CRISIL
INFRASTRUCTURE
ADVISORY

Assessment of Various Renewable Energy Resources Potential in Different States, Determination of RPO Trajectory and its Impact on Tariff

Final Report

Date: 19th June 2010

FORUM OF REGULATORS

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LIST OF ABBREVIATIONS

CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CRIS	CRISIL Risk and Infrastructure Solutions Limited
CHP	Combined Heat and Power
FOR	Forum of Regulators
JNNSM	Jawaharlal Nehru National Solar Mission
MW	Mega Watt
MUs	Million Units
MWh	Mega Watt Hours
NAPCC	National Action Plan on Climate Change
NEP	National Electricity Policy
NPO	Non Profit Organization
PPC	Power Purchase Cost
REC	Renewable Energy Certificate
RECS	Renewable Energy Certificate System
REFIT	Renewable Energy Feed-in tariff
RPO	Renewable Purchase Obligations
RPS	Renewable Energy Portfolio Standards
SEB	State Electricity Board
SERC	State Electricity Regulatory Commission
TWh	Tera Watt hours
TREC	Transferable Renewable Energy Certificate
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework Convention on Climate Change
IPCC	Intergovernmental Panel on Climate Change
IEA	International Energy Agency

EXECUTIVE SUMMARY

Background

The existing share of renewables in total electricity is around 3.9% in 2009-10. This has been achieved owing to continuous focus and support from the Government, Central Electricity Regulatory Commission (CERC), Forum of Regulators (FOR), State Electricity Regulatory Commissions (SERCs) and the other supporting bodies like MNRE and IREDA. The need for promoting renewable energy is also recognized and stipulated in the Electricity Act.

Pursuant to the provisions of the Electricity Act, the Forum of Regulators have stipulated that the SERCs shall fix minimum percentage of purchase of power from such sources taking into account the availability of renewable sources in the region and its impact on the retail tariff. As on date, sixteen SERCs have specified the Renewable Purchase Obligations (RPO) for their licensee distribution companies and have also notified regulations or orders pertaining to determination of tariff of RE sources of generation based on different technologies.

Further, the National Action Plan on Climate Change (NAPCC) has recommended increasing the share of renewable to 10% by 2015 and 15% by 2020. Similar target has been mentioned by Forum of Regulators in its Policy on Renewables. In order to achieve these targets and to set RPO trajectories for coming years, it is critical to assess the RE potential available in the country and the various challenges that are required to be addressed.

This report provides scenarios for RPO trajectory based on availability of Renewable Energy (RE) sources, target suggested by NAPCC, operationalisation of REC mechanism and the impact on tariffs. It also highlights the key challenges and bottlenecks that might be required to be addressed for step increase in the growth.

RE Potential and Existing RE Scenario

The available RE potential in the country is estimated to be approximately 85000 MW for non solar renewable sources[1]. For Solar, the available potential estimate varies as per different studies/ reports. However, the most accepted figure for solar potential available in India is 'more than 100,000 MW'. The available potential for solar and non-solar renewable potential thus together works out to be more than 185 GW; and against this only 17220 MW (approx) capacities have been installed so far. The gap between the available potential and the installed capacity is huge and provides an excellent opportunity to harness more RE based power.

[1] Source: MNRE Annual Report 2008-09

Potential and Installed Capacities for various RE sources

Source	Potential (MW)	Installed (MW)	Gap (MW)
Wind Power	45195	11807	33388
Biomass	16881	1097	15784
Small Hydro	15000	2735	12265
Cogeneration	5000	1456	3544
Waste to Energy	2700	111	2589
Solar power	>100000	14	-
Total	**84776**[2]	**17220**	**67570**[2]

Supply and Availability Scenario of RE sources till 2015

The expected RE capacities to come up in next 5 years have been estimated based upon discussion with various state renewable energy agencies [like Maharashtra Energy Development Agency (MEDA), Gujarat Energy Development Agency (GEDA), Tamil Nadu Energy Development Agency (TEDA), etc], industry and market players (like Suzlon, Moser Baer, etc. who provided an estimate of projects in pipeline) and the direction and focus set by the Government regarding renewables (as mentioned in NAPCC and National Solar Mission). Based on these, in next 5 years the RE capacities in India could increase to approx 2.5 to 3 times its existing level. This means approx 27500 to 32500 MW RE capacities are expected to come up, taking the total installed RE capacity figure to the range of 45000- 50000 MW.

The majority of additional RE capacity could come from Wind which is expected to add 17000-20000 MW in next 5 years. The next most contributing source would be solar which is expected to add 4000- 6000 MW in next 5 years. This estimation is based on likely capacity additions on account of both- capacity additions due to JNNSM initiatives as well as due to capacities likely to come in the states (like Gujarat, Rajasthan, Tamil Nadu, Karnataka and Maharashtra) with the State Government's initiatives. Apart from these 2 sources, cogeneration, biomass and small hydro power are together expected to add approx 5500-6500 MW in next 5 years. Needless to state, meeting these figures would require continuous support and focus from various institutions to overcome challenges being faced in the development of RE projects.

Concentrated RE potential in select states

Another key aspect related to supply of RE based power is the concentration of RE potential (and hence RE capacities- both existing as well as those likely to come up) in certain key states. For instance, most of the wind potential is available in states like Tamil Nadu, Karnataka, Gujarat, Andhra Pradesh, Maharashtra, Rajasthan, Madhya Pradesh and Kerala. There are also states like Chhattisgarh, Uttarakhand and Himachal Pradesh where there is moderate RE potential (primarily SHP). Remaining states have very little

[2] Excluding Solar

RE potential. The states mentioned above having high or moderate RE potential will be the ones who would drive the development of RE power in coming years. Some of these states like Tamil Nadu and Karnataka are already meeting their RPO levels of 10%. This would further get an impetus with the REC mechanism in place. However, there are few key challenges related to the extent to which RE based power can be developed in such states. The key challenges are:

- To what extent RE power (specifically wind) could be installed in certain states like Tamil Nadu and Karnataka considering its infirm nature. It is noted that in Spain, more 40% of capacity comes from wind power. They have devised mechanism of forecasting, which to an extent, is able to overcome the infirm challenge.
- Besides, with the REC mechanism in place, a regional level forecasting of RE sources and targets/transfer of RE power could be considered.
- Other form of RE technologies like biomass based stations could provide stability and increase the overall Capacity Utilization Factor (CUF) of RE technologies.

Renewable Energy Certificates (REC) Mechanism

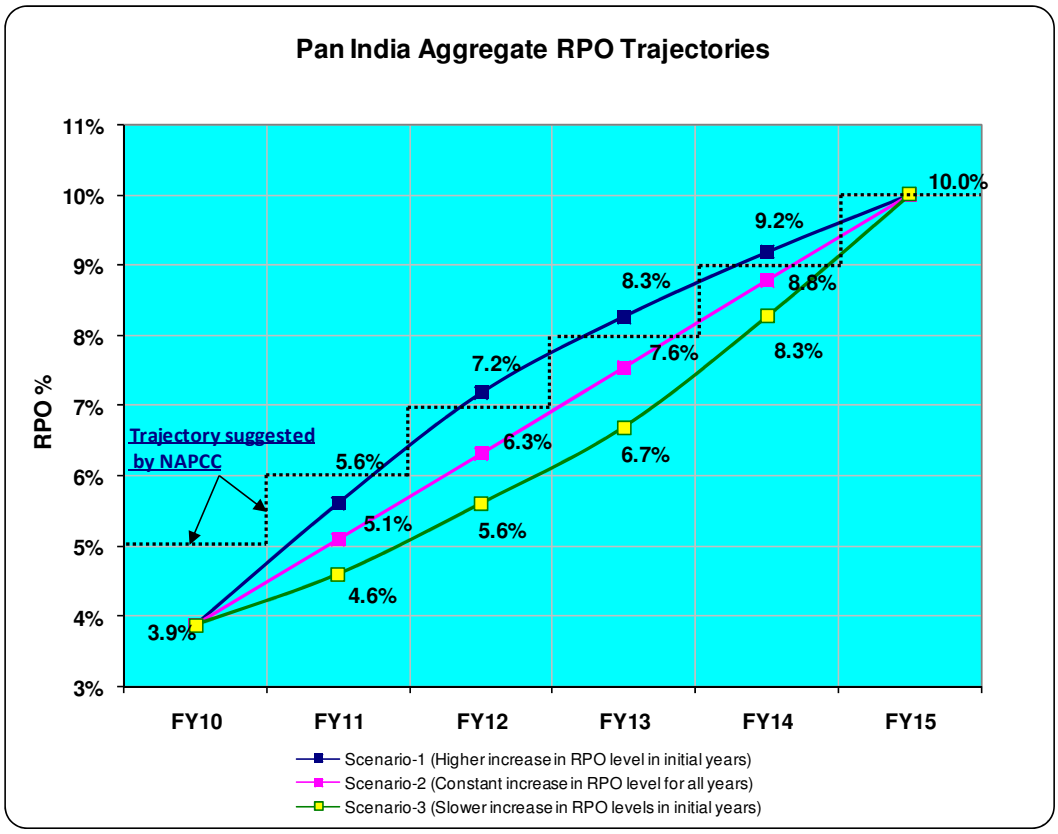
As mentioned earlier, RE potential is state specific. Some states have abundant RE potential where as others are deficient. However, the states which are harnessing more RE based power are also bearing the impact of cost of RE power. To avoid this effect of state specific availability/ lack of RE potential, REC mechanism provides an excellent tool to ensure that all states contribute in the development of RE based power. This mechanism is under implementation and will facilitate RPO compliance in those states too where there isn't sufficient RE potential/ capacity.

Scenarios for RPO trajectories

Various scenarios for RPO trajectories have been analyzed in the report. Proposed RPO trajectories is reflecting the target set out in the NAPCC which suggests RPO level of 5% for 2010 and then 1% increase in RPO level every year (i.e. 10% for 2015 and 15% for 2020). Considering these as target RPO levels to be achieved, 3 scenarios for RPO trajectories have been considered.

- Scenario-1: Higher increase in RPO levels in initial years
- Scenario-2: Same increase in RPO levels for all years
- Scenario-3: Slower increase in RPO levels in initial years

Figure 1: Pan India Aggregate RPO Trajectories



For each of these scenarios, likely impact and incremental impact on PPC have been computed. Also, pan India aggregation of RPO levels across different states have been done to ensure that sufficient RE capacities would exist to facilitate meeting RPO targets.

Varying RPO trajectory for each state has been suggested in the report. This is based on the RE potential & availability in respective states, existing levels of RPO compliance, and the impact on tariffs of various RPO levels in these states. For example, in state like Tamil Nadu RPO level of 14% is suggested by the end of 2015, whereas, 7% target is set out for Delhi to be achieved during the same period. The North-Eastern states- Arunachal Pradesh, Manipur, Mizoram, Nagaland and Sikkim as well as the Union Territories have been grouped taking into account the geographical similarities and other aspects relevant to the study.

The analysis shows that in order to meet 10% RPO level by 2015, approx 45482 MW of RE capacities would be required. This requirement is within the figure of projected RE capacity of 47220 MW by FY2015. Thus, proposed RPO level of 10% by 2015 is achievable.

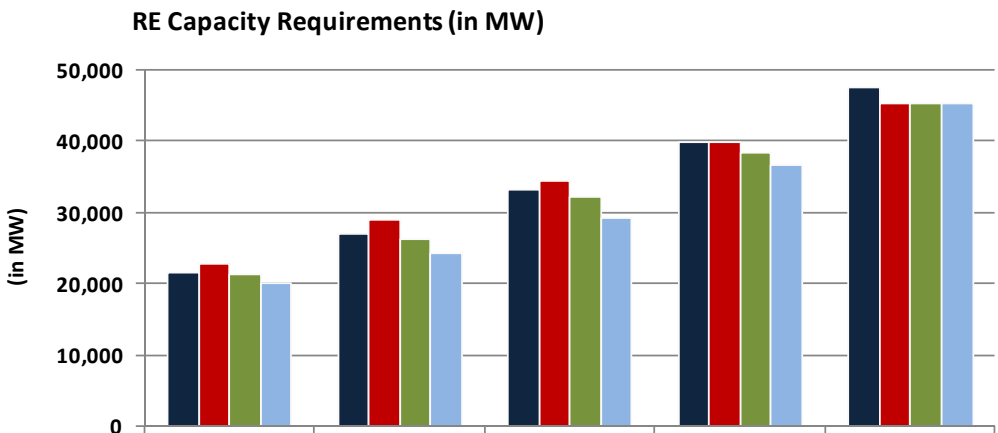
However, the 2 related critical factors are:

- CERC has come out with norms for determination of tariffs for various RE technologies. SERC are required to take cognizance of these norms and revise the rates appropriately.

- States are required to provide further thrust to increase the installed capacity of biomass based generation. As compared to other RE technologies, this provides firm power option that can generate higher PLF. The increasing cost of biomass fuel poses a challenge to Biomass based power developers[3]. Besides, there has been increased demand and usage of biomass fuel by other industries like captive power plants, small boilers and brick kiln. This has resulted in reduced supply and increased cost of biomass fuel. Limiting number of biomass plants in a designated area as well as limiting usage of biomass in other industries would be critical.

Comparison of the 3 scenarios

Figure 2: Year-wise RE capacity requirements for the 3 scenarios



	FY11	FY12	FY13	FY14	FY15
Likely RE capacities	21769	27100	33177	39903	47720
RE capacity requirement- Scenario-1	22936	29058	34507	39967	45482
RE capacity requirement- Scenario-2	21485	26448	32210	38552	45448
RE capacity requirement- Scenario-3	20161	24335	29373	36692	45406

The above figure shows the RE capacities requirement for the 3 scenarios. It is observed that for FY15 the likely RE capacity is expected to be 47720 MW against the requirement of 45482 MW to achieve 10% RPO level. However, it is also observed that during the initial years, the RE capacities requirement for scenario-1 is more than the likely RE capacities for respective years. This leads to exclusion of Scenario-1 to be specified as the pan India RPO trajectory. For both scenario-2 and 3, it is observed that the RE capacities requirement is well within the likely RE capacities for each year.

Between scenarios-2 and 3, it is suggested that states should go for scenario-2. The reason being the fact that relatively higher RPO level during the initial years would stimulate more capacities to be set up at the

[3] Tariffs are fixed based on particular assumed cost of biomass, whereas, cost of biomass fluctuate with the market conditions (including use of biomass by other industries).

sites with higher CUF (i.e. lower RE tariff). It is expected that the site selection for additional RE capacities would move from the best sites (initially) to comparatively inferior sites (in later years). Correspondingly, the CUFs for new RE capacities would gradually decrease over the period. This, in turn, would lead to increasing RE tariff over the period. Consequently, the impact on PPC would be more in case of higher RPO increase in later years (i.e. scenario-3). This gets corroborated by the findings of the study which highlights higher impact on PPC in case of scenario-3 than that for scenario-2.

Impact on PPC

For each of the 3 scenarios, the incremental impacts of varying levels of RPO on the PPC have been analyzed for each state as well as for pan India level. This analysis has been done using the latest RE tariffs as specified by CERC. Thereafter, the time value of the impact has been calculated taking the discount factor as 9.35% which is the same one as specified by CERC for bid evaluation for procurement of power by distribution licensees.

		FY11	FY12	FY13	FY14	FY15
Discounted impact on PPC						
Scenario-1	P/unit	8.1	9.3	10.0	10.0	9.6
Scenario-2	P/unit	7.1	8.1	9.1	9.6	9.7
Scenario-3	P/unit	6.5	7.3	8.3	9.1	9.8
Discounted incremental impact on PPC						
Scenario-1	P/unit	2.4	1.2	0.7	0.0	-0.4
Scenario-2	P/unit	1.5	1.0	1.0	0.5	0.1
Scenario-3	P/unit	0.9	0.8	0.9	0.9	0.6

The key takeaway from the Impact Analysis is:

- For Scenario-2 (equal increase in RPO for all years), which is suggested as the suitable RPO trajectory for adoption, the incremental impact on the PPC is 1.5 paisa per unit for the first year and it gradually decreases to 0.1 paisa per unit in FY15 at pan India level. State-wise maximum incremental impact on PPC is up to 4.2 paisa per unit.

Based on the detailed calculations, it is observed that the impact on tariff is not substantial and could be accommodated by the State utilities. It is noted that in some states the impact of inclusion of RE could be relatively higher than other states. This would be typical case for states which have fuel resources and therefore the cost of conventional energy is comparatively on the lower side.

Impact on Average Cost of Service

The impact on Average Cost of Service due to inclusion of renewables takes into account the partial differentiation of impact on PPC on the average cost of service i.e. keeping the other variables constant. This in turn implies the effect of change of base in energy units in computation of PPC and Average Cost of Service. The calculation is based upon the loss level in energy units as 28% and discount factor of 9.35%.

		FY11	FY12	FY13	FY14	FY15
Discounted impact on Av cost of service						
Scenario-1	P/unit	11.2	12.9	13.9	13.9	13.3
Scenario-2	P/unit	9.9	11.3	12.7	13.4	13.5
Scenario-3	P/unit	9.0	10.2	11.5	12.7	13.6
Discounted incremental impact on Av cost of service						
Scenario-1	P/unit	3.4	1.7	1.0	0.0	-0.6
Scenario-2	P/unit	2.1	1.4	1.4	0.7	0.1
Scenario-3	P/unit	1.2	1.1	1.3	1.2	0.9

From the above table, it is observed that the incremental impact on the average cost of service for the suggested scenario-2 is 2.1 paisa/unit for FY11 and gradually decreases to 0.1 paisa/unit for FY15. Thus, the impact on average cost of service is not substantial and could be accommodated by the State utilities

1 INTRODUCTION

1.1 Forum of Regulators

The Forum of Regulators (FOR) is a statutory body constituted by the Government of India under Section 166 (2) of the Electricity Act, 2003. The forum is responsible for harmonization, coordination and ensuring uniformity of approach amongst the Electricity Regulatory Commissions across the country, in order to achieve greater regulatory certainty in the electricity sector.

FOR has been taking steps towards ensuring that the provisions in the Electricity Act and the policies i.e. National Electricity Policy (NEP) and the Tariff Policy are well implemented. The responsibility of promoting cogeneration and generation of electricity from renewable sources has been entrusted on the Electricity Regulatory Commissions in India. Pursuant to the provisions of the act, the policy stipulates that the Appropriate Commission shall fix minimum percentage of purchase of power from such sources taking into account the availability of renewable sources in the region and its impact on the retail tariff.

1.2 Renewable Purchase Obligation

In the context of direction set by Electricity Act and the policies, some State Electricity Regulatory Commissions (SERCs) have specified the Renewable Purchase Obligations (RPO) for their licensee distribution companies and have also notified regulations pertaining to determination of tariff of RE sources of generation based on different technologies. Specified RPO vary across the states. Besides, the FOR Working Group on Policies on Renewables has recommended that State Commission should specify a minimum of RPO of 5% by 2010 in line with National Action Plan on Climate Change (NAPCC).

