributed 0% of the revenue. This clearly indicates that domestic and agriculture categories are completely cross subsidized by the industrial and commercial categories. Further, the sales to the agriculture consumers are completely subsidized by the state government.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXII-6: Comparative Analysis of Consumer Sales and Revenue Mix (w/o subsidy) 2011-12 - Punjab**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Punjab distribution utility has historically remained on a lower side compared to the national average.

The loss level reported by the distribution utilities of Punjab is in the range of 19% - 24%. This, however, is based on the estimated consumption in the agricultural sector (in absence of agriculture metering in the state). The trend observed over the years in collection efficiency has been on a higher side.

The table below illustrates the year on year trend on commercial losses and collection efficiency of the state DISCOMs.

**Table XXII-1: Historical Trend in AT&C losses and Collection Efficiency - Punjab**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	24%	23%	22%	19%	19%	18%	20%	21%
Collection Efficiency (%)	100%	98%	98%	100%	98%	99%	98%	95%

Source: PFC

Further, losses have also reduced due to the investment undertaken in the development of HT lines over the years. HT/LT ratio has improved significantly over the years, HT/LT ratio improved from 0.72 in 2005-06 to 1.01 in 2009-10.

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost. The power purchase cost accounts for ~60% of the total distribution cost, which is one of the lowest in the country, due to high levels hydro generation (~37%) in the generation mix.

The per unit cost break-up for different cost components for the state of Punjab is provided in the table below:-

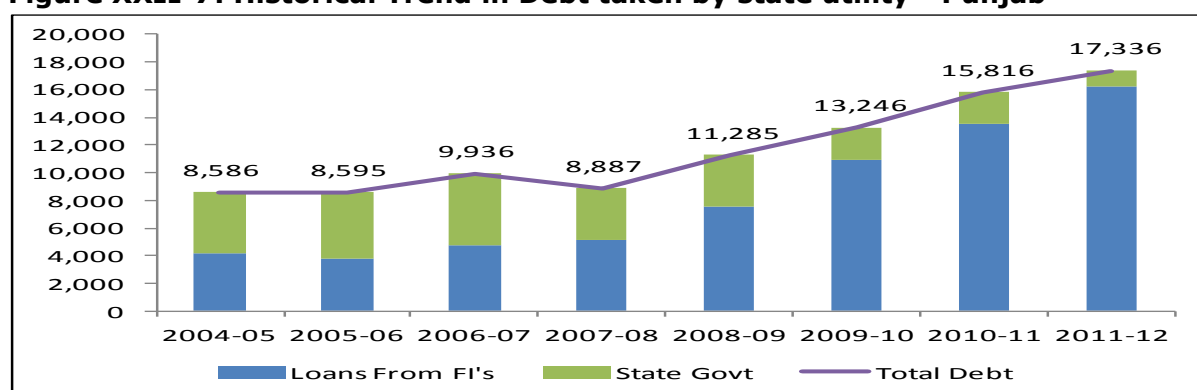
**Table XXII-2: Historical Trend in Distribution Cost Breakup - Punjab**

Cost Component (Rs per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost <sup>21</sup>	1.48	1.54	2.00	2.26	2.32	2.14	2.36	2.33
O&M (R&M + A&G + EC)	0.58	0.60	0.61	0.63	0.72	0.76	0.88	0.99
Interest	0.32	0.30	0.26	0.23	0.33	0.34	0.42	0.52
Depreciation	0.19	0.18	0.18	0.18	0.19	0.21	0.18	0.17

Source: PFC

The power purchase cost in the state has increased significantly, on account of increased power procurement from the independent power producers to meet the increased demand for power. Further, the variability in the availability of power from hydro generation plants (especially BBMB) impacts the power purchase cost in the state.

The interest liable to the financial institution has increased significantly from FY 09, on account of increased capital investments towards sub-transmission networks in the state. The trend in debt undertaken by the state utility on capital expenditure is depicted below:

**Figure XXII-7: Historical Trend in Debt taken by state utility - Punjab**

Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increase in power purchase cost. Although, the tariff hikes in the state have been regular (except in FY 08), the level of hike has not reflected the increasing cost to serve in the state.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

<sup>21</sup> Inclusive of fuel, generation and other costs

**Table XXII-3: Historical Trend in Consumer wise Average Revenue Realization (w/o subsidy) - Punjab**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	2.59	2.83	2.74	2.53	2.68	2.93	3.20	3.85
Agriculture	0.61	0.28	0.03	0.02	0.00	0.00	0.41	0.00
Commercial	4.24	4.51	4.47	4.31	4.58	4.93	5.13	5.23
Industrial HT	3.56	3.72	3.71	3.68	3.93	4.30	3.96	4.77
Industrial LT	3.39	3.73	3.73	3.68	3.97	4.32	4.81	5.68

Source: PFC

Agricultural sector is being heavily subsidised by the state government and the share of the state government subsidies accounts for ~26% of the total revenues. The increasing sale to the agriculture consumers has further increased the subsidy burden of the state.

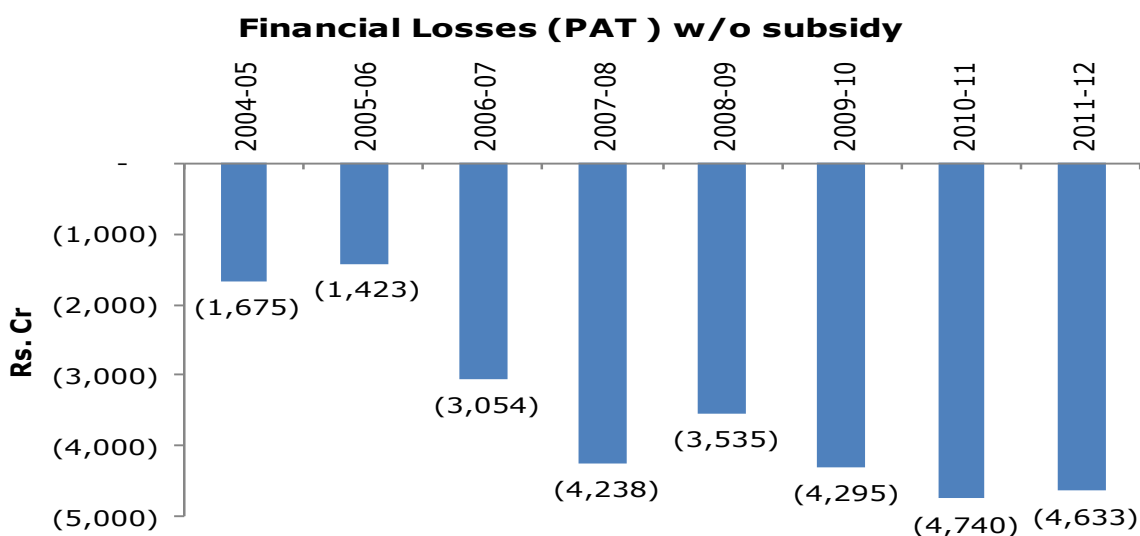
### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF THE DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Punjab has increased over the years. As discussed earlier, this is because of increasing power purchase cost and complete provision of free electricity to the agriculture consumers.

The figure below depicts the year on year trend in financial losses registered by the state utility.

**Figure XXII-8: Historical Trend in Financial Losses (w/o subsidy) - Punjab**

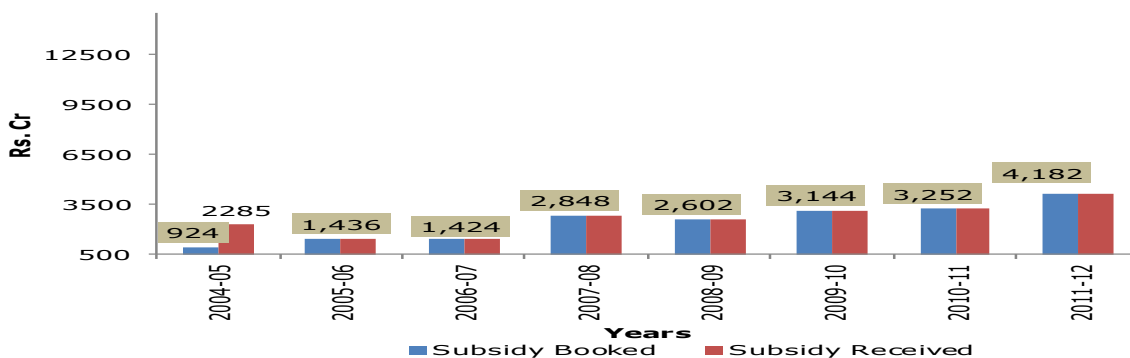


Source: PFC

#### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The subsidy burden of the state has increased from 13% in 2004-05 to 26% in 2011-12. The subsidy booked has registered a CAGR of 24% over the span of seven years, which is extremely high compared to the ACS that has registered a CAGR of 7% over the same period. The figure below depicts the year on year trend in subsidies booked and received by the state utility.

**Figure XXII-9: Historical Trend in Subsidy Booked v/s Subsidy Received - Punjab**



Source: PFC

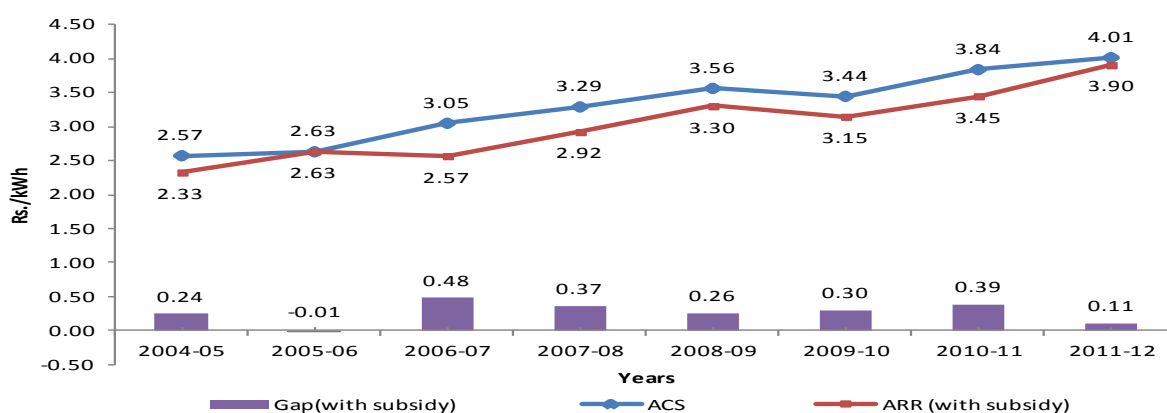
As shown in the figure above, the amount of subsidies booked by the state has increased significantly from FY 05 to FY 12, on account of agricultural categories and certain domestic categories. It can be observed from the above figure, that in all the years, amount of subsidy realised was equal to the amount of subsidy booked (except in FY 05).

### 3.3. ACS v/s ARR

The gap between average cost of supply and average revenue realized (with subsidy) has remained high over the years. This is primarily due to inaccurate demand estimation for the unmetered agriculture sales in the state.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumers.

**Figure XXII-10: Historical Trend in ACS v/s ARR (with subsidy) - Punjab**



Source: PFC



## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~4% of the total tax revenues of the state in 2011-12. The details for the same are provided in the table below:

**Table XXII-4: Tax Revenue from Power Sector - Punjab**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	928	928	928.28
Total Tax Revenue	14,184	19,879	22,395.31
Power sector Tax Revenue / Total state Tax Revenue	6.54%	4.67%	4%

Source: Audited CAG Accounts of the state: 2011-12, 2010-11, 2009-10

The tax revenue from power sector has remained constant since 2009-10, however, the contribution in total state tax revenue has declined from 6.5% in FY10 to 4% in FY12.

The power sector did not contribute to the non-tax revenue in 2011-12

Hence the overall income generated from power sector has remained constant at Rs 928 Cr over the years.

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector in the state of Punjab.

**Table XXII-5: Expenditure on Power Sector - Punjab**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	24	0	0
Revenue Expenditure	2,875	3,376	3,201
Total Expenditure	2,899	3,376	3,201

Source: PFC & Audited CAG Accounts of the state: 2011-12, 2010-11, 2009-10

As evident, the share of capital expenditure in the total expenditure towards the sector has been minimal. The revenue expenditure incurred on power sector has increased from the FY10 level, primarily on account of increase in other expenditure.

It can be observed that the power sector in the state has not been self-sufficient over the years, on account of revenue expenditure being significantly higher than the power sector revenue of the state.

### 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The state government guarantees constituted a substantial ~36.72% of the overall state revenue, towards the loan taken by the state DISCOMs. The same has been depicted in the table below:

**Table XXII-6: Guarantees as a Percentage of Total Revenues - Punjab**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	9,146	9,732	8,735.97
Total Revenues of the State	19,836	25,209	23,793.77
Guarantees as a %age of Total Revenues of State	46.11%	38.61%	36.72%

Source: Audited CAG Accounts of the state: 2011-12, 2010-11, 2009-10

As shown above, there has been a decrease in guarantees towards power sector since FY10 along with the decrease in proportion of the power sector guarantees in state revenues i.e. from 46% in FY10 to 36.72% in FY12.

The majority share of the guarantee (~92%) towards power sector is pledged towards the loan taken by the state POWERCOM Company, PSPCL.

The table below depicts the share distribution of the guarantees provided by the state government between the utilities.

**Table XXII-7: Breakup of Utility wise Guarantee - Punjab**

Utility	2009-10	2010-11	2011-12	Average Share in State Guarantees (%)
Rs Cr				
Punjab State Power Corporation Limited	9,146	9,732	8,585.97	99%
Punjab State Transmission Corporation Limited	9,146	9,732	150.00	1%

Source: Audited CAG Accounts of the state: 2011-12, 2010-11, 2009-10

As shown in the table above, almost entire share of the state guarantees have been directed towards the state DISCOM

**Table XXII-8: Power Sector Subsidy as a Percentage of overall subsidies - Punjab**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
				Rs Cr
PSPCL	2,874	3,376	4,182.00	100%
Power Sector subsidy/ Total Subsidy	2,874	3,376	4,182.83	98%

Source: PFC & Audited CAG Accounts of the state: 2011-12, 2010-11, 2009-10

Since FY10, the power sector has received almost cent percent of the overall subsidy given by the state government

#### **4.4. POWER BONDS**

The outstanding balance of 8.50% Punjab Govt. Power Bonds at the close of 2005-06 was Rs. 63.73 Cr. A sum of Rs 254.94 Cr remained outstanding at the close of 2011-12. The details related to year of issue and redemption was not mentioned in the available CAG state accounts. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 130 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XXII-9: Power Sector Financing Requirement (2011-12) - Punjab**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	3200.90
Loans And Advances made by the State Government	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year	63.73
Loans for Power Projects-T&D from the Central Govt. Discharged during the year	0
Total Power Sector Financing during the year	3264.63
Sector Financing Requirement as a % age of total revenues of state	14%
GSDP nominal	156454.00
Sector Financing Requirement as a % age of GSDP	2.09%
Financial Profit/(Losses) of Discoms during the year (with Subsidy Realised)	(451.00)

Particulars	2011-12 Rs. Cr
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	16%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	2.37%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated at 14% of the revenue generated by the state and 2.09% of the Gross State Domestic Product. Further, the financial loss (with subsidy realized) increased the financing requirement of the sector to ~16.00% of the state revenue and ~2.37% of the state GSDP.

However, it is observed the power sector in Punjab is highly dependent on the state government subsidy to control the over bearing losses registered. Further, the revenue generated by the state DISCOM is ~30% of the revenue expenditure by the state.

## **5. REGULATORY EFFECTIVENESS**

At the time of unbundling in April 2010, the Government of Punjab had assured a financial restructuring plan to improve the fiscal health of cash-strapped state power sector and the interests of the entire staff would be taken care of. However, almost two years down the line, the government has failed to bail out the Power Corporation from the debt-trap. Apart from this, many of the promises made by the State government during the unbundling remain unfulfilled.

The impact of the restructuring exercise is yet to be seen and it would be very premature to judge the implications at this stage. At the present Stage finalization of the FRP and establishment of appropriate accounting and governance policies and processes appear to be the top priority items for the State/ Restructured entities.

Punjab State Electricity Regulatory Commission (PSERC) was setup in 1999 by Government of Punjab under section 17 of the Electricity Regulatory Commission Act 1998 as a statutory independent regulatory authority in the electricity sector.

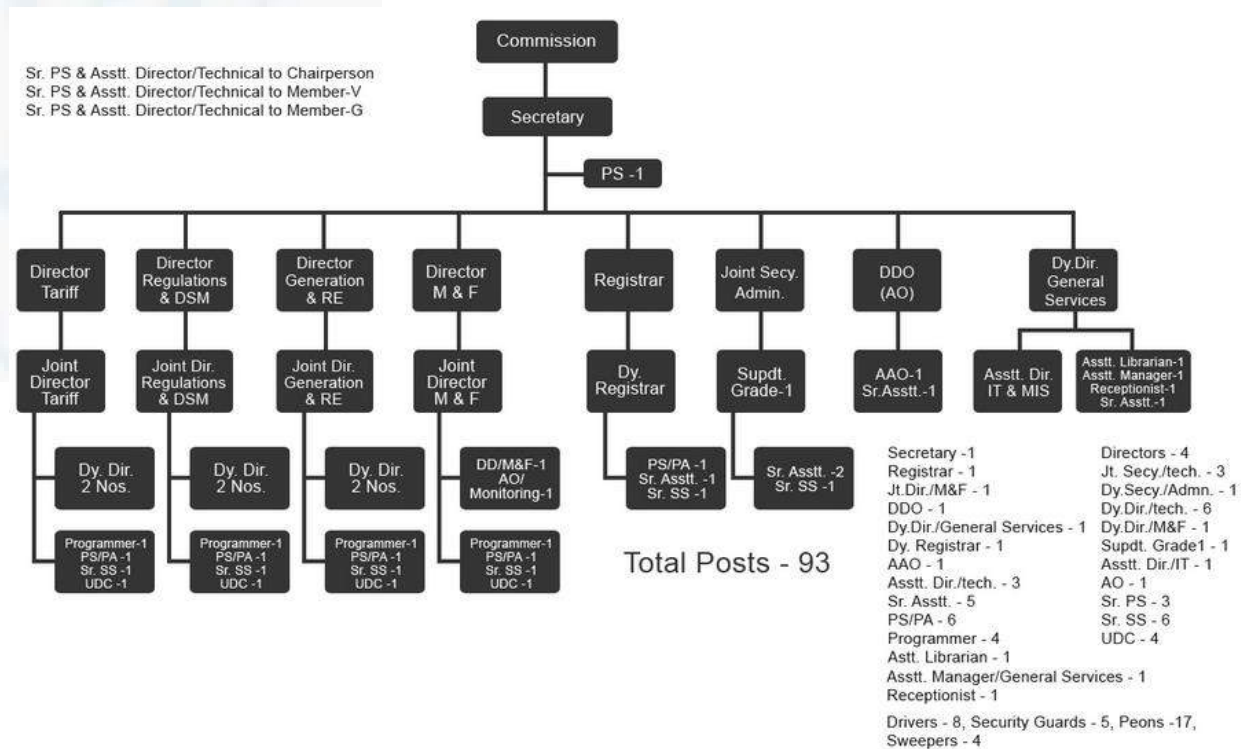
Key Regulations for the State of Punjab is summarized below:

### **5.1. BUDGETING**

The latest income-expenditure statement of the state regulatory commission is not available in public domain.

### **5.2. STAFFING**

The total number of positions available with the commission is 93, with 28 technical and 65 non-technical posts. The figure presents the prevalent organization structure of the state regulatory commission

**Figure XXII-11: Organization Chart - Punjab**

Source: PSERC

The state commission has one of the highest staffing requirements across the state regulatory commissions. Further, the state commission has no reported vacancies.

### 5.3. MYT REGULATION

The MYT regulation in the state has not been implemented in the state. In the absence of audited figures, PSERC is not in a position to fix the base line values for various financial and technical parameters, which are required for determining the tariff under MYT Regulations.

### 5.4. TARIFF REVISION

The tariff revision in the state of Punjab has been regular on an annual basis. The regular tariff revision indicates an efficient practice by the state utility and commission. However, the tariff for the agriculture segment has not been revised by the state DISCOM.

The table below depicts the historical trend in tariff revision in Punjab

**Table XXII-10: Historical Trend in Tariff Revisions - Punjab**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	11%	0%	5 %	2%	11%	7%	9%	12%	9%

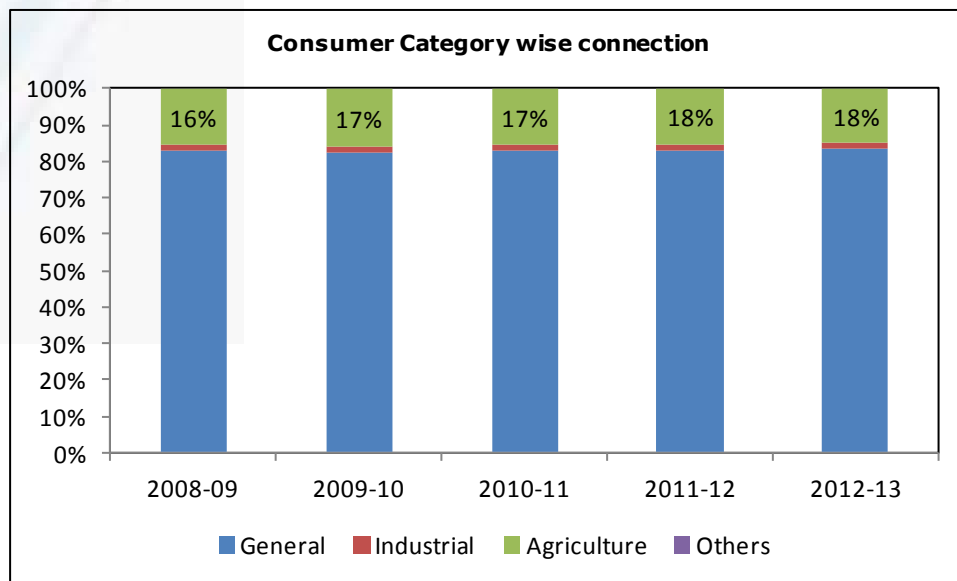
Source: Approved Tariff Order of the state DISCOMs for that year

### 5.5. LEVEL OF METERING

The state distribution utility has submitted that all connections in the state are metered, except the agriculture connections. The agriculture connections in the state are completely

unmetered. The figure below presents the percentage share of agriculture-unmetered connection in the state

**Figure XXII-12: Historical trend in percentage share of connection - Punjab**



Source: PSPCL

General Categories include: Domestic, Commercial, railway traction etc.

### 5.5.1. AGRICULTURE METERING

The methodology adopted by the state commission for demand estimation is as follows:

- The consumption (in BHP) of agriculture pumps is calculated through installation of about 10% sample meters and recording of energy pumped through AMR meters installed at various substations. The impact of level of rainfall in the monsoon season is also factored to calculate the consumption norm
- The consumption is projected for six or eight hours of power supply to the agriculture pump sets

The state distribution utility has stated difficulty in complete installation of meters to the tube-well consumers and recording the consumption of all agriculture pump consumers due to financial aspect, staff shortage aspect and other administrative reasons.

Further, for approval of agriculture sales, the commission allows a 5% growth over the demand submitted in the review order by the state utility.

### 5.6. OPEN ACCESS

Punjab State Load Despatch Center has been mandated with dealing of open access function in the state. PSERC has notified the Open Access Regulation, 2005 on August 9, 2005.

SLDC has further streamlined and strengthened the Open Access process by developing procedures and formats for application, introducing IT in various activities such as UI data

processing and web based application handling cum information system, to make the process transparent and consumer friendly.

The table below depicts the growth in Open Access Consumers and revenues in FY 12 compared to FY 11.

**Table XXII-11: Growth in Open Access Consumers and Revenue from Open Access Consumers**

Year	Consumers	Power (MW)	Transmission Charges (Rs. Cr.)	Wheeling Charges (Rs. Cr)	Misc. Charges (Rs. Cr.)
2010-11	227	1046.81	5.66	36.28	2.41
2011-12	336	1416.99	27.81	73.59	3.50

Source: Punjab SLDC Annual Report

Further, BBMB which was supplying electricity on behalf of its partner States as per the directions/ instructions of the Government of India was allowed to continue to supply on the existing terms and conditions without the need for paying any surcharge or additional surcharge. However, it was mandated for the BBMB to supply the requisite details of such arrangements to the STU and SLDC.



## 6. SUMMARY

1. **Subsidy Booked:** Free power sale to the agriculture segment has led to significant rise in subsidies over the years. The trend in increase in subsidies levels can lead to financial un-sustainability in future. Further, over the span of seven years the annual growth rate increase in subsidy has far exceeded the annual growth rate in cost. This indicates increased dependency of the state utility on state finances to cover its costs.
2. **Revenues from the sector to the state:** The total revenue from the power sector is not able to match up with the expenditure made by the state government towards the power sector. The state revenue from power sector constitutes ~30% of the expenditure on the power sector by the state government.
3. **Financial Losses due to low tariff levels:** The financial losses in the state pose a great challenge to the state utility. The key issue appears to be the inability of the regulatory commission to increase the tariffs to accommodate the increase in costs and increase in debt and thus increase in interest cost. Costs have been growing at a much higher pace than the growth in the revenue. Subsidy support also has increased over the years and can be attributed to the free supply of electricity to agricultural consumers in the state.

**Overall the state power sector appears to be reeling under inherited issues such as high levels of financial losses, accumulated debt that indicates a significant financial restructuring is required to clean up the balance sheet. Further, the tariff in the state remains unreflective of costs, which has increased the subsidy burden of the state. Hence, the state power sector poses a significant risk on the state finances in the future.**

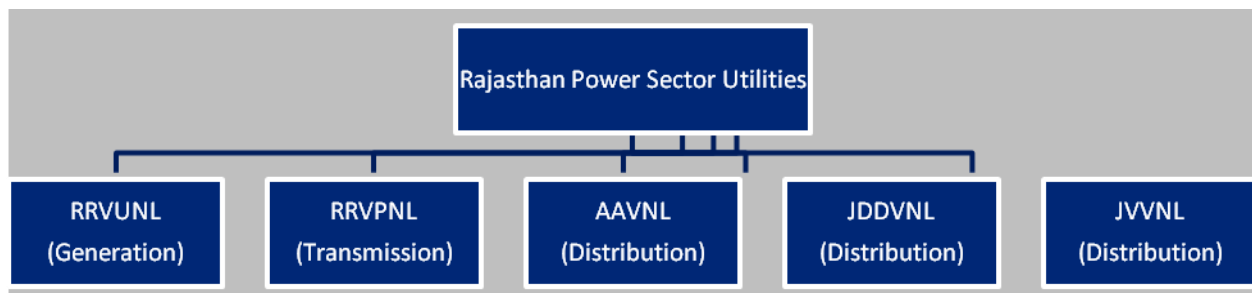
## XXIII RAJASTHAN

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The Rajasthan State Electricity Board (RSEB) was unbundled into 5 entities in July 2000 to form Rajasthan Rajya Vidyut Utpadan Nigam Limited (RRVUNL) (generation company), Rajasthan Rajya Vidyut Prasaran Nigam Limited (RRVPNL) (transmission company), and three distribution companies namely Ajmer Vidyut Vitran Nigam Ltd. (AAVNL), Jaipur Vidyut Vitran Nigam Ltd. (JVVNL) and Jodhpur Vidyut Vitran Nigam Ltd. (JdVVNL).

**Figure XXIII-1: Power Sector Structure – Rajasthan**



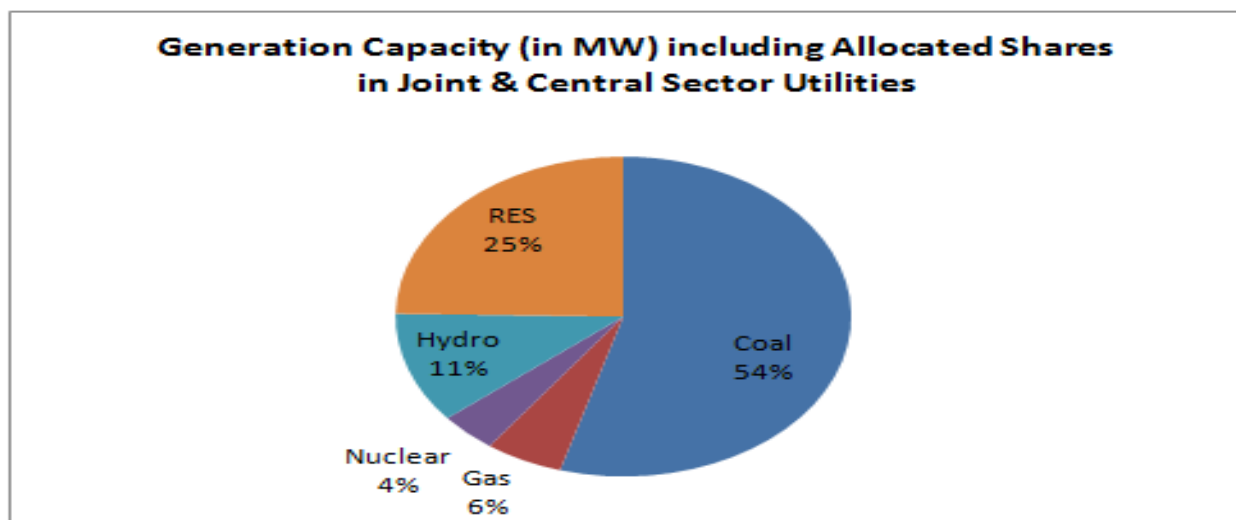
Source: RERC

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 capacity (including allocated share in Joint & Central Sector plants) for Rajasthan was 14094.32 MW out of which 54% of the share is of Coal based generation followed by Renewable based generation (25%) and hydro based (11%). The capacity has grown from 10840 MW by ~30% from last year due to huge additions to coal and renewable based generation.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXIII-2: Generation Capacity Mix - Rajasthan**



Source: CEA

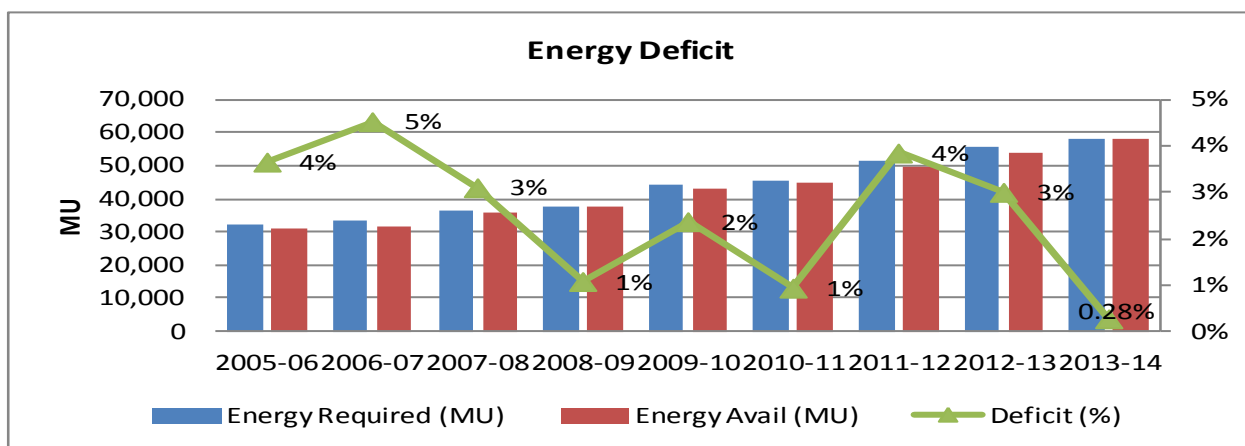
### 1.3. POWER SUPPLY POSITION

The energy and peak deficit in Rajasthan has remained low over the years. In 2013-14, Rajasthan had an energy deficit of less than 1%. The energy deficit has remained within the range of 1% to 5% in the last 8 years. The peak deficit has significantly reduced during 2013-14. The Peak deficit has decreased from 5% in 2012-13 to almost nil in 2013-14.

As discussed earlier, this is due to the huge capacity additions in the previous years in order to meet the demand.

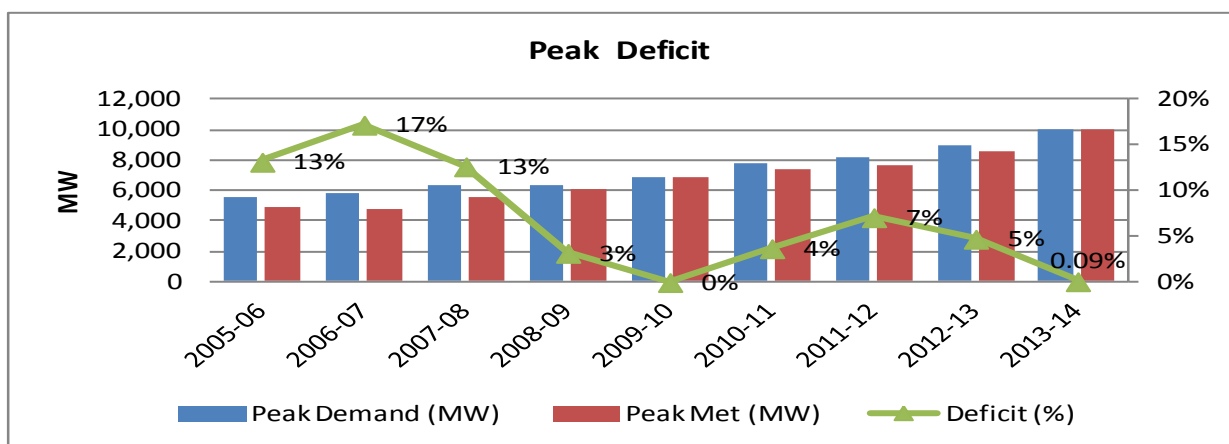
The trend of energy and peak deficit observed in Rajasthan over the years is presented in the figure below:

**Figure XXIII-3: Historical Trend in Energy Deficit - Rajasthan**



Source: CEA

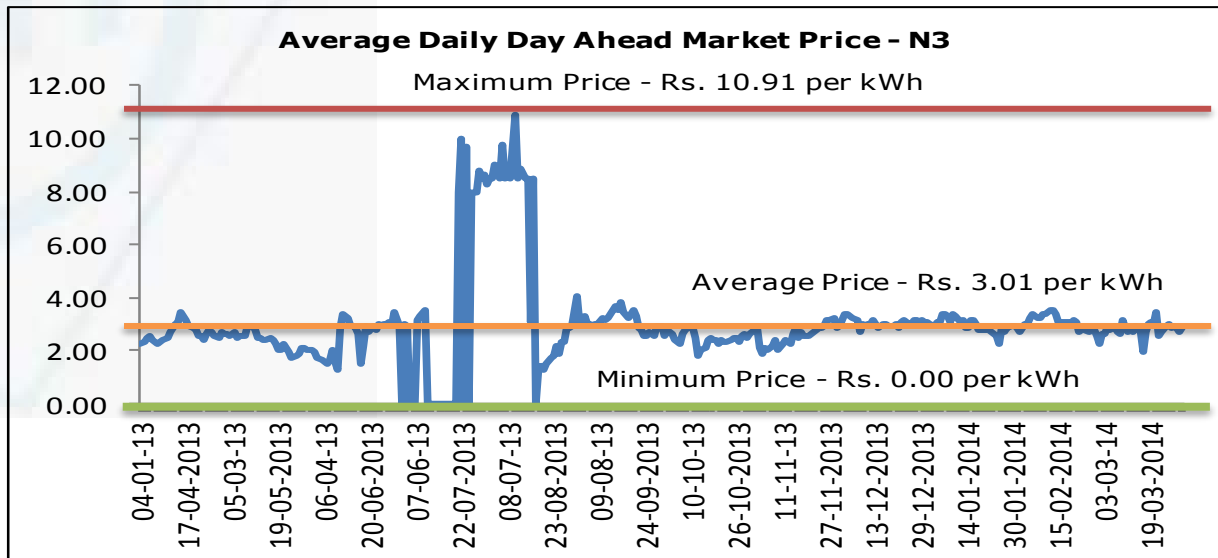
**Figure XXIII-4: Historical Trend in Peak Deficit - Rajasthan**



Source: CEA

This decreasing trend is likely to continue in the near future as the prices in the spot market have come down. The average daily day ahead market prices are less than the distribution costs for the previous years (discussed later in the report) in the state.