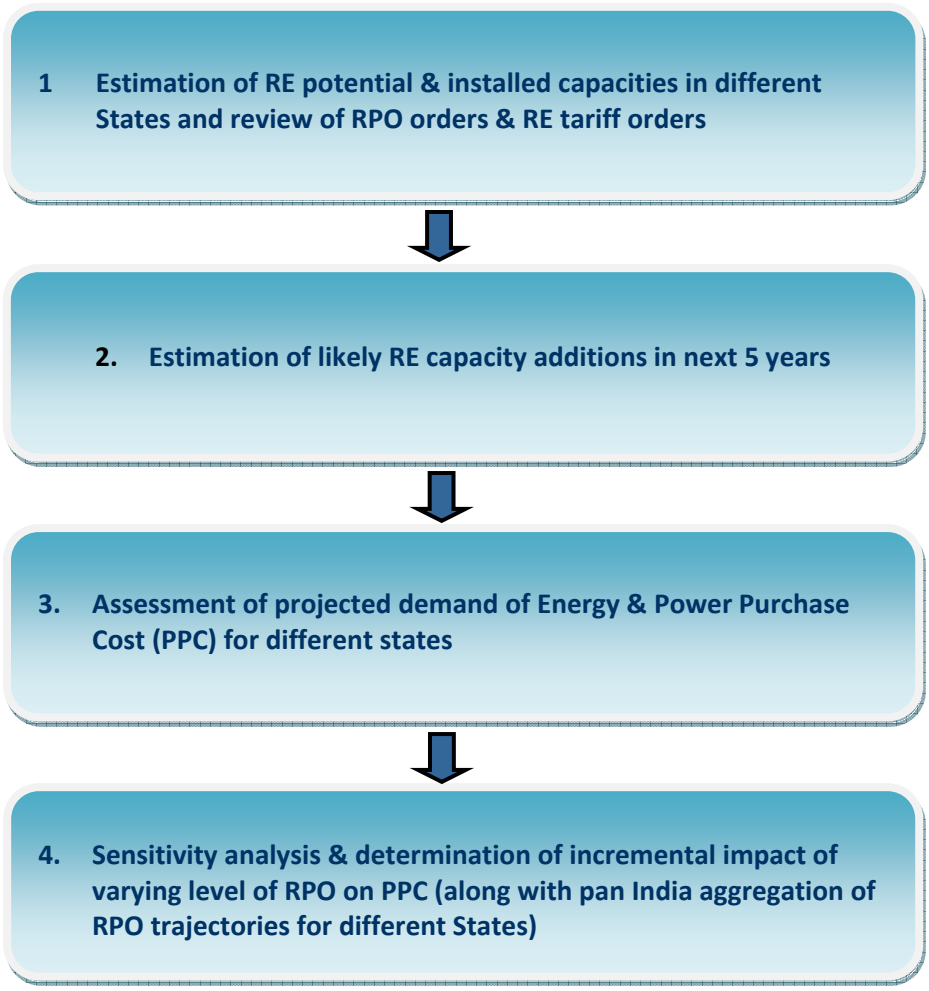
1.3 Objective of the study

In the context of generation of electricity from RE sources, there is wide divergence of potential of various RE sources in different states. Also, there is wide divergence in the tariff of different technologies being used for RE based electricity generation and its impact on the retail tariffs. Considering these, the objective of this study is to assess the feasible renewable energy potential in different states to enable setting the possible RPO trajectories and its likely impact on tariff.

2 FRAMEWORK & METHODOLOGY ADOPTED

The flow diagram of the methodology used for the study is as shown below.

Figure 2: Flow Diagram of the methodology used for the study



The various building blocks as shown above are discussed below.

2.1 Assessment of Existing RE Scenario

- **Estimation of RE potential and installed capacities in different states**

  The RE Potential for each state has been determined on the basis of authenticated data/reports available with various agencies such as MNRE, IREDA, Renewable Energy Departments of State Governments, Research Institutes and organizations in the country (like Centre for Wind Energy Technology, Biomass Resource Atlas of India, etc) and the industry experts.

➢ **Assessment of existing RPO Scenario**

Assessment of existing RPO scenario is based on the review of RPO orders issued by respective SERCs. This takes cognizance of the proposed time frame of regulation/ orders. The assessment includes observations/reasoning in these orders in facilitating increased generation of RE based power along with actual RPO compliance for the base year (2008-09).

➢ **Assessment of RE Tariff**

As next step, assessment of tariffs for each RE technology is based on tariff orders issued by respective SERCs. The RE tariffs for respective state have been used in calculation of impact of inclusion of RE on PPC. Wherever tariffs have been provided for multiple years, the same has been considered for calculations.

2.2 Estimation of likely RE capacity additions in next 5 years

- The expected RE capacities to come up in next 5 years have been estimated based upon discussion with various state renewable energy agencies [like Maharashtra Energy Development Agency (MEDA), Gujarat Energy Development Agency (GEDA), Tamil Nadu Energy Development Agency (TEDA), etc], industry and market players (like Suzlon, Moser Baer, etc. who provided an estimate of projects in pipeline) and the direction and focus set by the Government regarding renewables (as mentioned in NAPCC and National Solar Mission). This has been supplemented through secondary data available from websites of various agencies/institutions such as MNRE, IREDA, SERCs, and Research Institutes (like The Energy and Research Institute, Centre for Wind Energy Technology, Biomass Resource Institute, etc), along with data from CRISIL's in-house data base.

2.3 Assessment of the Projected Demand of Energy and Power Purchase Cost (PPC) in different States

➢ **Assessment of Projected Demand of Energy**

The projected demand of energy for different states has been derived from 17th Electric Power Survey of India (EPS). Actual figure has been taken for the base year 2008-09. For further years (till 2014-15), the figures have been projected based at growth rate as per 17th EPS.

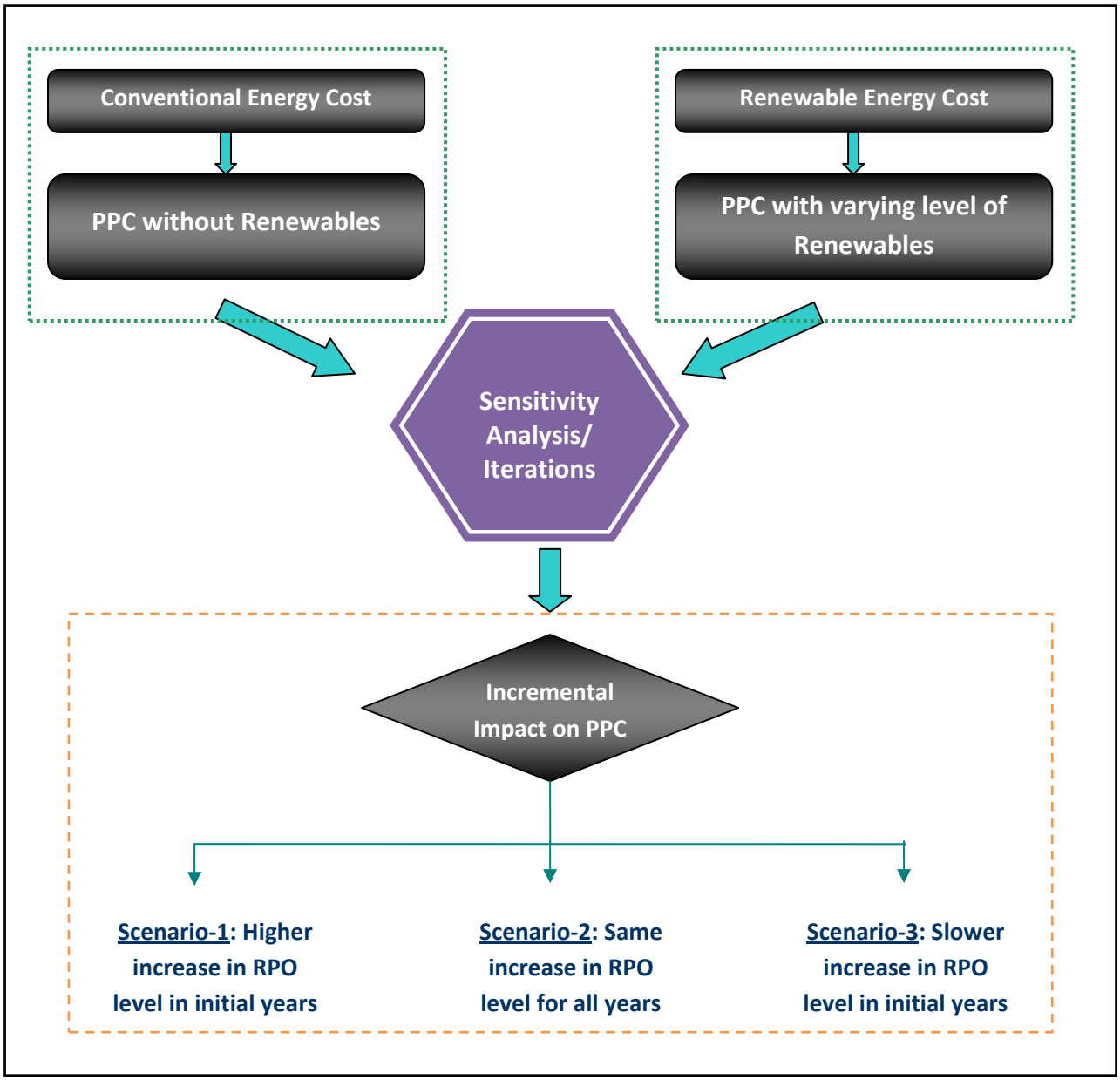
➢ **Estimation of projected Power Purchase Cost and Retail Tariff**

Estimation of projected Power Purchase Cost (PPC) from conventional sources is based on actual PPC for the base year (2008-09). For further years, the PPC has been derived taking into consideration the escalation (CAGR) in conventional energy tariff. This has been corroborated by analysis of the tariff petitions filed by the Distributions Licensees as well as the tariff orders passed by SERCs. These projections are for next five years starting 2010-11.

2.4 Sensitivity Analysis and determination of incremental impact of varying levels of RPO on PPC

This module determines the impact of RE power purchase on the Power Purchase Cost. The model used for the analysis is as shown below.

Figure 3: Framework used for analysis



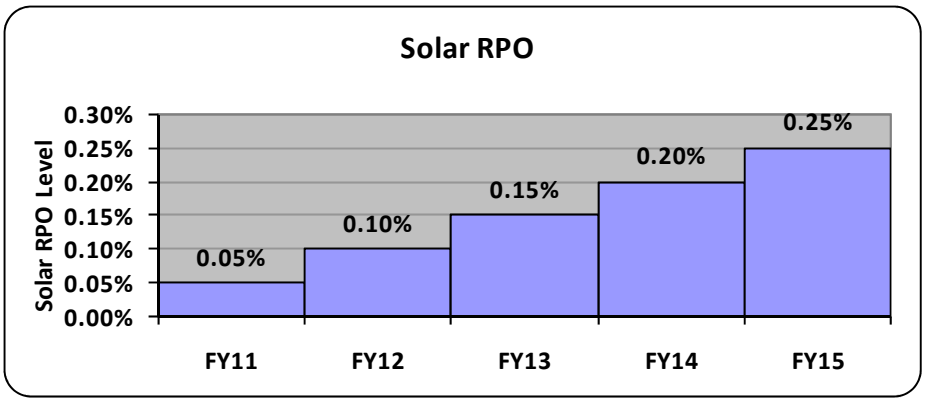
- **Impact of varying level of RPO on PPC and Sensitivity Analysis**

  The impact on the PPC has been calculated as the difference between PPC with RE and PPC without RE. A sensitivity analysis is then conducted by varying the level of the RPO to understand its impact on the total power purchase cost for different states.

- **Solar and Non Solar RPO**

The analysis has been done for the varying level of RPO which has 2 components- Solar RPO and the Non Solar RPO. However, the iterations have been done only with the varying levels of non solar RPO and keeping the solar RPO constant. This is because of the reason that presently the share of solar in RE power is miniscule and how much it will contribute in coming years will depend on the multiple factors including the thrust provided by the Government as well as the interest and participation of the power developers. For the time being, small level of solar RPO (as mentioned below) has been considered for calculation of impact on PPC.

Figure 4: Solar RPO Levels considered for analysis



- **Incremental impact on PPC for various scenarios of RPO trajectories**

For each State, the incremental impact on PPC has been determined for 3 scenarios.

Scenario-1: Higher increase in RPO level in initial years

Scenario-2: Same increase in RPO level for all years

Scenario-3: Slower increase in RPO level in initial years

Also, the actual RPO attainment level for base year 2008-09 has been considered for calculations. For year 2014-15, the RPO level has been considered as suggested in the National Action Plan on Climate Change and the Recommendations of Forum of Regulators, which says overall RPO of 5% in 2010 and then progressive RPO increase of 1% every year.

- **Pan India aggregation of RPO levels for different States**

After calculating the incremental impact on PPC for 3 scenarios for each State, pan India aggregation of RPO levels for different States has been done to calculate the incremental impact on PPC on pan India basis. This also facilitates a reality check in terms of RE capacity that would be required to meet the RPO levels vis-à-vis likely RE capacities for next 5 years.

3 KEY CONSIDERATIONS / FACTORS

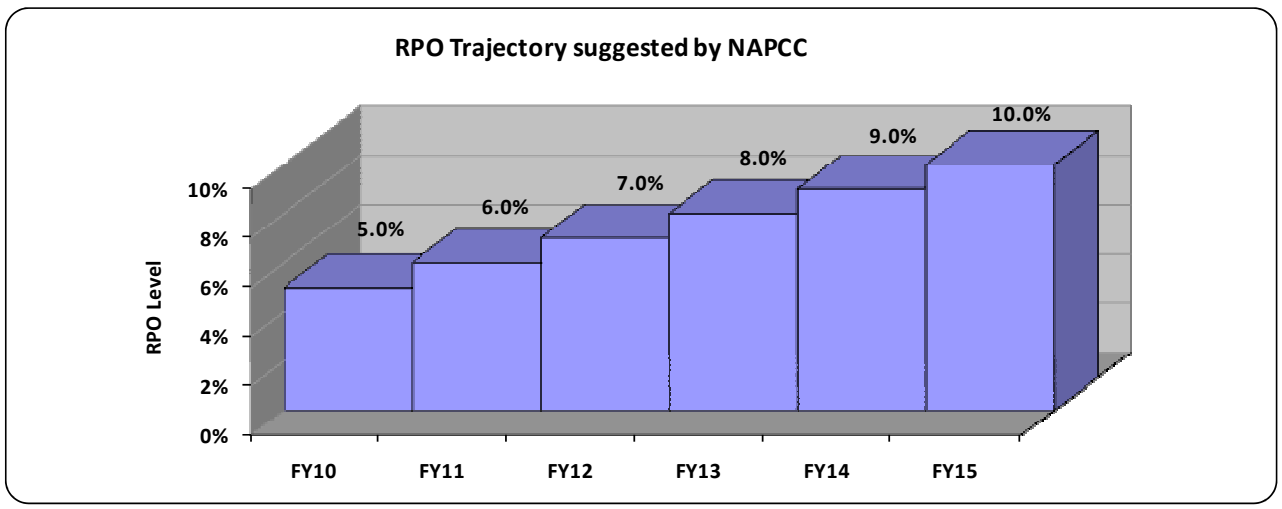
There are certain guiding factors that envelop the setting up of likely RPO trajectories. These factors pertain to the objectives of the Government with respect to Renewables and subsequent policies, regulations, recommendations and facilitating mechanism like Renewable Energy Certificates (REC) mechanism. These factors and their brief overview are as mentioned below.

3.1 National Action Plan on Climate Change (NAPCC)

The National Action Plan on Climate Change (NAPCC) was released by the Prime Minister of India on 30th June 2008. It outlines a national strategy that aims to enable the country adapt to climate change and enhances the ecological sustainability of India's development path. The key points of NAPCC regarding renewables are as mentioned below:

- Focus on promoting understanding of climate change, adaptation and mitigation, energy efficiency and natural resource conservation. Mitigation comprises of measures to reduce the emission of Green House Gases (GHG) by switching to renewable sources of energy.
- One of the 8 National Missions outlined in the NAPCC is the National Solar Mission which lays the path of development of Solar Energy sector in India. The objective of the National Solar Mission is to significantly increase the share of solar energy in the total energy mix.
- It recognizes the need to expand the scope of other renewable and non-fossil options such as nuclear energy, wind energy & biomass.
- One of the key messages in the NAPCC is the Dynamic Minimum Renewable Purchase Standard (DMRPS or the RPO). It suggests RPO to be 5% starting 2009-10 and to increase by 1% each year for 10 years.

Figure 5: RPO Trajectory suggested by NAPCC



- NAPCC also talks about tradable Renewable Energy Certificates (RECs). This mechanism is presently under implementation and is expected to be operational in the coming financial year 2010-11. The REC mechanism provides an option wherein the renewable based energy can be sold in two components separately- electricity component & the green attributes component. This provides an effective way to counter the issues of state/ region specific abundance/ deficiency of renewable potential.

3.2 FOR Recommendations

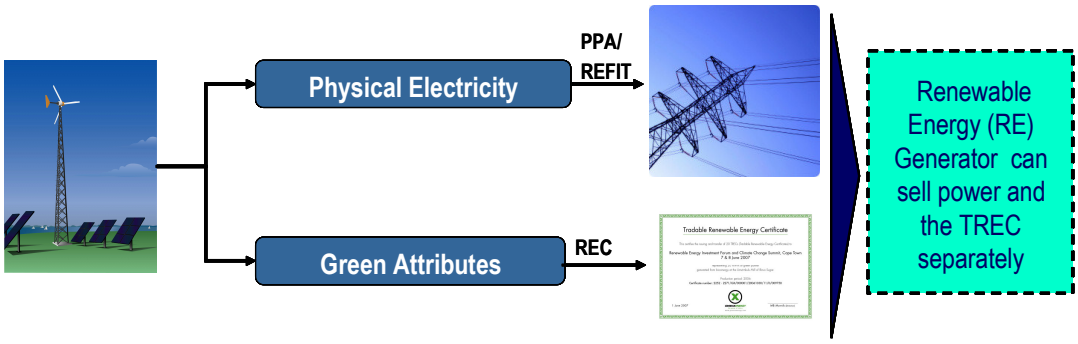
Forum of Regulators (FOR) has come out with the report- 'Policies on Renewables'. Some of the key recommendations made in this report regarding RPO are as mentioned below.