Figure XXIII-5: Average Daily Day Ahead Market Prices N3 – Rajasthan



Source: IEX

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

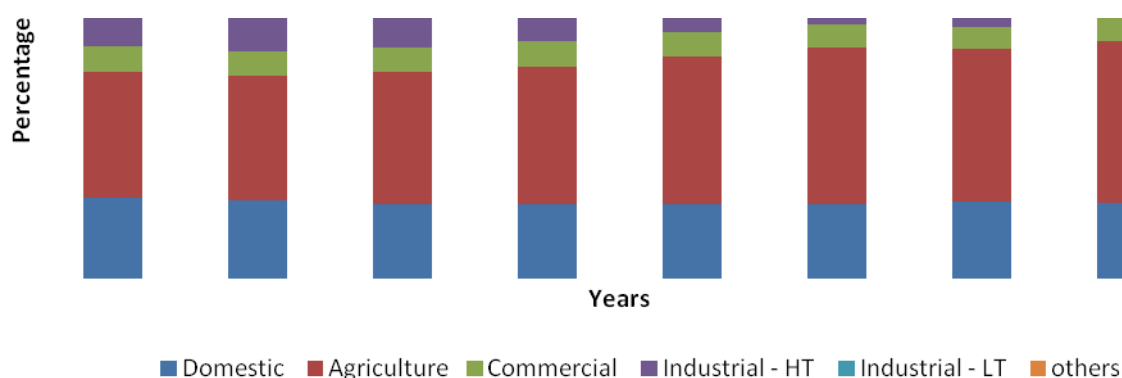
### 2.1. CONSUMER SALES MIX OF RAJASTHAN

AVVNL, JVVNL and JdVVNL are the three State Govt. owned companies, engaged in the business of distribution and retail supply of electricity in the state of Rajasthan.

AVVNL is engaged in distribution and supply of electricity in 11 districts of Rajasthan, namely Ajmer, Bhilwara, Nagaur, Sikar, Jhunjhunu, Udaipur, Banswara, Chittorgarh, Rajsamand, Doongarpur and Pratapgarh. JVVNL is engaged in distribution and supply of electricity in 12 districts of Rajasthan, namely Jaipur, Dausa, Alwar, Bharatpur, Dholpur, Kota, Bundi, Baran, Jhalawar, Sawaimadhopur, Tonk and Karauli. JdVVNL is engaged in distribution and supply of electricity in 10 districts Barmer, Bikaner, Churu, Hanumangarh, Jaisalmer, Jalore, Jodhpur, Pali, S. Ganganagar, Sirohi.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXIII-6: Historical Trend in Consumer Sales Mix - Rajasthan**



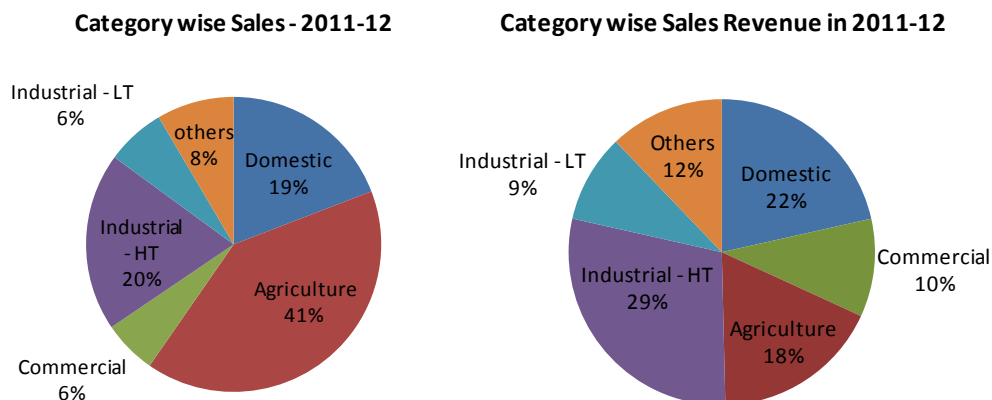
Source: PFC

The overall sales have registered growth in Rajasthan has grown at a CAGR of 13% over the span of eight years. Rajasthan electricity sales is dominated by agriculture consumers, and the share of agriculture has increased from 31% in 2004-05 to 41% 2011-12; in MU terms the sales have tripled over the last 8 years (CAGR ~17%).

In terms of revenue contribution, industries contributed ~38% of revenue, followed by domestic and agricultural categories with a share of 22% and 18%, respectively, while commercial contributed ~10% of the revenue.

It can be seen that despite accounting for highest sales, agriculture contributes just 18% of the revenue realised. This is due to low tariff rates for agriculture.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXIII-7: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 – Rajasthan.**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Rajasthan distribution utilities have shown an improving trend, they have decreased from 47% in 2004-05 to 25% in 2011-12. This, however, is based on the estimated consumption in the agricultural sector (Currently, state's unmetered (flat) agriculture sale is 8% of total sales). The trend observed over the years in collection efficiency has been on a higher side.

**Table XXIII-1: Historical Trend in AT&C Losses and Collection Efficiency - Rajasthan**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	47%	42.2%	35.7%	33%	30%	30%	25%	25%
Collection Efficiency	96%	97%	98%	98%	96%	95%	97%	94%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost forms the major cost component of distribution in Rajasthan. The power purchase cost accounts for ~72% of the total distribution cost (FY05 to FY12). These have increased due to increase in the prices of imported coal. The Interest Cost is gradually increasing have shown an increasing trend and accounted for ~16% of total distribution cost in 2011-12.

The per unit cost distribution cost break-up for different cost components for the state of Rajasthan is provided in the table below:-

**Table XXIII-2: Historical Trend in Distribution Costs - Rajasthan**

Cost Component (Rs/KWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	2.06	2.25	2.31	2.82	3.60	3.92	3.46	3.69
O&M (R&M + A&G + EC)	0.20	0.17	0.18	0.26	0.58	0.66	0.59	0.73
Interest	0.17	0.19	0.23	0.27	0.40	0.63	0.88	1.19

<i>Depreciation</i>	0.06	0.10	0.13	0.08	0.11	0.12	0.14	0.15
<i>Other cost</i>	0.03	0.01	0.01	0.02	0.01	-0.07	2.41	1.58

Source: PFC

Rajasthan has booked massive amount of subsidy on its account relative to the amount actually disbursed by the government during the previous years. The past years' unpaid amount has been recognized as "Other Costs" in the books of 2010-11.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. No tariff hikes were observed for several years and tariffs were increased in FY 2011-12 after a gap of 8 years wherein tariffs were hiked substantially i.e. 24%. In FY 2012-13 & FY 2013-14 the tariffs were further increased by 19% and 14% respectively.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XXIII-3: Historical Trend in Consumer Wise Average Revenue Realization - Rajasthan**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	2.29	2.77	2.68	2.70	2.75	2.66	2.65	3.16
Agriculture	1.14	1.65	1.45	1.36	1.26	1.18	1.17	1.24
Commercial	4.94	4.92	4.89	4.79	4.71	4.62	4.57	4.98
Industrial HT	3.89	3.83	3.99	4.27	3.69	3.93	3.81	4.17
Industrial LT	3.78	3.72	3.84	3.75	11.66	3.58	3.50	4.06

Source: PFC

The agriculture sale which forms the major part of the sales has annual revenue realization for less than Rs 1.25 per kWh. As discussed earlier, only 18% of revenue comes from agricultural sales. The state's unmetered (flat) agriculture sale is 8% of total sales.

No incentive is being given to encourage consumers to shift to metered category as in Rajasthan unmetered tariff is applicable only for a small fraction of agriculture consumers. No new connections are released under unmetered tariff and Commission has already issued directions for conversion of these unmetered agriculture consumers to metered category in a time bound manner.

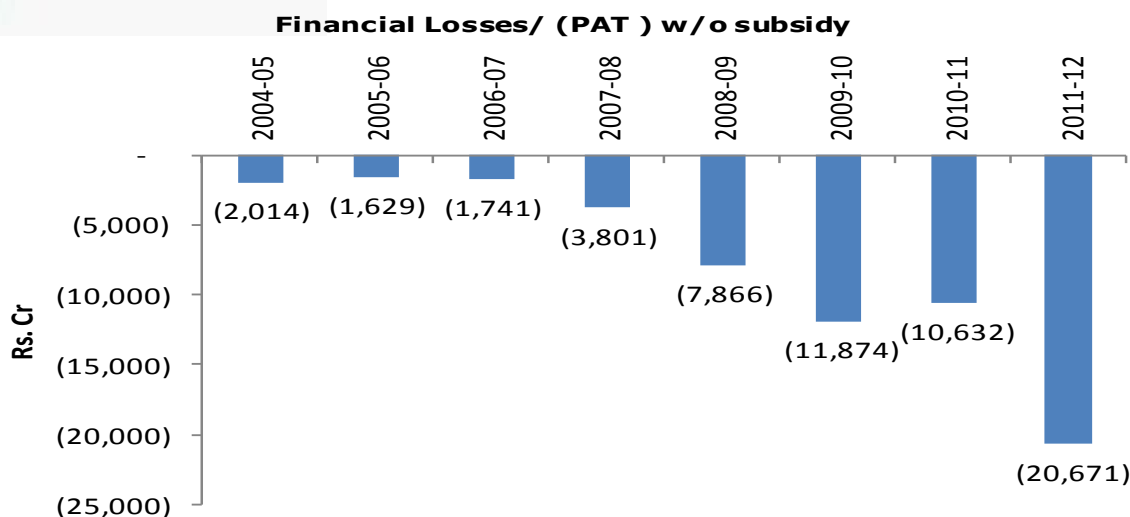
There is high resistance from flat rate consumers to get converted to metered category. However, the Commission had directed the Discoms in order dated 06/06/2013, (Petition No. RERC 356/12, 357/12, 358/12) that the urban flat rate consumers should get converted into metered category in next 2 months.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Rajasthan has increased over the years. As discussed earlier, this is because of increasing power purchase cost, inadequate tariff revisions over the years and decrease in subsidy payout. The financial losses of distribution utilities combined (without subsidy) have been shown below.

**Figure XXIII-8: Historical Trend Financial Losses (w/o) subsidies – Rajasthan**



Source: PFC

The Government of Rajasthan has been covering the losses of the discoms by providing Grants and Subsidies. In FY 2010-11 due to substantial decrease in Grants and Subsidies given by the state government (decrease by 90% over last year) and increase in other cost (increased to 32% of the total costs in FY11) the financial losses have gone up substantially. The total accumulated losses (with subsidy) till FY 2011-12 are over Rs 40,000 Crore.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

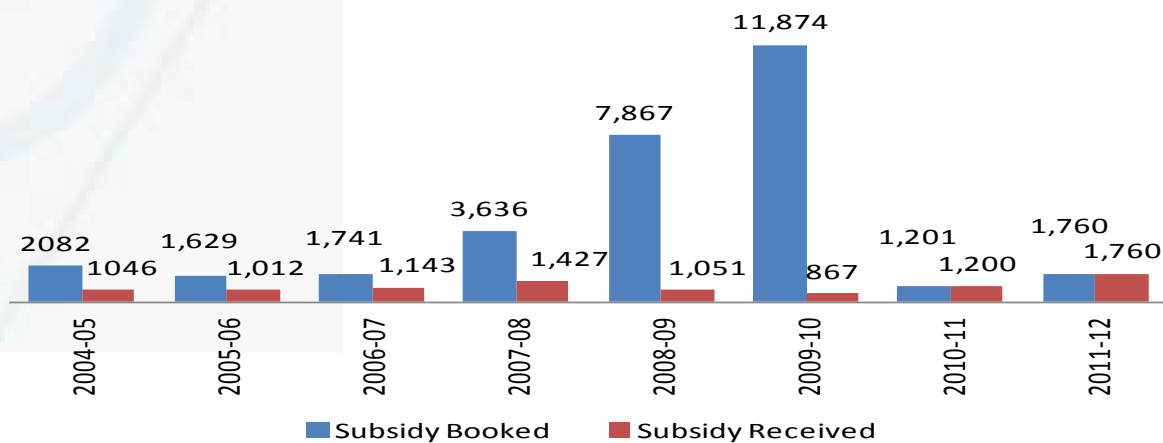
The subsidy received has always been less than subsidy booked. Subsidy booked increased over the years but the non-realization of the same led to decrease in subsidy booked by the utilities. In 2008-09 subsidy realization was only 13% while in 2009-10 the subsidy realization was only 7%. In 2008-09 and 2009-10 subsidy booked was 46% and 54% of the total revenues respectively. But on subsidy received basis, the share of subsidy received was 6% and 4% respectively of the total revenues in these years.

This has led to the creation of huge financial gap for the utilities and losses increased significantly in the last few years. In 2010-11 and 2011-12, subsidy booked decreased significantly by 90% and 85% as compared to 2009-10.

The graph below highlights the subsidy booked v/s subsidy received for the distribution utilities in the state.



**Figure XXIII-9: Historical Trend Subsidies Booked v/s Subsidies Received – Rajasthan**



Source: PFC

The trend in subsidy pay-out with respect to the subsidy booked was 100% from FY 2010-11 onwards. In 2010-11 and 2011-12, the share of subsidy as a percentage of revenue was 10% and 12% respectively.

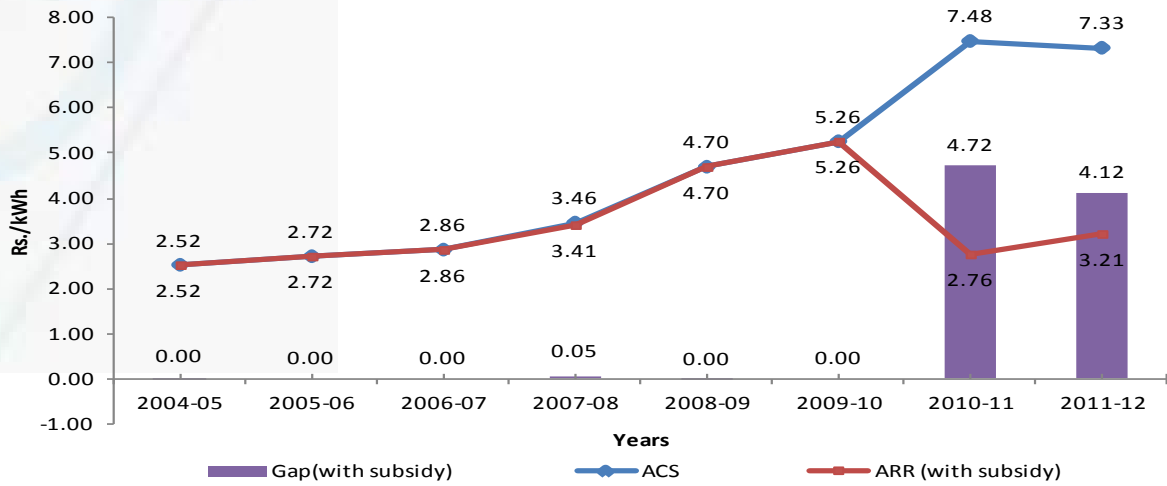
*The subsidy received being so much lower than the subsidy booked is a flagrant violation of the law as per Section 65 of the EA states that "If the State Government requires the grant of any subsidy to any consumer or class of consumers in the tariff determined by the State Commission under section 62, the State Government shall, notwithstanding any direction which may be given under section 108, pay, within in advance in the manner as may be specified, by the State Commission the amount to compensate the person affected by the grant of subsidy in the manner the State Commission may direct, as a condition for the licence or any other person concerned to implement the subsidy provided for by the State Government".*

### 3.3. ACS v/s ARR

The gap between average cost of supply and average revenue realized (with subsidy) was nil till 2009-10 primarily due to the huge subsidies booked over the years. However in 2010-11 the subsidies booked decreased significantly leading to creation of gap of ~Rs 4.5 per unit. In 2010-11 there was an increase in the cost of supply and a decrease in the revenue realized.

In 2011-12, the gap decreased to some extent due to revision in the tariffs after a time gap of 8 years.

The gap with subsidy between average cost of supply and average revenue realized has been shown below.

**Figure XXIII-10: Historical Trend ACS v/s ARR (with subsidy) – Rajasthan**

Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The tax revenue from the power sector forms a marginal ~3% of the total tax revenue.

**Table XXIII-4: Tax Revenues - Rajasthan**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	699.9	906	1,094.48
Total Tax Revenue	25,672	33,614	40,354.1
Power sector Tax Revenue / Total state Tax Revenue	2.73%	2.69%	2.71%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **Royalty/cess on water for power generation, T n D, Rural Electrification** etc. The years the Non Tax revenue from the sector has been an insignificant proportion of total state Non Tax Revenue.. The details for the same are provided in the table below.

**Table XXIII-5: Non-Tax Revenues - Rajasthan**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector*	0.23	-	4.22
Total Non-Tax Revenue	4,558	6,294	9,175.10
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0.00%	0.00%	0.05%

\*The non-tax revenue from the sector appears as other receipts in CAG State accounts, 2011-12.

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The overall income generated from power sector has increased from Rs 700 Cr in 2009-10 to Rs 1099 Cr in 2011-12. However, the contribution of Power Sector in overall State Revenues has been approximately the same (~3%).

### 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector by the state of Rajasthan

**Table XXIII-6: Power Sector Expenditure - Rajasthan**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	1,540	1,296	2,459
Revenue Expenditure	1,574	2,068	3,005.9
Total Expenditure	3,114	3,364	5,464.9

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The Capital and Revenue expenditure incurred on the Power sector has increased over the period of three years since FY10 primarily on account of investment in Power companies and release of more grants/subsidies to Power companies.

**The expenditure on Power Sector has been more than the Revenue generated from Power Sector over the years.**

### 4.3. POWER BONDS

Power Bonds to the tune of Rs 368.78 Cr were issued by the state government on 18th August, 2003 to be redeemed by 2016. The bonds were issued to the tune of Rs. 367.78 Cr. The total outstanding balance at the end of 2011-12 was Rs. 55.32 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was ~Rs 55 Cr.

### 4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The table below depicts the guarantees given to power sector relative to the total revenues of the state

**Table XXIII-7: Guarantees - Rajasthan**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Guarantees given by State Govt.	37,062	48,118	57,080.84
Total Revenues of the State	30,231	39,908	49,529.2
Guarantees as a %age of Total Revenues of State	74.83%	120.57%	115.25%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

As shown above, there has been a substantial increase in the Guarantees given by the government to Power sector, i.e. from 75% of State Revenues in 2009-10 to 121% in 2010-11. The Guarantees given to the Power sector exceeded the total revenue generated by the

state during the year 2011-12 and 2010-11. The table below depicts the three year average share of different utilities in sector guarantees:

**Table XXIII-8: Share of Guarantees among Utilities - Rajasthan**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Rajasthan Rajya Vidyut Prasaran	4,410	5,363	5,964.87	11%
Rajasthan Rajya Vidyut Utpadan	3,447	3,170	3,278.46	7%
Jaipur Vidyut Vitran Nigam Limited	9,619	12,932	15,491.74	27%
Ajmer Vidyut Vitran Nigam Limited	10,746	14,268	17,636.18	30%
Jodhpur Vidyut Vitran Nigam Limited	4,410	5,363	14,709.59	25%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The Guarantees to the power sector has primarily risen due to increase in Guarantees towards Discoms.

Over the span of three years, Discoms accounted for a share of ~82% in the Power Sector Guarantees.

### **Subsidy**

The table below depicts the share of utilities in subsidies given to Power sector and share of sector in total state subsidy:

**Table XXIII-9: Subsidy - Rajasthan**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
Rs Cr				
Generation	19	19	19	1%
Transmission	41	41	22	2%
Distribution	1,392	1,886	2,760	97%
Power Sector subsidy/ Total Subsidy	1,452	1,946	2,801	91%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

Over the span of three years, the subsidies to Discoms accounted for 97% of total subsidy given to the power sector by the state government.

#### 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XXIII-10: Financing Requirement for the Power Sector - Rajasthan**

Particulars	2011-12 Rs Cr
Power Sector Expenditure (Capital and Revenue)	5,464.9
Loans And Advances made by the State Government (Net of Recoveries)	(145.31)
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year ( Net of Receipts)*	16.79
Loans for Power Projects-T&D from the Central Govt. Discharged during the year ( Net of Receipts)	145.31
Total Power Sector Financing during the year	5,481.69
Sector Financing Requirement as a % age of total revenues of state	11%
GSDP nominal	2,27,824
Sector Financing Requirement as a % age of GSDP	2.41%
Financial Profit/(Loss) of Discoms during the year (with Subsidy realised)	(18,911)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	49%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	10.71%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 11% of the Total Revenue generated by the state and 2.41 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 49% of the State revenue and 10.71 % of the GSDP.

## 5. FINANCIAL RESTRUCTURING PLAN

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

Given below is the current status of the financial restructuring plan's implementation in the state.

**Table XXIII-11: Status of FRP - Rajasthan**

Particulars	Details
Accumulated Losses as on cutoff date (23 March 2012)	40942 cr.
STL (eligible under the scheme)	36,038 cr.
Bonds issued by Discoms to participating lenders	17961 cr.
Tariff petition for 2014-15	ARR filed
Operational losses to be funded (2013-14)	7647 cr.
Road-Map for private participation in distribution	Road map finalized
Status of liquidation of regulatory assets	Will start after 2016-17
Status of preparation of time bound plan for metering of all category of consumers	Being Prepared
Status of enactment of State Electricity Distribution Responsibility Bill	Under Progress

### 5.2. FRP OUTLOOK

In this section, key parameters for the state have been looked at in order to comment on the expected future financial position of the distribution segment after the FRP is fully implemented in the state. The color scheme used in the tables for each state in this section, refer to the color key provided here:

	Area of concern
	Can be better
	Good

The three Discoms in Rajasthan reported a combined financial loss (without subsidy) of Rs.20,671 Cr. in 2011-12, translating into a financial gap of Rs.4.38/kWh. The financial gap in 2010-11 was Rs 2.4/kWh. The sudden increase in the gap is due to a huge figure of subsidy receivables being expensed as bad debt in 2011-12.

As per the FRP scheme, the Rajasthan government would take over Rs.17,961 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The following table highlights the bond repayment schedule and State Government fiscal impact under FRP.



**Table XXIII-12: Bonds re-payment Schedule by the State Government and State fiscal impact – Rajasthan (Rs. Crore)**

Particulars	Years						
	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Bonds taken over schedule	3340	4500	5700	4421	-	-	-
Interest liability (A)	-	-	1787	1787	1787	1698	1519
Cash support from State Govt. (B)*	-	-	3272	3499	3753	4027	4335
Net Repayment liability on bonds taken over by State Govt (C)	-	-	-	-	-	1347	1347
Total (A+B+C)			5059	5286	5540	7072	7201

Source: Data submitted by the state to the FFC

\* Cash support includes interest-free loans from State Govt., Cash support from State Govt., reimbursement of losses, electricity duty retention and interest subsidy on IBRD loan.

Total fiscal impact of the FRP on the State Government finances by the end of FY28 includes net repayment of bonds/special securities of Rs. 13471 (i.e., gross repayment of bonds of Rs. 17961 Cr. less capital reimbursement support from Central Government of 25% of bonds amounting to Rs. 4490 Cr.) and the interest on bonds/special securities amounting to Rs. 16,892 Cr.

Some of the key parameters relevant to FRP implementation have been shown in the table below for Rajasthan.

**Table XXIII-13: Historical Parameters - Rajasthan**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	42%	36%	33%	30%	30%	25%	25%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	0%	24%	19%	14%
<b>Subsidy Received/Booked</b>	62%	66%	38%	13%	7%	11%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	7%	8%	8%	9%	12%	18%	16%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.54	0.57	1.10	2.17	2.86	2.40	4.38	n.a	n.a

Source: PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses have decreased to 25% in 2011-12. A >1.5% annual reduction in AT&C losses will be required in order to benefit from the central grants support scheme. If the Discoms continue to reduce AT&C losses at the rate they have decreased in the past, the potential grants from the central government will be significant. However, it is important to note that these losses are calculated on the basis of metered agricultural consumers. Agricultural metering is currently at 50% in

Rajasthan. Hence, it might not be totally appropriate to consider the 25% loss level in 2010-11 as the benchmark for the state.

- Tariffs were not revised for a continuous period of 5 years in Rajasthan. In the last three years, tariffs have been revised substantially. In 2013-14, Rajasthan increased agriculture tariffs (general category) from Rs 2.25/kWh to Rs 3.93/kWh. Also, tariffs for unmetered agriculture consumers were hiked by an even higher percentage, in order to incentivize them to shift to metered category. With limits on subsidy levels, the regulator will need to revise tariff hikes on a frequent basis in order to bring down the financial gap, which is currently very high.
- Barring 2011-12, the subsidy received-booked ratio has been quite low in Rajasthan. Transparency in subsidy sanction and disbursement is a required condition in the FRP and can possibly be an area of concern.
- The share of Interest expenses has been very high. With 50% of STL being taken over by the state government and a moratorium on principal payments for the remaining 50%, the Discoms' short-term loans, the liquidity position will significantly improve and aid its working capital requirements.
- The ACS-ARR Gap needs to be reduced yearly by 25% of the 2010-11 benchmark level in the moratorium period to be eligible for the central grants incentive. By 2014-15, the financial gap will need to be brought down to around 60 paise/kWh. Assuming the AT&C losses are reduced by 3%, the financial gap will come down by around 18 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same power as in 2010-11<sup>22</sup>. This implies that the technical losses will need to be brought down by a considerable percentage, unless the tariffs are revised to increase the revenue realization.

In the state of Rajasthan, lack of tariff hikes and inadequate disbursement of subsidies have contributed to the deterioration of financial health of Discoms. The reduction in AT&C loss levels has been significant and similar reduction in the future will allow the state to benefit from central government grants. While the FRP is expected to significantly improve the working capital condition of the state in the short-term, it is important to note that the accumulated financial losses of the Discoms have gone up to Rs 70,000 Cr. even before the scheme has been implemented. This will have severe cash flow implications in spite of the respite provided by the moratorium period on repayment of past loans under FRP.

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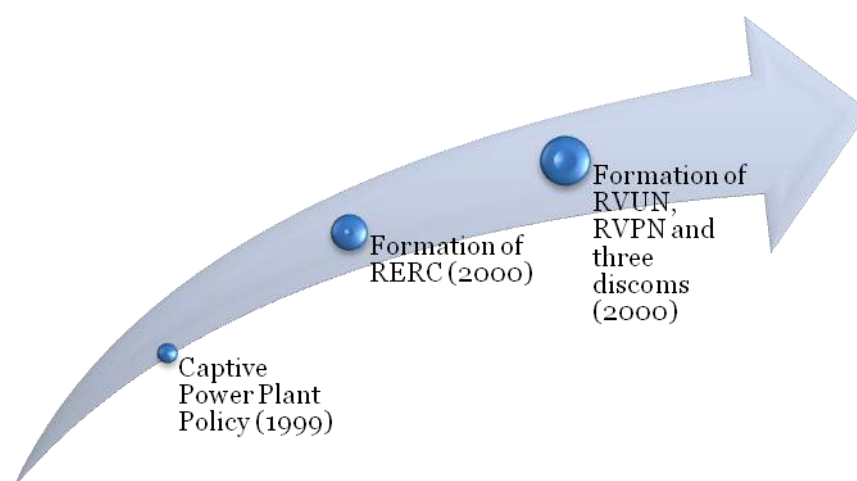
<sup>22</sup> In order to estimate gap reduction, 2010-11 data has been taken for Rajasthan because the ACS in 2011-12 is very high due to the bad debt (subsidy receivables) expensed in that year.

## 6. ASSESSMENT OF REGULATORY EFFECTIVENESS

The power sector received an impetus after the initiation of reforms. Reforms in the state started in 1999 with major objectives of unbundling erstwhile RSEB, encouraging private sector participation in sector, and ensuring network improvements. The reform journey so far has seen some objectives being fulfilled and some on the verge of fulfillment. The state's installed capacity is presently more than 14000 MW including more than 5000 MW capacity installed in state. The state's transmission network is very robust today and capable of intra and inter-state transfers of power. The number of EHV substations in State is more than 400. Most of the rural sectors and BPL families have been electrified.

If we talk about the power sector utilities, then the utilities especially the distribution utilities have not been performing well; they are suffering from financial losses, and from issues like power theft and pilferage, non-revision of retail tariffs, huge AT&C and T&D losses, and huge power procurement costs etc. The deteriorating condition of the utilities with their financials and reasons for these losses has been dealt in detail in subsequent sections.

**Figure XXIII-11: Reform Process – Rajasthan**



### 6.1. STATUS OF IMPORTANT REGULATIONS:

Reforms in the state started in 1999 with major objectives of unbundling erstwhile RSEB, encouraging private sector participation in sector, and ensuring network improvements. The reform journey so far has seen some objectives being fulfilled and some on the verge of fulfilment. The reform journey so far includes:

- Formulation of Captive Power Plants Policy by GoR facilitating any industrial unit or units to set a power plant for captive use of the industries in that area.
- Establishment of Rajasthan Electricity Regulatory Commission (RERC) on 2nd January, 2000 under the ERC Act, 1998. RERC since its inception has issued a number of important regulations, some of which include:
  - Metering Code for Rajasthan Grid
  - General and Planning Code
  - System Operation and load Dispatch Code
  - Standards of Performance

- Safety Standards Code
- Open Access Code
- Establishment of five power utilities: On 19th July 2000 the assets, liabilities and personnel of the erstwhile RSEB have been transferred to the newly formed 5 power companies namely:
  - RRVUNL, generating company
  - RRVPNL, transmission company
  - 3 distribution companies, viz. JVNNL, AVVNL and JdVVNL
- Encouraging private participating in sector: The reform programs in state have attracted private sector participation in Generation and Transmission sector

As per the present applicable tariff regulations, Multi Year Tariff (MYT) is set as per regulations for Control Period for generation, transmission and distribution utilities. The present control period is FY 2010 to FY 2014. In accordance with the regulations, distribution licensee (the applicant) in the state prepares annual statement of accounts and also prepare annual reports and statistics, giving an account of its activities during the current and previous year and likely to be undertaken in the remaining years of the MYT Control Period, including the ensuing year. The applicant also submits the forecast of aggregate revenue requirement and expected revenue from tariff for each year of the Control Period.

The reform processes has brought much improvements in transmission and generation sector, but it has not bring in much improvements in the distribution sector. Efficiency improvements are yet to be seen on both technical and financial fronts. Losses on both financial and technical fronts are huge and increasing the burden on distribution utilities despite of subsidy and transitional monetary support provided by GoR.

It has been observed RERC is not financially dependent on the state government for meeting their expenditure.

Also, out of the total number of posts working/sanctioned in RERC (58) majority comprise of technical posts (32) and vacancies in technical posts are 6. Hence the staff strength further gets reduced.

## **6.2. STATUS OF OPEN ACCESS IMPLEMENTATION:**

Open access regulations were issued by RERC in May 2004 as 'Terms & Conditions for Open Access'. These regulations were subsequently amended on 4.8.2004, 15.12.2005, 27.12.2006, & 30.3.2007.

During FY12, there were Sixty (60) wind power plants (mainly of M/s Suzlon and M/s Enercon) having open access on RVPN's transmission system under NES policies of Government of Rajasthan. Till date, RVPN has executed Thirty Two (32) open access agreements of total capacity of 302.05 MW. Of these 32 agreements, 17 agreements have been long term open access agreements with M/S VS Lignite Power Limited. Rest others were executed as short term open access agreements.

### 6.3. FREQUENCY OF TARIFF REVISIONS:

At present, though the ARR is worked in MYT basis, linking the same with loss reduction target but the consumer tariffs are not determined for multi-year, but only for the year, for which the petition for revision is filed. Utilities in Rajasthan are state owned and they are still not claiming full cost recovery, though have achieved target for loss reduction.

The tariff revisions were done in FY 2011-12 after a gap of 9 years wherein tariffs were hiked substantially i.e. 24%. Thereafter commission has approved a tariff hike in FY 2012-13 & FY 2013-14 by 19% and 14% respectively. The table below provides the details of tariff revision in the state.

**Table XXIII-14: Tariff Revisions - Rajasthan**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	0%	0%	0%	0%	0%	0%	24%	19%	14%

### 6.4. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION

Commission normally considers Compounded Annual Growth Rate (CAGR) of 3 or 5 previous years, as the case may be, in assessing energy requirement in a year. However, in case of Agriculture, connected load and specific consumption have been used for calculating sales as adopted in tariff order of FY 2012-13. This methodology is more appropriate rather than using CAGR of sales, as agricultural consumption varies considerably on year to year basis due to erratic nature of rainfall in the State. In addition, supply hours for agriculture in the past have varied considerably due to various reasons, which also lead to significant changes in consumption of power in agriculture. This methodology has been used in the order for estimating the energy sales of Agriculture consumers (both metered and flat rate).

The Commission, however, has approved the sales for FY 2013-14 using the following assumptions.

1. For metered category, the no. of consumers, specific consumption (kWh/KW/Year) and connected load (KW) for all Discoms have been taken as per tariff petitions after the reduction of no. of consumers and connected load of Farm Houses.
2. The Commission has considered that new and converted consumers on the average could be taken to be in the metered category for 6 months. Accordingly, connected load and specific consumption as applicable for metered category have been considered for 6 months in case of new consumers and those converted from flat rate for working out their sales

## 7. SUMMARY

1. **Tariff Hikes:** In line with increasing gap between ACS and ARR the tariffs have been hiked every year from 2011-12 to 2013-14. The tariff revisions were done in FY 2011-12 after a gap of 8 years wherein tariffs were hiked substantially i.e. 24%. Thereafter commission has approved a tariff hike in FY 2012-13 & FY 2013-14 by 19% and 14% respectively.
2. **Subsidy:** In 2011-12, majority of subsidy was provided to the power sector (~88%) by the state government. Also, the trend in subsidy pay-out with respect to the subsidy booked was 100% from FY 2010-11 onwards. In 2010-11 and 2011-12 the share of subsidy as a percentage of revenue was 10% and 12% respectively.
3. **Gap between ACS and ARR:** The gap between average cost of supply and average revenue realized (with subsidy) was nil till 2009-10 primarily due to the huge subsidies booked over the years. However in 2010-11 the subsidies booked decreased significantly leading to creation of gap of ~Rs 4.5 per unit. In 2010-11 there was an increase in the cost of supply and a decrease in the revenue realized. In 2011-12, the gap decreased to some extent due to revision in the tariffs after a time gap of 8 years. The commission needs to keep this tariff revision process going to ensure better recovery for discoms.
4. **Financial Viability:** The single biggest challenge for the State is to attain financial viability for the power business. Currently the distribution business is making huge losses and the deficit is increasing year over year. Due to delays in true-up exercise and non-revision of tariffs in previous financial years, financial losses get accumulated each year and are becoming high. In FY 2010-11 due to substantial decrease in Grants and Subsidies given by the state government (decrease by 90% over last year) and increase in other cost (increased to 32% of the total costs in FY11) the financial losses have gone up substantially. The total accumulated losses (with subsidy) till FY 2011-12 are over Rs 40,000 Crore.
5. **Operational Efficiency:** The Aggregated Technical & Commercial (AT&C) losses for Rajasthan distribution utilities have shown an improving trend, they have decreased from 47% in 2004-05 to 25% in 2011-12. This, however, is based on the estimated consumption in the agricultural sector (Currently, state's unmetered (flat) agriculture sale is 8% of total sales). Efficiency improvements are yet to be seen on both technical and financial fronts. Losses on both financial and technical fronts are huge and increasing the burden on distribution utilities despite of subsidy and transitional monetary support provided by GoR.. Utility faces severe cost side risks (mainly power purchase cost). Increasing power purchase costs are also a cause of concern, which are increasing the operational costs and are the main reason for incurring huge financial losses. It is necessary to conduct the demand forecasting studies for short and long term using the scientific methods to obtain the precise demand forecasts; it will help the utilities to properly plan their power procurement strategies and minimizing their power procurement costs.
6. **States Guarantees:** Guarantees given by the government to the Power sector exceeded the Total Revenue generated by the state. In 2011-12, the share of Discom was as high as 84% of the state Guarantees for Power Sector.

7. **State exposure to the Power Sector:** Total Revenue – Tax and Non Tax (Rs. 1098 Crores) from the Power sector is ~20% of the total expenditure on the sector (Rs. 5464.9 Crores). The financing requirement for the Power sector in the state was estimated to be 11% of the Total Revenue generated by the state and 2.41 % of the Gross State Domestic Product.

## XXIV SIKKIM

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

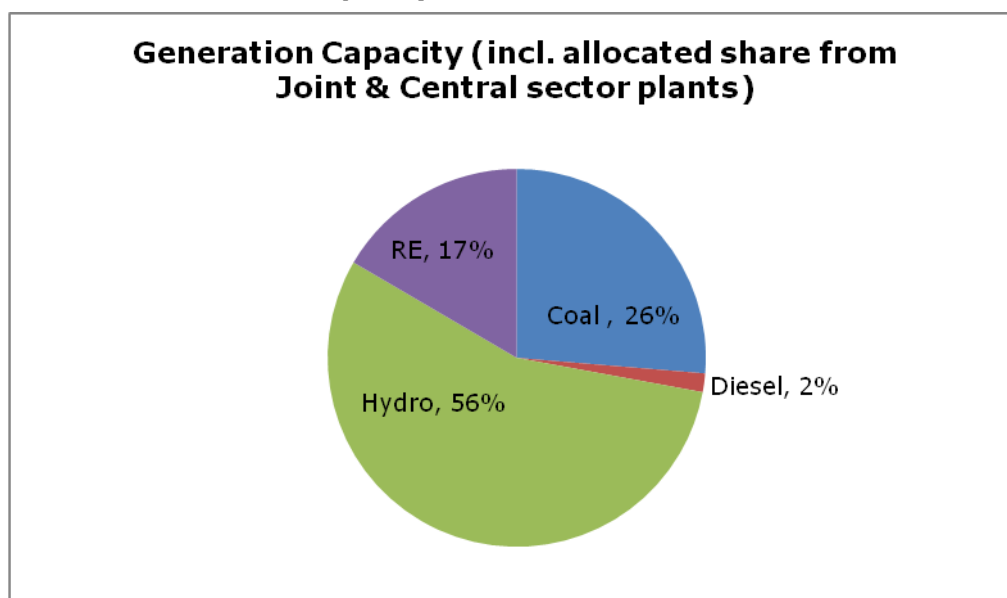
The Energy and Power Department of the State Government is responsible for power generation, transmission and distribution in Sikkim. Even after 10 years of the electricity act, the state has been a laggard in terms of power sector reforms with the operations still carried out by a single entity. Any detailed information on the formation of a state electricity regulatory commission is also not available. In recent years, Sikkim has been focussing on capacity addition and development of hydro potential by handing out projects to private sector investors. It has a peak potential capacity of around 8000 MW of hydroelectricity.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Sikkim was 313.99 MW. It has grown by 3% from June 2013 level of 305.38 MW. Out of total capacity as on Feb 2014, Hydro power accounted for ~56% followed by Coal (~26%) and RE (~17%).

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXIV-1: Generation Capacity Mix as on Feb 2014 - Sikkim**



Source: CEA

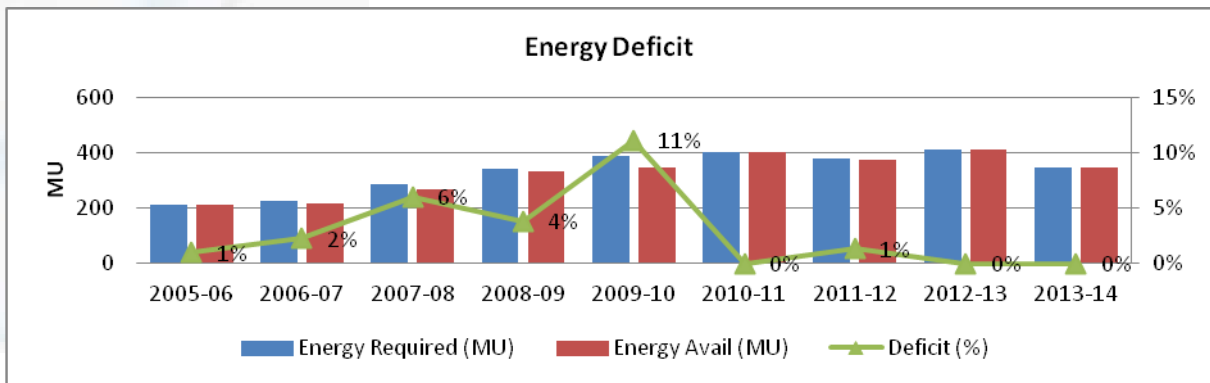
#### 1.3. POWER SUPPLY POSITION

The energy and peak deficit in the state has been considerably low for the last few years. The energy deficit which has reduced from 10% in 2009-10 to 0% in 2010-11 is because of continuous capacity addition and favorable hydro power generation in those years. The peak deficit of 5% observed in the financial year 2011-12 is because of the "Himalayan earthquake" which occurred on 18<sup>th</sup> September 2011.



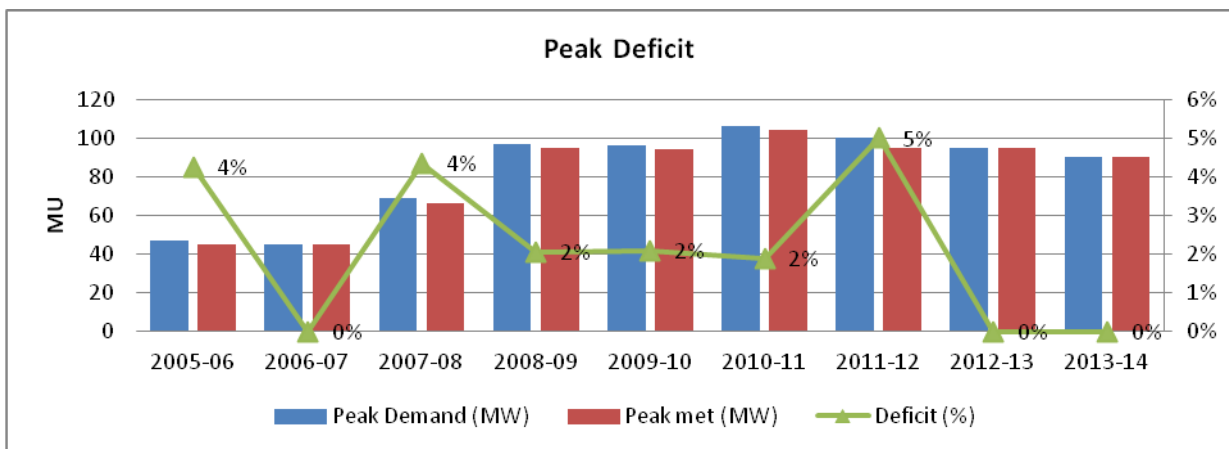
The trend of energy and peak deficit observed in Sikkim over the years is highlighted in the figure below:

**Figure XXIV-2: Energy Deficit - Sikkim**



Source: CEA

**Figure XXIV-3: Peak Deficit - Sikkim**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF SIKKIM

The energy and power department of the state government takes care of the power distribution across all sets of consumers in the state.

In FY 2011-12, Industrial LT category dominated the sales mix with a share of 38%, followed by domestic category (29%). The share of agricultural sales have reduced over the years while the share of LT industrial sales have increased over the years. The share of agricultural sales have reduced from 32% in 2004-05 to 6.3% in 2011-12 and the industrial sales have increased from 27% in 2004-05 to 37.5% in 2011-12.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXIV-4: Historical Trend in Consumer Sales Mix - Sikkim**

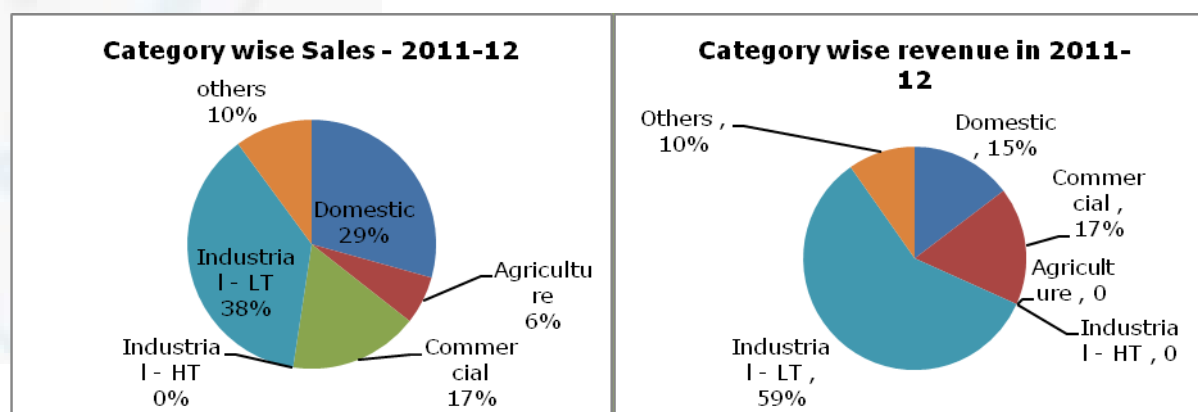


Source: PFC

The overall sales have registered a CAGR of 6% over the span of seven years wherein the sales of LT Industrial category have registered a higher CAGR of 14.5% followed by the commercial category with a CAGR of 12.05%.

In terms of revenue contribution, industries contributed close to 60% of the revenue, followed by commercial and domestic categories with a share of 17% and 15%, respectively, while agriculture has not contributed to any part of the revenue (Refer Figure I-5 below). This clearly indicates that the agricultural category is heavily cross subsidized by the industrial and commercial categories.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXIV-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Sikkim**

Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Sikkim power department have been very high. Lack of proper metering and billing of consumers are the primary reason for such losses. Further, extension of network in rural areas under the RGGVY scheme and free electricity to BPL households of upto 50 units of electricity has led to increasing AT&C losses and low collection efficiency.

**Table XXIV-1: Year on Year Trend in AT&C losses and Collection Efficiency – Sikkim**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	38%	44.8%	61.4%	51%	47%	59%	62%	59%
Collection Efficiency	93%	83%	56%	70%	75%	63%	67%	78%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of the distribution cost with an average of 60% of the total distribution cost over the years. (Refer table below)

The per-unit cost break-up for different cost components for the state of Sikkim is provided in the table below:-

**Table XXIV-2: Year on Year Trend Distribution Cost Breakup – Sikkim**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	-	1.28	1.48	1.57	0.51	0.66	1.07	1.25
O&M (R&M + A&G + EC)	-	0.64	0.61	0.51	0.59	0.66	0.62	1.00
Interest	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Depreciation	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other cost	-	0.00	0.00	0.00	0.00	0.00	0.00	0.02

Source: PFC

The state power sector is almost entirely supported by hydel energy, out of which, majority of the plants are run-of-the-river ones. As a result, there is high dependency on monsoons and good weather conditions. So, whenever the weather conditions are not suitable for the hydro plants, the state would require power from outside. This is visible from the table above wherein the power purchase cost has decreased in FY09 and FY10 due to favorable hydro power weather conditions and subsequently increased in FY11 and FY12 due to unfavorable conditions

## 2.4. REVENUE REALIZATION

Due to increase in financial losses over the years, the tariffs were hiked in 2012 to the tune of 15%. No hikes have been reported post that.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XXIV-3: Historical Trend Consumer Category Wise Revenue Realization - Sikkim**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.47	1.53	1.54	1.61	1.56	1.67	1.64	1.97
Agriculture	-	-	-	-	-	-	-	-
Commercial	2.63	2.59	2.59	2.62	2.55	2.55	2.61	4.00
Industrial HT	-	-	-	-	-	-	-	-
Industrial LT	2.62	2.50	2.50	2.58	2.55	2.52	2.36	6.15
Others	2.31	2.38	2.35	1.79	2.00	2.06	1.79	3.81

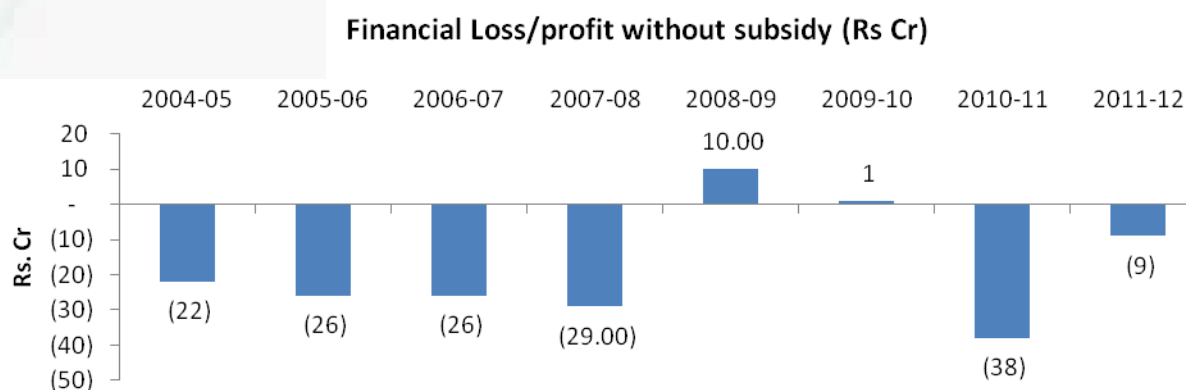
Source: PFC

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies is observed over the years in Sikkim because of the extensive set up of low voltage lines, lack of proper metering and inefficient billing.

**Figure XXIV-6: Historical Trend Financial Losses (w/o) subsidies – Sikkim**



Source: PFC

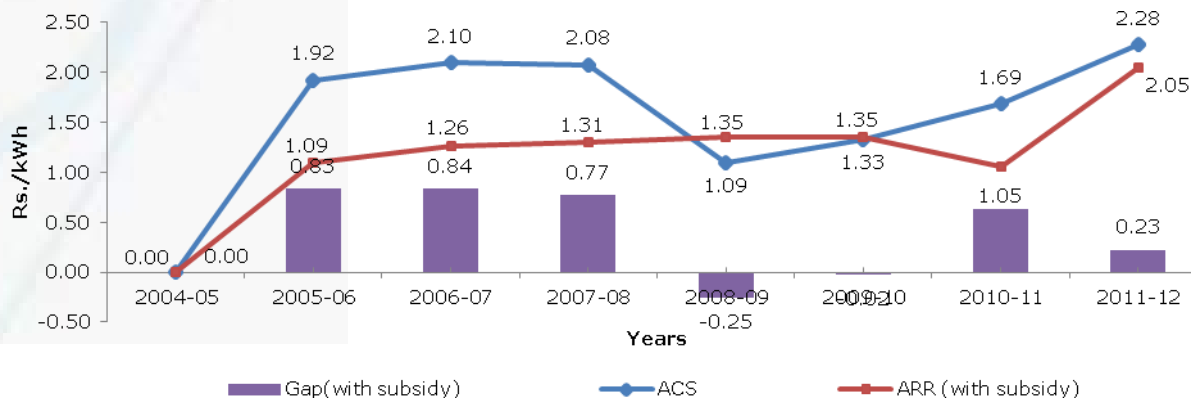
The losses decreased in FY 2011-12 due to increase in tariff. The state further aims at removing the obsolete meters with enhanced ones and introducing computerized billing. With this in line, we expect the losses to decrease in the future.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

There has been no subsidy booked/received over the years.

#### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has been high in the initial years from 2005-06 till 2007-08. The gap reduced in 2008-09 because of the reduction in power purchase cost. The gap has widened post that primarily due to increase in power purchase cost and lack of tariff revision. Tariffs were hiked in 2012 which has reduced the gap considerably.

**Figure XXIV-7: Historical Trend ACS v/s ARR (with subsidy) – Sikkim**

Source: PFC

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax revenue from the power is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details of the same are given below.

**Table XXIV-4: Tax Revenue from Power Sector - Sikkim**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0		0
Total Tax Revenue	598	805	906
Power sector Tax Revenue / Total state Tax Revenue	0%	0%	0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

As evident, the sector has not generated any tax revenues over the years.

The Non Tax revenue forms ~8% of the total non-tax revenues in 2011-12. The non-tax revenue from power sector is through royalty/cess on water for power generation, T &D, rural electrification. The details for the same are provided in the table below.

**Table XXIV-5: Non-Tax Revenue from Power Sector - Sikkim**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	286	88	80
Total Non-Tax Revenue	3,254	1,138	1,045
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	9%	8%	8%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Non Tax revenue from Hydel Generations constitutes the major portion of Non Tax revenue of the sector. Over the span of three years, the non tax revenue has declined for the state as a whole along with the revenue power sector. Hence, despite the decline in revenues, the contribution has been constant at ~8% over the three years.

The overall income generated from the power sector has declined from Rs 286 Cr in 2009-10 to Rs 80 Cr in 2011-12.

## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector in the state of Sikkim.

**Table XXIV-6: Expenditure on Power Sector - Sikkim**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	72	NA	38
Revenue Expenditure	0	NA	98
Total Power Sector Expenditure	72	NA	136

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

There has been a decline in capital expenditure primarily on account of decrease in expenditure under T&D. The revenue expenditure in power sector has increased primarily on account of expenses towards Purchase of Power.

The quantum of expenditure made on the power sector has been more than the revenue generated from the sector.

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

In 2009-10 guarantees to the tune Rs 0.5 Cr given towards Power Sector was a marginal ~1% of the state revenues.

## 4.4. POWER BONDS

The outstanding amount as on 1st April, 2006 was Rs 47.80 Cr. The outstanding amount as on 31<sup>st</sup> March was Rs 19.12 Cr. As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 10 Cr.

## 4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.



**Table XXIV-7: Financing Requirement of Power Sector (2011-12) - Sikkim**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	136
Loans And Advances made by the State Government (Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	5
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net of Receipts)	0
Total Power Sector Financing during the year	140
Sector Financing Requirement as a % age of total revenues of state	7%
GSDP nominal	5,148
Sector Financing Requirement as a % age of GSDP	2.73%
Financial Profits/(Losses) of DISCOMs during the year (with subsidy realised)	(9)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	8%
Sector Financing Requirement as a % age of GSDP including financial losses	2.9%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12

The financing requirement for the Power sector in the state was estimated to be 7% of the revenue generated by the state and 2.73 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 8% of the State revenue and 2.9 % of the GSDP.

The major portion of state investments went towards T n D. 30% of the Revenue expenditure on the power sector were made on Hydel generation and 26% on T n D.

The Discom losses have been increasing the burden of the sector on state finances. Hence, there is a need for further investments to build and strengthen the infrastructure and decrease the assistance.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

Sikkim has lacked progress in terms of effective reforms, unbundling and corporatization of the sector. The State Electricity Regulatory Commission lacks transparency in its operations. There has been a notification on the unbundling of the utility. However, nothing concrete has been reported. There has been no transition of tariff scheme from ARR to MYT. Open access hasn't been introduced in the distribution segment. Overall, sikkim has been a laggard in terms of regulatory reforms.

## 6. SUMMARY

Sikkim has been blessed with a beautiful geographical location and an amazing terrain which has some of the most turbulent and swiftest rivulets in the country that is best suited for harnessing hydro power development. The state has been recently engaged in harnessing this potential to the maximum. However, there needs to be further effort in improving metering, collection techniques and computerized billing. The year old systems must be replaced with new efficient ones. The key parameters of the states are discussed below-

- 1. Tariff Revisions:** The tariff revision in the state was last reported in FY 12. There is lack of visibility about the tariff revisions and implementations in the state.
- 2. Power purchase cost:** Since the state is largely dependent on its hydro power capacity, weak monsoons would lead to low PLF of these plants forcing the state to procure power from central stations, which would inturn increase the power purchase cost.
- 3. Financial Losses:** The increasing distribution financial losses without subsidies in Sikkim is a result of the extensive set of low and medium voltage lines under rural electrification program and lack of proper billing.
- 4. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 7% of the revenue generated by the state and 2.73 % of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector decreases to 8% of the State revenue and 2.9% of the GSDP.
- 5. Reforms:** There hasn't been any strong reform in the state even after a decade of the electricity act

## XXV TAMIL NADU

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

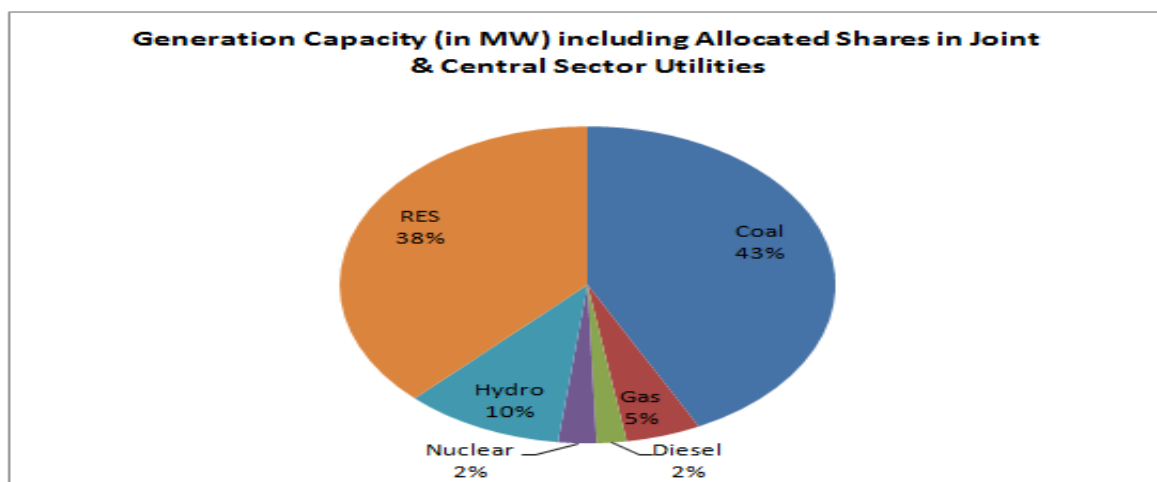
The Tamil Nadu Electricity Board (TNEB) was functioning as a vertically integrated utility responsible for generation, transmission, and distribution of electricity until 2010. In 2010, it was restructured into a holding company, viz., TNEB Ltd, and two subsidiary companies – TANGEDCO responsible for generation and distribution and Tamil Nadu Transmission Corporation Limited (TANTRANSCO) responsible for transmission of electricity.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Tamil Nadu was 21063.39 MW out of which 43% share is of Coal based generation and 38% is Renewable based generation followed by hydro based generation (~10%) and gas based generation (5%). Nuclear and diesel based generation account for 2% share each. The capacity has only grown by 12% from 18729 MW in FY13.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXV-1: Generation Capacity Mix - Tamil Nadu**



Source: CEA

#### 1.3. POWER SUPPLY POSITION

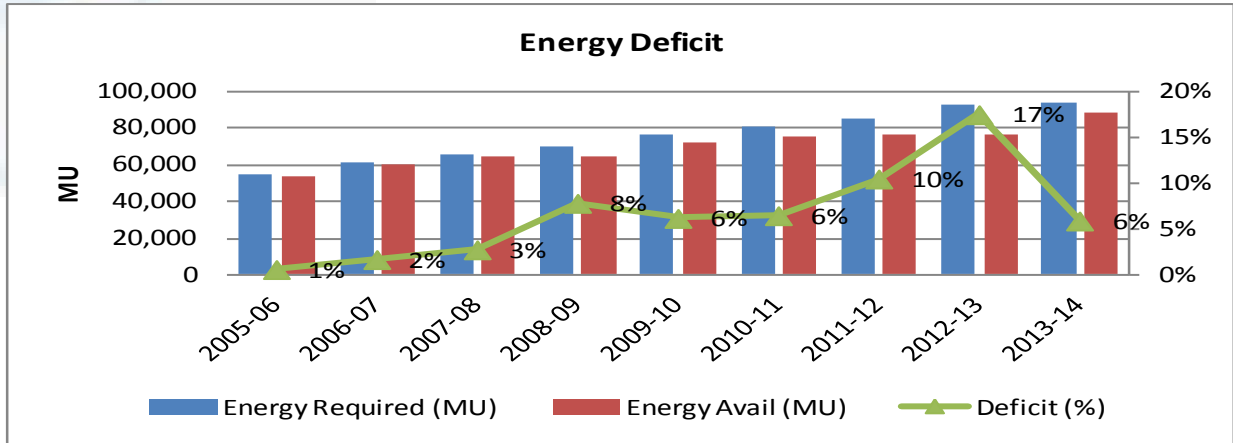
Tamil Nadu has been witnessing significant supply deficit. The deficit has increased from 1% in FY06 to 17% in FY13. Presently, it is around 6%. The increasing energy and peak deficit in the state was due to slow growth of capacity addition and limited transmission corridor available between NEW (North Eastern Western) and South grid.

The Peak deficit has been varying significantly and remained high over the last 9 years. This is also due to high amount of Renewable Energy component in the Energy mix which is highly variable and not capable of helping meet peak requirement. Further, low Plant Load

Factor (PLF) of hydro power plants caused by poor/weak monsoons has contributed to energy and peak deficit in the state.

The trend of energy deficit observed in Tamil Nadu over the years is have been highlighted in the figure graph below:-

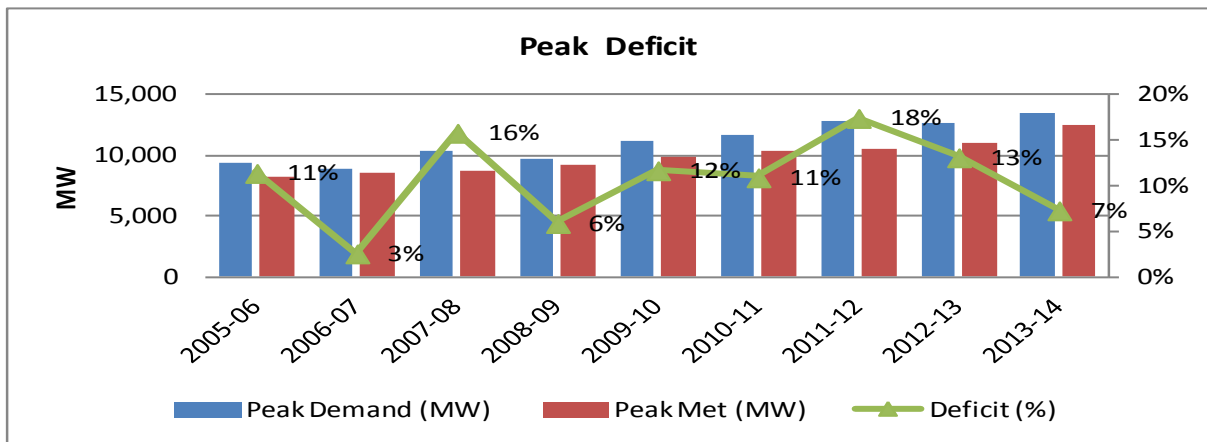
**Figure XXV-2: Energy Deficit – Tamil Nadu**



Source: CEA

The trend of peak deficit observed in Tamil Nadu over the years is have been highlighted in the figure graph below:-

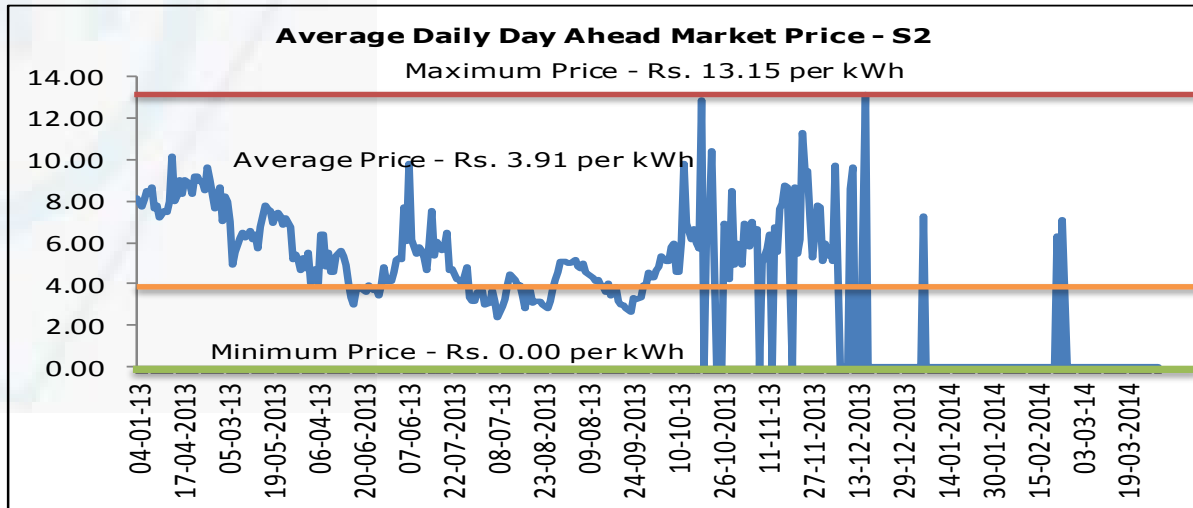
**Figure XXV-3: Peak Deficit – Tamil Nadu**



Source: CEA

However, with the integration of Southern Grid with the National Grid in January 2014, energy and peak deficit is expected to decrease. We can observe this in 2013-14.

This trend is likely to continue in the near future as the prices in the spot market have come down. The average daily day ahead market prices are less than the distribution costs for the previous years (discussed later in the report) in the state.

**Figure XXV-4: Average Daily Day Ahead Market Prices S2 – Tamil Nadu**

Source: IEX

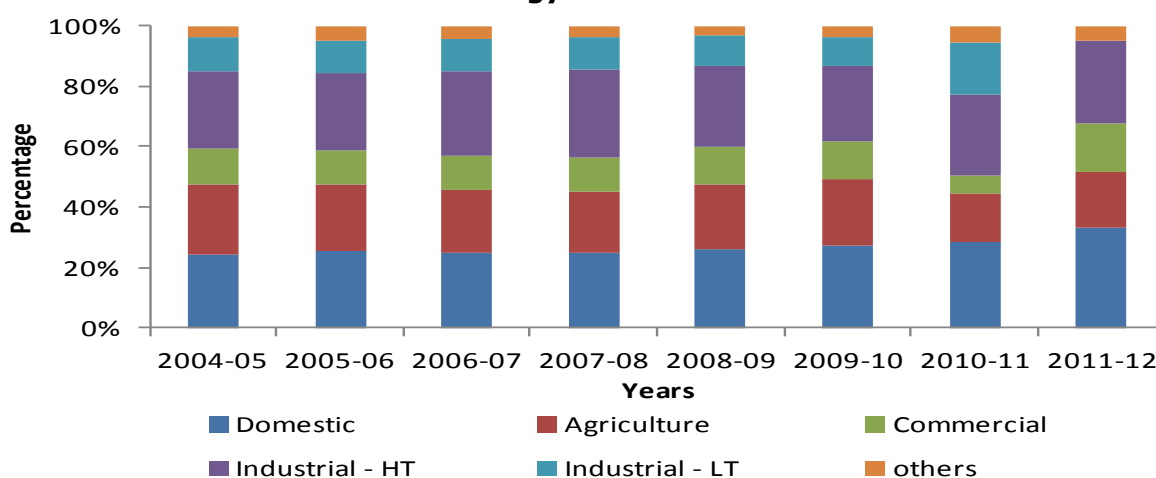
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF TAMIL NADU

TANGEDCO has a consumer base of about 223.44 lakh consumers. 100% rural electrification has been achieved. Per Capita consumption of Tamil Nadu is 1040 units. To achieve the goal of electrification of all households, the Government has launched the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) scheme. Where grid connectivity is not feasible or not cost effective, Decentralised Distributed Generation is permitted.

The historical trend in the consumer sales mix for the state is given in figure below:-

**Figure XXV-5: Historical Trend in Energy Deficit - Tamil Nadu**

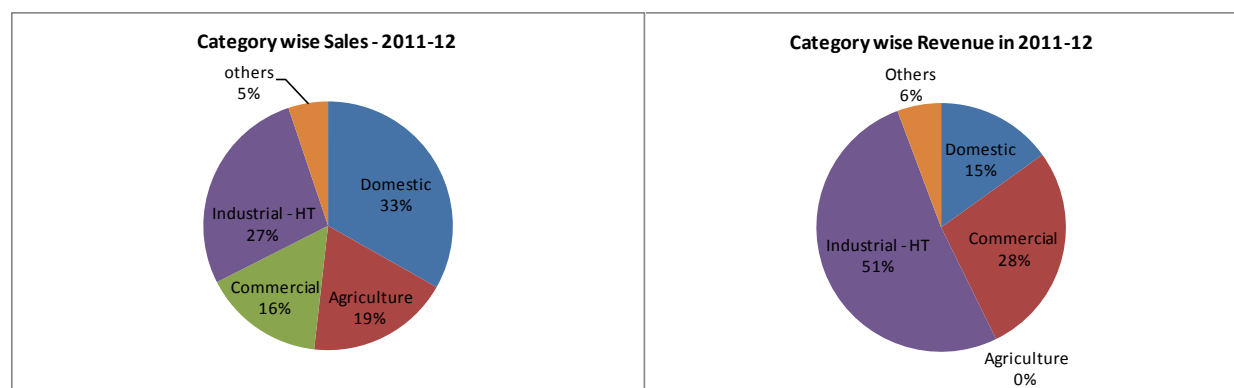


Source: PFC

The overall sales have registered a CAGR of 4% over the span of 8 years wherein the sales of commercial and domestic category have registered a CAGR of 9% each. Industrial has increased by CAGR of 5%.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXV-6: Comparative Analysis of Consumer Sales and Revenue Mix in 2011-12 - Tamil Nadu**



Source: PFC

Tamil Nadu's electricity sales is dominated by domestic consumers (33%) followed by industrial consumers (27%) and agricultural consumers (19%).

In terms of revenue contribution, there is no revenue realised from agricultural sales as there are no tariffs for agricultural consumer. For decades now the agricultural segment is subsidised in Tamil Nadu. The industrial consumers who account for about ~27% of the sales produce more than 50% of the sales revenue followed by commercial consumers (~28%). Domestic consumers contributed to 15% of the revenue realised.

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for TANGEDCO have been ranging from 14% to 20% over the period from 2004-05 to 2011-12. The loss levels are much lower as compared to the national average. This, however, is based on the estimated consumption in the agricultural sector (in absence of agriculture metering in the state).

The collection Efficiency has improved over the years reaching more than 100% during FY07.

However, the losses and collection efficiency have been considered for metered sales. The unmetered agricultural sales have not been considered by the state. Tamil Nadu has not achieved 100% consumer metering so far. Agriculture and hut service connections are provided free supply of power and they are entirely unmetered.

**Table XXV-1: Year on Year Trend in AT&C losses and Collection Efficiency - Tamil Nadu**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	19%	17.1%	16.2%	16%	14%	19%	19%	20%
Collection Efficiency	82%	83%	105%	94%	90%	96%	94%	93%

Source: PFC

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost forms the major cost component of that accounts for more 50% of the total distribution cost (2004-05 to 2011-12). It can be observed that power purchase cost per unit has increased over the years especially in FY09 and FY11. Power purchase cost increased significantly in due to increase in imported coal prices and increase in Renewable Based power which is costlier than the conventional power.