- The RPO to be maintained at the minimum level of 5% by 2010 as suggested in the National Action Plan on Climate Change. Besides, the RPO level to increase progressively as envisaged in the National Electricity Policy. The increase could be 1% every year till it reaches 10%.
- While fixing the RPO, the impact on average power purchase cost to be assessed
- RPO to also be applicable to captive consumers and open access consumers.
- The report emphasizes the Renewable Energy Certificate (REC) mechanism which could go a long way in enabling states deficit in renewable potential to meet their obligations while encouraging developers to set up generation facilities based on renewable sources in the most optimal locations.

3.3 REC Mechanism

REC mechanism offers the potential to expand the market for renewables by broadening the availability and scope of power products which are available to customers. The concept of RECs is based on separating the environmental or green power attribute of renewable generation from the underlying electrical energy. This creates two separate, though related products for sale by the owner of the generation asset(s): (1) Commodity electricity; and (2) Renewable attributes (alternatively known as renewable certificates, green certificates, green tags, and environmental attributes). A renewable energy certificate represents the renewable attributes of a single MWh of renewable energy. The renewable attributes may be sold separately or combined with system electricity at the point of sale by a developer.

Figure 6: Schematic Representation of REC



Source: Adapted from RECS International

The REC mechanism is presently under development in India and is expected to be operational by early of 2010-11.

3.4 Jawaharlal Nehru National Solar Mission (JNNSM)

The National Solar Mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge. It is one of the 8 National Missions outlined in the NAPCC.

- The objective of the JNNSM is to establish India as global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible. JNNSM sets path for providing policy and environment which provides incentive structure that
  - enable rapid and large scale capital investment
  - encourages technical innovation & lowering of costs
- JNNSM also sets path for separate Solar RPO. It suggests that Solar RPO may start with 0.25% in Phase-1 and may go up to 3% by 2022. This could be complemented with solar specific Renewable Energy Certificates (RECs).
- The targets set by JNNSM for its 3 Phases are as mentioned in the table below.

Table 1: National Solar Mission- Proposed Roadmap

S No	Application Segment	Target for Phase-I (2010-13)	Target for Phase-II (2013-17)	Target for Phase-III (2017-22)
1	Solar Collectors	7 million meter^2	15 million meter^2	20 million meter^2
2	Off grid solar applications	200 MW	1000 MW	2000 MW
3	Utility grid power, including roof top	1000-2000 MW	4000-10,000 MW	20,000 MW

Source: Mission Document, JNNSM

- JNNSM also outlines Policy and Regulatory framework, various fiscal incentives and financing/ funding support for achievement and upscaling of Mission targets

3.5 Policies & Regulations for Promotion of RE

Apart from above mentioned factors, the study also takes cognizance of the policies and regulations for the promotion of RE based power. This includes following:

- Tariff regulations for RE sources issued by CERC
- Tariff regulations for RE sources issued by different SERCs
- Fiscal incentives and support provided by the Government for promotion of renewable based energy.

4 ASSESSMENT OF RE POTENTIAL, EXISTING SCENARIO AND SUPPLY SCENARIO TILL 2015

4.1 Pan India existing RE Scenario

Figure 7: Renewable- Installed Capacity & Gap in India

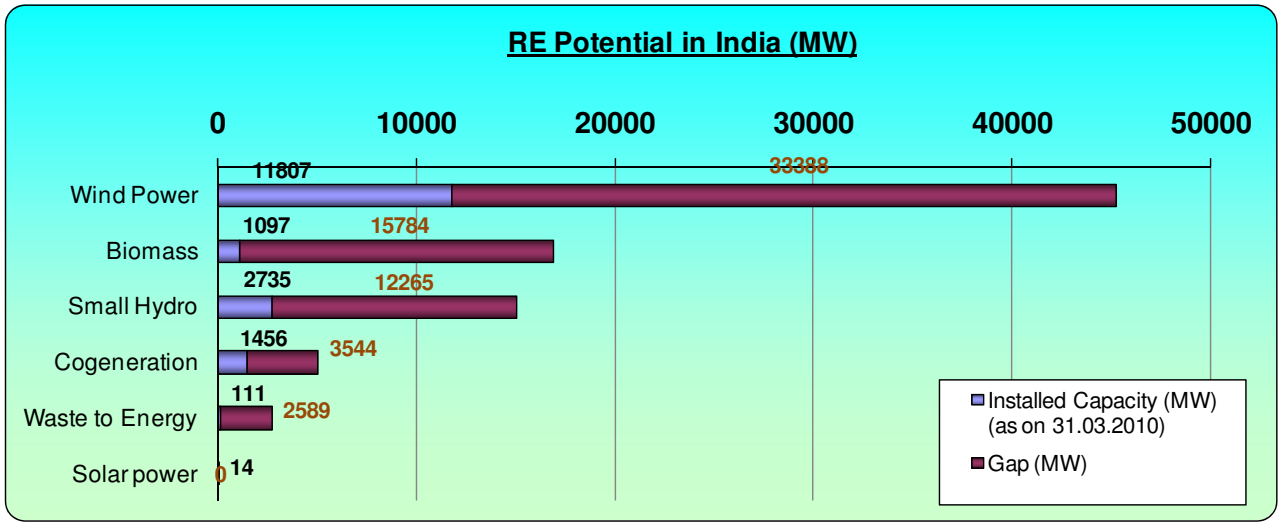


Table 2: Renewable- Installed Capacity & Gap in India

Source	Potential (MW)	Installed (MW)	Gap (MW)
Wind Power	45195	11807	33388
Biomass	16881	1097	15784
Small Hydro	15000	2735	12265
Cogeneration	5000	1456	3544
Waste to Energy	2700	111	2589
Solar power	>100000	14	-
Total	**84776**[4]	**17220**	**67570**

Source: MNRE and as per discussion with state renewable energy agencies

Key Takeaways:

- The available RE potential in the country is estimated to be approximately 85000 MW for non solar renewable sources and 'more than 100000 MW' for solar. Together this works out to be more than 185 GW; and against this only 17220 MW (approx) capacities have been installed so far. The gap

[4] Excluding solar potential

between the available potential and the installed capacity is huge and provides an excellent opportunity to harness more RE based power.

- It is observed from the above table that 69% of installed RE capacity is from Wind, 16% from Small Hydro, 8% from Cogeneration and 7% from other sources. This highlights the fact that the other sources (than wind) provides an opportunity to be developed and scaled up.
- Though wind based power has the highest share in total RE installed capacity, it also has the highest gap (MW) among non solar renewable sources, providing an opportunity for further harnessing wind energy.
- The biggest potential (and the gap) exists for solar power. Its installed capacity is miniscule and at the same time it has highest and most abundant potential. This provides an excellent opportunity for solar power to be developed and harnessed. Taking cognizance of this, and as mentioned in NAPCC and JNNSM, solar power development has risen to prime focus area by the Government.

4.2 Pan India RE Supply Scenario till 2015

4.2.1 Based on likely capacity additions as per discussion with various stakeholders (State Agencies, Power developers, Industry experts, etc)

Figure 8: RE Capacity- year wise & projections

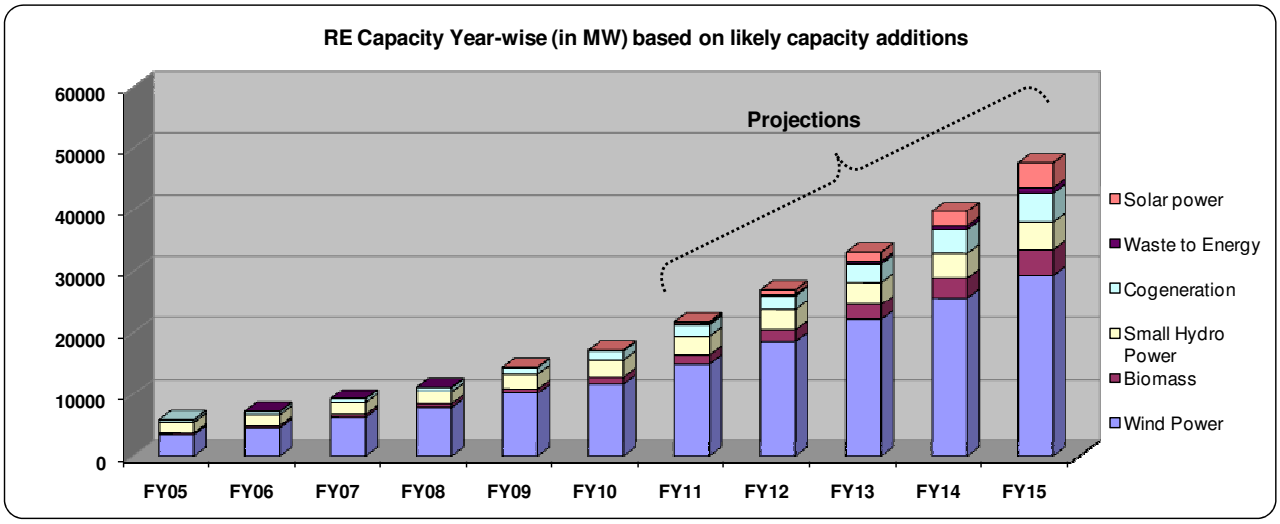


Table 3: RE Capacity- year wise & projections

Source	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Wind Power	3443	4554	6270	7845	10243	11807	15007	18607	22207	25807	29407
Biomass	290	347	441	606	703	1097	1431	1868	2437	3180	4150
Small Hydro	1693	1748	1905	2046	2430	2735	3010	3313	3647	4014	4417
Cogeneration	437	520	661	720	1049	1456	1852	2356	2998	3813	4851
Waste to Energy		21	23	40	59	111	168	256	388	589	894
Solar power					2	14	300	700	1500	2500	4000
Total RE (MW)	**5863**	**7190**	**9301**	**11256**	**14485**	**17220**	**21769**	**27100**	**33177**	**39903**	**47720**

Sources & assumptions:

- For Wind, Small Hydro, Biomass & Cogeneration- As per discussion with select states renewable energy development agencies and industry sources
- For Solar Power- As per JNNSM and estimate of fructification rate
- For Waste to Energy- As per historical growth vis-à-vis potential

Details for each source have been elaborated in their respective sections in later part of this report.

4.2.2 Based on Compounded Annual Growth Rate (CAGR)

Figure 9: RE Capacity- year wise & projections on CAGR basis

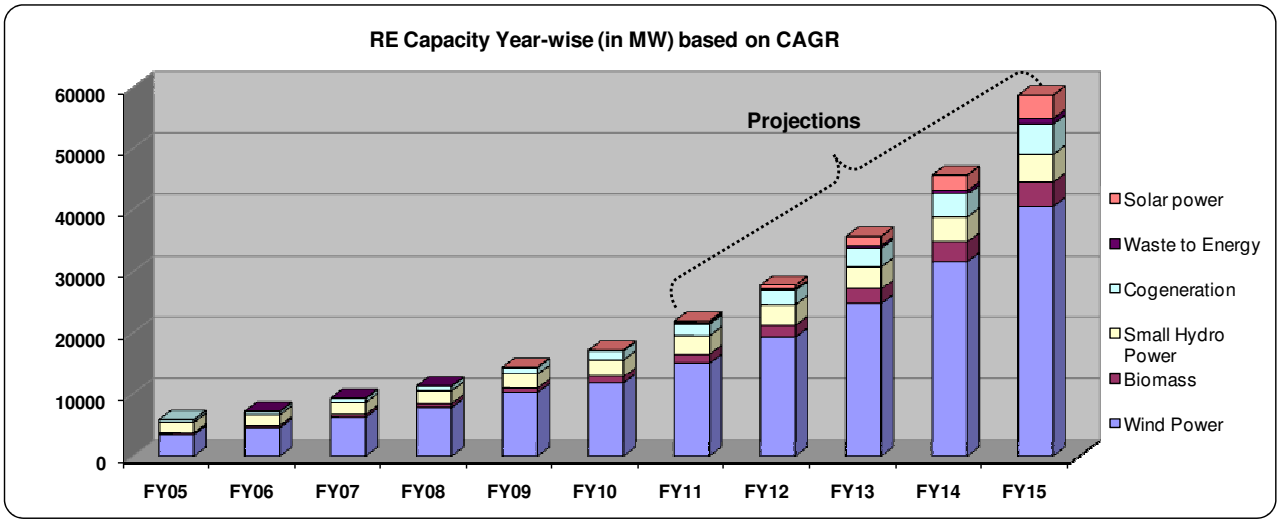


Table 4: RE Capacity- year wise & projections on CAGR basis

Source	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Wind Power	3443	4554	6270	7845	10243	11807	15108	19331	24734	31648	40495
Biomass	290	347	441	606	703	1097	1431	1868	2437	3180	4150
Small Hydro	1693	1748	1905	2046	2430	2735	3010	3313	3647	4014	4417
Cogeneration	437	520	661	720	1049	1456	1852	2356	2998	3813	4851
Waste to Energy		21	23	40	59	111	168	256	388	589	894
Solar power					2	14	300	700	1500	2500	4000
Total RE (MW)	**5863**	**7190**	**9301**	**11256**	**14485**	**17220**	**21870**	**27824**	**35704**	**45745**	**58808**

Key Takeaways:

- In next 5 years, the RE capacity in India is expected to increase to approx 2.5 to 3 times its existing level. This means approx 27500 to 32500 MW RE capacities are expected to come up, taking the total installed RE capacity figure to the range of 45000- 50000 MW.
- In next 5 years, the majority of additional capacity is likely to come from Wind which is expected to add 17000- 20000 MW. The next most contributing source would be solar which is expected to add 4000- 6000 MW. Apart from these 2 sources, cogeneration biomass and small hydro power are together expected to add approx 5500- 6500 MW.

Key Challenge: Concentrated RE potential in select states

A key challenge related to supply of RE based power is the concentration of RE potential (and hence RE capacities- both existing as well as those likely to come up) in certain key states. For instance, most of the wind potential is available in states like Tamil Nadu, Karnataka, Gujarat, Andhra Pradesh, Maharashtra, Rajasthan, Madhya Pradesh and Kerala. There are also states like Chhattisgarh, Uttarakhand and Himachal Pradesh where there is moderate RE potential (primarily SHP). Remaining states have very little RE potential. The states mentioned above having high or moderate RE potential will be the ones who would drive the development of RE power in coming years. Some of these states like Tamil Nadu and Karnataka are already meeting their RPO levels. This would further get an impetus with the REC mechanism in place. However, there are few key issues related to the extent to which RE based power can be developed in such states. The key issues are:

- To what extent RE power (specifically wind) could be installed in certain states like Tamil Nadu and Karnataka considering its infirm nature. It is noted that in Spain, more 40% of capacity comes from wind power. They have devised mechanism of forecasting, which to an extent, is able to overcome the infirm challenge.
- Besides, with the REC mechanism in place, a regional level forecasting of RE sources and targets/transfer of RE power could be considered.
- Other form of RE technologies like biomass based stations could provide stability and increase the overall Capacity Utilization Factor (CUF) of RE technologies.

4.3 Wind Energy

Table 5: State wise Wind Power Potential & Installed Capacity (as on 31.12.2009)

State	Potential (MW)	Installed Capacity (MW)	Gap (MW)
Andhra Pradesh	8968	123	8845
Gujarat	10645	1712	8933
Karnataka	11531	1391	10140
Kerala	1171	27	1144
Madhya Pradesh	1019	213	806
Maharashtra	4584	2004	2580
Orissa	255	-	
Rajasthan	4858	855	4003
Tamil Nadu	5530	4596	934
West Bengal	-	1	-
Others	-	3	-
TOTAL	**48561**	**10925**	**37385**

Source: MNRE Annual Report 2009-10

Key Takeaways:

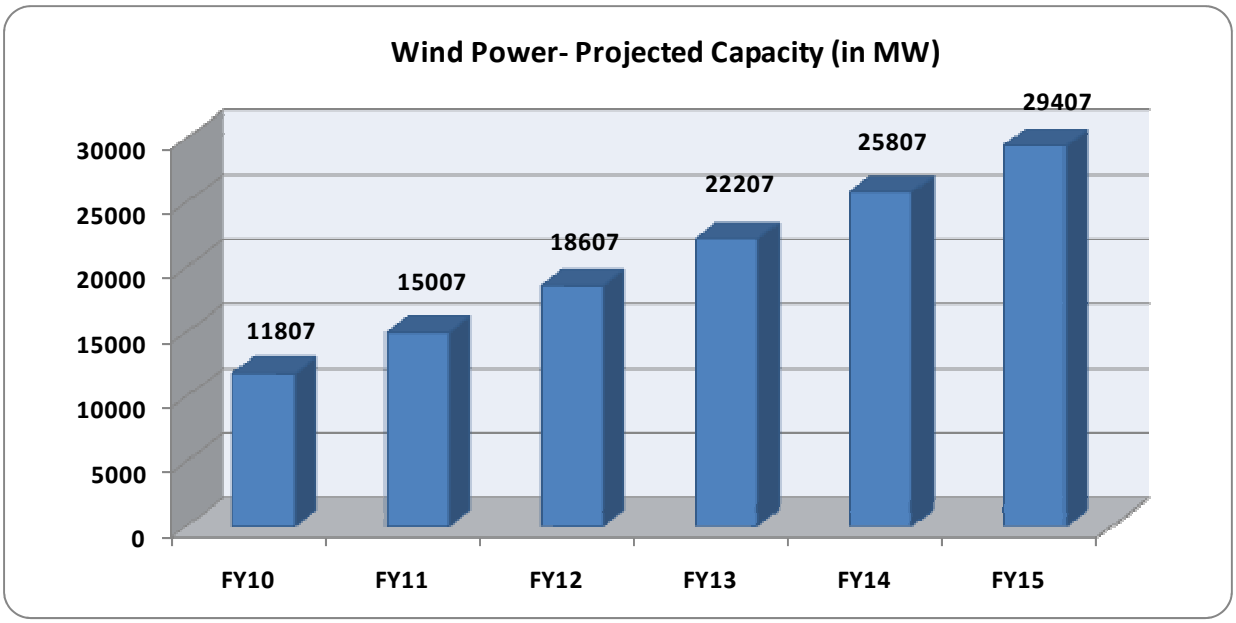
- Wind energy based power has been developed substantially in only 2 states- Tamil Nadu and Maharashtra, who contribute 42% & 19% respectively to the total installed wind capacity in the country. At the same time, these 2 states have harnessed 83% and 44% respectively of the wind potential available with them and have used most of the better sites.
- Key states where abundant and unused potential exist are Karnataka, Gujarat, AP and Rajasthan. These states could be driver states in further harnessing wind based power in the country.
- Significant potential/ opportunity also exists in Tamil Nadu where the older and less efficient plants and machinery at better wind-sites can be replaced by better and newer technology/machines.
- In order to ensure further harnessing of Wind power, certain key challenges need to be addressed. The biggest impediment as being perceived by the wind power developers is the inadequate power evacuation arrangement for RE based power. Another impediment is the land availability issue and the time taken for clearance of land which comes under forest areas.