The per unit cost break-up for different cost components for the state of Tamil Nadu is provided in the table below:-

**Table XXV-2: Year on Year Trend Distribution Cost Breakup - Tamil Nadu**

Cost Component	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.36	1.58	1.73	1.99	2.34	2.49	3.02	3.23
O&M (R&M + A&G + EC)	0.35	0.40	0.41	0.45	0.53	0.54	0.62	0.65
Interest	0.18	0.19	0.18	0.23	0.32	0.41	0.54	0.55
Depreciation	0.21	0.23	0.11	0.11	0.12	0.12	0.11	0.09



Other cost	0.57	0.68	0.58	0.66	0.79	0.70	0.74	1.11
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Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. No tariff hikes were observed for several years and tariff revisions were done in FY 2010-11 after a gap of 8 years wherein tariffs were increased substantially i.e. 9%. Thereafter commission has approved a tariff hike in FY 2011-12, FY 2012-13 & FY 2013-14 by 9%, 37% and 4% respectively.

The commercial and industrial HT segments which form around 43% of the electricity sales have annual revenue realization for more than Rs 6.5 kWh. The annual revenue realization for agricultural consumers has been negligible over the years.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XXV-3: Historical Trend Consumer Category Wise Revenue Realization (Rs/kWh) – Tamil Nadu**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	1.43	1.53	1.56	1.51	1.69	1.70	1.77	1.67
Agriculture	0.03	0.03	0.00	0.00	-	0.00	0.00	0.00
Commercial	5.61	5.59	5.60	5.93	5.84	5.66	5.78	6.49
Industrial HT	4.39	4.58	4.38	4.43	4.42	4.68	4.72	6.97
Industrial LT	4.06	4.13	4.01	4.10	3.70	3.83	5.02	-
Others	3.31	3.35	3.82	3.21	3.52	3.11	3.30	4.08

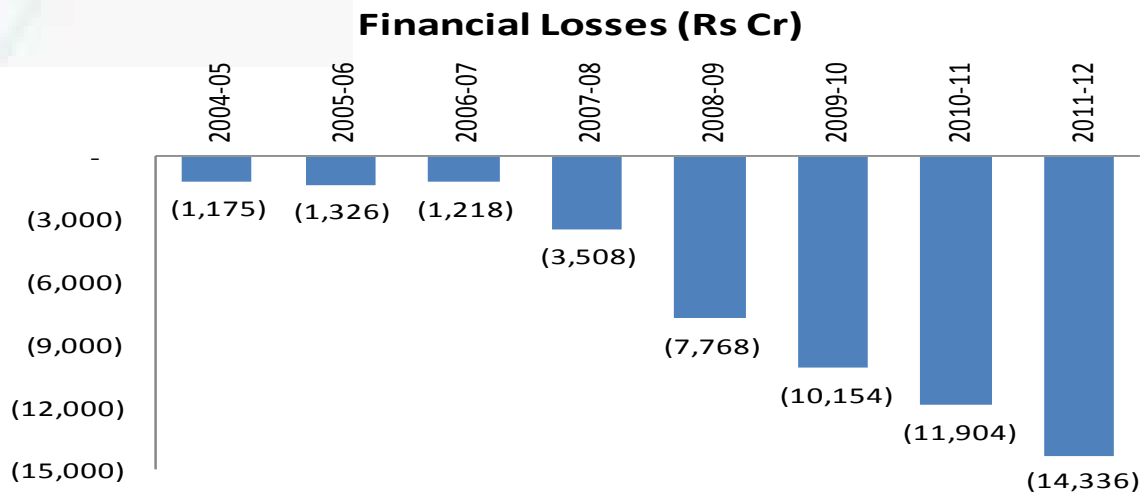
Source: PFC

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITY

The financial losses of TANGEDCO have increased every year due to high operation costs and low tariff realization from consumer categories.

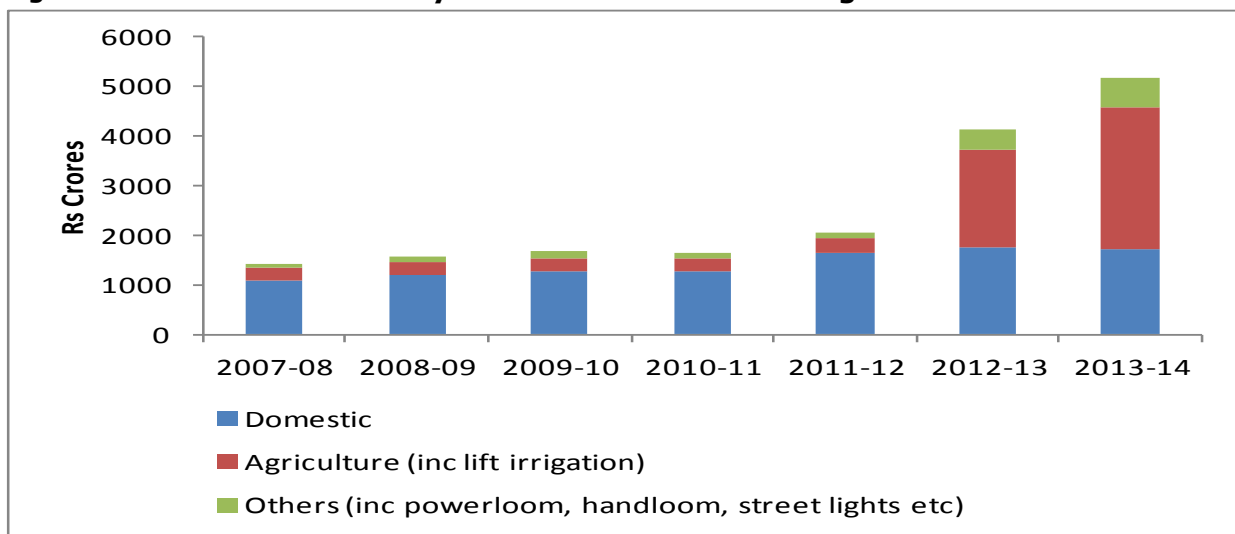
**Figure XXV-7: Historical Trend Financial Losses (w/o) subsidies – Tamil Nadu**



Source: PFC

The financial problems have been accentuated by provision of free power supply to agriculture and hut services by GoTN. The agriculture subsidies are determined on the basis of the existing agriculture pump set capacity records with TANGEDCO. As the records are outdated, the subsidies are underestimated and are, hence, inadequate to cover the actual expenditure. Also, it can be observed that due to lack of metering in agriculture, subsidy provided to a small section of domestic consumers actually exceeds the subsidy to agricultural sector.

**Figure XXV-8: Trend in subsidy allocated for various categories – Tamil Nadu**



Source: Subsidy orders for various years, TNERC

Figure above shows that till 2011-12 the domestic sector accounts for major share of subsidies as compared to other sectors including agriculture. However this trend has changed in the last 2 years and agriculture forms major portion of the subsidies.

Till 2011-12, the tariff for agriculture was Rs.250/HP/annum which amounted to Rs 218.34 Crores. However the tariff was revised to Rs.2500/HP/annum due to which the agricultural subsidies in the state reached Rs. 2,084.42 Crores.

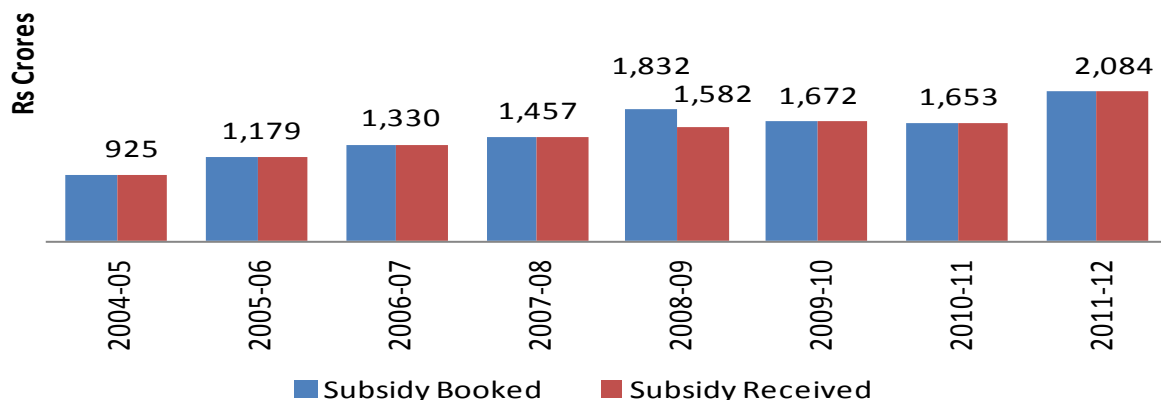
In addition to the above, Commission has arrived at the net regulatory asset of Rs. 25644 Crs for FY 2013-14 for TANGEDCO. Out of this 1033 Crores have been amortized as on March 2013. The Regulatory Asset is proposed to be amortized over a period of 5 years commencing from the year 2013-14 onwards.

TANGEDCO is in the process of finalization of its Financial Restructuring Plan (FRP) scheme and once the scheme is finalized, the amortization of balance regulatory asset will be worked out considering GoTN support, FRP scheme etc.

### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The subsidy burden of the State Government has been low over the years. In 2011-12, subsidy booked was 9% of the total revenues and has averaged around that number from 2004-05 to 2011-12. The graph below highlights the subsidy booked v/s subsidy booked for the distribution utilities in the state.

**Figure XXV-9: Historical Trend Subsidies Booked v/s Subsidies Received – Tamil Nadu**

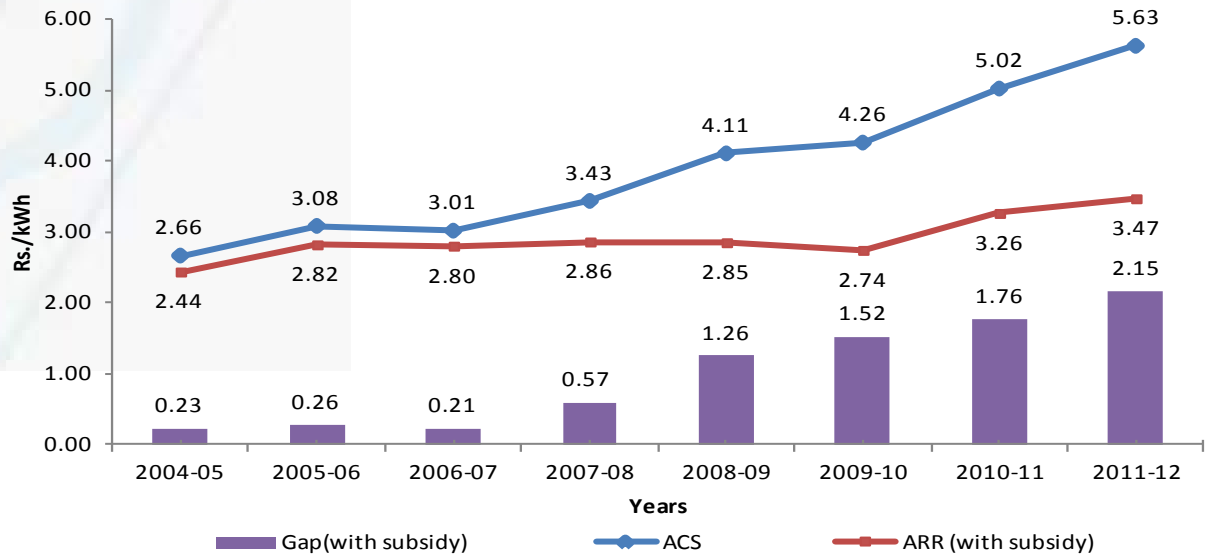


Source: PFC

The trend in subsidy pay-out with respect to the subsidy booked was 100% except for FY09.

### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized has been increasing over the years. It has increased from Rs 0.23 kWh in FY05 to Rs 2.15 kWh in FY12. This is due to rising power purchase costs on account of increase in imported coal prices and increase in Renewable Based power which is costlier than the conventional power. The widening of this gap has been attributed to the fact that the tariffs in Tamil Nadu have not been revised over several years.

**Figure XXV-10: Historical Trend ACS v/s ARR (with subsidy) – Tamil Nadu**

Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The tax revenue from the power sector forms a marginal ~1% of the total tax revenue.

**Table XXV-4: Tax Revenues - Tamil Nadu**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	37	1,745	1,040.2
Total Tax Revenue	45,303	58,696	72,232.26
Power sector Tax Revenue / Total state Tax Revenue	0.08%	2.97%	1%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The tax revenue from Power sector has increased substantially since FY10. However, the contribution to state tax revenue has been minimal i.e. ~1%.

The non-tax revenue from power sector is through Royalty/cess on water for power generation, T n D, etc. The details for the same are provided in the table below.

**Table XXV-5: Non-Tax Revenues - Tamil Nadu**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	0	0	0
Total Non-Tax Revenue	5,027	4,651	5,683.57
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0.00%	0.00%	0

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

Over the years, the Power sector in the state did not generate any Non Tax revenue.

**The overall income generated from power sector, has increased from Rs 37 Cr in 2009-10 to ~Rs 1040.2 Cr in the year 2011-12.**

## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure towards power sector by the state of Tamil Nadu.

**Table XXV-6: Power Sector Expenditure - Tamil Nadu**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	135	1,335	4,100
Revenue Expenditure	1,315	1,268	1,776.49
Total Expenditure	1,450	2,603	5,876.49

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The capital and revenue expenditure incurred on power sector increased primarily due to increase in general expenditure under state investments and the increase in subsidy payments to TNEB under the scheme to electrify villages.

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

The table below depicts the Guarantees given to Power Sector relative to State Revenue

**Table XXV-7: Guarantees - Tamil Nadu**

Particulars	2009-10	2010-11	2011-12
			Rs Cr
Guarantees given by State Govt.	4,380	9,383	9,024.25
Total Revenues of the State	50,330	63,348	77,915.83
Guarantees as a %age of Total Revenues of State	8.70%	14.81%	11.58%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

As shown above, there has been a substantial increase in the Guarantees given by the government to Power sector, i.e. from ~9% of State Revenues in 2009-10 to ~12% in 2011-12.

The table below depicts the share of different utilities in sector guarantees in 2011-12:

**Table XXV-8: Share of Guarantees among Utilities - Tamil Nadu**

Utilities	2009-10	2010-11	2011-12	Share in Sector Guarantees % (2011-12)
Rs Cr				
Tamil Nadu Electricity Board	4,380	3,980	0	37%
Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)	0	3,298	7,199	80%
Tamil Nadu Transmission Corporation Limited (TANTRANSCO)	0	2,106	1,825.28	20%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

Over the span of three years, the Generation and Distribution sector (TANGEDCO) accounted for a major share of 46%.

### **Subsidy**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table XXV-9: Subsidy - Tamil Nadu**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
Rs Cr				
Power Sector subsidy	1,358	1,281	1,801.1	100.00%
Total Subsidy	1,358	1,281	8,698	19%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

Over the span of three years, Power sector subsidy has accounted for a significant share in total subsidy given by the state.

#### **4.4. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XXV-10: Financing Requirement for the Power Sector – Tamil Nadu**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	5876.49
Loans And Advances made by the State Government ( Net of Recoveries)	1,392.26
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year ( Net of Receipts)	0
Loans for Power Projects-T&D from the Central Govt. Discharged during the year ( Net of Receipts)	0.02
Total Power Sector Financing during the year	7268.76
Sector Financing Requirement as a % age of total revenues of state	9%
GSDP nominal	4,16,549
Sector Financing Requirement as a % age of GSDP	1.74%
Financial Profit/(Loss) of Discoms during the year (with Subsidy Realised)	(14,336)
Sector Financing Requirement (including financial losses of Discoms ) as a % age of total revenues of state	28%
Sector Financing Requirement (including financial losses of Discoms ) as a % age of GSDP	5.19%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

The financing requirement for the Power sector in the state was estimated to be 9% of the revenue generated by the state and 1.74 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to 28% of the State revenue and 5.19 % of the GSDP.



## 5. FINANCIAL RESTRUCTURING PLAN

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

Given below is the status of the financial restructuring plan's implementation in the state.

**Table XXV-11: FRP - Tamil Nadu**

Parameters	Details
Accumulated Losses as on cutoff date (23 March 2012)	53694 cr.
STL (eligible under the scheme)	12,765 cr.
Bonds issued by Discoms to participating lenders	6353 cr.
Tariff petition for 2014-15	Not filed (delayed due to elections)
Operational losses to be funded (2013-14)	2887 cr.
Road-Map for private participation in distribution	Being discussed with state govt.
Status of liquidation of regulatory assets	Being discussed with state govt.
Status of preparation of time bound plan for metering of all category of consumers	Being Prepared
Status of enactment of State Electricity Distribution Responsibility Bill	Under Progress

### 5.2. FRP OUTLOOK

In this section, key parameters for the state have been looked at in order to comment on the expected future financial position of the distribution segment after the FRP is fully implemented in the state. The color scheme used in the tables for each state in this section, refer to the color key provided here:

	Area of concern
	Can be better
	Good

TANGEDCO reported a financial loss (without subsidy) of Rs.16,420 Cr. in 2011-12, translating into a financial gap of Rs.2.47/kWh. The financial gap has stayed at over Rs. 1.5/kWh for the last four years. In order to rescue TANGEDCO from the existing financial crisis, the Government of Tamil Nadu approved the above mentioned FRP scheme. As per this scheme, the state government would take over Rs.6353 cr. (50% of STL) by issue of bonds by TANGEDCO to participating lenders. The interest burden for the State Government on the bonds would be Rs. 559 Cr. per annum till redemption (5 years). The scheme would also permit TANGEDCO to restructure the remaining 50% of STL backed by government guarantee, with a repayment of principal in 7 years period after moratorium of 3 years. The

operational losses of TANGEDCO during the interim period would be funded under the FRP scheme as per the following terms:

**Table XXV-12: Operating losses funding Schedule – TANGEDCO**

Particulars	Years		
	2012-13	2013-14	2014-15
Cash loss/Operating loss (Rs.Cr.)	8183	3849	2060
Funding by banks	100%	75%	50%
Funding by GoTN	-	25%	50%

Source: Data submitted by the state to the FFC

Some of the key parameters relevant to successful FRP implementation at the state level have been presented for Tamil Nadu in the table below.

**Table XXV-13: Historical Parameters – Tamil Nadu**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	17%	16%	16%	14%	19%	19%	20%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	0%	0%	9%	9%	37%	4%
<b>Subsidy Received/Booked</b>	100%	100%	100%	86%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	6%	6%	7%	8%	10%	11%	10%	n.a	n.a
<b>ACS-ARR Gap w/o subsidy – Rs./kWh</b>	0.49	0.44	0.81	1.55	1.77	2.00	2.47	n.a	n.a

Source: PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The AT&C losses in Tamil Nadu have ranged from 15-20% during the period under review. A >1.5% annual reduction in AT&C losses, in order to benefit from the central grants support scheme, will require persistent efforts on part of the Discom. However, it is important to note here that AT&C losses are based on the estimated consumption in the agricultural sector. Agriculture and hut service connections are provided free supply of power and they are entirely unmetered in Tamil Nadu. Hence, it might not be totally appropriate to take the AT&C loss benchmark point of 2010-11 as given in the table above.
- The regulatory commission in Tamil Nadu revised tariffs in 2010-11, after a period of 7 years. In the last 3 financial years, the tariffs have been revised regularly (as much as 37% in 2012-13). In 2011-12, the state revised tariff for agriculture from Rs. 250/HP/annum to Rs. 2500/HP/annum. As part of the FRP, it is critical for the

regulator to increase tariffs on a consistent basis in order to eliminate the revenue gap in next 4 years.

- Transparency in disbursement levels, a requirement of the FRP, can be judged on two accounts. The subsidy received-booked ratio has consistently been at 100%, indicating that the Discom, regulator, and the state government have been in sync with respect to the amount booked and actually disbursed. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the complete lack of agricultural metering in the state.
- The share of interest expenses is considerably high in the state. The moratorium on principal repayment of balance loans outstanding will possibly free up funds in the near term that can aid working capital requirements of TANGEDCO.
- The ACS-ARR Gap needs to be reduced by 25% every year (from the 2010-11 benchmark of Rs. 2/kWh) in the moratorium period to be eligible for the central grants incentive. The Discom has brought down the revenue gap to zero<sup>23</sup> in 2012-13, making it eligible for the grants benefit. This is largely due to the significant tariff revision in the same year.

In conclusion, TANGEDCO has revised tariffs and managed to bring down its revenue gap to zero. Lack of agricultural metering is a cause of concern on the revenue front since subsidies will be dependent on that parameter and also on accurate estimation of AT&C Losses. Along with revenue realization, however, power procurement cost optimization will be crucial for the state to keep the power purchase costs under control and achieve its financial gap targets.

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<sup>23</sup> As per 'Status of compliance of APTEL order OP No. 1 of 2011: For financial year 2012-13'

## 6. ASSESSMENT OF REGULATORY EFFECTIVENESS

The Government of Tamil Nadu, duly recognizing the need for reforms in the power sector, issued a transfer scheme in October 2010 which was called "Tamil Nadu Electricity (Reorganization and Reforms) Transfer Scheme, 2010". This scheme extended to whole of the state as well as all the properties, interests, liabilities etc. of the state and came into force on November 1, 2010.

### 6.1. STATUS OF IMPORTANT REGULATIONS:

Power sector reforms are fairly recent in the state and not much time has passed since the reforms were implemented in Oct 2010. From 1957 till 2010, the power sector in the state was governed by Tamil Nadu Electricity Board (TNEB) with the responsibility of handling the generation, transmission and distribution assets and managing over 21 million consumers of electricity. In October 2010, the state government implemented a transfer scheme which unbundled TNEB into three separate companies, TNEB Limited (Holding Company), TANTRANSCO (Transmission Company) and TANGEDCO (Generation and Distribution Company).

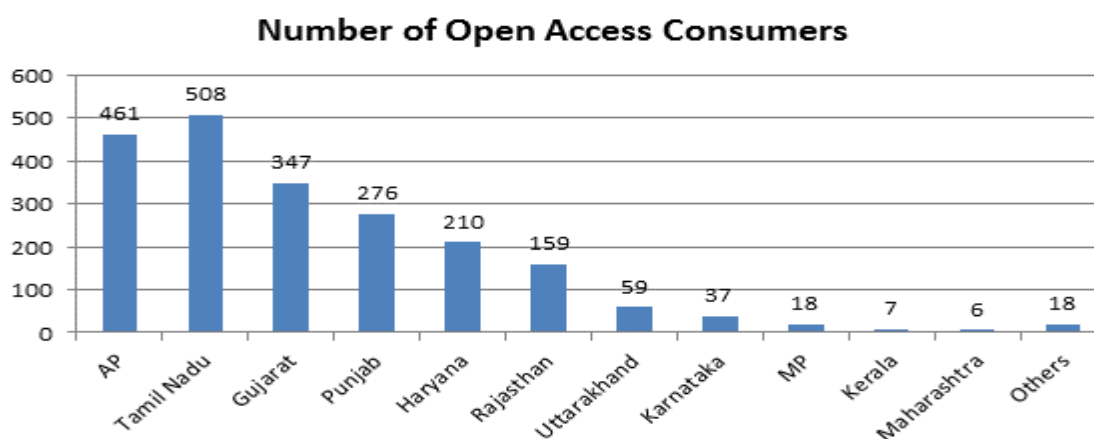
Since the implementation of reforms, TNERC had issued its second tariff order in 2010 (first was in 2003) after a period of seven years and has used the Multi Year Tariff (MYT) framework for the first time with a control period of 3 years (FY 2010-11 to FY 2012-13). It is presently in the second control period.

### 6.2. STATUS OF OPEN ACCESS IMPLEMENTATION:

The Government of India has approved nondiscriminatory open access to the transmission system to all generators for injecting power and to any consumer to carry the power from the point of injection to his load. To augment the power supply, the Government of Tamil Nadu has also permitted third party sale of power produced by IPPs, CPPs & other private power producers through short term Intra-State open access to HT consumers within Tamil Nadu as it will provide an incentive to the generators within the State to produce to their full capacity. Generators within Tamil Nadu are being allowed to sell power to HT consumers through intra- state open access.

Presently, the state has the maximum number of OA customers in the country.

**Figure XXV-11: Comparison of Open Access Consumers – Tamil Nadu**



Source: IEX

### **6.3. FREQUENCY OF TARIFF REVISIONS:**

The tariff revisions were done in FY 2010-11 after a gap of 8 years wherein tariffs were hiked substantially i.e. 9%. Thereafter commission has approved a tariff hike in FY 2011-12, FY 2012-13 & FY 2013-14 by 9%, 37% and 4% respectively. The table below provides the details of tariff revision in the state

**Table XXV-14: Tariff Revisions - Tamil Nadu**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	0%	0%	0%	0%	0%	9%	9%	37%	4%

### **6.4. REVIEW OF APPROACHES ADOPTED FOR MEASURING AGRICULTURAL CONSUMPTION**

The agricultural consumption is calculated every month based on the sample meter reading furnished by the field in the absence of 100 % metering. The sample meters to a value of 5 % are provided/ available in each area/circle in which readings are taken every month by the field staff. As sample meter readings are available in each area/circlewise on monthly basis, the areawise geographical condition and seasonal condition are taken care for arriving at computed consumption. This calculated agricultural consumption in each area/circles are combined /added to arrive at the total agricultural consumption in the State. Since 5 % sample meters are available in each and every area/circle and the readings are taken in all the sample meters every month by the field staff, the computed consumption of the total agricultural consumption in the State based on sample meter readings is a reasonable and scientific agricultural consumption data. However Anna University has already been appointed for suggesting a suitable scientific methodology for arriving at the agricultural consumption in Tamil Nadu in the absence of 100 % metering.

## 7. SUMMARY

- 1. Tariff Hikes:** The tariff revisions were done in FY 2010-11 after a gap of 8 years wherein tariffs were hiked substantially i.e. 9%. The gap between ARR and ACS has been consistently increasing. In addition to this the quantum of power procured to meet the increased demand, due to inadequate capacity addition in own sources, has drastically risen. Also there has been an increase in imported coal prices and increase in Renewable Based power which is costlier than the conventional power. All this has led to a sharp increase in ACS. On the other hand, the ARR has not kept pace with the increasing costs; 90 percent of the power sold to consumers is below Cost of Supply and the current tariff structure has imbalances which have led to under recovery from Domestic and Agriculture consumers. Efficiency gains need to be pushed forward – appropriate tariffs revisions need to take place regularly in the state.
- 2. Subsidy:** The trend in subsidy pay-out with respect to the subsidy booked was 100% except for FY09. The subsidies provided by GoTN have been progressively increasing over the years. In 2011-12, different consumer categories were given either free or subsidized electricity. This includes agriculture, hut services, power loom, handloom and lift irrigation cooperative societies, places of public worship, streetlights, and public water supply. The financial problems have been accentuated by provision of free power supply to these consumers by GoTN. The agriculture subsidies are determined on the basis of the existing agriculture pump set capacity records with TANGEDCO. As the records are outdated, the subsidies are underestimated and are, hence, inadequate to cover the actual expenditure. It is important that these records are suitably updated and show the actual figures based on present ground level situation.
- 3. Operational Efficiency:** The cost of supply of Discoms has been increasing over the years especially due to the increase in power purchase costs and interest burden. The Aggregated Technical & Commercial losses (AT&C) for TANGEDCO have been more or less averaging ~19% over the period between FY05 to FY12. The collection Efficiency has improved over the years reaching more than 100% during FY07. This, however, is based on the estimated consumption in the agricultural sector (in absence of agriculture metering in the state).
- 4. Financial Viability:** Currently the distribution business is making huge losses and the deficit is increasing year over year. One big challenge for the state is to increase its own installed capacity in order to be self-sustainable and not having to buy expensive power from external sources especially in the short term. The principal solution, which also remains to be the single biggest challenge, is to increase tariffs to attain financial viability while keeping the industrial growth steady. This is a big trade off as a higher industrial tariff could lead to disinvestments in the State.
- 5. Transmission Infrastructure:** The existing transmission system in Tamil Nadu does not have any ultra-high capacity lines of 700KV or even 440 KV. It only has a few 230 KV lines which creates a problem for the state in evacuating power from surplus regions (or load centers) and supplying it to regions with deficit with minimal transmission losses. The way forward is undergoing feeder separation, strengthening and upgrading the transmission and distribution systems to reduce the T&D losses which are currently adversely affecting the power situation in the state.

- 6. Metering of Consumers:** Tamil Nadu has not achieved 100% consumer metering so far. Agriculture and hut service connections are provided free supply of power and they are entirely unmetered, accounting for almost 15% of the total consumers. There is a strong need to meter these consumers to understand the trends and the exact quantum of power consumed by each of these consumers. Such a mechanism would ensure more targeted actions towards addressing the problems being faced by the sector.
- 7. States Guarantees:** Guarantees given by the State to Power sector represent a significant proportion (11.58%) of Total Revenues of the state in 2011-12.
- 8. Revenues from the sector to the state:** Total Revenue – Tax and Non Tax (Rs. 1040 Crores) from the Power sector is less than the total expenditure on the sector (Rs. 5876.49 Crores)

## XXVI TRIPURA

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

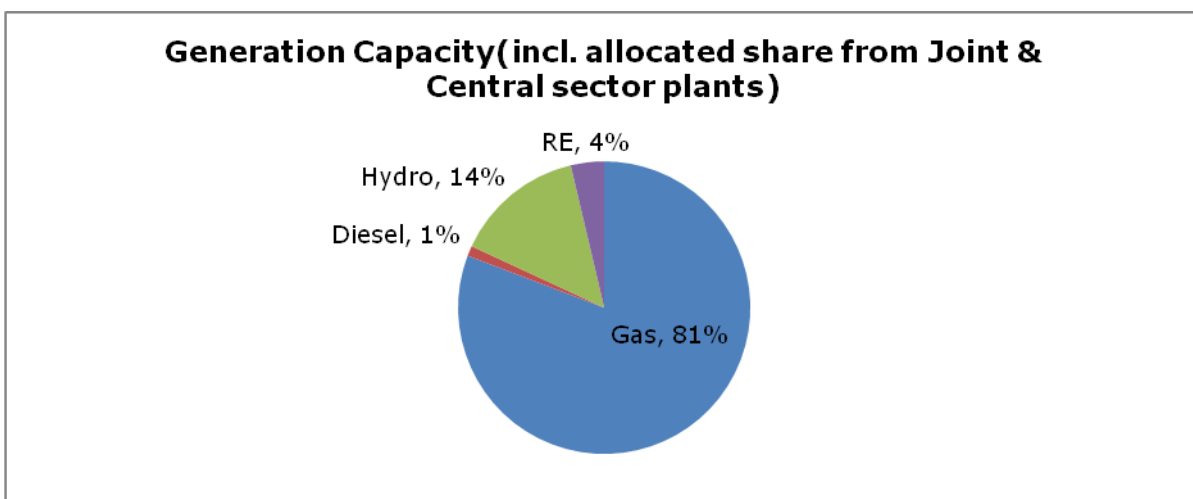
Tripura is the second most populous state in the North Eastern region with a population density of 350 per square Km. Around 83% of the state population lives in rural areas and a majority of households still remain un-electrified. The Government of Tripura had set up the Tripura Electricity Regulatory Commission (TERC) on 31<sup>st</sup> May 2004 as a statutory body as one main commission under section 82 of the Electricity Act, 2003 with the objective to improve performance of the state power sector and bring in more transparency. Similarly, the operational assets of the state government's Power Department were transferred to Tripura State Electricity Corporation Limited (TSECL), responsible for the entire power value chain of generation, transmission and distribution. The new entity started its operation from 1<sup>st</sup> January 2005.

#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for Tripura was 433.07 MW. It has grown by 5% from Feb 2013 level of 412.02 MW. Out of total capacity as on Feb 2014, Gas accounted for the highest (~81%) followed by Hydro (~14%) and RE (~4%)

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXVI-1: Generation Capacity Mix as on Feb 2014- Tripura**



Source: CEA

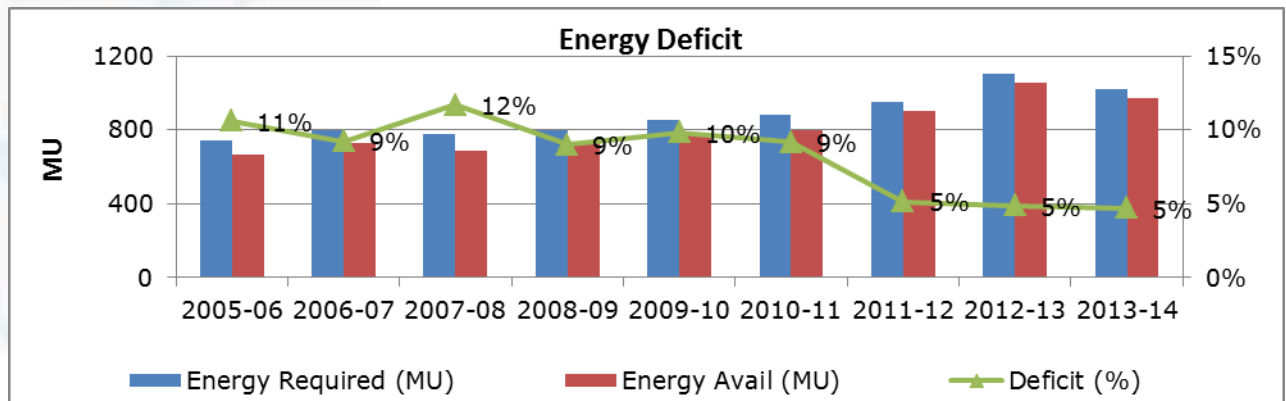
#### 1.3. POWER SUPPLY POSITION

Energy deficit in Tripura has remained consistent at 5% over the past three financial years. The peak deficit has also been between 0-2% during these years. This is due to improved capacity addition and infrastructure development in the state. Further, with Oil and Natural Gas Company (ONGC) and North East Electric Power Corporation (NEEPCO) setting up new gas based power plants of 726 MW and 101 MW respectively, the state energy and peak deficit is expected to be eliminated.



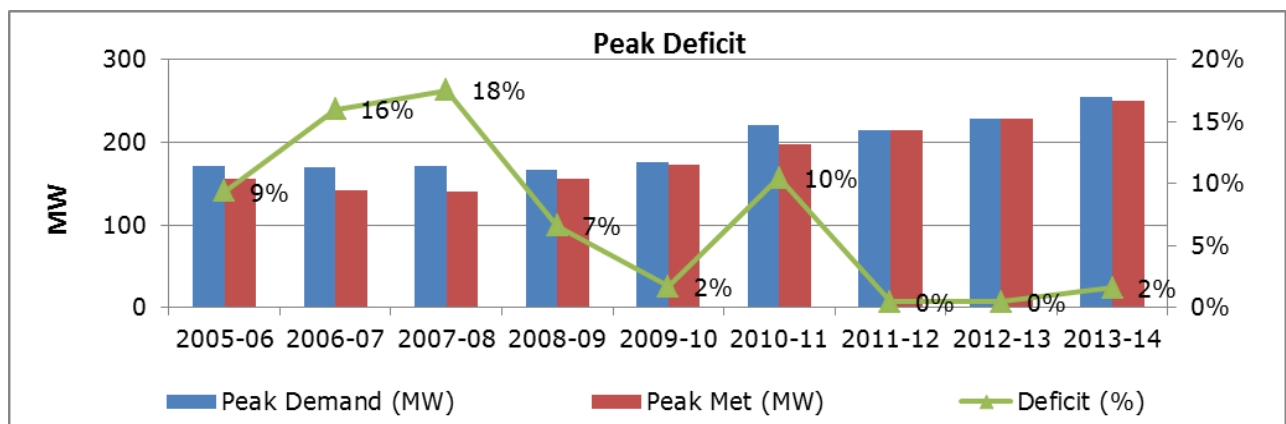
The trend of energy and peak deficit observed in Tripura over the years is highlighted in the figure below:

**Figure XXVI-2: Energy Deficit - Tripura**



Source: CEA

**Figure XXVI-3: Peak Deficit - Tripura**



Source: CEA

## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

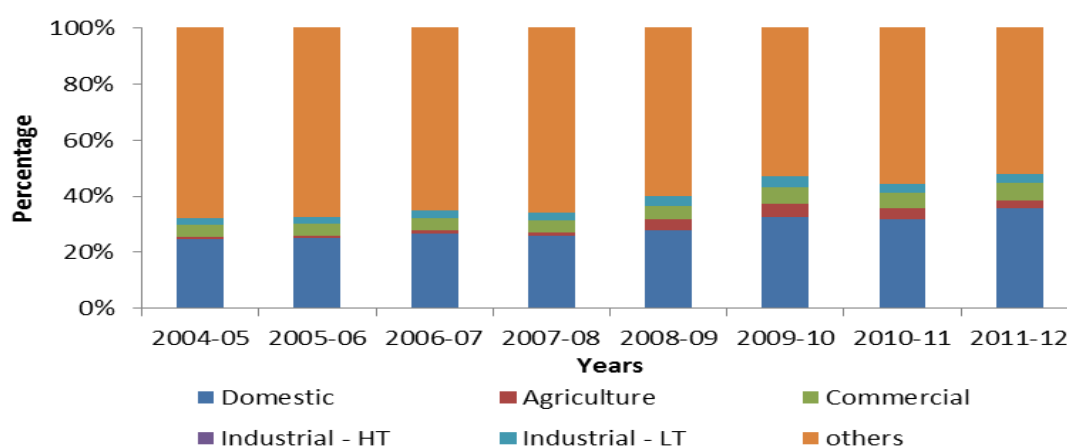
### 2.1. CONSUMER SALES MIX OF TRIPURA

In Tripura, TSECL is the sole entity responsible for power distribution across all sets of consumers in the state.

In FY 2011-12, domestic sector dominated the sales mix with a share of 36%, followed by commercial category (6%). The share of domestic sales have increased from 25% in 2004-05 to 36% in 2011-12. A major reason for such increase is the ongoing RGGVY scheme and the Kutir Jyoti scheme in the state.

The historical trend of consumer sales mix for the state is given in the figure below:-

**Figure XXVI-4: Historical Trend in Consumer Sales Mix - Tripura**



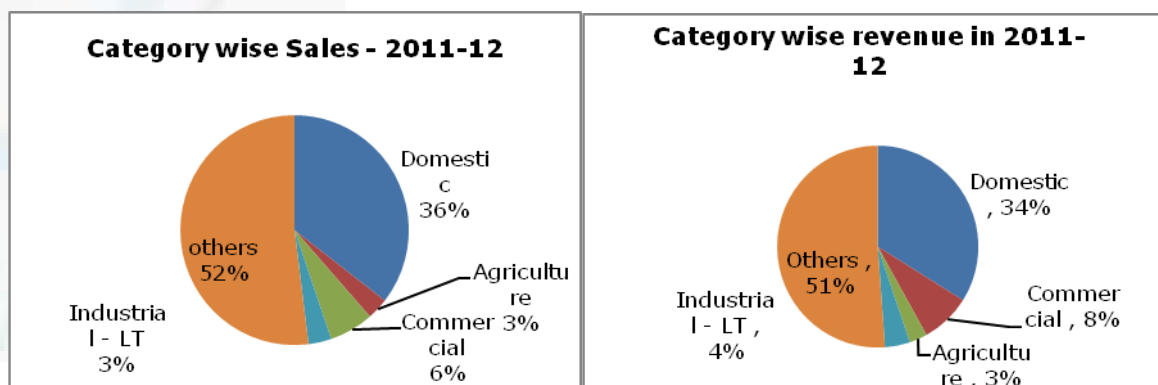
Source: PFC

The overall sales have registered a CAGR of 1% over the span of seven years wherein the sales of commercial category have registered a higher CAGR of approximately 7% followed by the domestic category with a CAGR of 6%.

In terms of revenue contribution, domestic category contributed more than 33% of the revenue, followed by commercial category with an 8% share.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXVI-5: Comparative Analysis of Consumer Sales and Revenue Mix 2011-12 - Tripura<sup>24</sup>**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for Tripura have increased over the years. One of the reasons is the extension of LT lines in remote villages as per various programs under rural electrification. Moreover, the share of domestic consumers has been increasing over the years which lead to the sale of power at low and medium voltage.

After tariff petitions for 2005-06 and FY 2006-07, the TSECL did not submit any ARR petitions since FY 2007-08 till FY 2011-12, which made it difficult for the state commission to analyze the financial health of the utility. However, the utility managed to file its third ARR petition on January 2012, with which few organizational drawbacks in the previously managed power department of the state was also visible.

The commission found out that the Power Department lacked proper manpower, efficient MIS and accounting of statements. The commission subsequently issued some policy improvement guidelines to the utility. The utility further aims to improve metering level and technology in the state. With this, we expect the losses to decrease in the future.

**Table XXVI-1: Year on Year Trend in AT&C losses and Collection Efficiency – Tripura**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	21%	32.3%	29.2%	30%	32%	29%	34%	34%
Collection Efficiency	93%	83%	56%	70%	75%	63%	67%	78%

Source: PFC

In recent years, the AT&C losses has been increasing because of the increasing gas cost which has affected the TSECL through increase in power purchase cost as well as fuel cost for its domestic plants, which has become difficult as a pass through for domestic consumers because of inadequate tariff revisions.

<sup>24</sup> Other accounts for inter-state sales and sales to foreign nation like Bangladesh.

### 2.3. TRENDS IN DISTRIBUTION COST

Power purchase cost accounts for majority of distribution cost. The power purchase cost has accounted for an average of ~40% of the total distribution cost over the years (Refer table below). However, over the years, the generation cost has been subsequently increasing. This is because of subsequent capacity addition and setting up of new generating plants in the state.

The per-unit cost break-up for different cost components for the state of Tripura is provided in the table below:-

**Table XXVI-2: Year on Year Trend Distribution Cost Breakup - Tripura**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	0.98	1.03	1.12	1.98	1.80	1.53	1.81	2.43
O&M (R&M + A&G + EC)	0.46	0.60	0.68	1.45	1.49	1.64	1.42	1.36
Interest	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	0.21	0.23	0.23	0.50	0.48	0.49	0.55	0.54
Generation cost	0.44	0.40	0.47	0.89	0.93	1.03	2.12	2.18
Other cost	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00

Source: PFC

W.r.t., the increasing costs and less revenue realization, TSECL had filed a Fuel and Power Purchase Cost Adjustment (FPPCA) petition in FY 2010-11. Subsequently, TERC approved for a subsidy to specified category of consumers in the year 2010-11 and later a tariff hike of 31% for FY13-14 to meet these costs.

### 2.4. REVENUE REALIZATION

The revenue realization has remained poor in the state because of ineffective metering of consumers. The erstwhile power department of the state had been historically carrying out metering, billing and collection manually, leaving wide scope for errors. As a result, the level of thefts in the state has also been high, further deteriorating the revenue realized. Moreover, a large number of consumers fall under special category in the rural electrification program, making it even more difficult for the utility to improve their revenue realization.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XXVI-3: Historical Trend Consumer Category Wise Revenue Realization - Tripura**

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Domestic	1.57	1.87	2.34	2.54	2.60	2.82	2.82	3.46
Agriculture	1.11	1.25	1.11	3.33	1.52	1.50	2.37	3.45
Commercial	2.63	3.24	3.33	3.78	3.41	3.62	4.26	4.67

Category	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Industrial HT	-	-	-	-	-	-	-	-
Industrial LT	2.61	3.33	3.04	2.61	3.13	3.33	4.52	4.52
Others	1.90	2.72	3.35	3.09	4.70	3.98	3.20	3.57

Source: PFC

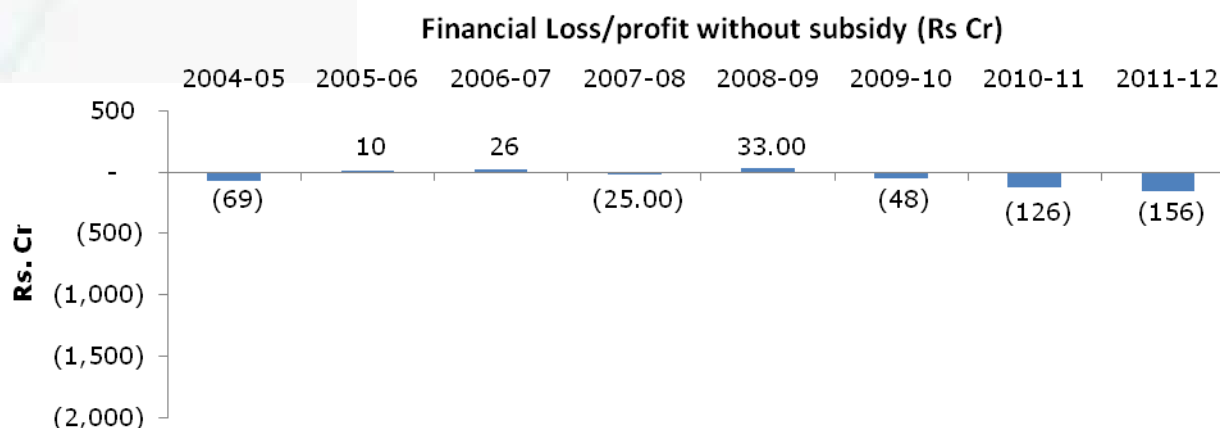
The state needs to invest in better technology in the power distribution area under R-APDRP so as to improve the present state of poor financial position of TSECL.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The financial losses of TSECL without subsidies has increased over the years. As discussed earlier, major reason for this is the increasing share of rural consumers and increasing fuel costs

**Figure XXVI-6: Historical Trend Financial Losses (w/o) subsidies – Tripura**



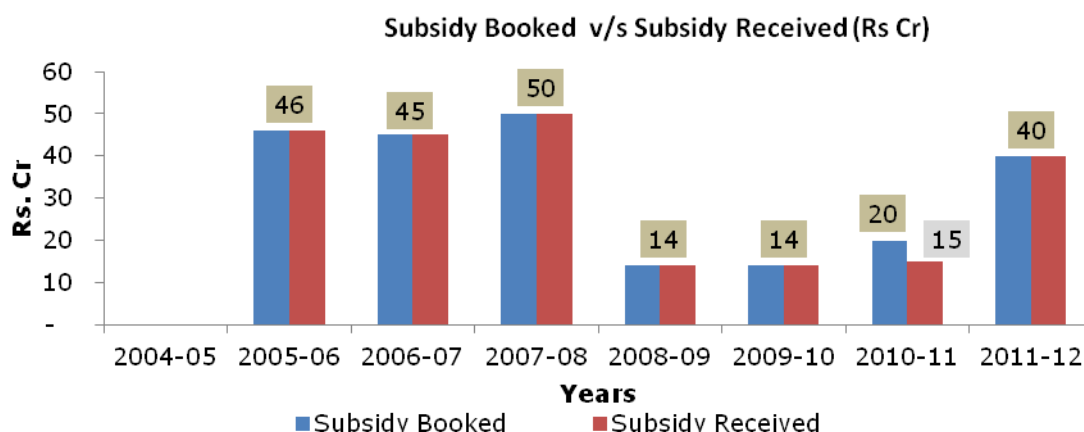
Source: PFC

The losses had decreased in FY 06 till FY 09 because of inter-state trading/sale of power by the utility. Lack of tariff revisions against increasing fuel costs and inefficient collection has led to losses in the recent years.

#### 3.2. SUBSIDY BOOKED v/s SUBSIDY RECEIVED

The figure below provides the subsidy booked v/s subsidy received for the distribution utility in the state.

**Figure XXVI-7: Historical Trend Subsidies Booked v/s Subsidies Received – Tripura**



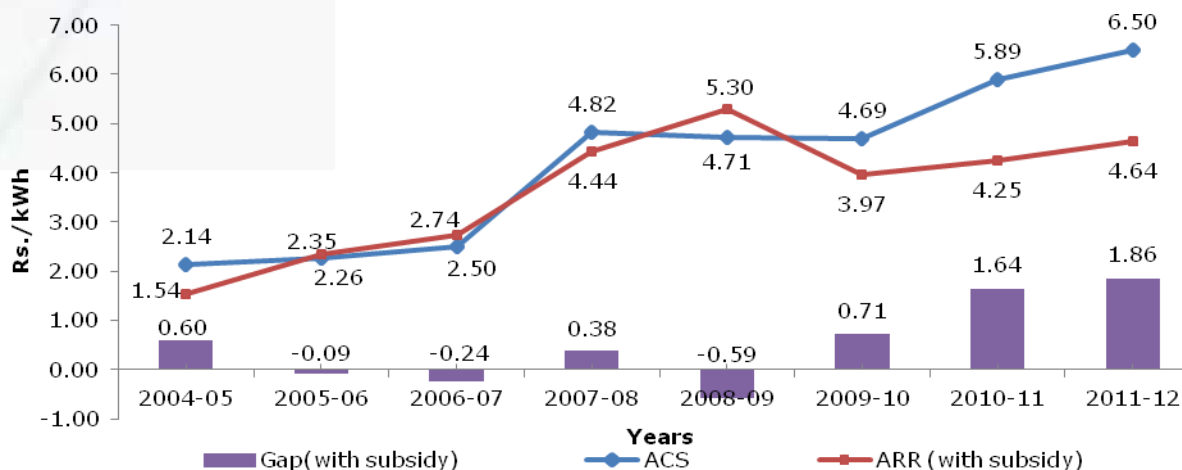
Source: PFC

The Subsidy received has been the same as subsidy booked over the years, except in the year 2010-11.

### 3.3. ACS v/s ARR

The gap (with subsidy) between average cost of supply and average revenue realized (with subsidy) has remained marginal over the years until 2008-09. Thereafter, the gap has widened. This is because the tariff revisions not being adequate with respect to the increasing fuel costs.

**Figure XXVI-8: Historical Trend ACS v/s ARR (with subsidy) – Tripura**



Source: PFC

## 4. STATE INCOME AND EXPENDITURE ON POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

#### Tax Revenue

The tax revenue from the power sector forms less than 1% of the total tax revenue, the tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The details of the same are given below.

**Table XXVI-4: Tax Revenue from Power Sector - Tripura**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	0	0	0.05
Total Tax Revenue	1,233	1,745	2,166
Power sector Tax Revenue / Total state Tax Revenue	0.00%	0.00%	0%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The non-tax revenue from power sector is through **royalty/cess on water for power generation, T & D, Rural Electrification** etc. The details for the same are provided in the table below.

**Table XXVI-5: Non-Tax Revenue from Power Sector - Tripura**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non Tax Revenue From Power Sector	0	0	0.002
Total Non-Tax Revenue	125	132	214
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0.00%	0.00%	0.00%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

In 2011-12, power sector did not generate any Non-tax revenue. The overall revenue generated from power sector in 2011-12, is to tune of **Rs 0.05 Cr.**



## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector in Tripura.

**Table XXVI-6: Expenditure on Power Sector - Tripura**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	77	76	22
Revenue Expenditure	30	22	42
Total Power Sector Expenditure	106	98	64

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The overall expenditure has come down from Rs 106 Cr in FY10 to Rs 64 Cr in FY12.

Over the years, the expenditure on power sector has far exceeded the revenues generated from the sector.

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

### Guarantees

The table below depicts the guarantees given to power sector relative to the total revenue of the state

**Table XXVI-7: Guarantees as a Percentage of Total Revenues - Tripura**

Particulars	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	0	0	47
Total Revenues of the State	1,359	1,876	2,310
Guarantees as a %age of Total Revenues of State	0.00%	0.00%	1.97%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

As shown above, the guarantees towards power sector have been minimal and have constituted a marginal share of total revenues of the state (~1.97% in 2011-12)

.The table below depicts the three year average share of different utilities in sector guarantees:

**Table XXVI-8: Utility wise Breakup of Guarantees - Tripura**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
RGGVY	0	0	4	9%
RAPDRP	0	0	43	91%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

In 2011-12, Guarantees to the power sector were towards RAPDRP which accounted for a substantial share of 91% in total sector guarantees followed by RGGVY.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 10 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.

**Table XXVI-9: Financing Requirement of Power Sector (2011-12) - Tripura**

Particulars	2011-12 Rs. Cr.
Power Sector Expenditure (Capital and Revenue)	64
Loans And Advances made by the State Government (Net of Recoveries)	10
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net Of Receipts)*	6
Loans for Power Projects-T&D from the Central Govt. Discharged during the year (Net Of Receipts)	0

Total Power Sector Financing during the year	80
Sector Financing Requirement as a % age of total revenues of state	3%
GSDP nominal	15,645
Sector Financing Requirement as a % age of GSDP	0.51%
Financial Profit /(Losses) of Discoms during the year	(156)
Sector Financing Requirement as a % age of total revenues of state including financial losses of Discoms	10%
Sector Financing Requirement as a % age of GSDP including financial losses	1.51%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances - 2011-12*

The financing requirement for the Power sector in the state was estimated to be ~3% of the revenue generated by the state and 0.51 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector increases to a significant 10% of the State revenue and 1.51% of the GSDP.

The financing requirement of the sector far exceeds the revenues generated from the sector. The main component of the requirement is Discom Losses. This suggests investments are required to rectify the inefficiencies of the segment. However, there is no capital expenditure made towards T & D segment. Considering, the guarantees given, burden on state finances increases further. It is vital that the State must invest in building and strengthening the infrastructure of Power Sector (especially T n D) to enhance the revenue generating capacity of the sector.

The Rural Electrification segment of the power sector is one of the main focus areas in the state. Major portion of capital expenditure and a significant portion of guarantees are routed towards this segment.

#### **4.6. POWER BONDS**

8.5% Power Bonds Government of Tripura was issued by State Government to be redeemed by 2016. The outstanding balance as on 1st April 2006 was Rs 63.51 Cr. The total outstanding balance at the end of 2011-12 was Rs. 28.58 Cr.

## **5. ASSESSMENT OF REGULATORY EFFECTIVENESS**

The Government of Tripura constituted the Tripura Electricity Regulatory Commission (TERC) on 31<sup>st</sup> May, 2004. TERC has introduced number of regulations in the state such as MYT regulations, 2011 and Open Access regulations, 2010, Renewable Purchase Obligation (RPO) regulations, 2009, Electricity Supply Code regulations, 2011, etc.

The key aspects of regulatory effectiveness have been discussed below -

### **5.1. STATUS OF MYT REGULATIONS**

The Commission has notified MYT Regulations in FY 2011. However, in the tariff order 2012-13, the commission states that the MYT framework cannot be carried forward because of lack of reliable data.

### **5.2. STATUS OF OPEN ACCESS IMPLEMENTATION**

The Commission notified the Open Access Regulations on 2010 for consumers requiring more than 1MW, stating guidelines on open access wheeling charges, cross subsidy surcharge and additional surcharges.

### **5.3. FREQUENCY OF TARIFF REVISIONS**

The tariff revisions in the state have not been frequent. Tariffs have been revised to the tune of 31% in FY 2013-14.

### **5.4. METERING OF CONSUMERS**

The commission has issued guidelines under the Electricity Supply Code regulations, 2011 for metering of consumers under different category, stating that no new connections should be provided without a meter. With a view towards 100% metering of trunk and sub-transmission lines, the Government of India has also sanctioned the following schemes worth Rs 27.5 crores towards the state under R-APDRP:

- 100% metering of the feeders in the entire State, metering of Distribution Transformers, Consumer metering & augmentation of sub-transmission & distribution system in West Tripura District.
- Metering, computerization, sub-transmission & distribution scheme for Agartala Town.

## 6. SUMMARY

The state has high energy potential and is expected to be one of the power richest states in the North Eastern Region. However, the level of metering needs to improve and there must be efficiency and transparency in operations so as to stabilize the financial scenario. Until late 2012, the billing for domestic and commercial categories was done under non-telescopic route. However, the commission has decided to introduce telescopic tariff for these categories in the state just like other major states in the years forward. The key parameters of the states are discussed below-

- 1. Inadequate Tariff Revisions:** The tariff revisions in the state have been inadequate with respect to the increasing fuel costs leading to an increase in subsidy and/or losses.
- 2. Power purchase cost:** With increasing fuel cost, power purchase costs have been subsequently increasing. However, in recent years, Tripura has been investing in power infrastructure development in the state. As a result, the power purchase cost is expected to decrease in the future.
- 3. Subsidy:** The subsidy burden of the state has increased in the year 2010-11 and 2011-12 in order to meet the unrecovered costs from rural consumers and to meet the increase in fuel cost.
- 4. Financial Losses:** The distribution financial losses without subsidies in Tripura has increased over the years due to inadequate tariff revisions. The losses without subsidy have increased from Rs 48 Cr in 2009-10 to Rs 156 Cr in FY 2011-12.
- 5. States Guarantees:** for the sector are not very significant and account for approximately 2% of Total Revenues of the state
- 6. Exposure to the State Gov. to power sector:** The financing requirement for the Power sector in the state was estimated to be 3% of the revenue generated by the state and 0.51 % of the Gross State Domestic Product. Considering, the Financial losses of Discoms in the year 2011-12, the financing requirement of the sector decreases to 10% of the State revenue and 1.51% of the GSDP.

## XXVII UTTAR PRADESH

### 1. INTRODUCTION

#### **1.1. BACKGROUND – POWER SECTOR OVERVIEW**

Uttar Pradesh, one of the largest states in the country shares its border with eight states and shares an international border with Nepal on the northeast. The state in the last five years has witnessed a significant ~5% CAGR in its energy demand, on account of significant increase in industrial demand during the same time frame.

Privatization in the distribution sector happened as early as the 1990s wherein the state government in conjunction with the centre carried out a pilot in the Greater NOIDA region of UP. About 77 percent of consumers in greater NOIDA were industries, and the rest were households. There was almost no subsidy offered in that area. An agreement was signed, in 1993, between UPSEB and a private company, NOIDA Power Company (NPCL) pertaining to distribution rights in the region.

In 1999 Government of UP notified the UP Electricity Reforms Act wherein it established a Regulatory Commission and on January 14, 2000 enabled the trifurcation of the UPSEB. The erstwhile UPSEB was trifurcated into three corporations namely UP Power Corporation (UPPCL), UP Rajya Vidyut Utpadan Nigam (UPRVUNL), UP Jal Vidyut Nigam (UPJVNL).

Kanpur Electricity Supply Company (KESCO), a distribution company was formed as a 100 percent subsidiary of UPPCL, effective 15th January, 2000. Need for further unbundling of UPPCL (responsible for both Transmission and Distribution functions) along functional lines was again felt after the enactment of the Electricity Act 2003, and four new distribution companies ("Discoms") were created vide Uttar Pradesh Transfer of Distribution Undertaking Scheme 2003-

- Dakshinanchal Vidyut Vitaran Nigam Limited (Agra Discom),
- Madhyanchal Vidyut Vitaran Nigam Limited (Lucknow Discom),
- Pashchimanchal Vidyut Vitaran Nigam Limited (Meerut Discom) and
- Poorvanchal Vidyut Vitaran Nigam Limited (Varanasi Discom)

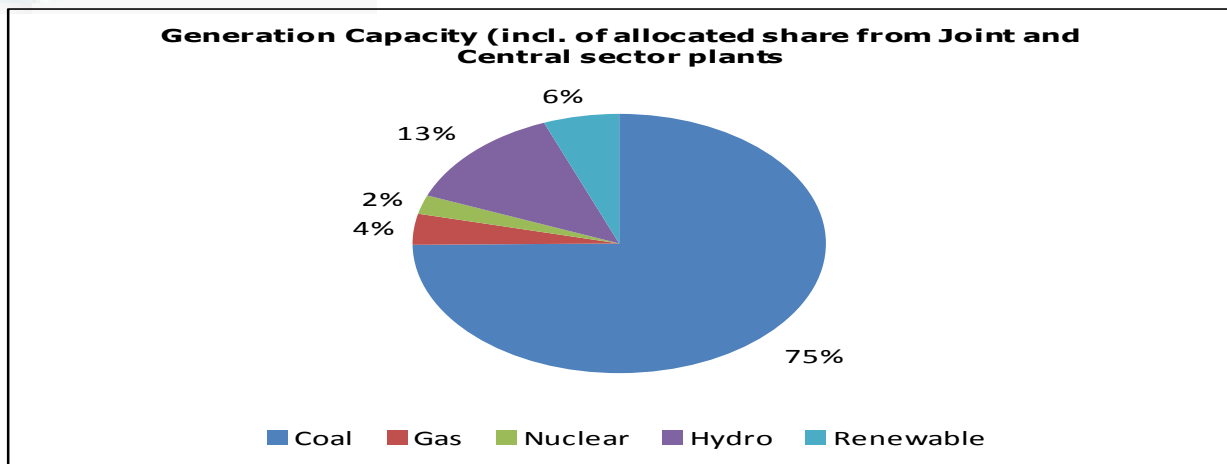
Post the unbundling exercise and transfer scheme dated 15th January 2000 & 14th June 2000, the distribution utilities were formed for the purpose of handling the distribution business in the State of Uttar Pradesh. The Government of Uttar Pradesh as per the U.P. Electricity Reform Act 1999 also set up the Uttar Pradesh Electricity Regulatory Commission (UPERC).

## 1.2. GENERATION MIX

The total installed capacity in February 2014 (including allocated share in Joint & Central Sector plants) for Uttar Pradesh was 14,339 MW out of which Coal based power capacity accounted for ~75% followed by Hydro (~13%) . RE based capacity accounted for a share of ~4%.

Figure below presents the generation capacity including allocated share in Joint & Central sector plant

**Figure XXVII-1: Generation Capacity Mix - Uttar Pradesh**



Source: CEA

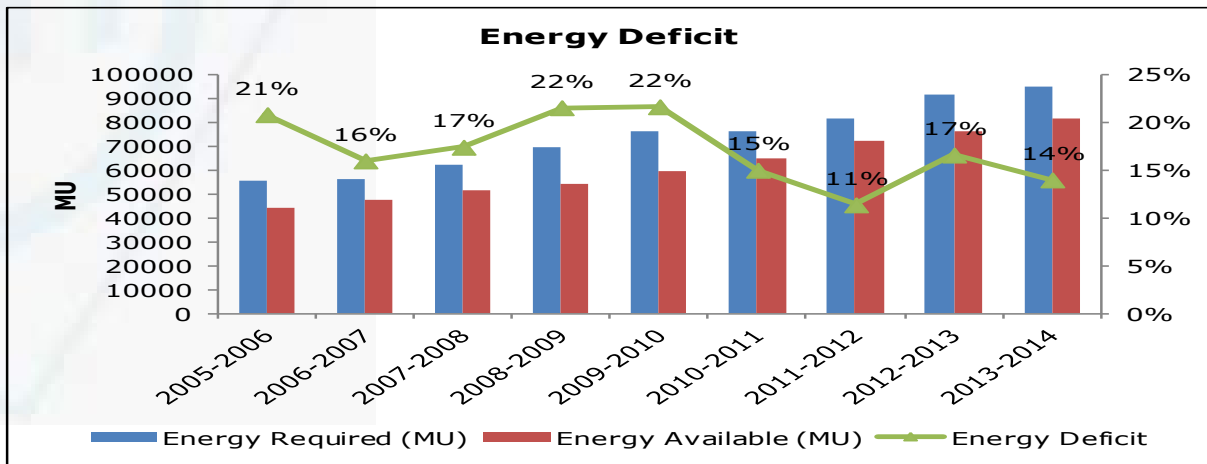
## 1.3. POWER SUPPLY POSITION

Uttar Pradesh has been witnessing consistent power supply shortage with high energy deficit levels, in the range 11% to 22%.

The capacity addition in the state has not been able to match the increasing demand of the state resulting in high levels of deficit. Further, the state DISCOMs have not been able to block power purchase through long term PPAs, increasing the dependency of the state on short-term power markets.

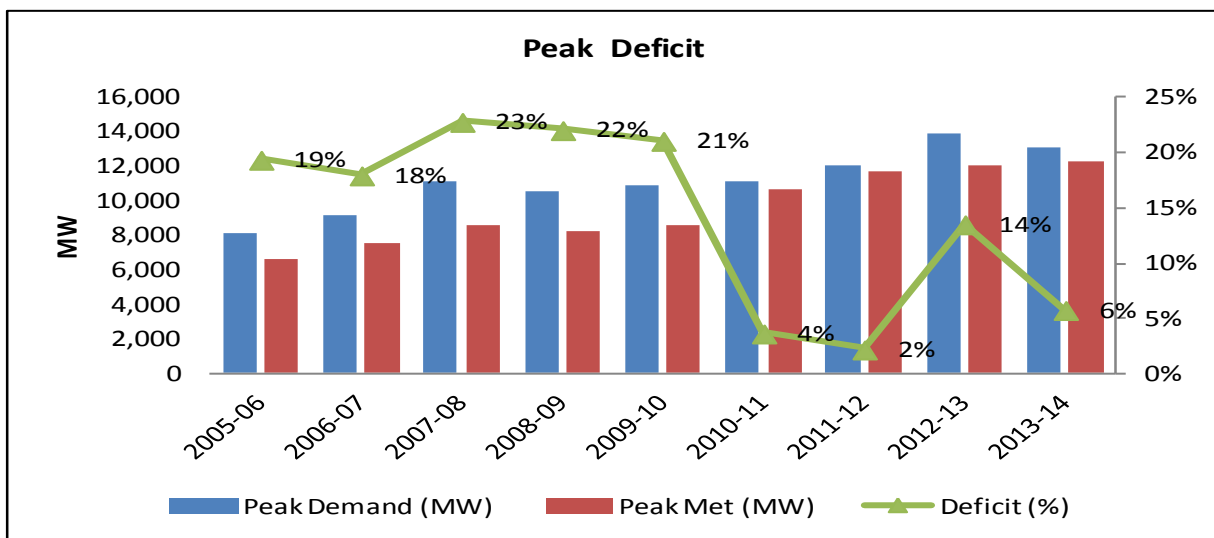
The peak demand in the state was high from FY 06 to FY 10. Further, with no major spike in peak deficit (except in FY 13) the peak deficit levels in the state have remained low.

The trend of energy deficit observed in Uttar Pradesh over the years is presented in the figure below:

**Figure XXVII-2: Historical Trend in Energy Deficit - Uttar Pradesh**

Source: CEA

The trend of peak deficit observed in Uttar Pradesh over the years is presented in the figure below:

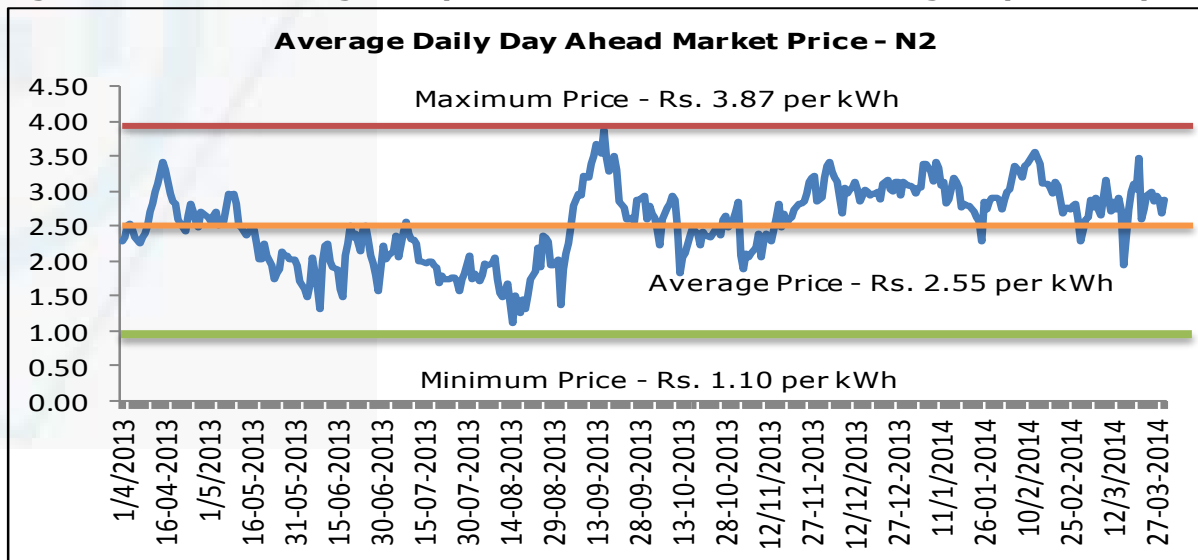
**Figure XXVII-3: Historical Trend in Peak Deficit - Uttar Pradesh**

Source: CEA

Further, the above deficit levels in the state are expected to reduce further in short to medium term, on account of huge stranded capacity and low prevalent prices in the short term market. The figure below presents the average daily short-term prices prevalent in IEX in FY 14.



**Figure XXVII-4: Average Daily Short Term Prices IEX – N2 Region (2013-14)**



Source: IEX

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF UTTAR PRADESH<sup>25</sup>

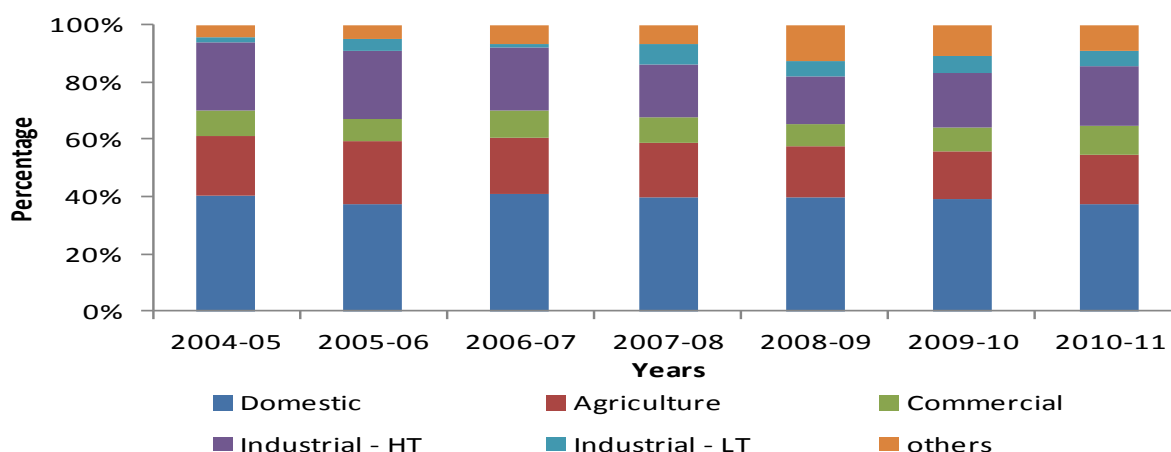
The distribution activity in the state of Uttar Pradesh is segregated into five distribution utilities with maximum share of the demand in the state of Uttar Pradesh served by PaVVNL. Domestic consumers dominate the consumer mix in the state of Uttar Pradesh, which forms more than 80% of the consumers in the state.

In 2010-11, domestic segmented dominated the sales mix with a share of 37%, followed by industry (HT) (21%) and agriculture category (18%).

The share of domestic and agriculture sales has reduced over the years from ~40% and ~21% in 2004-05 to ~37% and ~18% in 2010-11 respectively. Further, the demand from categories like educational institutions, etc that constitute the other segment has increased from 4% in 2004-05 to 11% in 2010-11.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXVII-5: Historical Trend in Consumer Sales Mix - Uttar Pradesh**



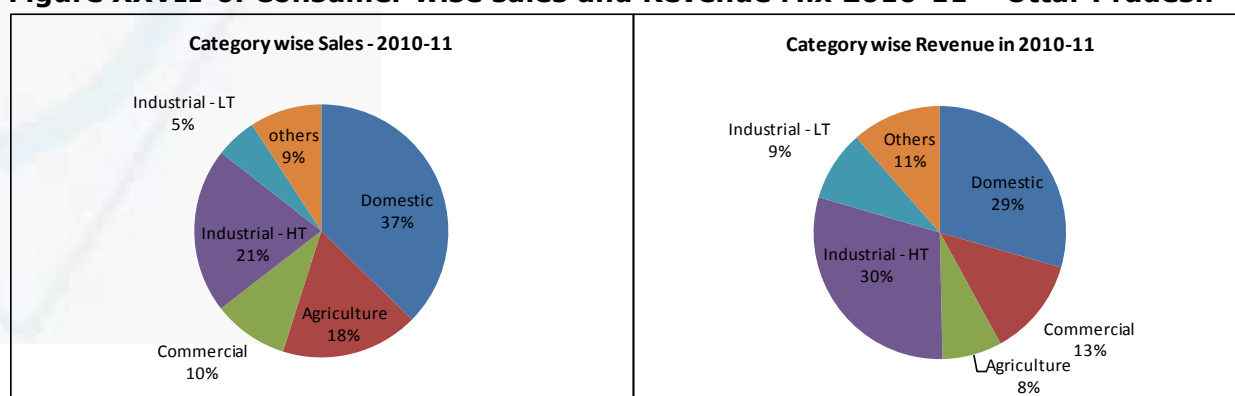
The overall sales have registered a CAGR of 12% over the span of six years wherein the sales of commercial category have registered a higher CAGR of 13% followed by the industrial category with a CAGR of 12%. Simultaneously, the demand of domestic category has increased at a CAGR of ~11%, from 2004-05 to 2010-11.