Projected Scenario:

As per discussion with Industry experts and state renewable energy agencies, wind based power is expected to grow substantially in next 5 years. As per projects in pipeline, additional 17000- 20000 MW of

wind based power plants are expected to come up in next 5 years. This will take the figure of total installed capacity of wind based power to about 28000- 31000 MW by 2015. The chart below shows likely year-wise wind power capacities in India for next 5 years.

Figure 10: Wind Power- Projected Capacities (in MW)



4.4 Solar Energy

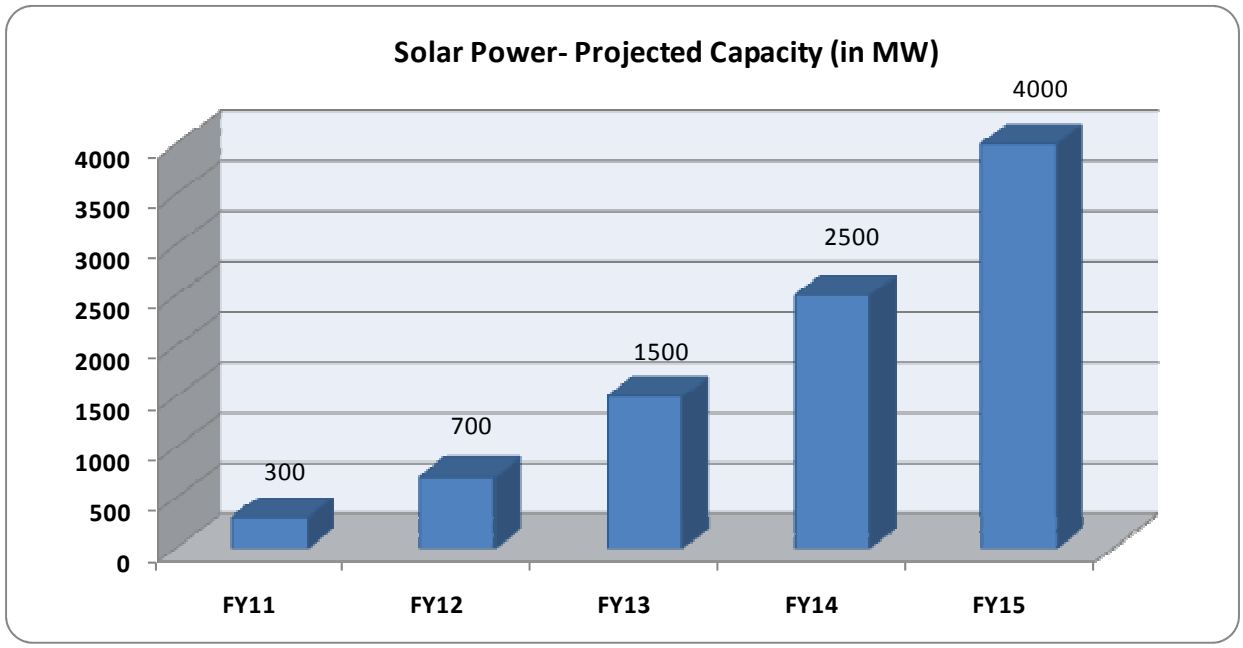
Solar based power has been least harnessed among all renewable energy sources so far. Only 6 MW has been installed against abundantly available and high potential of solar power. There have been several estimates on solar power potential and most of them identify feasible solar power potential in India to be more than 100,000 MW. This provides an opportunity, which coupled with thrust from Government to develop solar power, has made investments in solar power very attractive to solar developers. The key aspects related to solar power are as follows:

- National Solar Mission envisages ambitious targets for its 3 phases. The targets for grid connected solar power for the 3 phases are as follows
  - Phase 1: 1000-2000 MW by 2013
  - Phase 2: 4000-10000 MW by 2017
  - Phase 3: 20000 MW by 2022

  Though these targets appear aggressive considering the amount of investment required for such set up, but at the same time these targets are achievable considering the focus and support being provided by the Government. A moderate achievement of Mission Target (4000- 10000 MW solar power by 2017), considering normal fructification rate of project proposals and interest of investors, could lead to a figure of 4000- 6000 MW of solar power by 2015.
- Solar Power Developers have shown interest in setting up solar power projects in various states. The solar project proposals/ registration in some of the states are as mentioned below.
  - In Rajasthan, 1524 MW solar power projects have been registered out of which 71 MW is expected to come up in 2010-11
  - In Gujarat, 716 MW solar power projects have been allocated to developers out of which 100 MW is expected to come up in 2010-11
  - In Tamil Nadu, 200 MW solar power project is expected to come up during 2010-13
  - In Karnataka, 121 MW solar projects application have been received out of which 88 MW solar projects have been allocated
  - In Maharashtra, 40 MW solar power projects have been sent to MNRE for evaluation
- Considering above points there is high likelihood that about 4000-6000 MW Solar power could be achieved by 2015.

- In order to meet the above mentioned targets for solar power, certain key challenges need to be addressed. Taking cognizance of the fact that solar power requires high capital investment, facilitating the required capital investment is the biggest challenge. With aggressive targets set out in the National Solar Mission, the challenge is even bigger. Besides, the solar power development would also require extensive support from Government in terms of R&D, fiscal and monetary incentives.

Figure 11: Solar Power- Year wise Projected Capacities (in MW)



4.5 Small Hydro Power

Table 6: Small Hydro Power- State wise Potential & Installed Capacities (in MW)

S No	State	Potential	Installed Capacity	Under Installation	Gap
1	Andhra Pradesh	560.2	180.8	21.5	349.7
2	Arunachal Pradesh	1333	61.3	25.9	1245.7
3	Assam	213	27.1	15.0	170.9
4	Bihar	213	54.6	3.4	155.0
5	Chattisgarh	706	18.1	1.0	687.0
6	Goa	9	0.1		9.0
7	Gujarat	196	7.0	5.6	183.4
8	Haryana	110	62.7	6.0	41.3
9	Himachal Pradesh	2268	230.9	26.8	2010.3
10	Jammu & Kashmir	1411	111.8	5.9	1293.3
11	Jharkhand	208	4.1	34.9	169.1
12	Karnataka	3000	563.5	85.3	2351.3
13	Kerala	708	133.9	3.2	570.9
14	Madhya Pradesh	400	71.2	19.9	308.9
15	Maharashtra	762	306.0	31.3	424.7
16	Manipur	109	5.5	2.8	100.8
17	Meghalaya	229	31.0	1.7	196.3
18	Mizoram	166	24.5	8.5	133.0
19	Nagaland	196	28.7	4.2	163.1
20	Orissa	295	44.3	23.9	226.8
21	Punjab	390	123.9	18.8	247.4
22	Rajasthan	63	23.9		39.2
23	Sikkim	265	47.1	5.2	212.7
24	Tamil Nadu	499	90.1	13.0	396.0
25	Tripura	46	16.0		30.0
26	Uttarakhand	1609	127.9	40.4	1440.7
27	Uttar Pradesh	292	25.1		266.9
28	West Bengal	393	98.4	79.3	215.4
	Andman & Nicobar	8	5.3		2.8
	Total	**14292**	**2524.4**	**483.2**	**11284.3**

Source: MNRE Annual Report 2008-09

Key Takeaways:

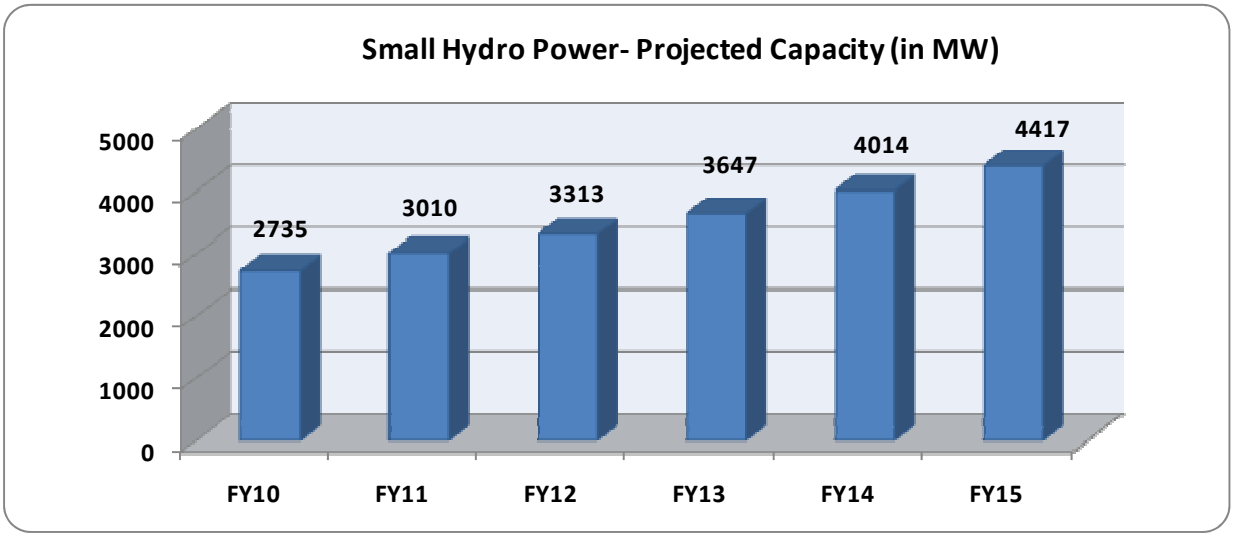
- In terms of installed capacity small hydro power is the second highest among all RE sources. It contributes around 16% of the total installed RE capacity in the country.
- In terms of harnessing the available potential, small hydro power installed capacity represents around 17.6% of its available potential. This provides a significant opportunity for small hydro power to be developed further.

- Small hydro power has been developed substantially in 4 states- Karnataka, Maharashtra, Himachal Pradesh and Andhra Pradesh. These States together contribute 50.7% of the total installed RE capacity in the country.
- The other states which have abundant potential for small hydro power to harness are Uttarakhand, Arunachal Pradesh, Jammu & Kashmir and Chhattisgarh. Presently, these states have less installed capacities against significant potential; hence these could be driver states in coming years for further development of small hydro power.

Projected Scenario:

The 11th Plan Proposals for New and Renewable Energy by MNRE talks about 6500 MW of Small Hydro Power capacity by 2022 i.e. end of 13th Plan. This implies addition of approximately 4000 MW to the current level. Considering this and as per discussion with Industry experts and State Renewable Development Agencies, Small Hydro Power is likely to add around 1600-1800 MW in next 5 years. This will take the figure of total installed capacity of Small Hydro Power to about 4417 MW by 2015.

Figure 12: Small Hydro Power- Projected Capacities (in MW)



4.6 Biomass based Power

Table 7: Biomass based Power- State wise Potential (in MW)

Biomass Class	Agro	Forest & wasteland
State	Potential (MWe)	Potential (MWe)
Andhra Pradesh	738.3	
Arunachal Pradesh	9.3	
Assam	278.7	
Bihar	645.9	
Chhattisgarh	245.6	
Goa	26.1	
Gujarat	1226.1	1155.2
Haryana	1375.1	39.5
Himachal Pradesh	142.2	
Jammu & Kashmir	42.7	
Jharkhand	107	
Karnataka	1222.1	
Kerala	864.4	
Madhya Pradesh	1386.2	2060.6
Maharashtra	1969.7	1741.7
Manipur	15.3	
Meghalaya	11.4	
Mizoram	1.16	
Nagaland	10.2	
Orissa	432.8	
Punjab	3177.6	36.8
Rajasthan	1121.9	262.3
Sikkim	2.44	
Tamil nadu	1163.9	429.4
Tripura	2.96	
Uttar Pradesh	1764.9	514.1
Uttaranchal	88.3	
West Bengal	529.2	
Sub- Total	**18601.5**	**6239.6**
Total	**24841.1**	

Source: Biomass Resource Atlas of India

Key Takeaways:

- The above table shows potential for both Agro based biomass as well as biomass out of Forest and Wasteland. However due to environmental reason, the use of Forest and Wasteland is not considered for power generation. However, even looking only at agro based biomass, the available potential is 18601 MW as per Biomass Resource Atlas of India. The similar figure as per estimate of MNRE is 16881 MW.

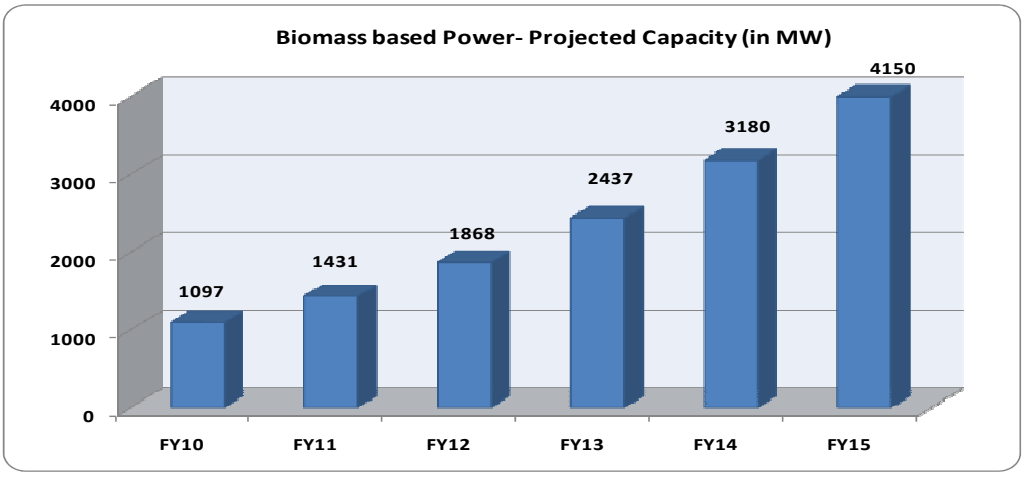
- The available potential of agro based biomass (16881 MW) is the second highest among available potential for all RE sources. Against this, the installed capacity is only 817 MW. This provides huge unused biomass based power potential which can be harnessed further.
- Based upon significant available potential and planned capacity additions, the key driver states for harnessing biomass based power in coming years could be Punjab, Maharashtra, Uttar Pradesh, Rajasthan, Tamil Nadu, Karnataka and Madhya Pradesh.
- Certain key challenges need to be addressed to further harness biomass based power. The increasing cost of biomass fuel poses the biggest challenge to biomass power developers. Besides, there has been increased demand and usage of biomass fuel by other industries like captive power plants, small boilers and brick kiln. This has resulted in reduced supply and increased cost of biomass fuel.

Projected Scenario:

The 11th Plan Proposals for New and Renewable Energy by MNRE talks about 7500 MW of Biomass based Power capacity by 2022 i.e. end of 13th Plan. This implies addition of approx 6600 MW to the current level. Considering this and as per discussion with Industry experts and state renewable energy agencies, biomass based power is likely to add around 3000-3500 MW in next 5 years. This will take the figure of total installed capacity of biomass based power to about 4150 MW by 2015. This gets substantiated by the plans of some of the states for development of biomass based power in coming years. These are as mentioned below.

- Maharashtra plans to add 550 MW biomass & cogeneration based power plants in next 5 years.
- Karnataka envisages 100 MW capacity additions every year for next 4 years.
- In Rajasthan, 214 MW capacity for biomass based power is expected to come up by end of 2012

Figure 13: Biomass based Power- Projected Capacities (in MW)



4.7 Summary of RPO Orders across States

Table 8: RPO Specifications across States

State	RE Source/ Eligible Entity	RPO Levels		
		FY09	FY10	FY11
Assam			5%	
Andhra Pradesh		5%	5%	5%
Chhattisgarh	Biomass	5%	5%	5%
	SHP	3%	3%	3%
	Others	2%	2%	2%
Delhi	NDPL	1%	1%	1%
	BYPL	1%	1%	1%
	BRPL	1%	1%	1%
	NDMC	1%	1%	1%
Gujarat		2%	2%	5%
Haryana		5%	10%	10%
Karnataka	BESCOM, MESCOM,CESC	10%		
	GESCOM, HESCOM, Hukeri	7%		
Kerala	SHP	2%		
	Wind	2%		
	Others	1%		
Madhya Pradesh	Wind	5%	6%	6%
	Biomass	2%	2%	2%
	Cogen & Others	3%	2%	2%
Maharashtra	Non Solar	5%	6%	5.75%
	Solar			0.25%
Punjab		1%	2%	3%
Rajasthan	Wind	5%	6%	6.75%
	Biomass	1.25%	1.45%	1.75%
Tamil Nadu		10%	13%	14%
UP		7.5%	7.5%	7.5%
Uttarakhand		5%	8%	9%
West Bengal	WBSEB	4.8%	6.8%	8.3%
	CESC	4.0%	6.0%	8.0%
	DPL	2.5%	4.0%	7.0%
	DPSC	2.0%	4.0%	7.0%

Wide Divergence in RPO Specifications across States, terms of

Varying RPO Trajectories

Different RPO as per RE Technology

Differential RPO for Discoms

Shortfall Clause

Key Takeaways:

The above table shows the wide divergence in RPO specifications across states. These divergences are in terms of following aspects:

- **Varying RPO Trajectories:** The variation in RPO trajectories is of two types. Firstly, there are different RPO levels across states which are due to difference in state specific RE potential availability. The two extremes of this variation are Tamil Nadu, which has envisaged RPO level of 14% for FY11, and the other states (which do not appear in above table) where no RPO exist. The

second type of variation is in terms of incoherent annual increase in RPO levels. There are states where the RPO level is constant (like Andhra Pradesh). At the same time, there are states where RPO level is increasing significantly (like Rajasthan). Such variation in RPO trajectories are resulting in varying impact on power purchase cost for states.

- **Different RPO for different RE technology:** There are states which have specified RE technology wise RPO levels (like Kerala and Madhya Pradesh). On the other hand there are those states too which have mentioned only overall RPO for all RE sources.
- **Differential RPO for different Discoms:** In some states different RPO level is specified for different Discoms taking cognizance of RE availability in their respective areas. For example, in Karnataka RPO level has been specified as 10% for Bescom, Mescom & CESC & 7% for others
- **Divergence in Shortfall Clause:** Only few states (like Maharashtra and Rajasthan) have shortfall clause in place. Also, the shortfall clause gets rendered ineffective by the fact that the RPO compliance talks of mandatory purchase of RE energy subject to availability of RE based power. This acts as an impediment for RE development efforts.

4.8 Summary of RE Tariffs across States

Table 9: RPO Specifications across States

State	Tariff for various RE sources (Rs per unit)				
	Wind	SHP	Biomass	Solar	Cogeneration
Assam		Rs 3.2 fixed for 5 years	Rs 4 fixed for 3 years	Rs 11 fixed for 10 years	Rs 3.2 fixed for 5 years
Andhra Pradesh	Rs 3.50 for 10 years	Rs 2.69- Rs 1.92 (year 1-10)	Fixed: Rs 1.61- Rs 0.87 (year 1-10) Var: Rs 2.54- Rs 3.09 (FY10-FY14)		Fixed: Rs 1.72-Rs 0.9 (year 1-10) Var: Rs 1.68- Rs 2.04 (FY10-FY14)
Gujarat	Rs 3.56 fixed for 20 years	Rs 3.29 for FY08, esc@3%	Rs 4.40 (year 1-10)) Rs 4.75 (year 11-20)	Solar PV: Rs 15 (year 1-12), Rs 5 (year 13-25) Solar Thermal: Rs 11 (year 1-12), Rs 4 (year 13-25)	Rs 4.55 (year 1-10) Rs 4.90 (year 11-20)
Haryana	Rs 4.08 (FY08), esc@1.5%	Rs 3.67 (FY08), esc@1.5%	Rs 4 (FY08), esc@3%	Rs 15.96	Rs 3.74 (FY08), esc@2%
Karnataka	Rs 3.7 for 10 years	Rs 3.4 for 10 years	Rs 3.66- Rs 4.13 (year 1-10)	Rs 3.4 (+ GBI)	Rs 3.59-Rs 4.14 (year 1-10)
Kerala	Levelised Rs 3.14 fixed for 20 years	Levelised Rs 2.44 fixed for 25 years			Levelised Rs 2.55 fixed for 10 years
Madhya Pradesh	Rs 4.35 for 25 years		Rs 3.33- Rs 5.14 for year 1-20		Rs 2.80- Rs 3.84 for year 1-20
Maharashtra	Rs 3.50, Esc@ 15p/ year for 13 years	Rs 2.84, esc@ 3p/ year till 10th year	Rs 4.98 interim till 31.03.10		Rs 4.79 interim till 31.03.10
Rajasthan	Rs 4.28 & Rs 4.5 for diff districts		Rs 4.44 (water cooled), Rs 4.84 (air cooled)	Rs 15.78 SPV, Rs 13.78 STV	
Tamil Nadu	Rs 3.39		Fixed cost: Rs 1.833- 1.435 Var cost: Rs 2.667 (FY10), Rs 2.8 (FY11), Rs 2.94 (FY12)	Rs 3.15 (+ GBI)	Fixed cost: Rs 2.52- Rs 1.94 Var cost: Rs 1.856 (FY10), Rs 1.948 (FY11)

Key Takeaways:

The above table shows the divergence in RE tariff across states. These divergences are in terms of following aspects:

- The RE tariff framework adopted by different states vary from each other. Some states have fixed/ levelised tariff for any particular RE source where as other states have incorporated escalation factors.

- Some states have also come up with interim tariff till the time they come up with revised tariffs (for example Maharashtra has announced interim tariff till 31.03.2010) and at the same time they are revisiting the tariff for different RE sources.
- There is also difference in ways the states have taken cognizance of Generation based Incentive being provided by MNRE. Some states have considered GBI while calculating the tariff, whereas other states have not considered GBI.
- Taking cognizance of the divergence in RE tariff among various states, CERC has recently announced revised tariff for different RE sources and for different regions. In order to increase attractiveness of RE based power development and to facilitate further investments by RE power developers, the individual states need to align their respective state's RE tariff to the latest CERC tariff. The details of CERC tariff are shown in the table below.

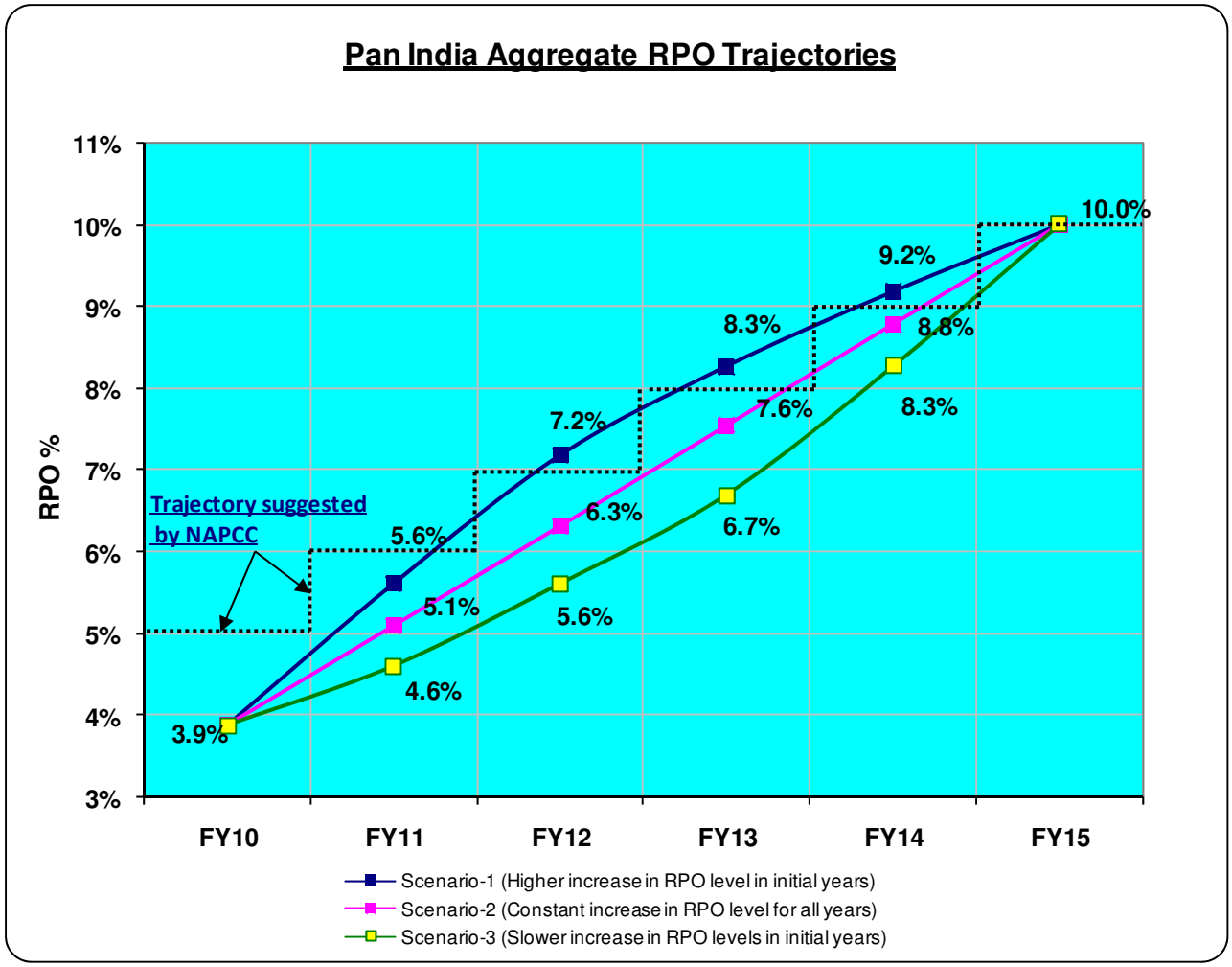
Table 10: CERC Tariff for various RE sources (in Rs per unit)

RE Technology	Sub- Category	Levelised Tariff	Benefit of Accl. Dep., if availed	Net Levelised Tariff, if Accl. Dep. is availed
Wind	Wind Zone-1	5.63	0.37	5.26
	Wind Zone-2	4.90	0.32	4.58
	Wind Zone-3	4.17	0.28	3.89
	Wind Zone-4	3.75	0.25	3.50
Small Hydro Power	HP, Uttarakhand & NE (< 5 MW)	3.90	0.23	3.67
	HP, Uttarakhand & NE (5-25 MW)	3.35	0.21	3.14
	Other States (< 5 MW)	4.62	0.27	4.35
	Other States (5-25 MW)	4.00	0.25	3.75
Solar Power	Solar PV	18.44	1.30	17.14
	Solar Thermal	13.45	0.91	12.54
Biomass based Power	Andhra Pradesh	4.15	0.10	4.05
	Haryana	5.52	0.10	5.42
	Madhya Pradesh	3.93	0.10	3.83
	Maharashtra	4.76	0.10	4.66
	Punjab	5.49	0.10	5.39
	Rajasthan	4.73	0.10	4.63
	Tamil Nadu	5.08	0.10	4.98
	Uttar Pradesh	4.47	0.10	4.37
	Others	4.88	0.10	4.78
Cogeneration	Andhra Pradesh	4.93	0.15	4.78
	Haryana	5.78	0.13	5.65
	Maharashtra	4.80	0.12	4.68
	Madhya Pradesh	4.29	0.13	4.16
	Punjab	5.75	0.13	5.62
	Tamil Nadu	5.10	0.12	4.98
	Uttar Pradesh	5.21	0.15	5.06
	Others	5.17	0.13	5.04

5 IMPACT ANALYSIS

5.1 Summary of Pan India Scenarios

Figure 14: Various Scenarios for pan India RPO Trajectories



The above graph shows the 3 scenarios for pan India RPO trajectories vis-à-vis the RPO target as suggested by the National Acton Plan on Climate Change. The 3 scenarios have been developed as per following

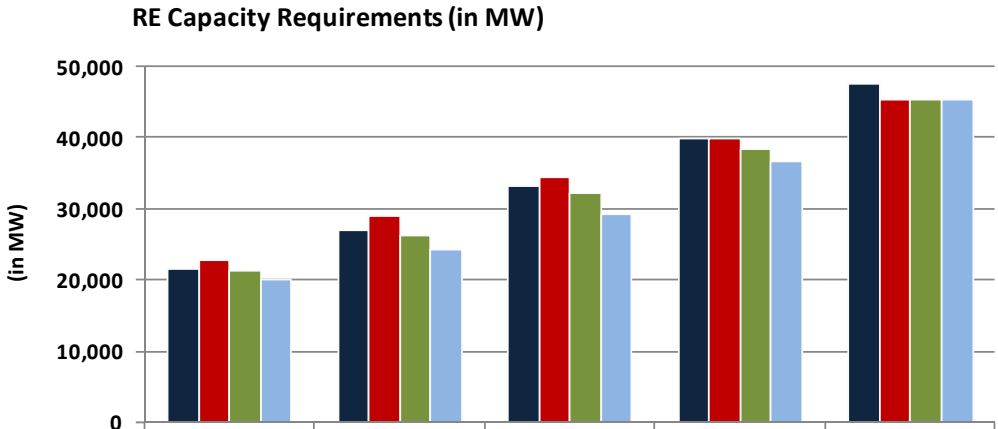
Scenario-1: Higher increase in the RPO level in the initial years

Scenario-2: Constant increase in RPO level for all years

Scenario-3: Slower increase in RPO levels in initial years

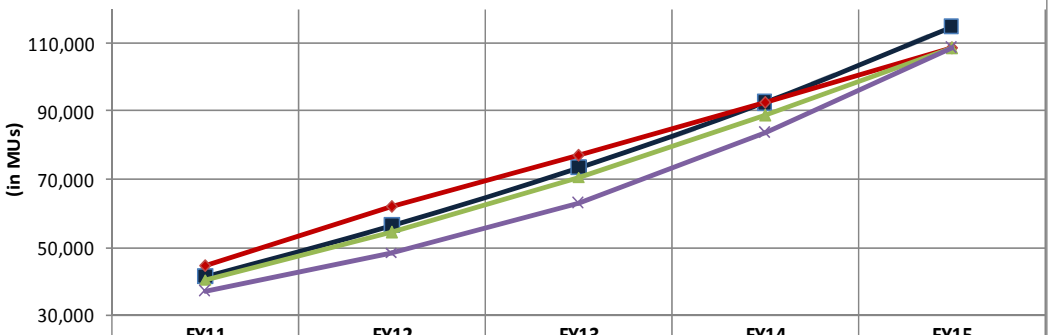
Pan India RE capacity requirement and RE energy requirement for these scenarios are as shown below.

Figure 15: RE Capacity Requirements (in MW)



	FY11	FY12	FY13	FY14	FY15
Likely RE capacities	21769	27100	33177	39903	47720
RE capacity requirement- Scenario-1	22936	29058	34507	39967	45482
RE capacity requirement- Scenario-2	21485	26448	32210	38552	45448
RE capacity requirement- Scenario-3	20161	24335	29373	36692	45406

Figure 16: RE Energy Requirements (in MUs)



	FY11	FY12	FY13	FY14	FY15
Likely RE generation (MUs)	41315	56318	73451	92571	115029
RE-MUs requirement- Scenario-1	44609	61840	77201	92722	108567
RE-MUs requirement- Scenario-2	40513	54481	70726	88754	108567
RE-MUs requirement- Scenario-3	36774	48522	62727	83532	108567

Key Takeaways:

- The analysis shows that in order to meet 10% RPO level by 2015, approx 45482 MW of RE capacities would be required. This requirement is within the figure of projected RE capacity of 47720 MW by FY2015. Thus, proposed RPO level of 10% by 2015 is achievable.

- It is also observed that during the initial years, the RE capacities requirement for scenario-1 is more than the likely RE capacities for respective years. This leads to exclusion of Scenario-1 to be specified as the pan India RPO trajectory.
- For both scenario-2 and 3, it is observed that the RE capacities requirement is well within the likely RE capacities for each year.
- Between scenarios-2 and 3, it is suggested that states should go for scenario-2. The reason being the fact that relatively higher RPO level during the initial years would stimulate more capacities to be set up at the sites with higher CUF (i.e. lower RE tariff). It is expected that the site selection for additional RE capacities would move from the best sites (initially) to comparatively inferior sites (in later years). Correspondingly, the CUFs for new RE capacities would gradually decrease over the period. This, in turn, would lead to increasing RE tariff over the period. Consequently, the impact on PPC would be more in case of higher RPO increase in later years (i.e. scenario-3). This gets corroborated by the findings of the study which highlights higher impact on PPC in case of scenario-3 than that for scenario-2.
- In order to achieve the RPO level of 10% by 2015, 2 related critical factors need to be taken care of. These are :
    - CERC has notified norms for determination of tariffs for various RE technologies. SERC are required to take cognizance of these norms and revise the tariffs for various RE technology appropriately.
    - States are required to provide further thrust to increase the installed capacity of biomass based generation. As compared to other RE technologies, this provides firm power option that can generate higher PLF. The increasing cost of biomass fuel poses a challenge to Biomass based power developers[5]. Besides, there has been increased demand and usage of biomass fuel by other industries like captive power plants, small boilers and brick kiln. This has resulted in reduced supply and increased cost of biomass fuel. Limiting number of biomass plants in a designated area as well as limiting usage of biomass in other industries would be critical.

Impact on PPC:

For each of the 3 scenarios, the incremental impacts of varying levels of RPO on the PPC have been analyzed for each state as well as for pan India level. This analysis has been done using the latest RE tariffs as specified by CERC. Thereafter, the time value of the impact has been calculated taking the

[5] Tariffs are fixed based on particular assumed cost of biomass, whereas, cost of biomass fluctuate with the market conditions (including use of biomass by other industries).

discount factor as 9.35% which is the same one as specified by CERC for bid evaluation for procurement of power by distribution licensees.

		FY11	FY12	FY13	FY14	FY15
Discounted impact on PPC						
Scenario-1	P/unit	8.1	9.3	10.0	10.0	9.6
Scenario-2	P/unit	7.1	8.1	9.1	9.6	9.7
Scenario-3	P/unit	6.5	7.3	8.3	9.1	9.8
Discounted incremental impact on PPC						
Scenario-1	P/unit	2.4	1.2	0.7	0.0	-0.4
Scenario-2	P/unit	1.5	1.0	1.0	0.5	0.1
Scenario-3	P/unit	0.9	0.8	0.9	0.9	0.6

The key take away from the Impact Analysis is:

- For Scenario-2 (equal increase in RPO for all years), which is suggested as the suitable RPO trajectory for adoption, the incremental impact on the PPC is 1.5 paisa per unit for the first year and it gradually decreases to 0.1 paisa per unit in FY15.

Based on the detailed calculations, it is observed that the impact on tariff is not substantial and could be accommodated by the State utilities. It is noted that in some states the impact of inclusion of RE could be relatively higher than other states. This would be typical case for states which have fuel resources and therefore the cost of conventional energy is comparatively on the lower side.

Impact on Average Cost of Service:

The impact on Average Cost of Service due to inclusion of renewables takes into account the partial differentiation of impact on PPC on the average cost of service i.e. keeping the other variables constant. This in turn implies the effect of change of base in energy units in computation of PPC and Average Cost of Service. The calculation is based upon the loss level in energy units as 28% and discount factor of 9.35%.