In terms of revenue contribution, industries contributed ~39% of revenue, followed by domestic and commercial categories with a share of 29% and 13%, respectively, while agriculture contributed a meagre 8% of the revenue. This clearly indicates that domestic and agriculture categories are heavily cross subsidized by the industrial and commercial categories.

<sup>25</sup> Consumer wise sales and revenue data for MVVN in 2011-12 not available.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXVII-6: Consumer wise sales and Revenue Mix 2010-11 – Uttar Pradesh**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL LOSSES AND TECHNICAL LOSSES

The Aggregated Technical & Commercial losses (AT&C) for Uttar Pradesh distribution utilities have historically remained extremely high compared to the national average.

The loss level reported by the distribution utilities of Uttar Pradesh is in the range of 35% (FY 09) - 47% (FY05).

The trend observed over the years in collection efficiency has had a moderate impact on the AT&C losses in the state. In FY10, with ~90% collection efficiency the reported AT&C losses were ~34%, which increased to ~40% due to decline in collection efficiency to ~85% in the subsequent year.

**Table XXVII-1: Historical Trend in AT&C losses and Collection Efficiency – Uttar Pradesh**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11
AT&C Losses (%)	47%	44%	44%	35%	35%	34%	40%
Collection Efficiency (%)	75%	80%	80%	91%	87%	90%	85%

Source: PFC

The persistent high levels of AT&C losses in the state are on account of high line losses due to ageing transmission and sub-transmission network. Further, the lack of infrastructure to assess the true usage by consumers across the state has resulted in large-scale power thefts.

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost. The power purchase cost accounts for ~85% of the total distribution cost.

The table below indicates the historical trend in the distribution costs in the state of Uttar Pradesh.

**Table XXVII-2: Historical Trend in Distribution Cost Breakup – Uttar Pradesh**

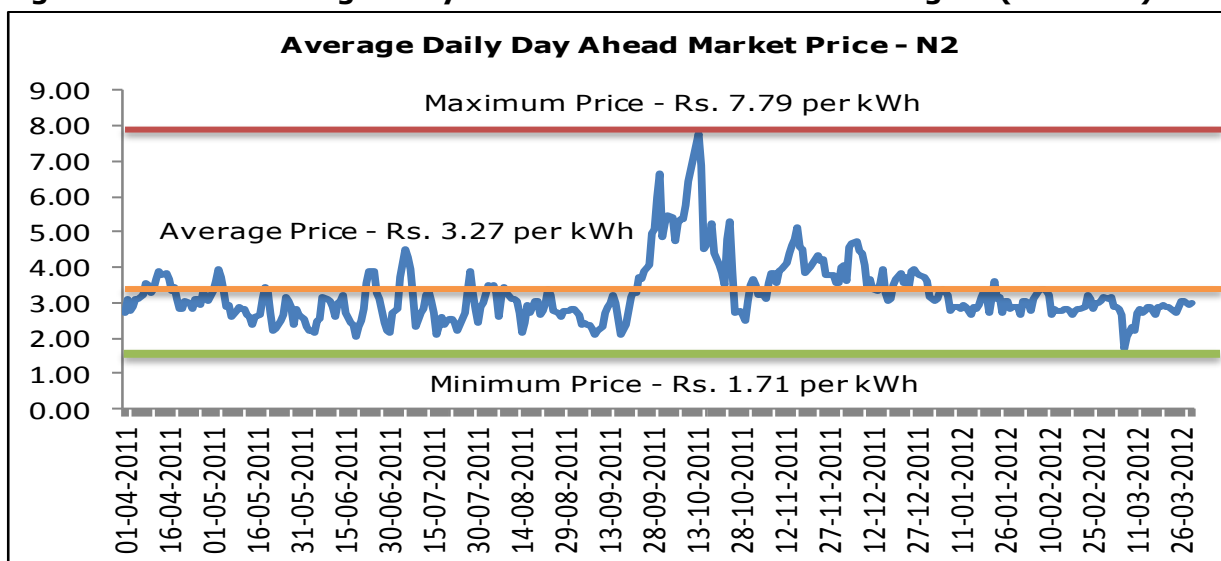
Cost Component (Rs per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	2.24	2.47	2.39	2.51	2.69	2.82	2.96	3.19
O&M (R&M + A&G + EC)	0.23	0.22	0.21	0.22	0.26	0.30	0.38	0.34

Cost Component (Rs per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Interest	0.05	0.12	0.11	0.13	0.12	0.20	0.12	0.08
Depreciation	0.13	0.14	0.11	0.12	0.11	0.09	0.07	0.08
Other cost	0.03	0.03	0.02	0.04	0.02	0.19	0.03	0.02

Source: PFC

The PLFs of the state generating units continue to be on the lower side when compared to the national average. The PLF of the state owned plant decreased from 64.14% in FY 10 to 60.28% in FY 11. The historical trend in PLF of the state owned generation plant and the corresponding prevalent prices in short term market is presented below:

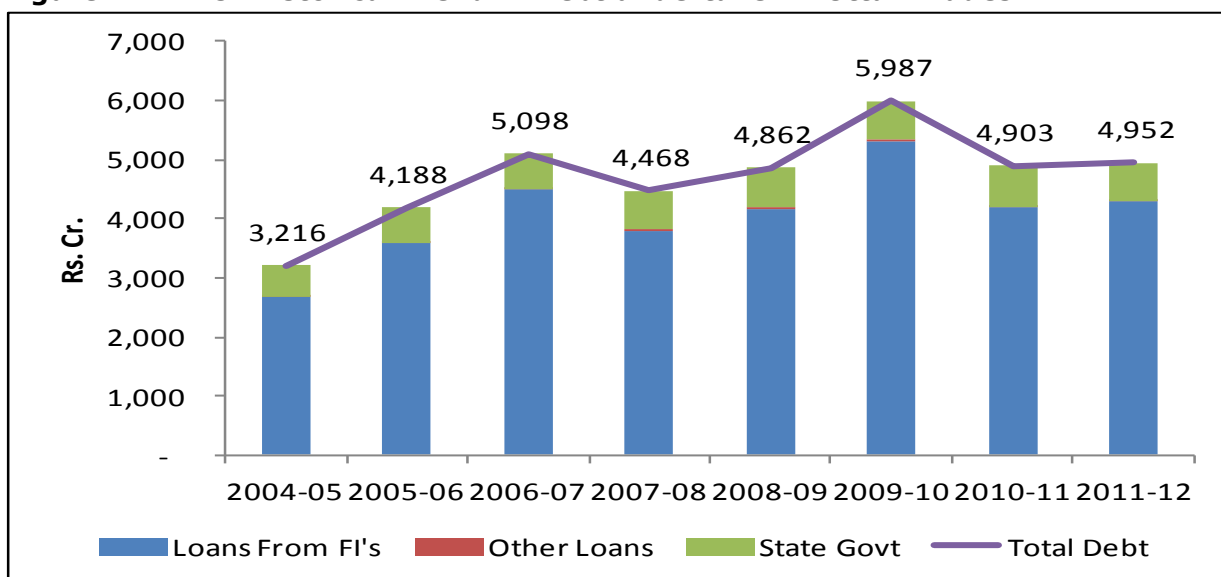
**Figure XXVII-7: Average Daily Short Term Prices IEX – N2 Region (2011-12)**



Source: IEX

The per unit interest cost liable increased significantly in the year FY 10, to cover for the sharp increase in power purchase costs from independent power producers and short term market. The figure below illustrates the increasing debt undertaken by the state DISCOMs.

**Figure XXVII-8: Historical Trend in Debt undertaken – Uttar Pradesh**



Source: PFC

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing power purchase cost. Although, the tariff were increased from FY 09, the high levels of AT&C losses eroded the impact of the tariff increase in the state.

**Table XXVII-3: Historical Trend in Consumer wise Average Revenue Realization – Uttar Pradesh**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Domestic	2.17	1.76	1.54	1.56	1.80	2.01	2.86
Agriculture	1.32	1.11	1.27	1.31	1.53	1.52	1.57
Commercial	5.33	4.86	3.53	3.58	4.80	4.71	4.74
Industrial HT	4.71	4.42	3.98	4.46	5.15	4.81	5.13
Industrial LT	6.92	5.35	3.57 <sup>26</sup>	4.01 <sup>27</sup>	5.20	5.81	6.23

Source: PFC

Agricultural and rural-domestic consumers are being subsidized by the state government and the share of state government subsidies accounts for ~17% of the total revenues. Increase in power purchase cost, high levels of AT&C losses and inaccurate demand estimation for unmetered categories has resulted in deterioration of the financial position of the distribution utilities of the state.

<sup>26</sup> Estimate sale towards Small & Medium Power for the year 2006-07.

<sup>27</sup> Estimate sale towards Small & Medium Power for the year 2007-08 – True up Order, ARR 2009-10.

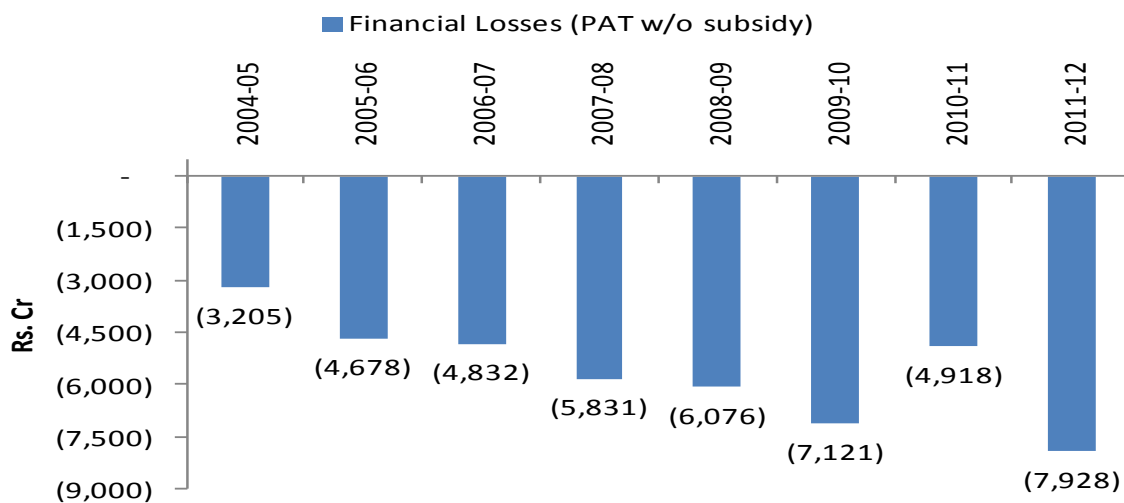
### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITY

The distribution financial losses without subsidies in Uttar Pradesh has increased over the years. As discussed earlier, this is because of increasing power purchase costs, high levels of AT&C losses and inaccurate demand estimation for the unmetered category.

The figure below depicts the year on year trend in profit after tax registered by the state DISCOMs.

**Figure XXVII-9: Historical Trend in Financial Losses (w/o subsidy) – Uttar Pradesh**

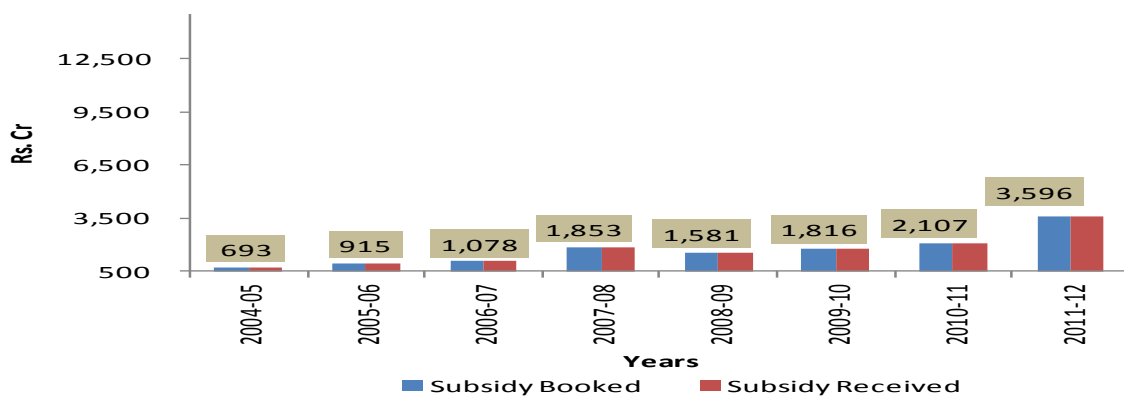


Source: PFC

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY REALIZED

The subsidy burden of the state utility has increased from 9% in 2004-05 to 17% in 2011-12. The subsidy booked has registered a CAGR of 27% over the span of seven years, which is extremely high compared to the ACS that has registered a CAGR of 5% over the same period. The figure below depicts the year on year trend in subsidies booked and received by the state utility.

**Figure XXVII-10: Historical Trend in Subsidy Booked v/s Subsidy Realized - Uttar Pradesh**



Source: PFC

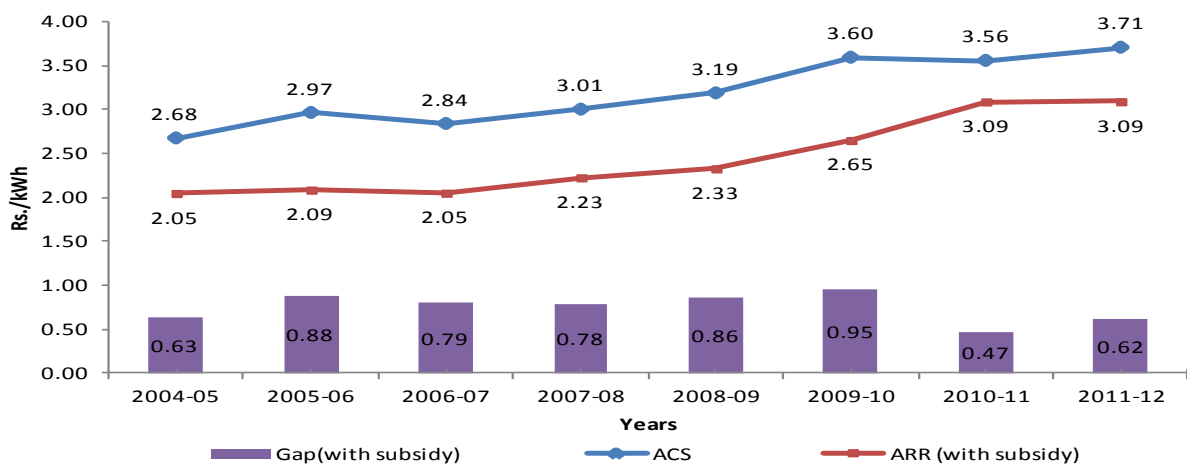
As shown in the graph above, the amount of subsidies booked by the state has increased significantly from FY 05 to FY 12. This is primarily on account of subsidy to the agricultural category and certain sections of domestic category. It can be observed from the above figure, that in all the years, amount of subsidy realised was equal to the amount of subsidy booked by the state DISCOMs.

### 3.3. ACS v/s ARR

The gap with subsidy between average cost of supply and average revenue realized (with subsidy) has widened over the years. This is primarily due to the under-recovery of tariff due to prevalent high levels of AT&C losses in the state.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer

**Figure XXVII-11: Historical Trend in ACS v/s ARR (with subsidy) - Uttar Pradesh**



Source: PFC

Lack of power procurement strategy and absence of robust strategy to counter the high levels of commercial losses have further increased the gap between average cost to serve and average revenue realized.

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector has formed less than ~0.45% of the total tax revenues of the state. The details for the same are provided in the table below:

**Table XXVII-4: Tax Revenue from Power Sector - Uttar Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue From Power Sector	272	357	458.20
Total Tax Revenue	65,674	84,574	1,02,964.38
Power sector Tax Revenue / Total state Tax Revenue	0.41%	0.42%	0.45%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The tax revenue from the power sector has increased since 2009-10. However, the contribution of sector in Total Tax revenue has increased marginally since FY10.

The non-tax revenue from power sector is through **Royalty/CESS on water for power generation, transmission and distribution, Rural Electrification etc.** The Non-Tax revenue, which is Rs 77.17 Cr, contributes a marginal ~0.76% of the total non-tax revenues in 2011-12. The details for the same are provided in the table below:

**Table XXVII-5: Non-Tax Revenue from Power Sector - Uttar Pradesh**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	171	103	77.17
Total Non-Tax Revenue	13,601	11,176	10,145.30
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	1.26%	0.92%	0.76%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

The Non tax revenue from the sector has decreased substantially since FY10 and hence the contribution in state revenues has also declined.

The overall revenue generated from the power sector has increased from Rs 443 Cr in FY 10 to Rs 535 Cr in FY12.



## 4.2. EXPENDITURE ON POWER SECTOR

The table below depicts the expenditure on power sector by the state of Uttar Pradesh.

**Table XXVII-6: Expenditure on Power Sector - Uttar Pradesh**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	5,092	4,100	4,314.36
Revenue Expenditure	1,896	2,174	3,535.54
Total Expenditure	6,989	6,274	7,849.90

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Over the span of three years the capital expenditure has decreased whereas the revenue expenditure has increased. Decrease in investments is primarily on account of decrease in overall capital outlay on Power projects. However, in Fy2011-12, there has been an increase in state investments in UP Power Transmission Corporation Ltd. The revenue expenditure increased primarily due to state investments and increase in subsidy payments to UP Power Corporation Ltd.

It can be observed that the power sector in the state has not been self sufficient, on account of revenue expenditure being significantly higher than the power sector revenue of the state.

## 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The state government guarantees constituted a significant ~15.57% of the overall state revenue, towards the loan taken by the state DISCOMs. The same has been depicted in the table below:

**Table XXVII-7: Guarantees as a Percentage of Total Revenues - Uttar Pradesh**

Parameter	2009-10	2010-11	2011-12
RS Cr			
Guarantees given by State Govt.	14,152	17,140	17,608
Total Revenues of the State	79,275	95,750	1,13,109.68
Guarantees as a %age of Total Revenues of State	17.85%	17.90%	16%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

As shown above, there has been a substantial increase in the Guarantees given by the government to Power sector. However, the proportion of guarantee towards Power sector in the state revenue has declined i.e. from ~17.85 % of State Revenues in 2009-10 to ~15.57% in 2011-12.

The power sector received a substantial ~62% of the overall subsidy given by the state government. The same has been depicted in table below:

### **Subsidy:**

The table below depicts the average share of utilities in subsidies given to Power sector and the average share of sector in total state subsidy over three years:

**Table XXVII-8: Power Sector Subsidy as a Percentage of overall Subsidies - Uttar Pradesh**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Subsidy (%)
Rs Cr				
Compensatory Grant to UPPCL	1,342	1,500	2,996.81	83%
Compensatory Grant for adjustment against recovery of electricity tax to UPPCL	250	300	400.00	14%
Compensation against rebate in electricity rate to Powerloom Weavers	50	85	8,500.00	3%
Power Sector subsidy (% of Total Subsidy)	1,642	1,885	3,481.81	49%

Source: C&AG Audited Accounts for the state – 2011-12, 2010-11, 2009-10

Over the span of three years, UPPCL accounted for significant 83% of total subsidy given to the power sector by the state government. The power sector accounted for a significant 49% of the total state subsidy.

#### **4.4. POWER BONDS**

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 1170 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.

**Table XXVII-9: Power Sector Financing Requirement (2011-12) - Uttar Pradesh**

Particulars	2011-12 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	7,849.90
Loans And Advances made by the State Government ( Net of Recoveries)	0
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year ( Net of Receipts)	40.95
Loans for Power Projects-T&D from the Central Govt. Discharged during the year ( Net of Receipts)	0
Total Power Sector Financing during the year	7,890.85
Sector Financing Requirement as a % age of total revenues of state	7%
<b>GSDP nominal</b>	423261
Sector Financing Requirement as a % age of GSDP	1.86%
Financial Profit/(Loss) of Discoms during the year (with Subsidy Realised)	(4,332)
The Power sector in the state did not generate any Non Tax revenue	11%
The Power sector in the state did not generate any Non Tax revenue	2.89%

Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12

The financing requirement for the Power sector in the state was estimated at 7% of the revenue generated by the state and 1.86% of the Gross State Domestic Product. Further, the profits (with subsidy realized) reduced the financing requirement of the sector to ~11.00% of the state revenue and ~2.89% of the state GSDP.

However, it is observed the power sector in Uttar Pradesh is highly dependent on the state government subsidy to control the over bearing losses registered. Further, the revenue generated by the state DISCOM is ~15% of the revenue expenditure by the state.

## 5. FINANCIAL RESTRUCTURING PLAN

### 5.1. STATUS OF FINANCIAL RESTRUCTURING PLAN

The five Discoms in Uttar Pradesh reported a combined financial loss (without subsidy) of Rs.7,928 Cr. in 2011-12, translating into a financial gap of Rs.1.13/kWh. The financial gap has stayed at over Rs. 1/kWh for the last five years. The financial health of the Discoms is even worse when its short-term liabilities are considered. Due to the existing financial crisis, the Government of Uttar Pradesh has approved the FRP scheme.

As per the scheme, the state government would take over Rs.15,810 cr. (50% of STL) by issue of bonds by the Discoms backed by Government guarantee to participating lenders. The scheme would permit the Discoms to restructure the remaining 50% of STL backed by government guarantee, with a negotiated moratorium period. The Discoms had issued bonds for Rs. 15840 Crores, however, the bonds were not fully subscribed by the banks leaving a shortfall of Rs. 29.62 Crores. This liability remains unfunded and shall be discharged by the Discoms from their current revenues.

The bonds will be converted into special securities of the Government in three year time frame starting from 2014-15 till 2016-17 with Rs. 5270.13 Crores converted each year.

The following table highlights the bond repayment schedule and State Government fiscal impact under FRP.

**Table XXVII-10: Bond Repayment Schedule and State Government fiscal impact – Uttar Pradesh (Rs. Crores)**

Particulars	Years								
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Interest @ 9.68%	-	-	1530	1530	1530	1530	1530	1379	9029
Redemption of bonds	-	-	-	-	-	-	1581	1581	3162
Additional subsidy burden	375	461	917	1413	3500	4000	500	0.00	11166
<b>Total</b>	<b>375</b>	<b>461</b>	<b>2447</b>	<b>2943</b>	<b>5030</b>	<b>5530</b>	<b>3611</b>	<b>2960</b>	<b>73319</b>

Source: Data submitted by the state to the FFC

Some of the key parameters relevant to FRP implementation have been shown in the table below for Uttar Pradesh.

**Table XXVII-11: Historical Parameters – Uttar Pradesh**

Key Parameters	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>AT&amp;C losses</b>	44%	44%	35%	35%	34%	40%	45%	n.a	n.a
<b>Tariff Hikes</b>	0%	0%	0%	20%	19%	n.a	n.a	9%	16%
<b>Subsidy Received/Booked</b>	100%	100%	100%	100%	100%	100%	100%	n.a	n.a
<b>Interest Cost/Total Cost</b>	4%	4%	4%	4%	6%	3%	2%	n.a	n.a
<b>ACS-ARR Gap w/o</b>	1.10	1.02	1.14	1.17	1.27	0.82	1.13	n.a	n.a

<b>subsidy – Rs./kWh</b>									
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Source: PFC report on utility finances and Discom ARR

Some of the key observations from the above table, along with relevant state-level aspects are listed below.

- The Aggregated Technical & Commercial losses (AT&C) for Uttar Pradesh distribution utilities have historically remained high (averaging at 40%) on account of ageing transmission and sub-transmission network. Uttar Pradesh will require a >3% annual reduction in AT&C losses in order to benefit from the central grants scheme. The higher the reduction (over 3%), greater is the potential for receiving the grants from the central government.
- While the state has revised tariffs in last 2 years, the regulator will need to hike tariffs frequently and substantially. In the past, there have been periods of 2-3 years with no tariff revisions at a stretch.
- The subsidies received-booked ratio has continued to be 100% for last 6-7 years. It is however important to note that since the FRP requires the state government to release agricultural subsidy based purely on accurate feeder metering data levels, it might limit subsidy levels considering the existing low level of agricultural metering (9%).
- The share of interest expenses is not very high in Uttar Pradesh. The total debt taken by the Discoms was Rs. 4952 crores and the debt-equity ratio stood at 0.4 in 2011-12. While those figures sound relatively moderate for the loss making Uttar Pradesh Discoms, the payables to suppliers on the Discoms' balance sheet stood at Rs. 39,716 crores in the same year. Clearly, the Discoms have not regularly paid the suppliers. Lack of timely payments will force the suppliers to cut supply, increasing the Discoms' reliance on short term power further.
- The ACS-ARR Gap needs to be reduced annually by 25% from the 2010-11 benchmark value to be eligible for the central grants incentive. The gap will need to be reduced by around 20 paise per year in the next 3-4 years. Assuming the AT&C losses are reduced by 3%, the financial gap will come down by around 15 paise/unit in terms of the cost reduction achieved by purchasing fewer units to supply the same amount of power as in 2011-12. This implies that the technical losses will need to be brought down by a considerable amount, unless the tariffs are revised to increase the revenue realization.

In conclusion, the huge short term payables in Uttar Pradesh are a matter of concern and the FRP is expected to improve its short term liquidity position. The AT&C losses are significantly high and considerable improvement is required on that front. In order to bring down the ACS-ARR gap, the Discoms will need to revise tariffs adequately and bring down technical/commercial losses.

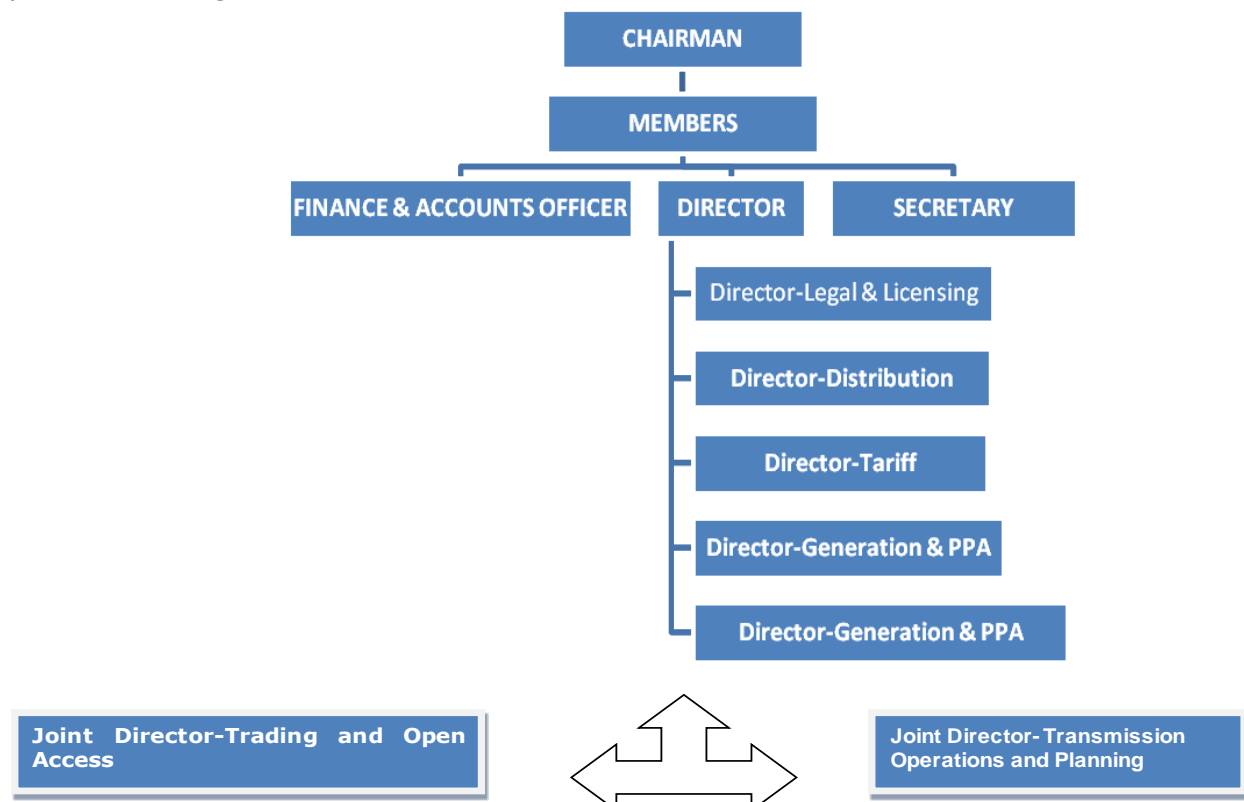
## 6. REGULATORY EFFECTIVENESS

The regulatory framework along with the accountability mechanisms governing the various entities existing in UP's power sector are governed and fall under the jurisdiction of the UPERC. The below sections elaborate further on the functioning, mechanisms and the major achievement of the UPERC.

The main objectives of UPERC are,

- That electricity will be supplied under the most efficient conditions in terms of cost and quality to support the economic development of the state of Uttar Pradesh.
- Power sector would cease to be a burden to the state's budget and would eventually become a net generator of financial resources.
- Protection of Interest of Consumers.

To meet the above objectives, the Commission is vested with the same powers as that of a Civil Court under the Code of Civil Procedure 1908 (Central Act 5 of 1908) for obtaining information and evidence. The Commission has the power to call any person or undertaking to produce before it documents relating to any matter concerning the generation, transmission, distribution and supply or use of electricity. It may also by order call any person or generating company to furnish any information concerning the activities carried out by such person/company relating to generation, transmission, distribution and supply or use of electricity. The Commission has the power to act as arbitrator or nominate arbitrators to adjudicate and settle disputes arising between licensees. The figure below presents the organization chart of UPERC



Source: UPERC

## 6.1. BUDGETING

The state regulatory commission, UPERC, is highly dependent on state government grants and subsidies to carry out its operations. In 2012-13, state grants provided a by the state government contributed ~20% of the overall revenue of the state commission. Further, the state commission incurred a surplus of ~1.77 Cr in the same year.

Hence, the state commission generates marginal revenue from licensee, application fees.

## 6.2. STAFFING

The office of the Commission consists of permanent employees besides officials on deputation and on contract basis. The total working strength of the commission at the end of the financial year 2011-12 is 55. The technical post contributed ~38% of the overall positions in the state commission

Another important aspect that needs to be considered is that considerable proportion of the staff especially the technical staff is on deputation or on contract basis. Deputation is generally done from another government department or from the utility itself, which again limits the true independence of the staff of SERC's.

## 6.3. MYT REGULATION

The state commission has not been able to implement the MYT Order. In July 2013, there is only one Member in the Commission which comprises of one Chairman and two Members<sup>28</sup>. The licensees have been issued various directions in the recent so that they may gear up/ prepare for the MYT Regime to be put in place by 1st April 2014. The state commission plans to introduce a MYT order for a control period of five years from FY 15 to FY 19.

## 6.4. TARIFF REVISION

The tariff revisions in the state have been very sporadic. The ineffective tariff revision in the state is one of the primary reasons for high level of gap between cost of supply and revenue realization. Further, the irregular revisions has led to sharp increase in tariff in the years where tariff is revised. The table below depicts the historical trend in historical revision in the state.

**Table XXVII-12: Historical Trend in Tariff Revisions - Uttar Pradesh**

	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	0%	20%	19%	n.a	n.a	9%	16%

Source: Approved Tariff Orders of DISCOM for that year

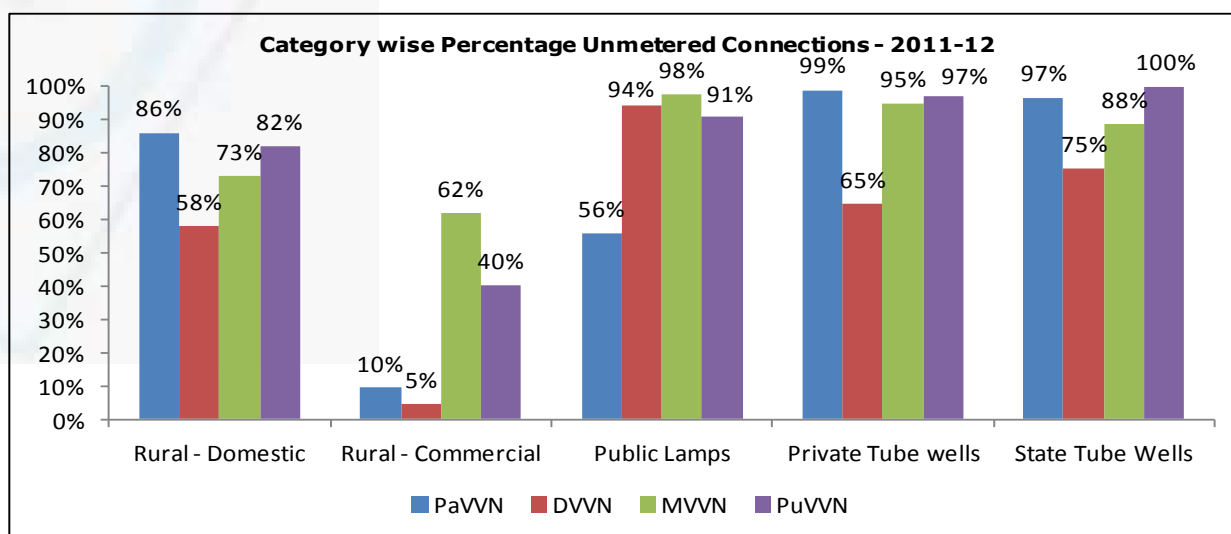
n.a – Not available in public domain

## 6.5. LEVEL OF METERING

The unmetered connections are provided to the rural BPL consumers, agriculture consumers and public lamps. In 2011-12, ~21% of the overall consumers were unmetered in the state. The figure below presents the category wise percentage un-metered connections in the state.

<sup>28</sup> Forum of Regulators

**Figure XXVII-12: Consumer category wise percentage un-metered consumers in 2011-12 – Uttar Pradesh**



Source: Tariff Order of the respective DISCOMs (FY 2012-13).

### 6.5.1. CONSUMPTION NORM – UN-METERED CATEGORIES

The state commission has approved a consumption norm for the above mention un-metered consumer categories. The table below depicts the consumption norm approved by the commission in 2012-13 tariff order.

**Table XXVII-13: Consumption Norm Un-Metered Categories**

DISCOM	Weighted Average Consumption Norm
Private Tube Well	91.66 kWh/KW
Domestic Rural Consumers	72.00 kWh/KW
Rural Commercial Consumers	72.00 kWh/KW
Rural State Tube Well	3562.35 kWh/consumer or pump
Public Lamps - Rural	300 kWh/KW
Public Lamps - Urban	360 kWh/KW

Source: Approved Tariff Order 2012-13 for the respective DISCOMs

### 6.6. OPEN ACCESS

Open access regulations were issued by UPERC 2004 as 'Open Access Regulations, 2004'. The present application status of open access consumers is not available.