		FY11	FY12	FY13	FY14	FY15
Discounted impact on Av cost of service						
Scenario-1	P/unit	11.2	12.9	13.9	13.9	13.3
Scenario-2	P/unit	9.9	11.3	12.7	13.4	13.5
Scenario-3	P/unit	9.0	10.2	11.5	12.7	13.6
Discounted incremental impact on Av cost of service						
Scenario-1	P/unit	3.4	1.7	1.0	0.0	-0.6
Scenario-2	P/unit	2.1	1.4	1.4	0.7	0.1
Scenario-3	P/unit	1.2	1.1	1.3	1.2	0.9

From the above table, it is observed that the impact on the average cost of service for the suggested scenario-2 is 2.1 paisa/unit for FY11 and gradually decreases to 0.1 paisa/unit for FY15. Thus, the impact on average cost of service is not substantial and could be accommodated by the State utilities

5.2 Pan India Scenario-1

Figure 17: Pan India RPO Trajectory Scenario-1

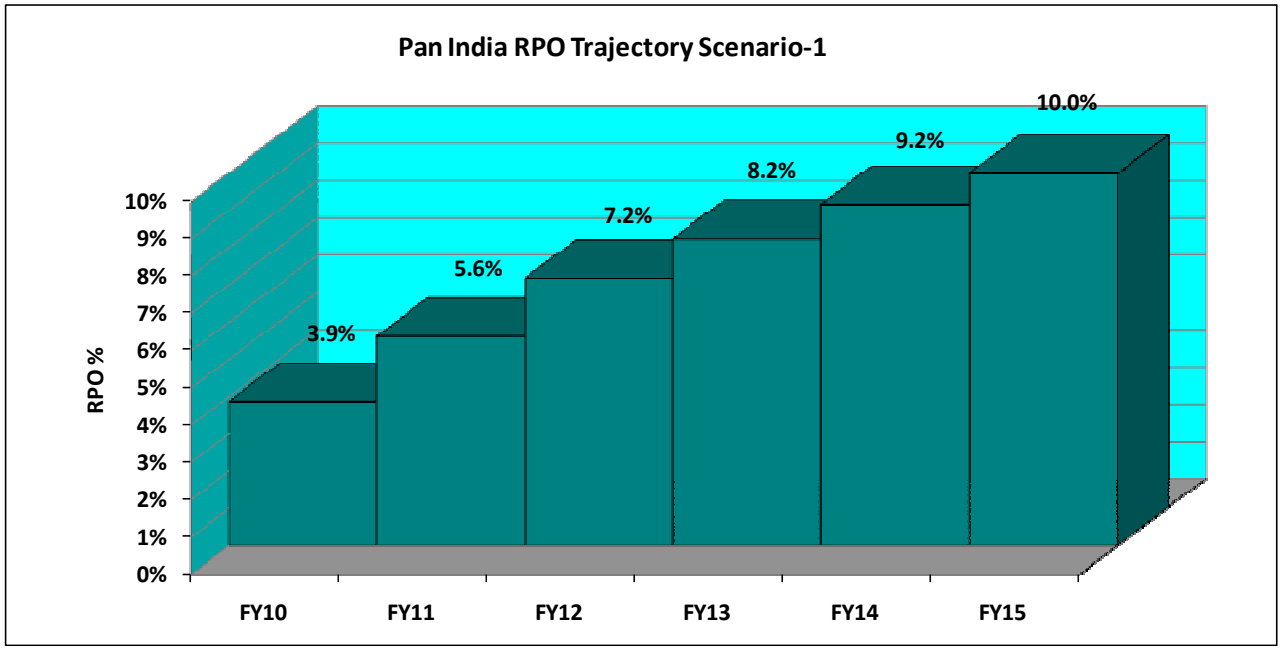
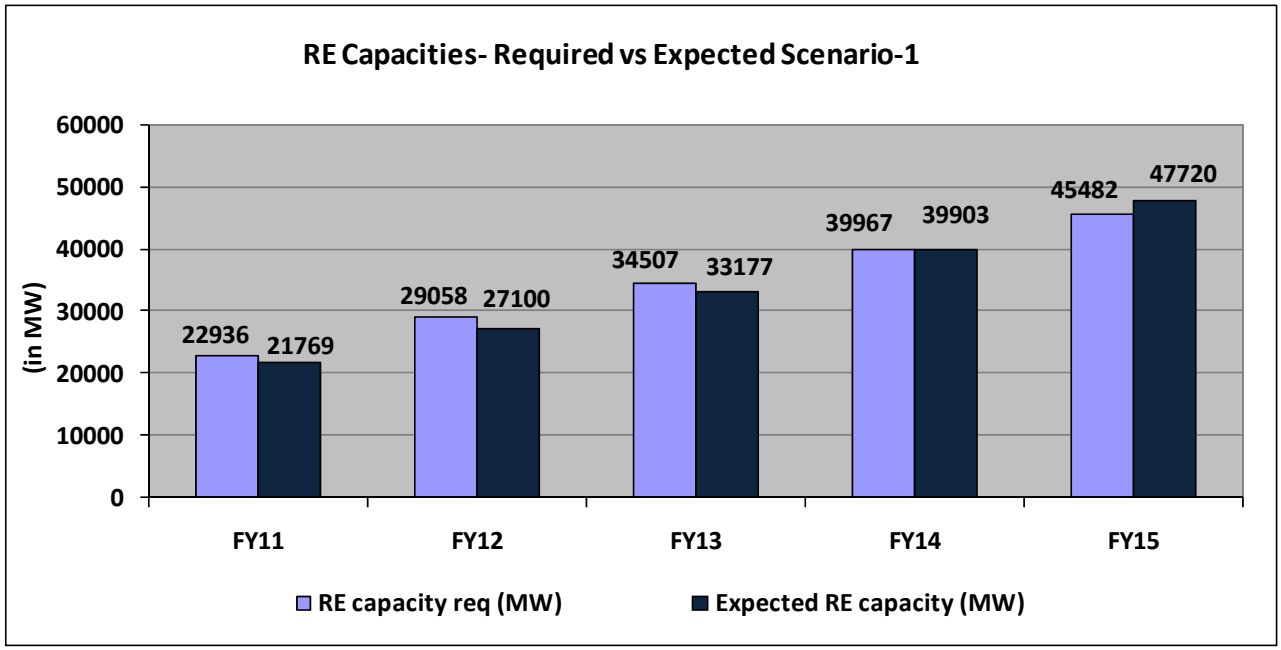


Figure 18: RE Capacity Required vs. Expected (in MW) for Scenario-1



The above graphs show scenario-1 for the pan India RPO trajectory. As evident from the graph, in this scenario the increase in RPO level is more in the initial years and slower increase in later years. It is also observed that during the initial years, the RE capacities requirement for scenario-1 is more than the likely RE capacities for respective years. Scenario-1 thus gets ruled out as the pan India RPO trajectory.

The table below shows the year wise incremental impact on PPC that would be incurred for meeting the RPO targets.

Table 11: Details for pan India Scenario-1

Item	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Total Energy (MUs)	675573	731845	793911	862222	937263	1012304	1087345
RE energy (MUs)	24322	28472	44609	61840	77201	92722	108567
RPO %	**3.6%**	**3.9%**	**5.6%**	**7.2%**	**8.2%**	**9.2%**	**10.0%**
Increase in RPO			1.7%	1.6%	1.1%	0.9%	0.8%
Impact of inclusion of RE (p/unit)	**5.6**	**5.6**	**8.1**	**10.1**	**11.9**	**13.1**	**13.7**
Incremental impact (p/unit)			**2.4**	**2.1**	**1.8**	**1.2**	**0.6**
Time value of Impact of inclusion of RE (p/unit)*			**8.1**	**9.3**	**10.0**	**10.0**	**9.6**
Incremental impact, considering time value (p/unit)			**2.4**	**1.2**	**0.7**	**0.0**	**-0.4**

Discount rate= 9.35%

It is observed from the above table that the incremental impact on PPC is just 2.4 paisa per unit for FY11 and it decreases to -0.4 paisa per unit for FY15.

This pan India RPO trajectory is an aggregation of state wise RPO levels, which have been taken considering the state wise available potential, installed capacities and existing RPO level being met. The state wise RPO details are as shown in the table below.

Table 12: State wise RPO summary for Scenario-1

State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
TN	11.4%	12.0%	13.0%	13.5%	14.0%	14.0%	14.0%
Karnataka	10.6%	11.0%	12.0%	12.5%	13.0%	13.0%	13.0%
Maharashtra	4.0%	5.0%	6.5%	8.0%	9.0%	10.0%	11.0%
Kerala	5.0%	6.0%	8.0%	9.0%	10.0%	10.5%	11.0%
Gujarat	2.0%	2.0%	4.0%	6.0%	8.0%	10.0%	11.0%
Rajasthan	4.7%	5.0%	7.0%	8.0%	9.0%	10.0%	11.0%
AP	3.7%	3.7%	5.5%	7.0%	8.0%	9.0%	10.0%
UP	2.4%	2.5%	4.5%	6.5%	8.0%	9.0%	10.0%
HP	4.2%	4.5%	6.0%	7.5%	8.5%	9.5%	10.0%
Chhattisgarh	3.2%	3.2%	4.5%	6.0%	7.0%	8.0%	9.0%
Punjab	0.8%	1.0%	4.0%	6.0%	7.0%	8.0%	9.0%
Uttarakhand	1.3%	1.5%	3.5%	5.5%	7.0%	8.0%	9.0%
MP	0.1%	0.2%	2.0%	4.0%	5.0%	6.0%	7.0%
WB	0.8%	0.9%	2.0%	4.0%	5.0%	6.0%	7.0%

State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Haryana	0.1%	0.2%	2.0%	4.0%	5.0%	6.0%	7.0%
Delhi	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Bihar	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Jharkhand	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
J&K	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Orissa	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Assam	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Arunachal Pradesh	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Manipur	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Meghalaya	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Nagaland	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Mizoram	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Tripura	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Sikkim	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Andaman & Nicobar	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Chandigarh	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Goa	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Dadra & Nagar Haveli	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Daman and Diu	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Lakshadweep	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%
Puducherry	0.0%	0.0%	2.0%	4.0%	5.0%	6.0%	7.0%

5.3 Pan India Scenario-2

Figure 19: Pan India RPO Trajectory Scenario-2

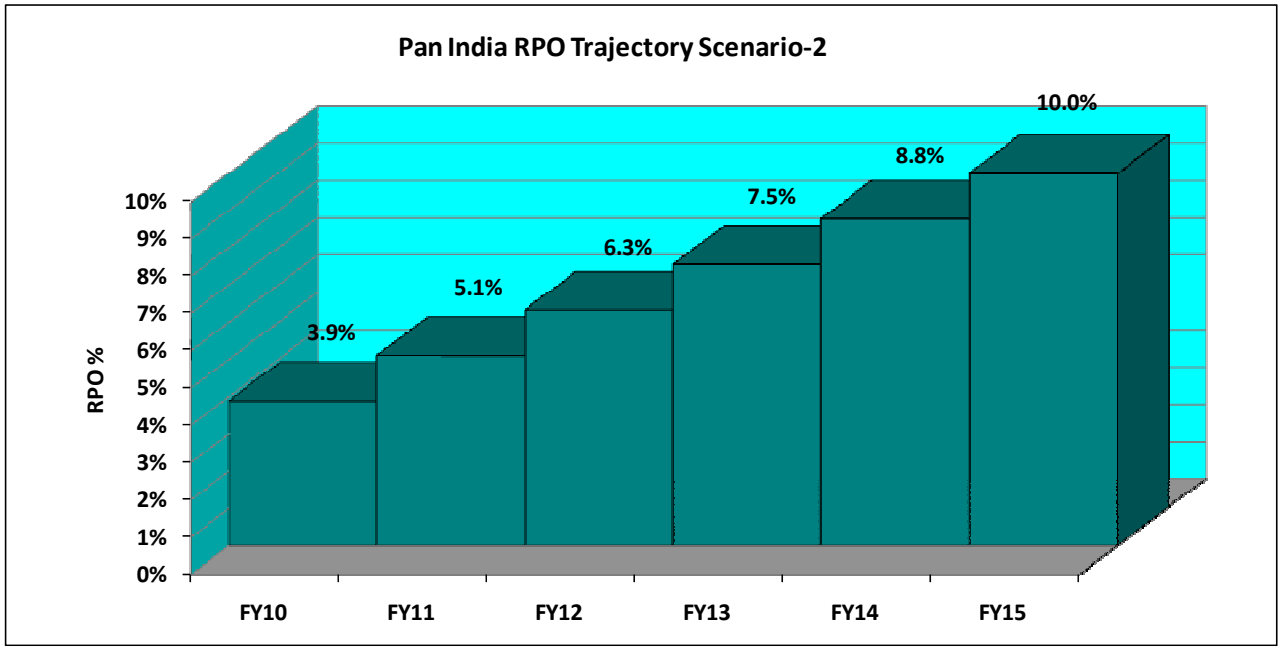
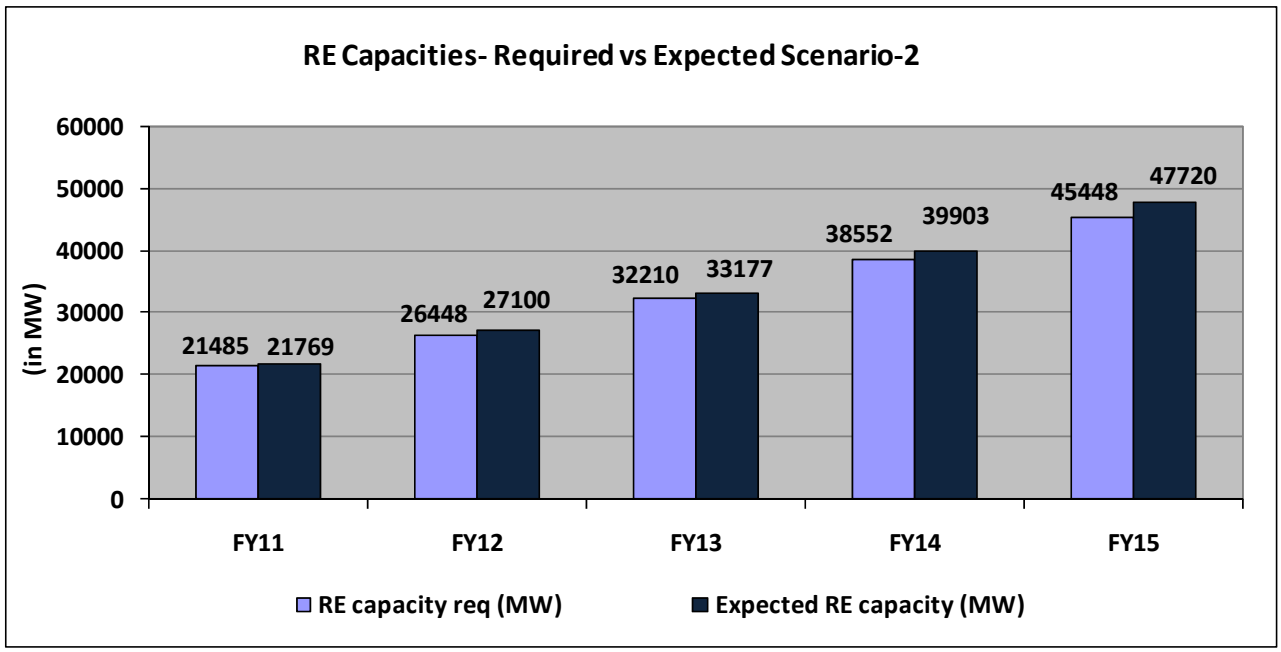


Figure 20: RE Capacity Required vs Expected (in MW) for Scenario-2



The above graphs show scenario-2 for the pan India RPO trajectory. As evident from the graph, in this scenario the increase in RPO level is same for all years. Also, sufficient RE capacity is expected to come up to facilitate meeting the RPO targets as per the trajectory.

The table below shows the year wise incremental impact on PPC that would be incurred for meeting the RPO targets.

Table 13: Details for pan India Scenario-2

Item	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Total Energy (MUs)	675573	731845	793911	862222	937263	1012304	1087345
RE energy (MUs)	24322	28472	40513	54481	70726	88754	108567
RPO %	**3.6%**	**3.9%**	**5.1%**	**6.3%**	**7.5%**	**8.8%**	**10.0%**
Increase in RPO			1.2%	1.2%	1.2%	1.2%	1.2%
Impact of inclusion of RE (p/unit)	5.6	5.6	7.1	8.9	10.9	12.6	13.9
Incremental impact (p/unit)			**1.5**	**1.7**	**2.0**	**1.7**	**1.3**
Time value of Impact of inclusion of RE (p/unit)*			7.1	8.1	9.1	9.6	9.7
Incremental impact, considering time value (p/unit)			**1.5**	**1.0**	**1.0**	**0.5**	**0.1**

The key message from the above table is the low incremental impact on the PPC (less than 1.5 paisa per unit). The incremental impact on PPC is 1.5 paisa per unit for FY11 and gradually decreases to 0.1 paisa per unit for FY15.

This pan India RPO trajectory is an aggregation of state wise RPO levels, which have been taken considering the state wise available potential, installed capacities and existing RPO level being met. The state wise RPO details are as shown in the table below.

Table 14: State wise RPO summary for Scenario-2

State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
TN	11.4%	12.0%	12.4%	12.8%	13.2%	13.6%	14.0%
Karnataka	10.6%	11.0%	11.4%	11.8%	12.2%	12.6%	13.0%
Maharashtra	4.0%	5.0%	6.2%	7.4%	8.6%	9.8%	11.0%
Kerala	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%	11.0%
Gujarat	2.0%	2.0%	3.8%	5.6%	7.4%	9.2%	11.0%
Rajasthan	4.7%	5.0%	6.2%	7.4%	8.6%	9.8%	11.0%
AP	3.7%	3.7%	5.0%	6.2%	7.5%	8.7%	10.0%
UP	2.4%	2.5%	4.0%	5.5%	7.0%	8.5%	10.0%
HP	4.2%	4.5%	5.6%	6.7%	7.8%	8.9%	10.0%
Chhattisgarh	3.2%	3.2%	4.4%	5.5%	6.7%	7.8%	9.0%
Punjab	0.8%	1.0%	2.6%	4.2%	5.8%	7.4%	9.0%
Uttarakhand	1.3%	1.5%	3.0%	4.5%	6.0%	7.5%	9.0%
MP	0.1%	0.2%	1.5%	2.9%	4.3%	5.6%	7.0%
WB	0.8%	0.9%	2.1%	3.3%	4.6%	5.8%	7.0%
Haryana	0.1%	0.2%	1.6%	2.9%	4.3%	5.6%	7.0%
Delhi	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%

State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Bihar	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Jharkhand	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
J&K	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Orissa	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Assam	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Arunachal Pradesh	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Manipur	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Meghalaya	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Nagaland	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Mizoram	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Tripura	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Sikkim	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Andaman & Nicobar	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Chandigarh	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Goa	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Dadra & Nagar Haveli	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Daman and Diu	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Lakshadweep	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%
Puducherry	0.0%	0.0%	1.4%	2.8%	4.2%	5.6%	7.0%