## 7. SUMMARY

1. **High Levels of Subsidy:** The quantum of subsidy booked by the state DISCOMs have increased substantially compared to the increase in the cost to supply. This reiterates the high operational losses reported by the state DISCOMs.
2. **High Levels of AT&C Losses:** The state has continued to register high levels of AT&C losses. The decreasing levels of collection efficiency coupled with increasing electricity theft, especially by the unmetered consumers have pose a major challenge to the state DISCOMs. The utility needs to strengthen the existing mechanism to estimate the demand of the unmetered consumers.
3. **High level of dependency on the state funding:** The power sector in the state is highly dependent on the financial support provided by the state government. The state revenue generated by power sector forms a meager ~15% of the overall revenue expenditure made by the state government, towards the power sector.
4. **High Financial Gap:** The gap (with subsidy) continues to remain high, on account of high levels of AT&C losses, increasing power purchase costs and electricity thefts in the state. Further, the subsidy provided by the state government is not sufficient to cover the losses incurred by the state DISCOMs
5. **Decreasing PLFs of the state generating plants:** The average PLF of the state generating plant have continued to be lower than the national average. A low PLF as observed resulted in higher per unit fixed costs and increased purchase from short term market, further increasing the financial loss levels of the state DISCOMs.

**The overall financing requirements of the utilities places the state finances at a high risk.**

## XXVIII UTTARAKHAND

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

The state of Uttarakhand was, formed after reorganization of Uttar Pradesh in the year 2000.

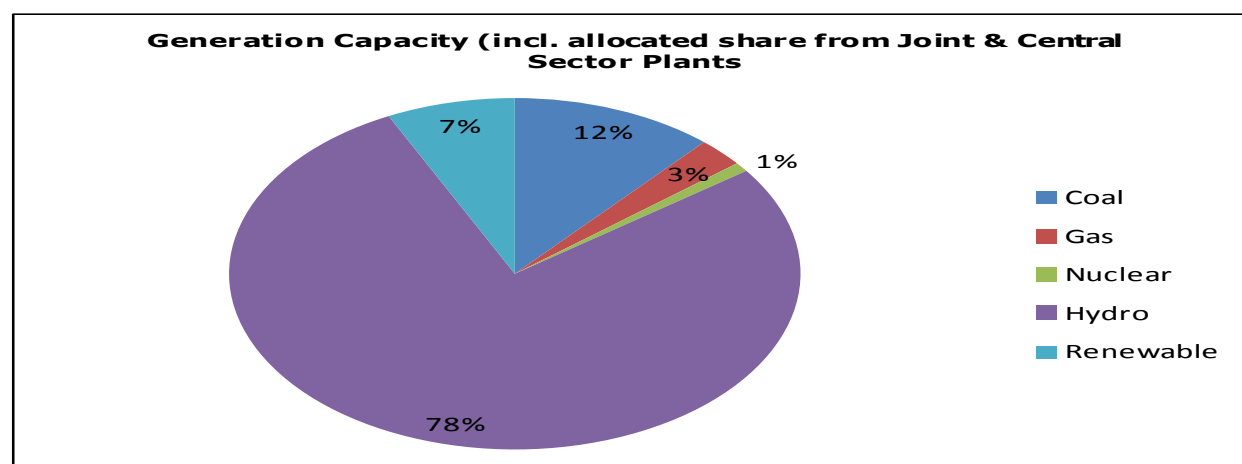
Consequent to the formation of the state,– Uttaranchal Power Corporation Limited (UPCL) and Uttaranchal Jal Vidyut Nigam Ltd.(UJVNL) were incorporated in 2001 pursuant to sub-section 4 of Section 63 of UP Reorganization Act 2000. Government of India transferred all assets located in the State of Uttaranchal to UPCL and UJVNL with effect from November 8, 2001. Subsequently, the transmission operations under UPCL were transferred to a separate transmission company, the Power Transmission Corporation of Uttarakhand (PTCUL) in 2005.

#### 1.2. GENERATION CAPACITY MIX

The total installed capacity in February 2014 (including allocated share in Joint & Central Sector plants) for Uttarakhand was 2,601 MW out of which Hydro based power capacity accounted for ~78% followed by Coal (~12% ) and Renewable (~7%). Diesel and Nuclear based capacity accounted for a combined share of ~4%.

Figure below presents the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXVIII-1: Generation Capacity Mix - Uttarakhand**

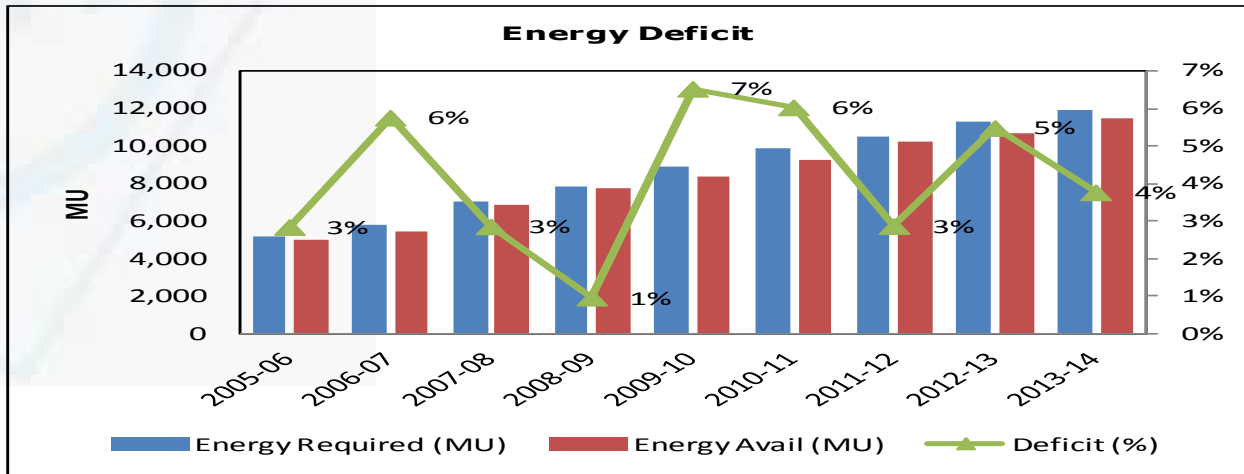


#### 1.3. POWER SUPPLY POSITION

Historically, the state of Uttarakhand has witnessed low levels of energy and peak deficit. The energy deficit in the state increased from ~1% in FY 08 to ~7% in FY 09. The energy deficit was ~4% in FY 14. Further, the peak deficit in the state has decreased from 14% in FY 06 to 0% in FY 14. This clearly indicates the capacity addition was sufficient to cover the marginal increase in peak and energy demand in FY 14.

The trend of energy deficit observed in Uttarakhand over the years is highlighted in the figure below:

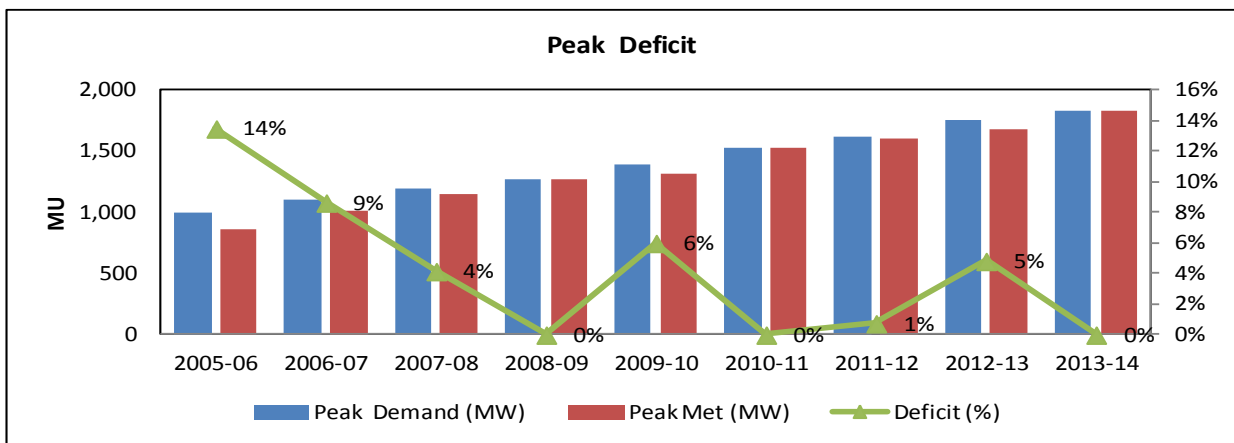
**Figure XXVIII-2: Historical Trend in Energy Deficit - Uttarakhand**



Source: CEA

The trend of peak deficit observed in Uttarakhand over the years is highlighted in the figure below:

**Figure XXVIII-3: Historical Trend in Peak Deficit - Uttarakhand**



Source: CEA

The above deficit levels in the state are expected to increase on account of latest Supreme Court ruling, which suspended any further expansion of hydro power plants in the state, on account of the floods that hit the state in June 2013.

## 2. ASSESSMENT OF OPERATIONAL PARAMETERS OF DISTRIBUTION UTILITIES

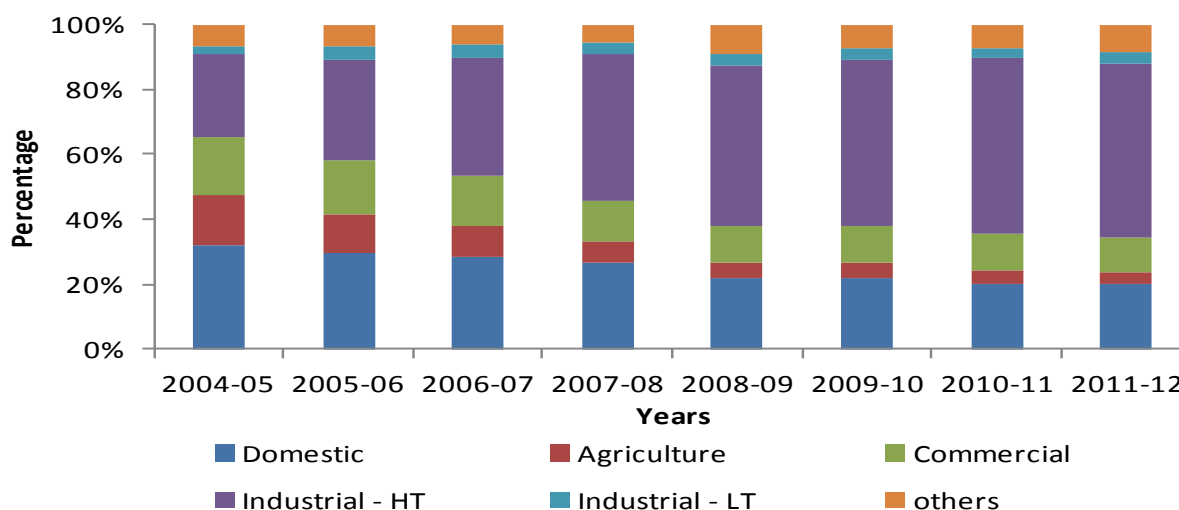
### 2.1. CONSUMER SALES MIX OF UTTARAKHAND

Uttarakhand Power Corporation Limited (UPCL) is the distribution company responsible for the distribution activity in the state of Uttarakhand. In 2011-12, the state DISCOM catered to more than 1.5 million consumers.

In 2011-12, industries share dominated the sales mix with a share of 57%, followed by domestic (20%) and commercial (10%) consumer categories. Further, agriculture had a marginal 4% share in the overall sales mix. The share of industrial consumers have increased significantly over the years on account of industrial policy followed by the state DISCOM that offers electricity to the industrial consumers at low tariffs.

The historical trend of consumer sales mix for the state is given in figure below:-

**Figure XXVIII-4: Historical Trend Consumer Sales Mix - Uttarakhand**



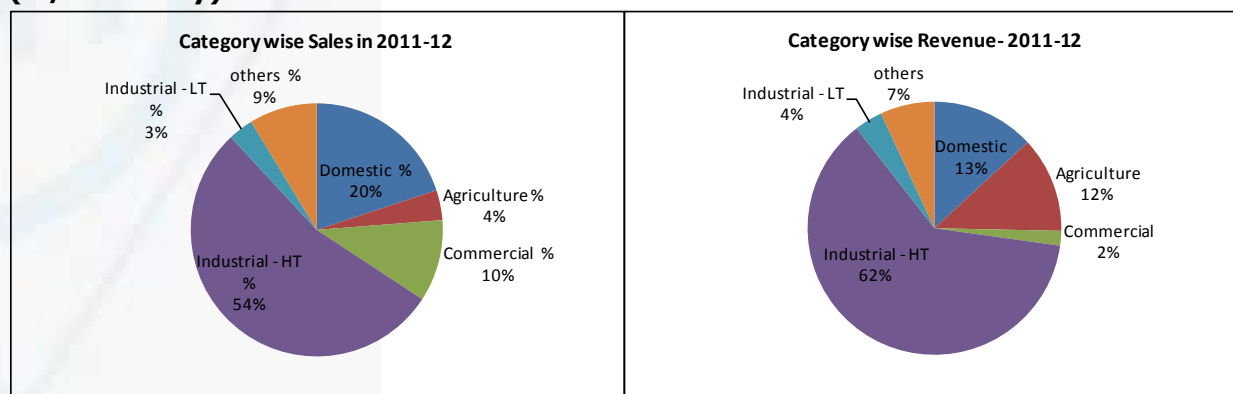
Source: PFC

The overall sales have registered a CAGR of 15% over the span of seven years wherein the sales of industrial category have registered a higher CAGR of 27%. The agriculture sales have reported a negative CAGR of 6% over the same period.

In terms of revenue contribution, industries contributed ~66% of the revenue, followed by domestic and agriculture categories with a share of 12% and 12%, respectively. This clearly indicates that domestic categories are heavily cross subsidized by the industrial categories.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXVIII-5: Comparative Analysis Consumer wise Sales and Revenue Mix (w/o subsidy) 2011-12 – Uttarakhand**



Source: PFC

## 2.2. TRENDS IN COMMERCIAL AND TECHNICAL LOSSES

The AT&C losses for Uttarakhand distribution utility have historically remained on a higher side compared to the national average. The loss level reported by the distribution utilities of Uttarakhand is in the range of 28% - 46% since FY 2006. The collection efficiency has remained on the higher side, in the range of 87% to 101%.

The technical losses (~15%) over the years have contributed majority portion of the AT&C losses in the state.

**Table XXVIII-1: Historical Trend AT&C losses and Collection Efficiency - Uttarakhand**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	46%	28%	36%	38%	40%	28%	28%	31%
Collection Efficiency (%)	89%	101%	92%	88%	90%	95%	91%	87%

Source: PFC

The above identification of the losses into technical and commercial losses is a good practice adopted by the state distribution utility. The primary reason cited for the high levels of technical losses is that the distribution network has not increased commensurate the increase in the demand, resulting in overloading of the distribution system.

## 2.3. TRENDS IN DISTRIBUTION COSTS

Power purchase cost accounts for majority of distribution cost, accounting for ~82% of the overall distribution costs.

The per-unit cost, break-up for different cost components for the state of Uttarakhand is provided in the table below:-

**Table XXVIII-2: Historical Trend in Distribution Cost Breakup - Uttarakhand**

Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.02	1.35	1.57	1.80	2.04	2.49	2.51	3.00
O&M (R&M + A&G + EC)	0.27	0.33	0.28	0.27	0.21	0.28	0.31	0.29

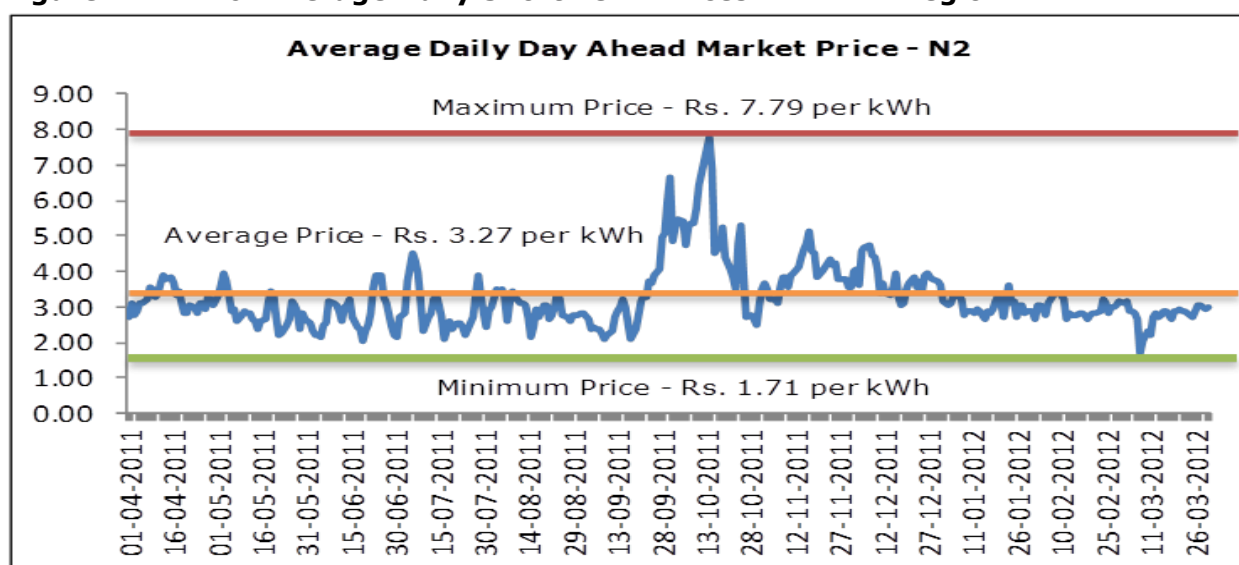
Cost Component (Rs. per kWh)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Interest	0.29	0.28	0.09	0.18	0.10	0.09	0.09	0.10
Depreciation	0.17	0.19	0.19	0.19	0.09	0.11	0.12	0.12
Other cost	0.07	0.00	-0.04	-0.27	0.06	0.18	0.14	0.15

Source: PFC

The power purchase cost has increased in recent years on account of reduced PLFs of the hydro based generation that constitutes ~78% of the generation capacity. Hence, in order to meet the increasing demand, the state DISCOM had to procure power from the expensive short-term markets.

The figure below illustrates the trend in short-term prices the year 2011-12.

**Figure XXVIII-6: Average Daily Short Term Prices IEX – N2 Region**



Source: IEX

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has increased commensurate to increasing power purchase cost. No tariff hikes were observed from FY 05 to FY 08 and tariffs were increased in FY 09 to FY 12 wherein tariffs were hiked in range of 17% to 3%. The table below depicts the average Tariff Realization in Uttarakhand in Major Consumption Categories

**Table XXVIII-3: Historical Trend in Consumer Wise Average Revenue Realization - Uttarakhand**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	1.70	1.65	1.69	1.82	1.77	1.90	2.30	2.37
Agriculture	0.89	0.95	0.95	0.93	1.32	1.38	1.55	1.75
Commercial	3.18	3.56	3.06	3.26	3.07	3.66	4.02	4.18

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Industrial HT	3.22	2.94	2.48	2.86	3.07	3.28	3.78	4.16
Industrial LT	4.18	2.67	2.77	2.69	3.94	3.32	3.91	4.04

Source: PFC

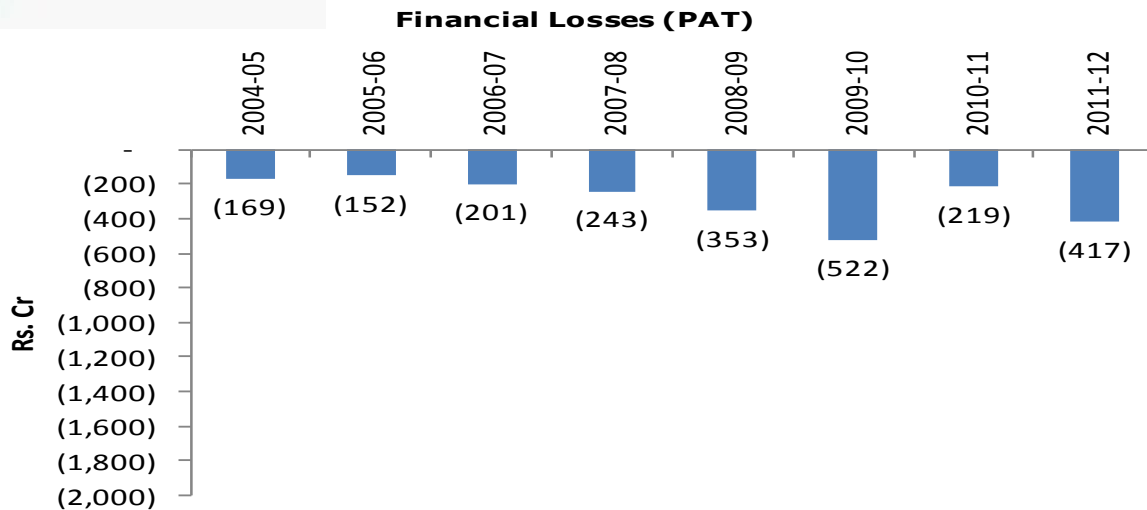
As per the industrial policy adopted by the state distribution utility, the industrial tariff in the state continued to be on the lower side from FY 05 to FY 10. However, with the increase in power purchase costs the tariff for industrial consumers have increased proportionately to the increase in cost to serve in the state.

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITIES

The distribution financial losses without subsidies in Uttarakhand have increased over the years. The figure below depicts the year on year trend in the profit/ (loss) booked by the state DISCOM

**Figure XXVIII-7: Historical Trend in Financial Losses (w/o subsidy) - Uttarakhand**



Source: PFC

The marginal increase in power purchase costs in the year FY 2010-11 coupled with tariff hike decreased the financial losses in that year.

#### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

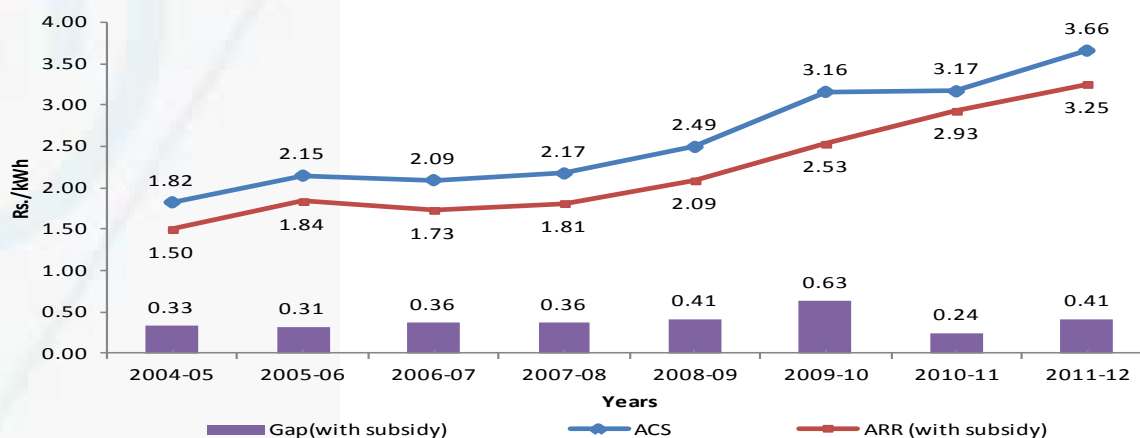
The state distribution utility has not booked subsidy over the years.

#### 3.3. ACS v/s ARR

The gap between average cost of supply and average revenue realized has remained high over the years. This is due to inadequate tariff revisions combined with the high levels of reported AT&C losses by the state distribution utility.

The figure below depicts the trend in revenue gap on per unit sale of electricity to the consumer



**Figure XXVIII-8: Historical Trend in ACS v/s ARR - Uttarakhand**

Source: PFC

## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The source of tax revenue is the electricity distribution tax, paid to the state government by the distribution utilities. The tax revenue from the power sector formed ~3% of the total tax revenue in the state in 2011-12. The details for the same are provided in the table below:

**Table XXVIII-4: Tax Revenue from Power Sector - Uttarakhand**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	2	2	229
Total Tax Revenue	5,109	6,866	8,482
Power sector Tax Revenue / Total state Tax Revenue	0.04%	0.03%	3%

Source: Audited C&AG Reports on state: 2011-12

The tax revenue from the power sector increased substantially from Rs 2 Cr in FY10 to Rs 229 Cr in FY12. The sector contribution in state tax revenue has remained a minimal share of less than 3% over the years despite the increase.

The non-tax revenue from power sector is through **Royalty/CESS on water for power generation, transmission and distribution, Rural Electrification etc.** The non-tax revenue, which is Rs 41 Cr, forms 4% of the total non-tax revenues of the state government in 2011-12. The details for the same are provided in the table below.

**Table XXVIII-5: Non-Tax Revenue from Power Sector - Uttarakhand**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Non-Tax Revenue From Power Sector	56	14	41

Total Non-Tax Revenue	632	678	1,136
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	8.88%	2.00%	4%

Source: Audited C&AG Reports on state: 2011-12

The non tax revenue from Power sector has a decreased from Rs 56 Cr in FY10 to Rs 41 Cr in FY12. Hence the contribution of the sector in state revenues has accordingly come down.

The overall revenue generated from the power sector increased from Rs 58 Cr in FY10 to Rs 270 Cr in FY12.

#### 4.2. EXPENDITURE ON POWER SECTOR

The details of the expenditure made on the power sector by the state in the year 2011-12 are provided in the table below:

**Table XXVIII-6: Expenditure on Power Sector - Uttarakhand**

Categories	2009-10	2010-11	2011-12
Rs Cr			
Capital expenditure	N.A	57	42
Revenue Expenditure	N.A	11	10
Total Expenditure	N.A	68	52

Source: Audited C&AG Reports on state: 2011-12, 2010-11, 2009-10

The Capital and Revenue expenditure incurred on the Power sector has decreased over the period of three years since FY10 primarily on account of lower investments in Hydel Generation and decrease in revenue expense on T&D.

Further, it can be observed that in 2011-12, the state power sector is self-sufficient with revenues from Power Sector far exceeding the expenditure made on state power sector.

#### 4.3. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES

The state government guarantees constituted a marginal ~12.35 % of the overall state revenue. The same has been depicted in the table below:

**Table XXVIII-7: Guarantees as a Percentage of Total Revenues - Uttarakhand**

Parameter	2009-10	2010-11	2011-12
Rs Cr			
Guarantees given by State Govt.	N.A	1,309	1,188
Total Revenues of the State	N.A	7,544	9,618
Guarantees as a %age of Total Revenues of State	N.A	17.35%	12.35%

Source: Audited C&AG Reports on state: 2011-12, 2010-11, 2009-10

The guarantees given to Power sector have decreased from the FY11 level i.e. 17.35% in FY11 of the state revenue to 12.35% in FY12.

The table below depicts the three year average share of different utilities in sector guarantees:

**Table XXVIII-8: Breakup of Utility wise Guarantee - Uttarakhand**

Utility	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Rural Electrification corporation	N.A	301	341	26%
Power Finance Corporation	N.A	1,008	847	74%

Source: Audited C&AG Reports on state: 2011-12, 2010-11, 2009-10

Over the span of three years, the guarantees provided by the state were majorly pledged towards loan taken from Power Finance Corporation.

In 2011-12, the share of Power Finance Corporation was the highest in State Guarantees for Power sector. The guarantee was given for Maneri Bali Project, i.e. towards Hydel generation. The remaining of 29% was essentially towards strengthening transmission infrastructure and rural electrification programme.

**Table XXVIII-9: Power Sector Subsidy as a Percentage of overall subsidies – Uttarakhand**

Particulars	2009-10	2010-11	2011-12	Average Share in Sector Subsidy %
Rs Cr				
Electricity	0	0	0.14	1%
Non Conventional Energy	3.2	3.1	3.42	99%
Power Sector subsidy (% of total subsidy)	3.2	3.1	3.6	3%

Source: Audited C&AG Reports on state: 2011-12, 2010-11, 2009-10

The share of Non Conventional Energy has been the highest in subsidy payments made towards Power Sector since FY10. Under this, the major share of sector subsidies went to Minor Hydro power. However, the subsidy granted to the power sector over the years has accounted for a nominal proportion of the total state subsidy.

#### **4.4. POWER BONDS**

Electricity bonds - The total outstanding amount as on 1<sup>st</sup>, April 2007 was Rs 514.8 Cr. The Amount outstanding at the end of 2011-12 was Rs 229 Cr. As per RBI 'State Finance

Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 110 Cr.

#### **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE'S ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

*The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.*

**Table XXVIII-10: Power Sector Financing Requirement (2011-12) – Uttarakhand**

Particulars	2011-12
	Rs Cr
Power Sector Expenditure (Capital and Revenue)	52
Loans And Advances made by the State Government ( Net of Recoveries)	44
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year (Net of Receipts)	57
Loans for Power Projects-T&D from the Central Govt. Discharged during the year ( Net of Receipts)	0
Total Power Sector Financing during the year	154
Sector Financing Requirement as a % age of total revenues of state	2%
GSDP nominal	58,561
Sector Financing Requirement as a % age of GSDP	0.26%
Financial Profit/ (Losses) of DISCOM during the year	(417)
Sector Financing Requirement as a % age of total revenues of state including financial losses of DISCOM	6%
Sector Financing Requirement as a % age of GSDP including financial losses	0.97%

*Source: State Government annual accounts from CAG, Data book for DCH - 22nd April, 2013, PFC Report on Utility finances – 2011-12*

The financing requirement for the Power sector in the state was estimated to be 2% of the revenue generated by the state and 0.26 % of the Gross State Domestic Product.

Considering the Financial losses of DISCOM in the year, the financing requirement of the sector increases to 6% of the State revenue and 0.97 % of the GSDP

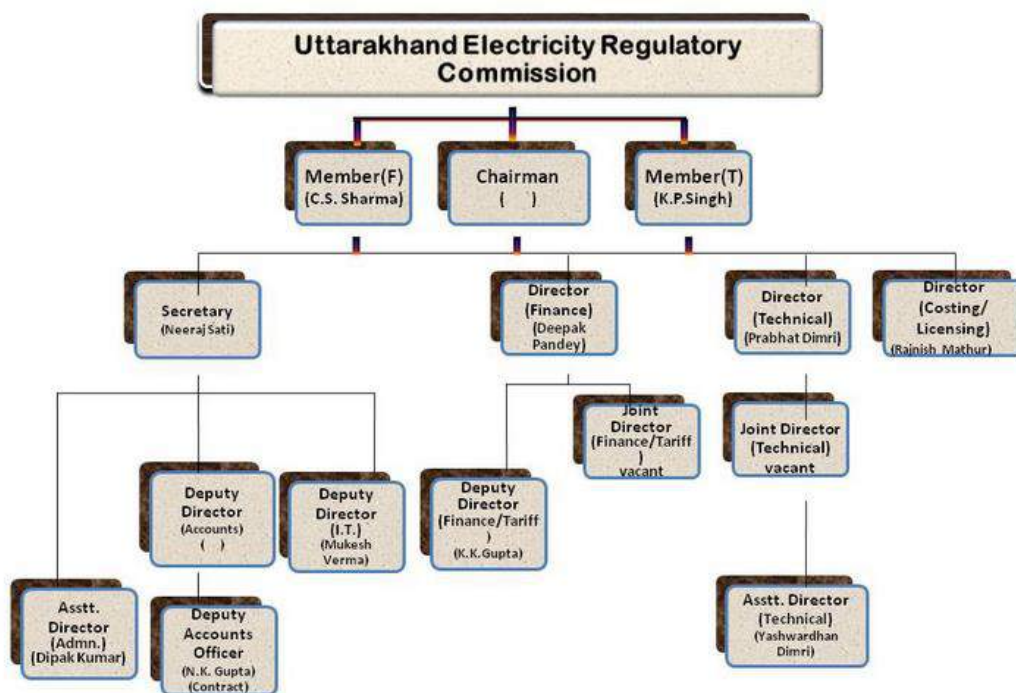
The sector as expected has a significant Discom loss. The losses increase the burden of the sector on the state (financing requirement) which otherwise is marginal relative to revenues of the state or GSDP.

## 5. REGULATORY EFFECTIVENESS

The Uttarakhand Electricity Regulatory Commission was constituted by Government of Uttarakhand, vide Notification 03/9-3- URJA/2002 dated 1st January, 2002 under the Electricity Regulatory Commission Act, 1998.

The figure below presents the current organization structure of UERC.

**Figure XXVIII-9: Organization Structure - UERC**



Source: UERC

### 5.1. BUDGETING

The information related to state budgeting is not available in public domain.

### 5.2. STAFFING

The office of the Commission consists of permanent employees besides officials on deputation and on contract basis. The total working strength of the Commission is 15 (including the chairman and members).

### 5.3. MYT REGULATION

The MYT has been implemented for the first control period. The commission had selected a control period of three years for the MYT (FY 2014-16). The focus of the MYT regulation is to reduce the prevalent high levels of AT&C losses along with attainment of 100% metering for correct assessment of the energy demand in the state.

#### 5.4. TARIFF REVISION

The tariff revision in the state has been regular from FY 09 to FY 13. The increase in tariff has been in the range of 3% to 17% from FY 09 to FY 14. Although, the high levels of AT&C losses have negated the impact of tariff increase on the state utility finances.

**Table XXVIII-11: Historical Trend in Tariff Revision - Uttarakhand**

	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13
Average Tariff Revisions	0%	0%	0%	14%	17%	3%	6%	6%

*Source: Approved Tariff Orders of DISCOM for that year*

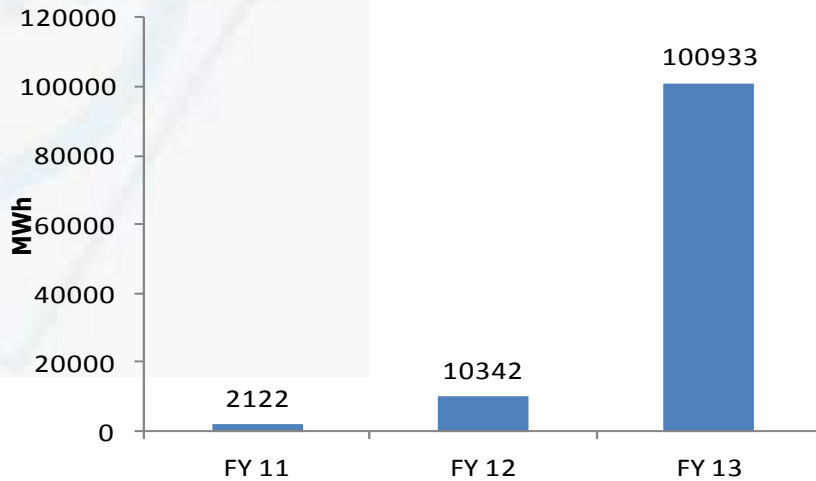
#### 5.5. LEVEL OF METERING

The two major consumer segments that continue to be unmetered by the state utility are domestic and tube-well consumers. In the year 2011-12, the commission recorded 24,610 unmetered consumers across the state, with more than 98% consumers metered.

#### 5.6. OPEN ACCESS

State Load Despatch Center of Uttarakhand has been mandated with dealing of open access function in the state. The number of registered open access consumers has increased from 20 in FY 2010-11 to 26 in FY 2013-14.

The figure below presents the trend in sale of power traded through Open Access from FY 11 to FY 13.

**Figure XXVIII-10: Trend in Quantity Traded through Open Access (FY 11 to FY 13) - UERC**

Source: Annual Report PTUCL

The regulator has had a positive impact on the operations of the distribution utilities, with important provision of the Electricity Act, 2003 and National Tariff Policy enacted by the state distribution utility like the MYT framework, 100% metering, regular tariff revision and sufficient staffing.