5.4 Pan India Scenario-3

Figure 21: Pan India RPO Trajectory Scenario-3

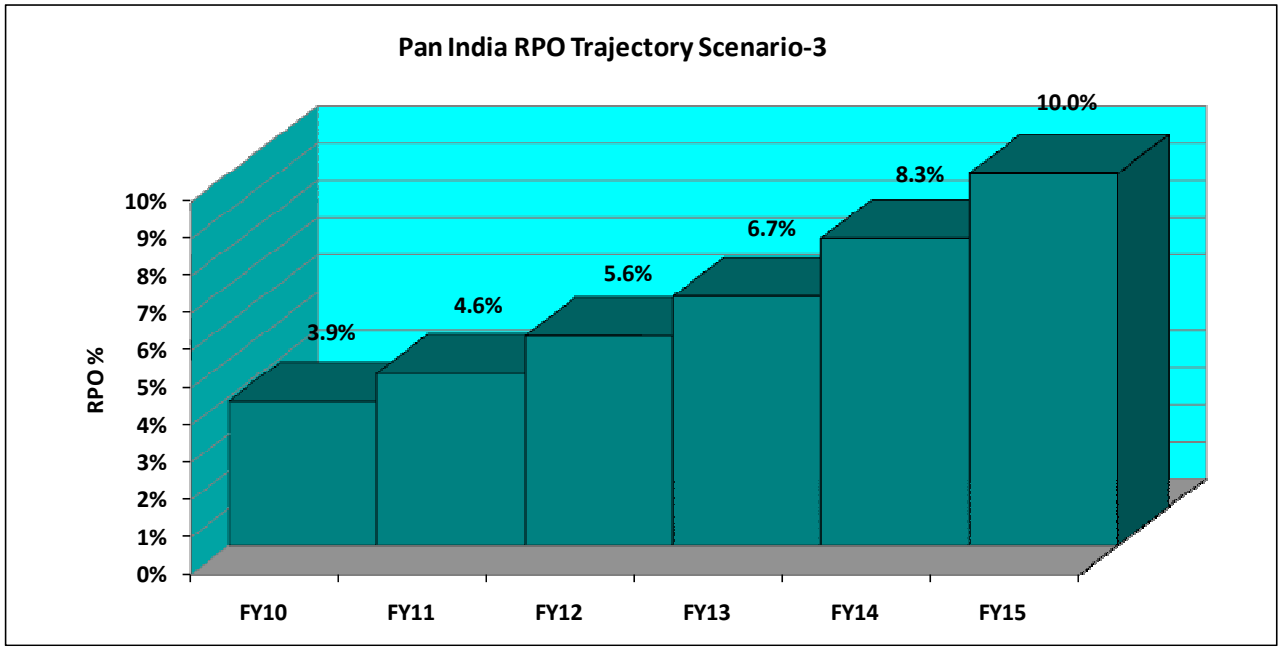
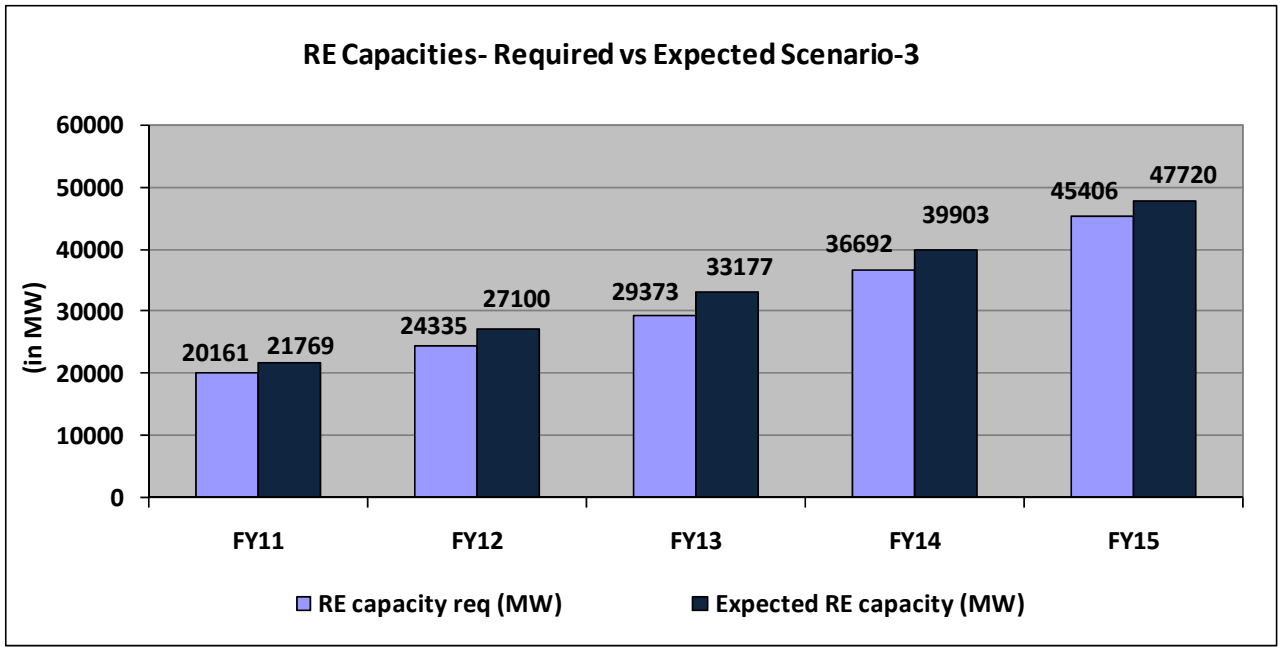


Figure 22: RE Capacity Required vs Expected (in MW) for Scenario-3



The above graphs show scenario-3 for the pan India RPO trajectory. As evident from the graph, in this scenario the increase in RPO level is slower in the initial years and more increase in the later years. Also, sufficient RE capacity is expected to come up to facilitate meeting the RPO targets as per the trajectory.

The table below shows the year wise incremental impact on PPC that would be incurred for meeting the RPO targets.

Table 15: Details for pan India Scenario-3

Item	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Total Energy (MUs)	675573	731845	793911	862222	937263	1012304	1087345
RE energy (MUs)	24322	28472	36774	48522	62727	83532	108567
RPO %	**3.6%**	**3.9%**	**4.6%**	**5.6%**	**6.7%**	**8.3%**	**10.0%**
Increase in RPO			0.7%	1.0%	1.1%	1.6%	1.7%
Impact of inclusion of RE (p/unit)	5.6	5.6	6.5	8.0	9.9	12.0	14.0
Incremental impact (p/unit)			**0.9**	**1.5**	**1.9**	**2.1**	**2.0**
Time value of Impact of inclusion of RE (p/unit)*			6.5	7.3	8.3	9.1	9.8
Incremental impact, considering time value (p/unit)			**0.9**	**0.8**	**0.9**	**0.9**	**0.6**

The key message from the above table is the low incremental impact on the PPC (less than 1 paisa per unit). The incremental impact on PPC is 0.9 paisa per unit for FY11 and is 0.6 paisa per unit for FY15.

This pan India RPO trajectory is an aggregation of state wise RPO levels, which have been taken considering the state wise available potential, installed capacities and existing RPO level being met. The state wise RPO details are as shown in the table below.

Table 16: State wise RPO summary for Scenario-3

State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
TN	11.4%	12.0%	12.0%	12.5%	13.0%	13.5%	14.0%
Karnataka	10.6%	11.0%	11.0%	11.5%	12.0%	12.5%	13.0%
Maharashtra	4.0%	5.0%	6.0%	7.0%	8.0%	9.5%	11.0%
Kerala	5.0%	6.0%	6.5%	7.0%	8.0%	9.0%	11.0%
Gujarat	2.0%	2.0%	3.0%	5.0%	7.0%	9.0%	11.0%
Rajasthan	4.7%	5.0%	6.0%	7.0%	8.0%	9.0%	11.0%
AP	3.7%	3.7%	4.5%	5.5%	6.5%	8.0%	10.0%
UP	2.4%	2.5%	3.5%	4.5%	6.0%	8.0%	10.0%
HP	4.2%	4.5%	5.0%	6.0%	7.0%	8.5%	10.0%
Chhattisgarh	3.2%	3.2%	4.0%	5.0%	6.0%	7.5%	9.0%
Punjab	0.8%	1.0%	2.0%	3.0%	4.0%	6.0%	9.0%
Uttarakhand	1.3%	1.5%	2.5%	3.5%	5.0%	7.0%	9.0%
MP	0.1%	0.2%	1.0%	2.0%	3.0%	5.0%	7.0%
WB	0.8%	0.9%	1.0%	2.0%	3.0%	5.0%	7.0%
Haryana	0.1%	0.2%	1.0%	2.0%	3.0%	5.0%	7.0%
Delhi	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Bihar	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%

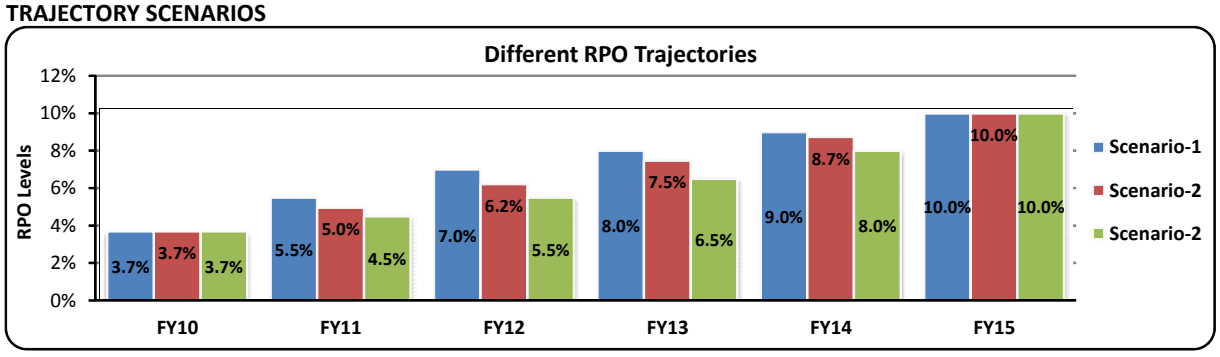
State	RPO %						
	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Jharkhand	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
J&K	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Orissa	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Assam	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Arunachal Pradesh	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Manipur	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Meghalaya	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Nagaland	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Mizoram	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Tripura	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Sikkim	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Andaman & Nicobar	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Chandigarh	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Goa	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Dadra & Nagar Haveli	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Daman and Diu	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Lakshadweep	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%
Puducherry	0.0%	0.0%	1.0%	2.0%	3.0%	5.0%	7.0%

ANNEXURE 1- Andhra Pradesh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	66,754	72,964	79,952	87,444	95,908	104,371	112,835	
PPC without RE	Rs./Unit	2.16	2.24	2.31	2.40	2.48	2.57	2.66	3.52%
Cost of power purchase, without RE	Rs. Crores	14,419	16,315	18,507	20,953	23,790	26,800	29,993	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**3.70%**	**3.70%**	**4.96%**	**6.22%**	**7.48%**	**8.74%**	**10.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	64,284	70,265	75,987	82,005	88,734	95,249	101,551	
Renewable Energy Purchase	MUs	2,470	2,700	3,966	5,439	7,174	9,122	11,283	
- Non Solar	MUs	2,470	2,700	3,926	5,352	7,030	8,913	11,001	
- Solar	MUs	-	-	40.0	87.4	143.9	208.7	282.1	
RE (Non-Solar) Tariff	Rs./Unit	2.67	4.12	4.23	4.23	4.44	4.44	4.44	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	13,885	15,711	17,589	19,650	22,010	24,458	26,994	
Renewable Energy Purchase Costs	Rs. Crores	659	754	1,347	2,038	2,887	3,844	4,907	
Total Power Purchase Costs	Rs. Crores	14,545	16,465	18,935	21,687	24,898	28,301	31,900	
Total Per unit Cost of power	Rs./Unit	2.18	2.26	2.37	2.48	2.60	2.71	2.83	
Difference in Power Purchase Cost	**Rs./Unit**	**0.019**	**0.021**	**0.054**	**0.084**	**0.116**	**0.144**	**0.169**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

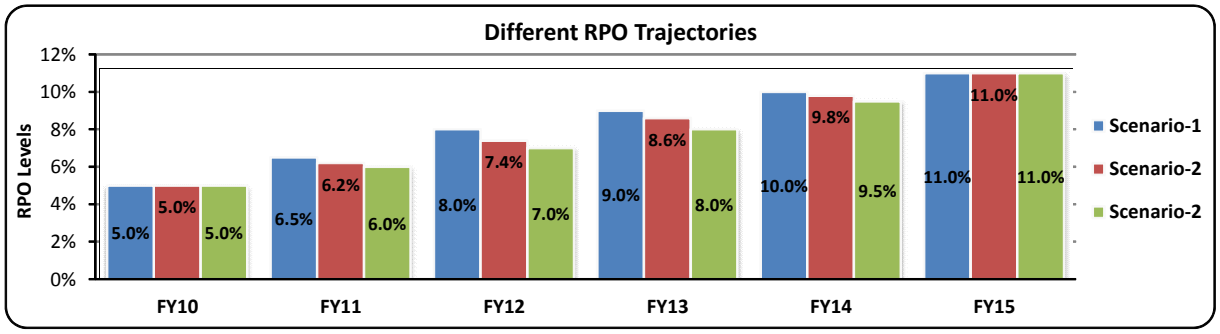
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.8%	1.5%	1.0%	1.0%	1.0%
RPO Level	**%**	**3.7%**	**3.7%**	**5.5%**	**7.0%**	**8.0%**	**9.0%**	**10.0%**
Impact on PPC	Paisa/ unit	1.9	2.1	6.4	9.8	12.4	14.7	16.8
Incremental impact on PPC	Paisa/ unit		0.2	4.3	3.4	2.6	2.3	2.0
Discounted Impact on PPC	**Paisa/ unit**			**6.4**	**9.0**	**10.4**	**11.3**	**11.7**
Discounted Incremental Impact	**Paisa/ unit**			**4.3**	**2.6**	**1.4**	**0.9**	**0.5**
SCENARIO-2								
Increase in RPO Level:				1.3%	1.3%	1.3%	1.3%	1.3%
RPO Level	**%**	**3.7%**	**3.7%**	**5.0%**	**6.2%**	**7.5%**	**8.7%**	**10.0%**
Impact on PPC	Paisa/ unit	1.9	2.1	5.4	8.4	11.6	14.4	16.9
Incremental impact on PPC	Paisa/ unit		0.2	3.3	3.0	3.2	2.8	2.5
Discounted Impact on PPC	**Paisa/ unit**			**5.4**	**7.7**	**9.7**	**11.0**	**11.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.3**	**2.3**	**2.0**	**1.3**	**0.8**
SCENARIO-2								
Increase in RPO Level:				0.8%	1.0%	1.0%	1.5%	2.0%
RPO Level	**%**	**3.7%**	**3.7%**	**4.5%**	**5.5%**	**6.5%**	**8.0%**	**10.0%**
Impact on PPC	Paisa/ unit	1.9	2.1	4.5	7.1	9.8	13.1	17.0
Incremental impact on PPC	Paisa/ unit		0.2	2.4	2.6	2.7	3.4	3.9
Discounted Impact on PPC	**Paisa/ unit**			**4.5**	**6.5**	**8.2**	**10.0**	**11.9**
Discounted Incremental Impact	**Paisa/ unit**			**2.4**	**2.0**	**1.7**	**1.9**	**1.9**

ANNEXURE 2- Maharashtra

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	95,750	101,968	108,627	115,759	123,418	131,076	138,734	
PPC without RE	Rs./Unit	2.66	2.79	2.93	3.08	3.23	3.39	3.55	4.92%
Cost of power purchase, without RE	Rs. Crores	25,497	28,489	31,842	35,603	39,825	44,378	49,281	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**3.95%**	**5.00%**	**6.20%**	**7.40%**	**8.60%**	**9.80%**	**11.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	91,968	96,870	101,892	107,193	112,804	118,230	123,473	
Renewable Energy Purchase	MUs	3,782	5,098	6,735	8,566	10,614	12,845	15,261	
- Non Solar	MUs	3,782	5,098	6,681	8,450	10,429	12,583	14,914	
- Solar	MUs	-	-	54.3	115.8	185.1	262.2	346.8	
RE (Non-Solar) Tariff	Rs./Unit	3.31	3.99	4.59	4.59	4.82	4.82	4.82	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	24,490	27,064	29,868	32,968	36,400	40,029	43,860	
Renewable Energy Purchase Costs	Rs. Crores	1,251	1,776	2,602	3,527	4,607	5,787	7,066	
Total Power Purchase Costs	Rs. Crores	25,741	28,840	32,470	36,495	41,008	45,816	50,926	
Total Per unit Cost of power	Rs./Unit	2.69	2.83	2.99	3.15	3.32	3.50	3.67	
Difference in Power Purchase Cost	**Rs./Unit**	**0.025**	**0.034**	**0.058**	**0.077**	**0.096**	**0.110**	**0.119**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

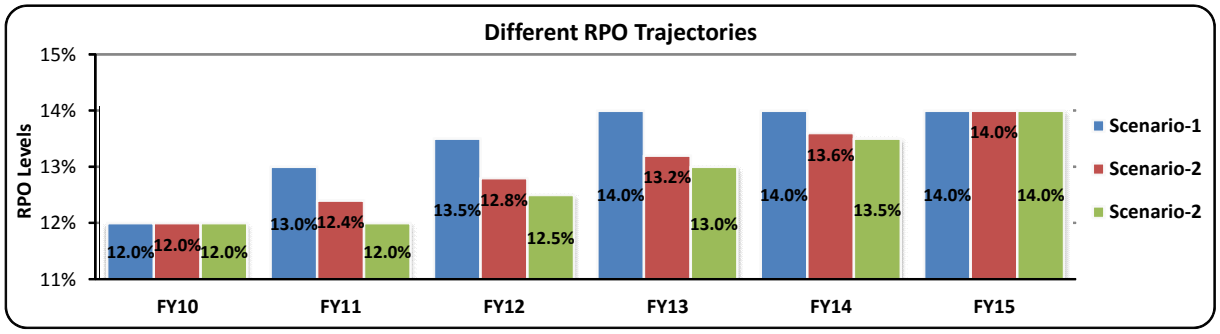
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.5%	1.5%	1.0%	1.0%	1.0%
RPO Level	**%**	**4.0%**	**5.0%**	**6.5%**	**8.0%**	**9.0%**	**10.0%**	**11.0%**
Impact on PPC	Paisa/ unit	2.5	3.4	6.3	8.6	10.1	11.1	11.7
Incremental impact on PPC	Paisa/ unit		0.9	2.8	2.3	1.5	1.0	0.6
Discounted Impact on PPC	**Paisa/ unit**			**6.3**	**7.9**	**8.4**	**8.5**	**8.2**
Discounted Incremental Impact	**Paisa/ unit**			**2.8**	**1.6**	**0.6**	**0.1**	**-0.3**
SCENARIO-2								
Increase in RPO Level:				1.2%	1.2%	1.2%	1.2%	1.2%
RPO Level	**%**	**4.0%**	**5.0%**	**6.2%**	**7.4%**	**8.6%**	**9.8%**	**11.0%**
Impact on PPC	Paisa/ unit	2.5	3.4	5.8	7.7	9.6	11.0	11.9
Incremental impact on PPC	Paisa/ unit		0.9	2.3	1.9	1.9	1.4	0.9
Discounted Impact on PPC	**Paisa/ unit**			**5.8**	**7.0**	**8.0**	**8.4**	**8.3**
Discounted Incremental Impact	**Paisa/ unit**			**2.3**	**1.3**	**1.0**	**0.4**	**-0.1**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	1.5%	1.5%
RPO Level	**%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.5%**	**11.0%**
Impact on PPC	Paisa/ unit	2.5	3.4	5.4	7.1	8.7	10.6	11.9
Incremental impact on PPC	Paisa/ unit		0.9	2.0	1.7	1.6	1.9	1.3
Discounted Impact on PPC	**Paisa/ unit**			**5.4**	**6.5**	**7.3**	**8.1**	**8.3**
Discounted Incremental Impact	**Paisa/ unit**			**2.0**	**1.1**	**0.8**	**0.8**	**0.2**