## 6. SUMMARY

1. **Level of Metering:** The distribution utility has achieved close to 100% metering, with domestic and tube-well consumers forming the residual unmetered connections in the state. The state utility aims to achieve 100% metering that would significantly improve the data aggregation in the state.
2. **Suspension of Hydro Generation Plants:** The Supreme Court in August 2013 suspended any further addition of hydro-based capacity in the state after the floods in June 2013. Further, the Court ordered a detailed study of the impact of the existing and under-construction hydro based power plants on the environment and ecology of the state. The above Court order would impact the hydro based capacity addition in the state that dominates the overall capacity mix in the state. The state distribution utility needs to explore the option of increasing the purchase of electricity from short term market to match the growing energy demand of the state.
3. **High levels of Technical Losses:** The state distribution utility has continued to report high levels of technical losses, even though industries (HT) contribute ~55% of the overall sales in the state.
4. **Financial Losses:** The high levels of AT&C losses reported by the state utility have resulted in financial losses in the state. The financial losses have increased over the years. Further, the state distribution utility does not subscribe to subsidies to reduce the loss levels.
5. **Financial Self Sufficiency:** The power sector in Uttarakhand is self-sufficient, with revenues from tax and non tax sources far exceeding the expenditure made by the state government towards the power sector.

**The sector operations pose a low risk on state finances. Although, the increasing levels of financial losses has affected the financial strength of the power sector in the state.**



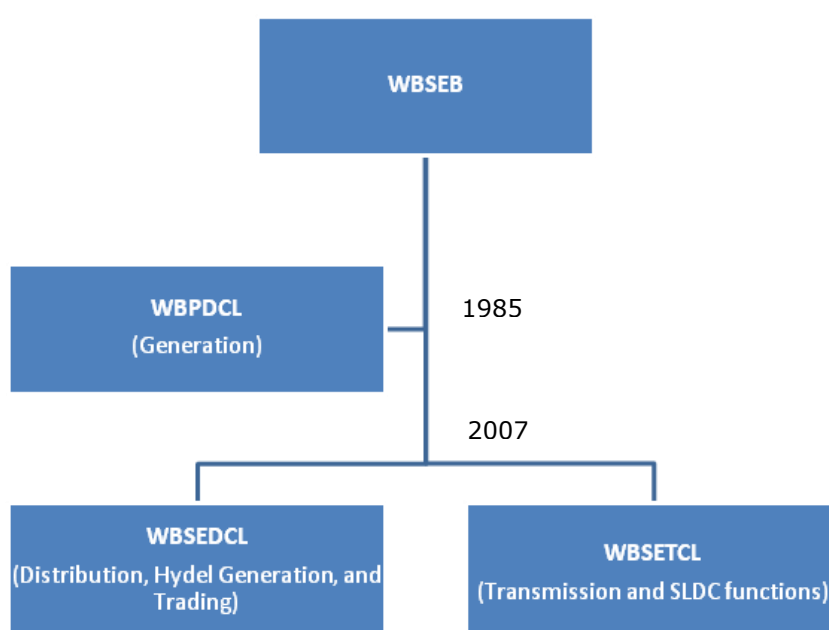
## XXIX WEST BENGAL

### 1. INTRODUCTION

#### 1.1. BACKGROUND – POWER SECTOR OVERVIEW

West Bengal State Electricity Board (WBSEB) was a state owned electricity board in West Bengal in India. It has now been restructured and split into two companies namely West Bengal State Electricity Transmission Company (WBSETCL) and West Bengal State Electricity Distribution Company (WBSEDCL). The split came into effect on 01.04.2007 under the provisions of West Bengal Power Reform Scheme, 2007.

**Figure XXIX-1: Power Sector Structure – West Bengal**



Source: WBERC

WBSEDCL is responsible for distributing power in the state of power at 33 KV level and below. West Bengal State Electricity Distribution Company Limited has come into effect from 01.04.2007 after restructuring of erstwhile West Bengal State Electricity Board in compliance of Electricity Act 2003. The State has three more DISCOMs namely, CESC Limited (CESC), Durgapur Projects Limited (DPL), Dishergarh Power Supply Company Limited (DPSCL).

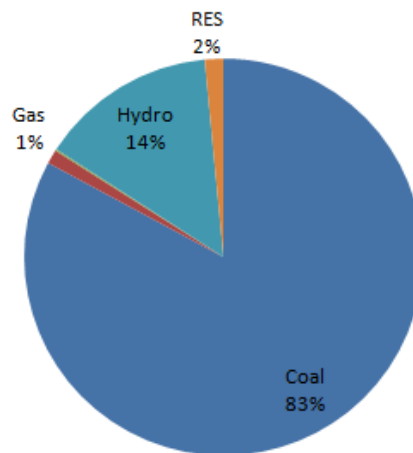
#### 1.2. GENERATION MIX

The total installed capacity as on February 2014 (including allocated share in Joint & Central Sector plants) for West Bengal was 8708.82 MW out of which 83% share is of Coal based generation followed by hydro based (~14%). Renewable and Gas based generation account for 2% and 1% share respectively.

Figure below highlights the generation capacity including allocated share in Joint & Central sector plants.

**Figure XXIX-2: Generation Capacity Mix - West Bengal**

Generation Capacity (in MW) including Allocated Shares in Joint & Central Sector Utilities



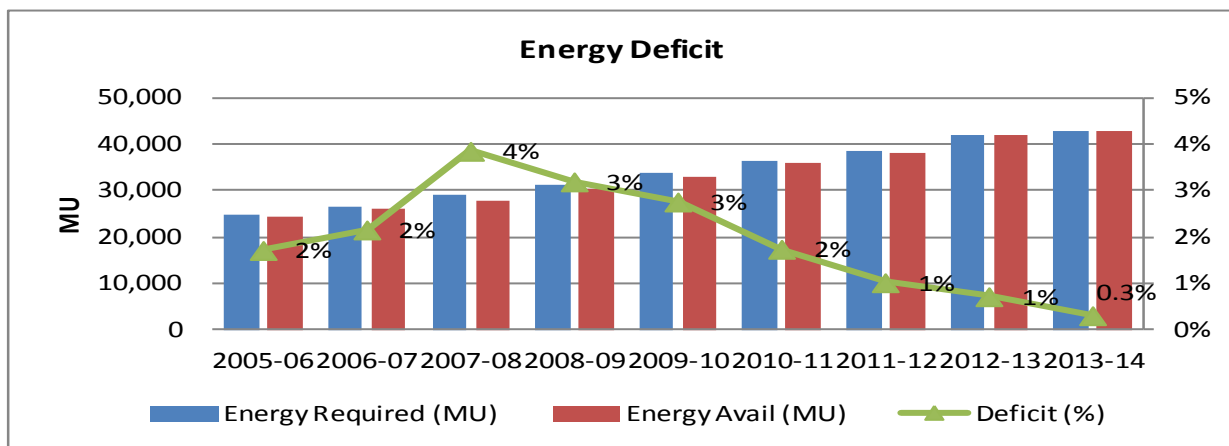
Source: CEA

### 1.3. POWER SUPPLY POSITION

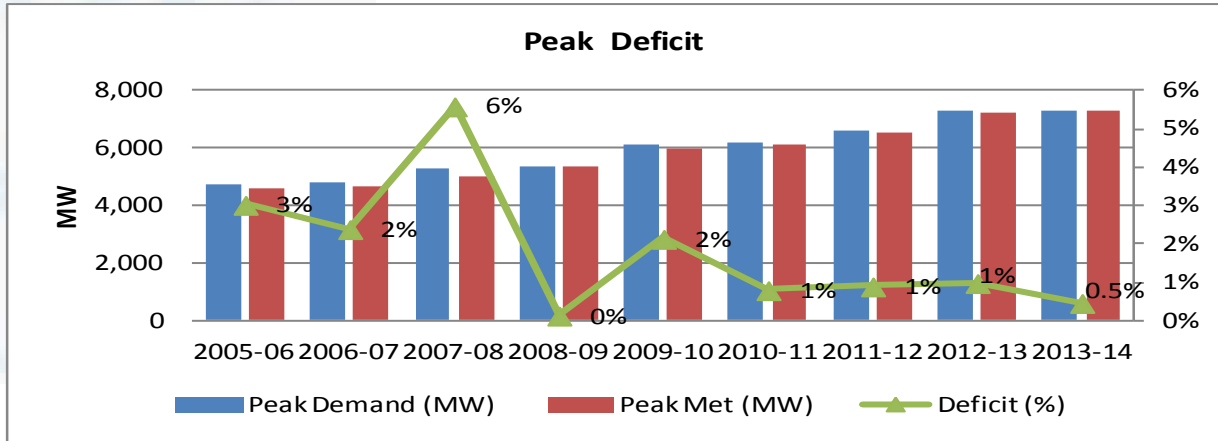
West Bengal has not been witnessing significant supply deficit. The demand supply situation is good in the state. The energy deficit has been ranging from 1% to 4% from the past 8 years. The energy deficit of the state was almost nil in FY 2013-14.

The Peak deficit has reduced from 6% in 2007-08 to 1% in 2012-13.

The trend of energy and peak deficit observed in West Bengal over the years is have been highlighted in the figure graph below:-

**Figure XXIX-3: Energy Deficit– West Bengal**

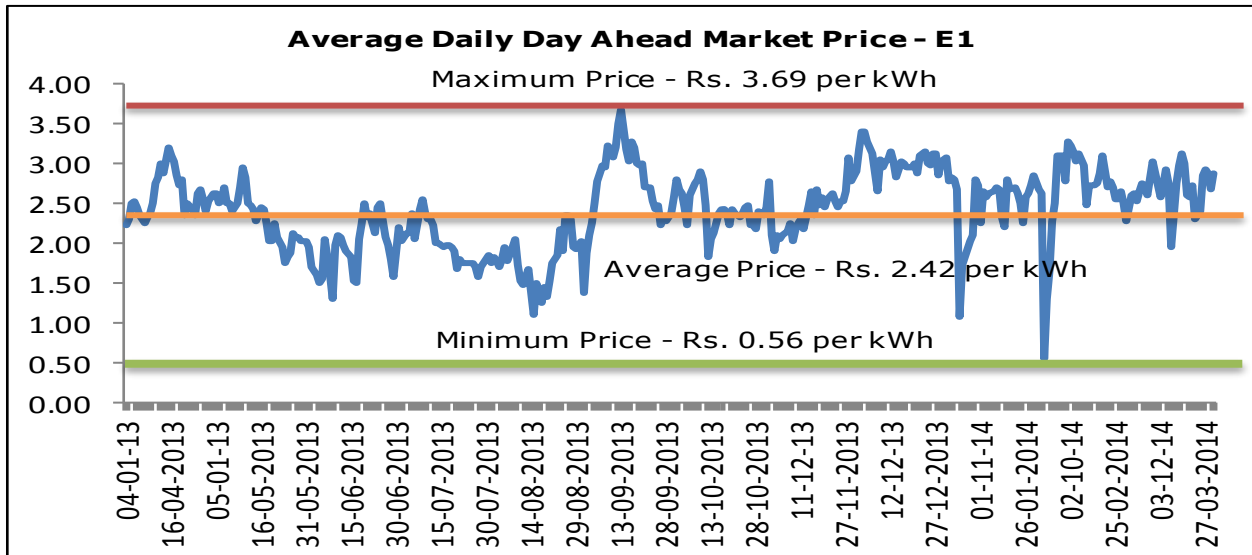
**Figure XXIX-4: Peak Deficit – West Bengal**



Source: CEA

This decreasing trend is likely to continue in the near future as the prices in the spot market have come down. The average daily day ahead market prices are less than the distribution costs for the previous years (discussed later in the report) in the state.

**Figure XXIX-5: Average Daily Day Ahead Market Prices E1 – West Bengal**



Source: IEX

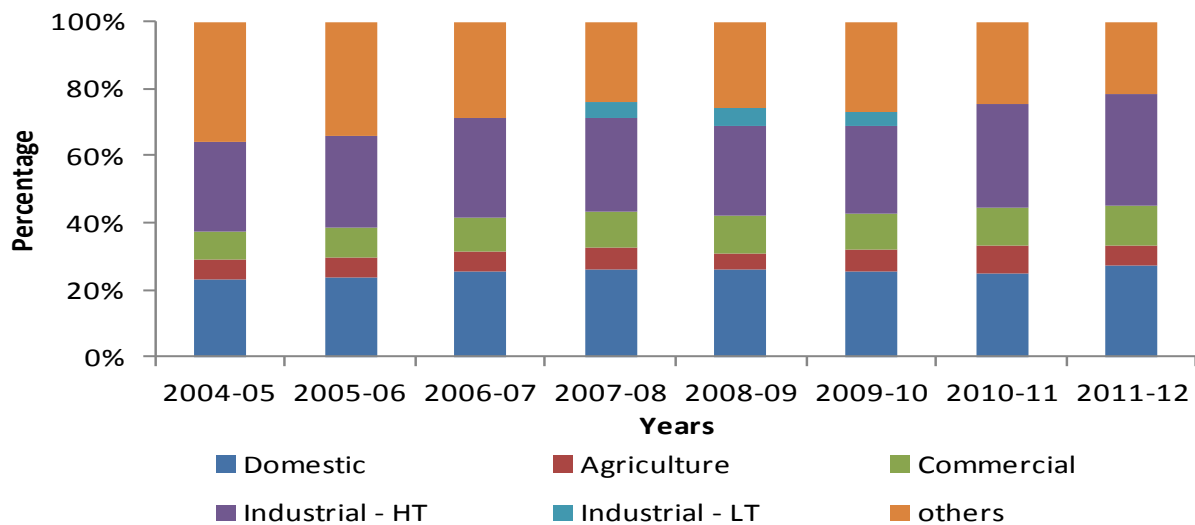
## 2. ASSESSMENT OF OPERATIONAL PERFORMANCE OF DISTRIBUTION UTILITIES

### 2.1. CONSUMER SALES MIX OF WEST BENGAL

WBSEDCL is a major power utility of the state with consumer strength over 1.35 crores, 5 zones, 17 regional offices, 64 distribution divisions and 483 customer care centers make up the backbone to the power distribution system of the state. It is divided into 5 zones: Kolkata, Burdwan, Midnapore, Berhampore and Siliguri.

The historical trend in the consumer sales mix for the state is given in figure below.

**Figure XXIX-6: Historical Trend in Consume Sales Mix - West Bengal**

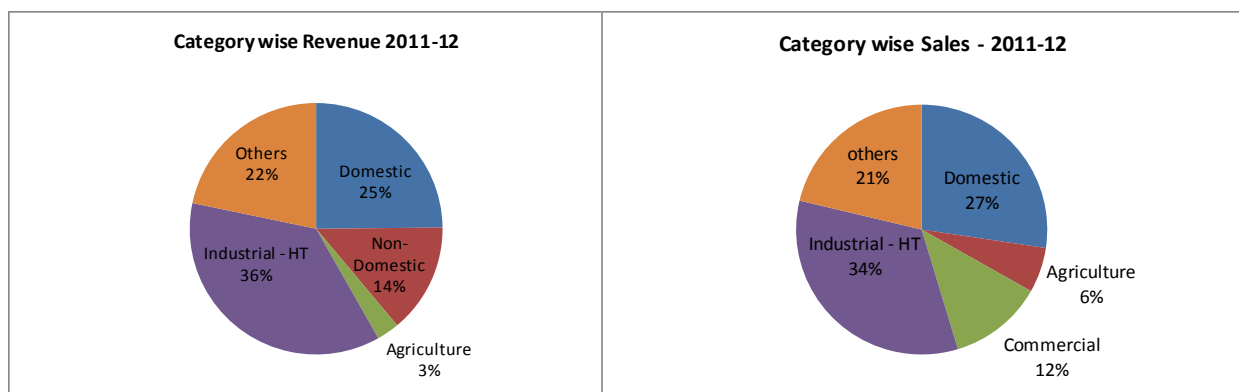


Source: PFC

The overall sales have registered a CAGR of 6% over the span of 8 years wherein the sales of commercial category have registered a highest CAGR of 11% followed by the industrial category with a CAGR of 10%.

The figure below compares the sales mix of FY 2011-12 and the revenue realized from the different category of consumers.

**Figure XXIX-7: Comparative Analysis of Consumer Sales and Revenue Mix in 2011-12 - West Bengal**



Source: PFC

Industrial consumption is high and contributes more than 34% of the total energy consumption. The "Other" category forms a considerable portion of the Sales Mix (21%).

In terms of revenue contribution, Industrial consumers account for 34% of the revenues followed by domestic consumers (27%). The Revenues from "Other" category is 22% even when it hardly forms a small portion of the total consumers. This is due to a significant Bulk Supply and Inter State Sale of power by the discom.

## 2.2. TRENDS IN COMMERCIAL & TECHNICAL LOSSES

The Aggregated Technical & Commercial (AT&C) losses for WBSEDCL have historically remained on a higher side compared to the national average. The AT&C for WBSEDCL were 33% in FY12 which have been the highest in last 8 years.

**Table XXIX-1: Year on Year Trend in AT&C losses and Collection Efficiency - West Bengal**

Year	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
AT&C Losses (%)	24%	28%	31%	23%	26%	33%	27%	33%
Collection Efficiency	109%	105%	98%	100%	99%	94%	100%	93%

Source: PFC

The collection Efficiency has varied over the years from above 100% to 93% in FY12.

## 2.3. TRENDS IN DISTRIBUTION COST

The power purchase cost forms the major cost component of distribution in West Bengal. The power purchase cost accounts for ~80% of the total distribution cost (FY05 to FY12).

The per unit cost distribution cost break-up for different cost components for the state of West Bengal as a percentage of total cost is provided in the table below:-

**Table XXIX-2: Year on Year Trend Distribution Cost Breakup - West Bengal**

Cost Component (Rs/KwH)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Power Purchase Cost	1.68	1.86	1.85	2.40	2.72	2.77	2.86	3.89
O&M (R&M + A&G + EC)	0.30	0.32	0.42	0.35	1.21	0.47	0.45	0.49
Interest	0.52	0.37	0.39	0.19	0.22	0.18	0.16	0.23
Depreciation	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other cost	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: PFC

WBSEDCL purchases energy from different sources like Central Generating stations, West Bengal Power Development Corporation Ltd, West Bengal Renewable Energy Development Authority (WBREDA) and other DISCOMs in the state like DPL, DPSC and CESC.

Power purchase requirement of WBSEDCL is mostly met with energy production of WBPDC (including some hydel generating stations), quantum and tariff of which has been approved by the Commission. WBERC allows recovery of increase in the fuel cost through FPPCA and takes into account while passing next year tariff order.

## 2.4. REVENUE REALIZATION

Tariff realization from different consumer category has not increased commensurate to increasing costs. The tariff revision took place in FY13 where it was increased 10%.

The table below shows the revenue realization (without subsidy) from different consumer categories over the years.

**Table XXIX-3: Year on Year Trend Consumer Category Wise Revenue Realization - West Bengal**

Years	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	2.64	2.67	2.69	2.76	2.74	3.31	4.07	4.85
Agriculture	1.08	1.50	1.48	1.21	1.68	1.41	1.46	2.63
Commercial	4.24	4.44	4.44	4.62	4.74	5.64	6.13	6.19
Industrial HT	3.98	4.02	3.94	4.15	4.19	4.60	4.82	5.83
Industrial LT				3.99	4.08	4.37		
Others	2.49	3.07	3.95	3.84	4.80	3.58	3.39	5.45

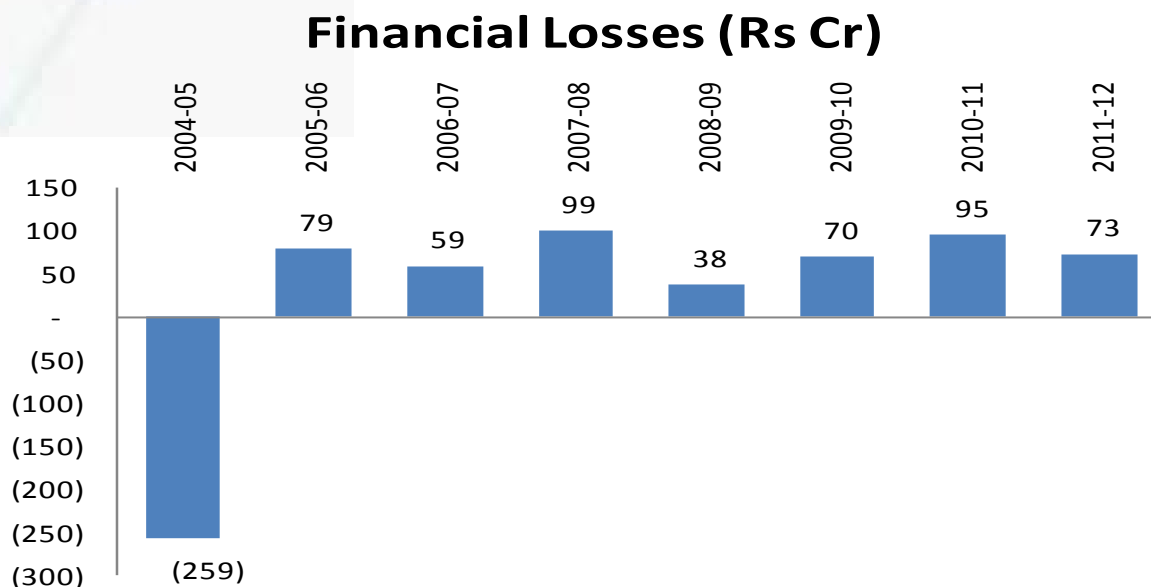
Source: PFC

### 3. ASSESSMENT OF FINANCIAL PERFORMANCE OF – DISTRIBUTION UTILITY

#### 3.1. FINANCIAL HEALTH OF DISTRIBUTION UTILITY

WBSEDCL has been in profits over the years except FY05.

**Figure XXIX-8: Historical Trend Financial Losses (w/o) subsidies – West Bengal**



Source: PFC

However, the state has huge regulatory assets. After releasing of existing regulatory asset and after adjusting a part of the amount to be recovered due to WBSEDCL's Annual Performance Review of 2009-10 and 2010-11 through this tariff order the balance amounts remaining as regulatory asset after the tariff order upto 2012 – 2013 are shown below:

SI No	Item	Amount (in Crores)	
A	1	Balance Regulatory Assets as per APR order of WBSEDCL for the year 2010-11	1255
	2	Part release of Regulatory Assets in the year 2011-12	455
	3	Part release of Regulatory Assets in the year 2012-13	18
	4	Part release of Regulatory Assets in the year 2013-14	65
		<i>Balance (1-2-3-4)</i>	<i>717</i>
B	<i>APR of 2009-10</i>	<i>1188</i>	
C	<i>APR of 2010-11</i>	<i>269.77</i>	
	<b>Total ( A + B + C)</b>	<b>2174.82</b>	

Source: WBERC Tariff Order dated 01.12.2012

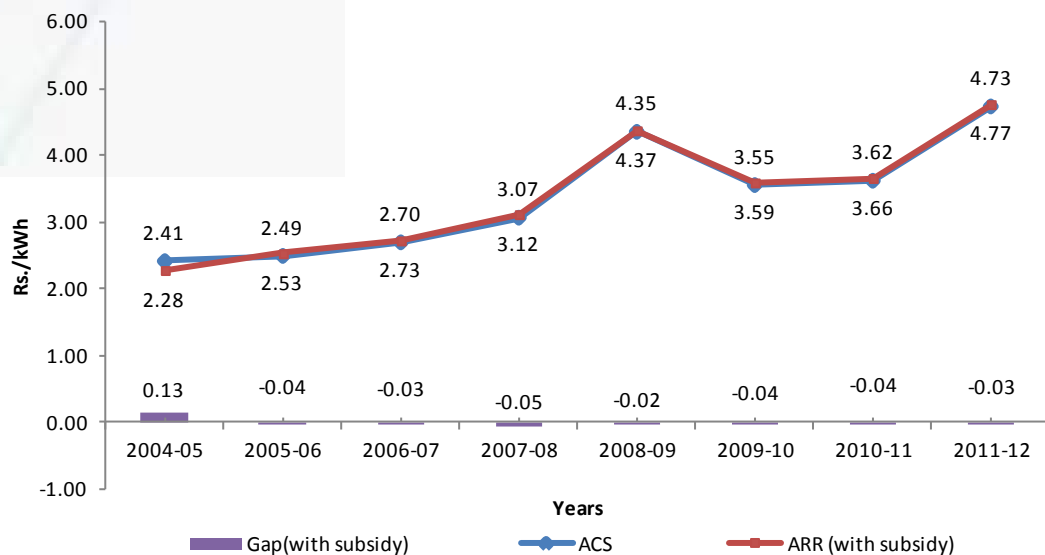
The above balance regulatory asset of serial number A and C of the above table is likely to be released in three years and regulatory asset of serial number B of the above table is likely to be released within five years after the completion of third control period.

### 3.2. SUBSIDY BOOKED V/S SUBSIDY RECEIVED

Since the utility has been in profits, no subsidies were given by the government in the last five years. The subsidy burden of the State Government has been nil over the years.

### 3.3. ACS v/s ARR

Figure XXIX-9: Historical Trend ACS v/s ARR (with subsidy) – West Bengal



Source: PFC

The discom has been able to recover its costs. Except FY05, the ARR has always been marginally greater than ACS.



## 4. STATE EXPOSURE TO POWER SECTOR

### 4.1. INCOME FROM POWER SECTOR

The tax income is majorly through electricity distribution tax, which is paid by the distribution utilities to the state government. The tax revenue from the power sector forms ~2% of the total tax revenue in 2011-12.

#### Tax revenue

**Table XXIX-4: Tax Revenues - West Bengal**

Revenue	2009-10	2010-11	2011-12
Rs Cr			
Tax Revenue from Power Sector	588	665	769
Total Tax Revenue	25,741	28,548	37,084
Power sector Tax Revenue / Total state Tax Revenue	2.28%	2.33%	2%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

There has been an increase in tax revenue from the power sector FY10 from Rs 588 Cr in FY10 to Rs 769 Cr in FY12. However, the contribution of sector in state tax revenues has come down to 2.07% in FY12 from 2.28%. As evident, the sector has contributed a marginal share in total state tax revenues.

The non-tax revenue from power sector is through **royalty/cess on water for power generation, T n D, Rural Electrification** etc. The Non Tax revenue which is only Rs 0.01 Cr forms an insignificant part of the total non-tax revenues. The details for the same are provided in the table below.

#### Non-tax Revenue

**Table XXIX-5: Non Tax Revenues - West Bengal**

Revenue	2009-10	2010-11	2011-12
RS Cr			
Non Tax Revenue From Power Sector	0	0	0.01
Total Non-Tax Revenue	4,966	2,438	2,380
Power sector Non-Tax Revenue /Total state Non-Tax Revenue	0.00%	0.00%	~0%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The sector has generated a nominal amount of the non tax revenue since FY10 and hence the contribution to state revenue has been very marginal.

In 2011-12, the Non-Tax revenue from power sector came from Diesel Gas Power generation.

**The overall income generated from power sector, increased from Rs 588 Cr in FY10 to Rs 769 Cr in FY2011-12.**

#### **4.2. EXPENDITURE ON POWER SECTOR**

The table below depicts the expenditure towards power sector by the state of West Bengal.

**Table XXIX-6: Power Sector Expenditure - West Bengal**

Categories	2009-10	2010-11	2011-12
			Rs Cr
Capital expenditure	1,090	190	45
Revenue Expenditure	8,438	209	283.08
Total Expenditure	9,528	399	328.08

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

The total expenditure has come down substantially over the period of three years since 2011-12. The capital and revenue expenditure incurred on power sector has decreased decrease in investments in thermal generation and lesser revenue expenditure as general expense.

**The Revenue generated from the Power sector has exceeded the Expenditure made on the sector in FY2011 and FY2012.**

#### **4.3. POWER BONDS**

The outstanding balance for Electricity Bond as on 1st April 2008, was Rs 1571.02 Crores. The outstanding balance at the end of 2010-11 was Rs 981.89 Crores. The details related to year of issue of bonds are not mentioned in the available CAG accounts.

As per RBI 'State Finance Report' 2014, the outstanding liability of Power Bonds in the state as on 31<sup>st</sup> March 2014 was Rs 390 Cr.

#### **4.4. ANALYSIS ON STATE GUARANTEES AND SUBSIDIES**

##### **Guarantees**

The table below depicts the Guarantees given to Power Sector relative to State Revenue.

**Table XXIX-7: Guarantees - West Bengal**

Particulars	2009-10	2010-11	2011-12
			Rs Cr

Guarantees given by State Govt.	1,856	1,590	1,534
Total Revenues of the State	30,707	30,986	39,464.18
Guarantees as a %age of Total Revenues of State	6.04%	5.13%	3.89%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

In 2011-12, the guarantees given towards Power sector were marginal compared to State revenue.

The table below depicts the share in Guarantees given by the state government to the Power Sector.

**Table XXIX-8: Share of Guarantees - West Bengal**

Utilities	2009-10	2010-11	2011-12	Average Share in Sector Guarantees (%)
Rs Cr				
Given to RBI for Power Sector	0	1,300	1,023	47%
For Repayment of share capital, dividend	1,856	290	267	48%
To Electricity board	0	0	240	5%
Others	0	0	4	0%

Source: Audited CAG Accounts for the state: 2011-12, 2010-11, 2009-10

In 2011-12, majority proportion of the guarantee was towards RBI, Other banks and Financial Institutions.

### **Subsidy**

In 2010-11, there were no Subsidy payments towards the Power Sector.

## **4.5. POWER SECTOR FINANCING REQUIREMENT RELATIVE TO STATE ECONOMY**

In this section, the expenditure (under all possible heads) on the power sector by the state government has been listed to determine the state Power sector financing requirement which is then compared to state finances.

The sector financing requirement is estimated as the summation of total expenditure of the state government on the sector including Capital and Revenue Expenditure, Loans and Advances (Net Of Recoveries) and Public Debt repaid (Net of Receipts) by the State Government.

**Table XXIX-9: Financing Requirement for the Power Sector (2011-12) - West Bengal**

Particulars	2010-11 Rs. Cr
Power Sector Expenditure (Capital and Revenue)	328.08
Loans And Advances made by the State Government	-270.73
8.5% Tax Free Special Bonds of the State Government (Power Bonds) disbursed during the year	241.84
Loans for Power Projects-T&D from the Central Govt. Discharged during the year	0
Total Power Sector Financing during the year	299.18
Sector Financing Requirement as a % age of total revenues of state	0.76%
GSDP nominal	3,18,871
Sector Financing Requirement as a % age of GSDP	0.09%
Financial Profit/(Loss) of Discom during the year (with Subsidy Realised)	95
Sector Financing Requirement (including financial profits of Discom) as a % age of total revenues of state	0.5%
Sector Financing Requirement (including financial profits of Discoms as a % age of GSDP	0.06%

Source: Audited CAG Accounts for the state

The financing requirement for the Power sector in the state was estimated to be 0.76% of the revenue generated by the state and 0.09 % of the Gross State Domestic Product.

Considering, the financial losses of Discoms in the year, the financing requirement of the sector decreases to 0.5 % of the State revenue and 0.06 % of the GSDP.

## 5. ASSESSMENT OF REGULATORY EFFECTIVENESS

The state of West Bengal demonstrated reasonable performance parameters even in the pre-reform period.

- WBSEB was making significant efforts to reduce transmission and distribution losses. The Board earned incentive under the APDRP scheme of the Government of India.
- Company was making cash profits due to its trading operations, and benefits of the same were also passed on to the consumers
- Consumer tariffs decreased both in real and nominal terms indicating efficiency gains (besides gains due to trading).

The reforms process was designed through extensive stakeholder consultant to ensure larger stakeholder buy in. In the post reform period, the State has focused attention on the need for efficiency improvement and internal reforms within the sector entities. Accordingly, both the transmission and distribution companies in West Bengal have embarked upon process of identifying the gaps in the current process and practices, and adopted best industry practice to address these specific gaps.

Distribution reforms in the West Bengal have been making satisfying progress – interface metering up to 11 kV has been completed with DTR metering also covered to a reasonable extent. Completion of consumer metering has been delayed mainly in agricultural segment. T&D losses have steadily declined over the last few years with improvement in the collection efficiency.

It has been observed WBERC is not financially dependent on the state government for meeting their expenditure. Also, WBERC has highest percentage of technical posts (72%) in the country (42 out of 58).

### 5.1. STATUS OF IMPORTANT REGULATIONS:

**Table XXIX-10: Status of Important Regulations - West Bengal**

Parameters	Compliance/Details
Formation of SERC	Yes
Unbundling	Yes
Corporatization of Utilities	Yes
Segregation of Trading function from Transmission	Yes
MYT framework Control Period duration	First control period = 1 year (FY 2007-08); Second control period = 3 years (FY 2009 to FY 2011); Subsequent control periods = 3 years (FY 2011-12 to FY 2013-14)
Regularity of Tariff Orders	Regular

Notification of Standards of Performance	Yes, only for Discoms
Notification of Grid Code	Yes
Enforcement of Renewable Purchase Obligation	Yes
Private Sector Participation	No
Establish Consumer Grievance Addressal Forum	Yes

### **5.2. STATUS OF OPEN ACCESS IMPLEMENTATION:**

WBERC first determined the Open Access Charges in transmission in 2006-07. WBERC determines the OA charges and notifies the same every year. Notification of Open Access Regulations, Determination of Surcharge, and Determination of Wheeling Charges – all these have been issued by WBERC.

### **5.3. FREQUENCY OF TARIFF REVISIONS:**

The tariff revision took place in FY13 where it was increased 10%. The table below provides the details of tariff revision in the state.

**Table XXIX-11: Tariff Revisions - West Bengal**

	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Average Tariff Revisions	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%

## 6. SUMMARY

1. **Tariff Hikes:** The ARR has been greater than ACS in the last 7 years ensuring cost recovery. The tariff revision had taken place in FY13 where it increased 10%.
2. **Financial Viability:** WBSEDCL has been in profits over the years except FY05. However to insure that, the tariff revisions should continue to take place in the state.
3. **Regulatory Assets:** The state has huge regulatory assets. After releasing of existing regulatory asset and after adjusting a part of the amount to be recovered due to WBSEDCL's Annual Performance Review of 2009-10 and 2010-11 through this tariff order the balance amounts remaining as regulatory asset after the tariff order upto 2012 – 2013 were 2174.82 Crores. This is a cause of concern going forward and the commission needs to reduce such regulatory asset rapidly so that its impact can be reduced fast and in future have small impact on tariff increase beyond 3<sup>rd</sup> Control Period though a part of regulatory release that shall continue in subsequent control periods.
4. **Subsidy:** The state government does not give any subsidy amount to WBSEDCL and that would not be expected to change as the Discom continues to be in profits.
5. **Past Financial Baggage:** The outstanding balance for Electricity Bond as on 1st April 2008, was Rs 1571.02 Crores. The outstanding balance at the end of 2010-11 was Rs 981.89 Crores.
6. **Operational Efficiency:** The cost of supply of Discoms has been increasing over the years especially due to the increase in power purchase costs. However, the Discom has always been in profits since FY06. The tariff revision needs to take place time to time to insure profitability in the coming years as well. AT&C losses have been high and were 33% in FY13. WBSEDCL needs to take significant initiatives to bring down these losses including introduction of high voltage distribution system; appropriate metering and billing of agricultural consumers; audit mapping; Spot billing facility for all categories of L & MV consumers etc.
7. **States Guarantees:** Guarantees given by the government to the Power sector have been ~4% of the Total Revenue generated by the state.
8. **Revenues from the sector to the state:** Total Revenue – tax and non-tax revenues (Rs. 770 Crores) from the Power sector is more (almost double) than the total expenditure on the sector (Rs. 328 Crores). The financing requirement for the Power sector in the state was estimated to be 0.76% of the revenue generated by the state and 0.09 % of the Gross State Domestic Product.

WBSEB and post unbundling WBSEDCL has turned in improved financial performance in the past few years due to better collection performance, and income arising from UI charges & trading. Of the above factors, income due to UI charges may not be recurring in the coming years. Hence the ability to constantly improve upon its operational efficiency parameters including reduction in losses etc and reduction in regulatory assets will be critical in ensuring that the financial improvement seen is sustained, especially if tariffs are not to increase in the state. Rightly, the power sector entities in the state in the post

reform period have focused on internal restructuring to improve their process and operational efficiency. On account of reforms as well as sale of surplus power, the state finances face low risk on account of power sector.