ANNEXURE 3- Tamil Nadu

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	64,090	69,701	76,155	83,545	92,650	101,756	110,862	
PPC without RE	Rs./Unit	2.58	2.71	2.84	2.98	3.13	3.28	3.44	4.92%
Cost of power purchase, without RE	Rs. Crores	16,535	18,868	21,629	24,895	28,967	33,379	38,155	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**11.40%**	**12.00%**	**12.40%**	**12.80%**	**13.20%**	**13.60%**	**14.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	56,784	61,337	66,712	72,851	80,421	87,917	95,341	
Renewable Energy Purchase	MUs	7,306	8,364	9,443	10,694	12,230	13,839	15,521	
- Non Solar	MUs	7,306	8,364	9,405	10,610	12,091	13,635	15,244	
- Solar	MUs	-	-	38.1	83.5	139.0	203.5	277.2	
RE (Non-Solar) Tariff	Rs./Unit	3.21	3.78	4.70	4.70	4.94	4.94	4.94	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	14,650	16,604	18,947	21,709	25,143	28,839	32,813	
Renewable Energy Purchase Costs	Rs. Crores	2,342	2,742	3,302	3,952	4,786	5,668	6,598	
Total Power Purchase Costs	Rs. Crores	16,992	19,345	22,248	25,661	29,929	34,507	39,411	
Total Per unit Cost of power	Rs./Unit	2.65	2.78	2.92	3.07	3.23	3.39	3.55	
Difference in Power Purchase Cost	**Rs./Unit**	**0.071**	**0.069**	**0.081**	**0.092**	**0.104**	**0.111**	**0.113**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

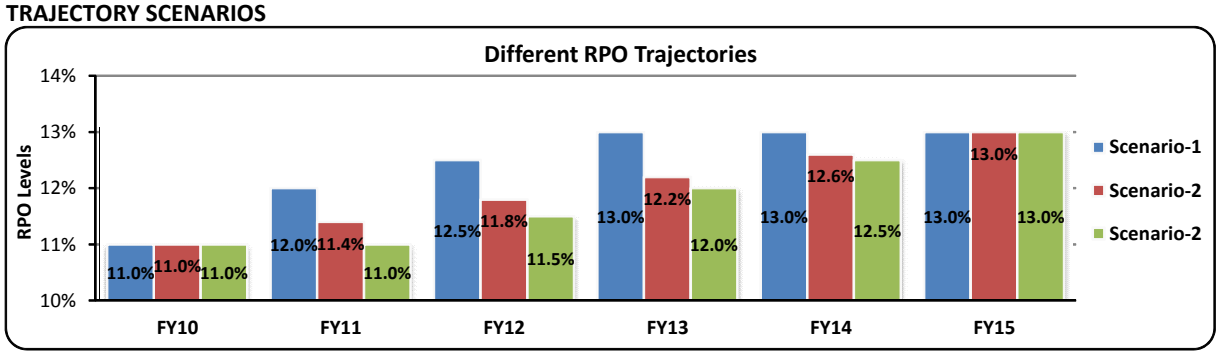
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.0%	0.5%	0.5%	0.0%	0.0%
RPO Level	**%**	**11.4%**	**12.0%**	**13.0%**	**13.5%**	**14.0%**	**14.0%**	**14.0%**
Impact on PPC	Paisa/ unit	7.1	6.9	9.3	10.4	11.7	11.6	11.2
Incremental impact on PPC	Paisa/ unit		-0.3	2.4	1.1	1.3	-0.1	-0.4
Discounted Impact on PPC	**Paisa/ unit**			**9.3**	**9.5**	**9.8**	**8.9**	**7.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.4**	**0.2**	**0.3**	**-0.9**	**-1.0**
SCENARIO-2								
Increase in RPO Level:				0.4%	0.4%	0.4%	0.4%	0.4%
RPO Level	**%**	**11.4%**	**12.0%**	**12.4%**	**12.8%**	**13.2%**	**13.6%**	**14.0%**
Impact on PPC	Paisa/ unit	7.1	6.9	8.1	9.2	10.4	11.1	11.3
Incremental impact on PPC	Paisa/ unit		-0.3	1.3	1.0	1.2	0.7	0.2
Discounted Impact on PPC	**Paisa/ unit**			**8.1**	**8.4**	**8.7**	**8.5**	**7.9**
Discounted Incremental Impact	**Paisa/ unit**			**1.3**	**0.2**	**0.3**	**-0.2**	**-0.6**
SCENARIO-2								
Increase in RPO Level:				0.0%	0.5%	0.5%	0.5%	0.5%
RPO Level	**%**	**11.4%**	**12.0%**	**12.0%**	**12.5%**	**13.0%**	**13.5%**	**14.0%**
Impact on PPC	Paisa/ unit	7.1	6.9	7.4	8.6	10.1	11.0	11.4
Incremental impact on PPC	Paisa/ unit		-0.3	0.5	1.3	1.4	0.9	0.4
Discounted Impact on PPC	**Paisa/ unit**			**7.4**	**7.9**	**8.4**	**8.4**	**8.0**
Discounted Incremental Impact	**Paisa/ unit**			**0.5**	**0.5**	**0.5**	**0.0**	**-0.4**

ANNEXURE 4- Karnataka

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	40,700	43,807	47,281	51,183	56,242	61,300	66,358	
PPC without RE	Rs./Unit	2.31	2.46	2.63	2.80	2.98	3.18	3.39	6.59%
Cost of power purchase, without RE	Rs. Crores	9,408	10,793	12,417	14,327	16,779	19,493	22,491	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**10.59%**	**11.00%**	**11.40%**	**11.80%**	**12.20%**	**12.60%**	**13.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	36,390	38,988	41,891	45,144	49,380	53,576	57,732	
Renewable Energy Purchase	MUs	4,310	4,819	5,390	6,040	6,861	7,724	8,627	
- Non Solar	MUs	4,310	4,819	5,366	5,988	6,777	7,601	8,461	
- Solar	MUs	-	-	23.6	51.2	84.4	122.6	165.9	
RE (Non-Solar) Tariff	Rs./Unit	3.30	4.25	4.61	4.61	4.84	4.84	4.84	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	8,412	9,606	11,001	12,636	14,732	17,037	19,567	
Renewable Energy Purchase Costs	Rs. Crores	1,423	1,639	1,935	2,272	2,715	3,184	3,679	
Total Power Purchase Costs	Rs. Crores	9,835	11,245	12,936	14,908	17,447	20,220	23,246	
Total Per unit Cost of power	Rs./Unit	2.42	2.57	2.74	2.91	3.10	3.30	3.50	
Difference in Power Purchase Cost	**Rs./Unit**	**0.105**	**0.103**	**0.110**	**0.114**	**0.119**	**0.119**	**0.114**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

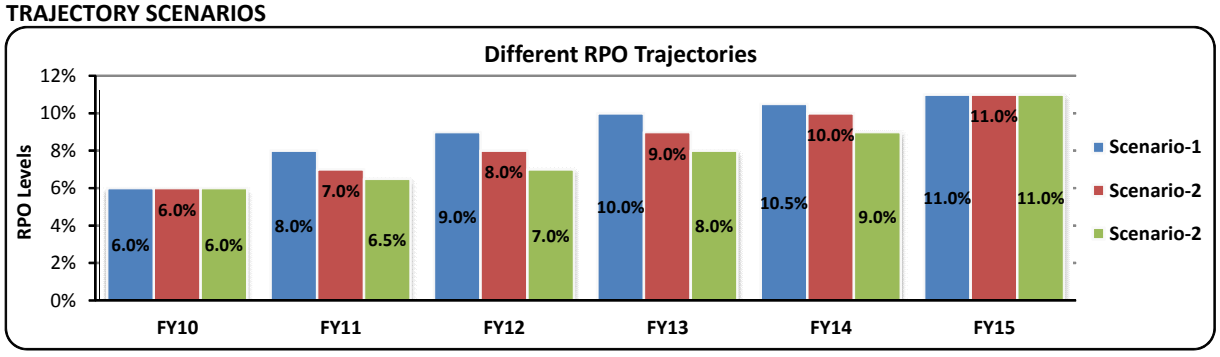
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.0%	0.5%	0.5%	0.0%	0.0%
RPO Level	**%**	**10.6%**	**11.0%**	**12.0%**	**12.5%**	**13.0%**	**13.0%**	**13.0%**
Impact on PPC	Paisa/ unit	10.5	10.3	12.2	12.6	13.2	12.4	11.3
Incremental impact on PPC	Paisa/ unit		-0.2	1.9	0.5	0.6	-0.8	-1.1
Discounted Impact on PPC	**Paisa/ unit**			**12.2**	**11.5**	**11.0**	**9.5**	**7.9**
Discounted Incremental Impact	**Paisa/ unit**			**1.9**	**-0.6**	**-0.5**	**-1.6**	**-1.6**
SCENARIO-2								
Increase in RPO Level:				0.4%	0.4%	0.4%	0.4%	0.4%
RPO Level	**%**	**10.6%**	**11.0%**	**11.4%**	**11.8%**	**12.2%**	**12.6%**	**13.0%**
Impact on PPC	Paisa/ unit	10.5	10.3	11.0	11.4	11.9	11.9	11.4
Incremental impact on PPC	Paisa/ unit		-0.2	0.7	0.4	0.5	0.0	-0.5
Discounted Impact on PPC	**Paisa/ unit**			**11.0**	**10.4**	**9.9**	**9.1**	**8.0**
Discounted Incremental Impact	**Paisa/ unit**			**0.7**	**-0.6**	**-0.5**	**-0.8**	**-1.1**
SCENARIO-2								
Increase in RPO Level:				0.0%	0.5%	0.5%	0.5%	0.5%
RPO Level	**%**	**10.6%**	**11.0%**	**11.0%**	**11.5%**	**12.0%**	**12.5%**	**13.0%**
Impact on PPC	Paisa/ unit	10.5	10.3	10.2	10.8	11.6	11.8	11.4
Incremental impact on PPC	Paisa/ unit		-0.2	-0.1	0.6	0.7	0.2	-0.3
Discounted Impact on PPC	**Paisa/ unit**			**10.2**	**9.9**	**9.7**	**9.0**	**8.0**
Discounted Incremental Impact	**Paisa/ unit**			**-0.1**	**-0.3**	**-0.2**	**-0.7**	**-1.0**

ANNEXURE 5- Kerala

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	15,551	16,449	17,465	18,579	19,951	21,323	22,696	
PPC without RE	Rs./Unit	1.67	1.76	1.85	1.94	2.04	2.15	2.26	5.11%
Cost of power purchase, without RE	Rs. Crores	2,604	2,896	3,232	3,614	4,079	4,582	5,127	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**5.00%**	**6.00%**	**7.00%**	**8.00%**	**9.00%**	**10.00%**	**11.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	14,773	15,462	16,242	17,093	18,156	19,191	20,199	
Renewable Energy Purchase	MUs	778	987	1,223	1,486	1,796	2,132	2,497	
- Non Solar	MUs	778	987	1,214	1,468	1,766	2,090	2,440	
- Solar	MUs	-	-	8.7	18.6	29.9	42.6	56.7	
RE (Non-Solar) Tariff	Rs./Unit	2.51	4.19	4.34	4.34	4.56	4.56	4.56	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	2,474	2,722	3,005	3,325	3,712	4,124	4,563	
Renewable Energy Purchase Costs	Rs. Crores	195	283	397	526	683	854	1,039	
Total Power Purchase Costs	Rs. Crores	2,669	3,005	3,403	3,850	4,394	4,978	5,602	
Total Per unit Cost of power	Rs./Unit	1.72	1.83	1.95	2.07	2.20	2.33	2.47	
Difference in Power Purchase Cost	**Rs./Unit**	**0.042**	**0.066**	**0.098**	**0.127**	**0.158**	**0.185**	**0.209**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

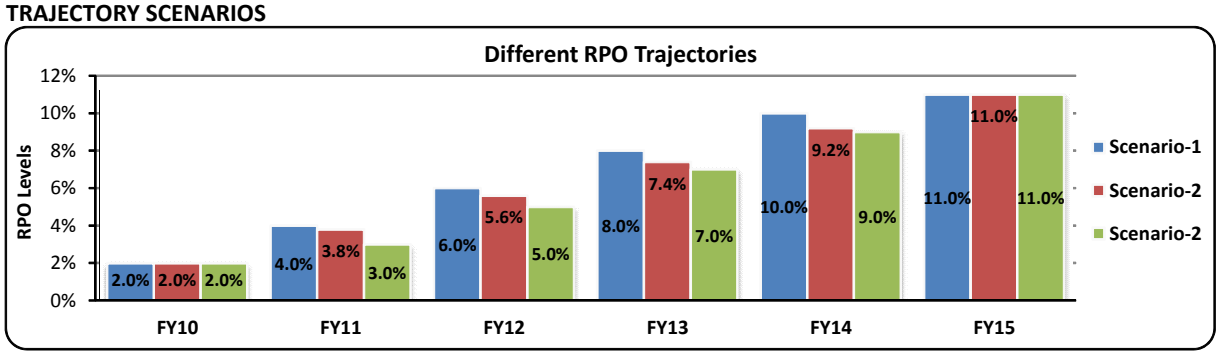
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	1.0%	1.0%	0.5%	0.5%
RPO Level	**%**	**5.0%**	**6.0%**	**8.0%**	**9.0%**	**10.0%**	**10.5%**	**11.0%**
Impact on PPC	Paisa/ unit	4.2	6.6	12.3	15.1	18.1	19.6	20.8
Incremental impact on PPC	Paisa/ unit		2.5	5.7	2.8	3.0	1.4	1.2
Discounted Impact on PPC	**Paisa/ unit**			**12.3**	**13.8**	**15.2**	**15.0**	**14.5**
Discounted Incremental Impact	**Paisa/ unit**			**5.7**	**1.5**	**1.3**	**-0.2**	**-0.4**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**	**10.0%**	**11.0%**
Impact on PPC	Paisa/ unit	4.2	6.6	9.8	12.7	15.8	18.5	20.9
Incremental impact on PPC	Paisa/ unit		2.5	3.2	2.9	3.1	2.7	2.4
Discounted Impact on PPC	**Paisa/ unit**			**9.8**	**11.7**	**13.2**	**14.2**	**14.6**
Discounted Incremental Impact	**Paisa/ unit**			**3.2**	**1.8**	**1.6**	**1.0**	**0.5**
SCENARIO-2								
Increase in RPO Level:				0.5%	0.5%	1.0%	1.0%	2.0%
RPO Level	**%**	**5.0%**	**6.0%**	**6.5%**	**7.0%**	**8.0%**	**9.0%**	**11.0%**
Impact on PPC	Paisa/ unit	4.2	6.6	8.6	10.3	13.5	16.3	21.1
Incremental impact on PPC	Paisa/ unit		2.5	1.9	1.8	3.2	2.8	4.8
Discounted Impact on PPC	**Paisa/ unit**			**8.6**	**9.5**	**11.3**	**12.5**	**14.8**
Discounted Incremental Impact	**Paisa/ unit**			**1.9**	**0.9**	**1.8**	**1.2**	**2.3**

ANNEXURE 6- Gujarat

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	60,885	65,852	71,312	77,319	83,407	89,494	95,582	
PPC without RE	Rs./Unit	2.44	2.55	2.66	2.78	2.90	3.03	3.17	4.43%
Cost of power purchase, without RE	Rs. Crores	14,856	16,780	18,977	21,488	24,207	27,125	30,255	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**2.00%**	**2.00%**	**3.80%**	**5.60%**	**7.40%**	**9.20%**	**11.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	59,667	64,535	68,602	72,989	77,234	81,261	85,068	
Renewable Energy Purchase	MUs	1,218	1,317	2,710	4,330	6,172	8,233	10,514	
- Non Solar	MUs	1,218	1,317	2,674	4,253	6,047	8,054	10,275	
- Solar	MUs	-	-	35.7	77.3	125.1	179.0	239.0	
RE (Non-Solar) Tariff	Rs./Unit	3.37	3.38	4.61	4.61	4.84	4.84	4.84	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	14,559	16,445	18,256	20,284	22,416	24,630	26,927	
Renewable Energy Purchase Costs	Rs. Crores	410	444	1,135	1,940	2,897	3,968	5,154	
Total Power Purchase Costs	Rs. Crores	14,969	16,888	19,391	22,224	25,312	28,598	32,080	
Total Per unit Cost of power	Rs./Unit	2.46	2.56	2.72	2.87	3.03	3.20	3.36	
Difference in Power Purchase Cost	**Rs./Unit**	**0.019**	**0.016**	**0.058**	**0.095**	**0.133**	**0.165**	**0.191**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

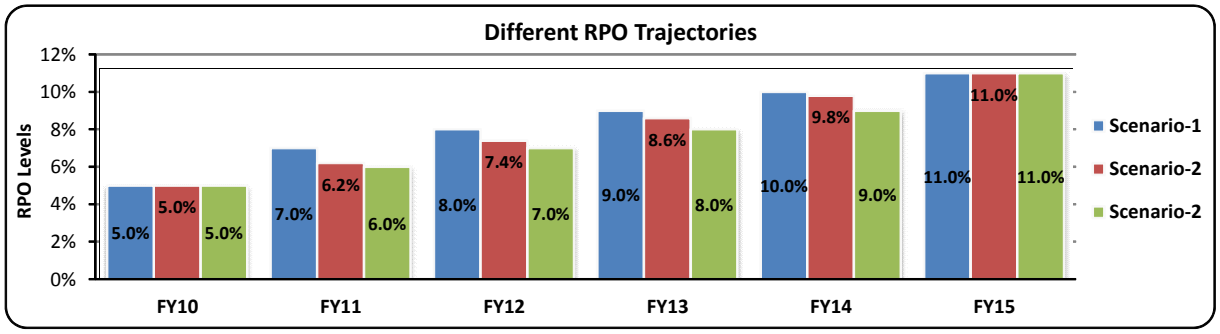
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	2.0%	2.0%	1.0%
RPO Level	**%**	**2.0%**	**2.0%**	**4.0%**	**6.0%**	**8.0%**	**10.0%**	**11.0%**
Impact on PPC	Paisa/ unit	1.9	1.6	6.2	10.3	14.3	17.8	19.0
Incremental impact on PPC	Paisa/ unit		-0.2	4.6	4.1	4.1	3.5	1.2
Discounted Impact on PPC	**Paisa/ unit**			**6.2**	**9.4**	**12.0**	**13.6**	**13.3**
Discounted Incremental Impact	**Paisa/ unit**			**4.6**	**3.2**	**2.6**	**1.6**	**-0.3**
SCENARIO-2								
Increase in RPO Level:				1.8%	1.8%	1.8%	1.8%	1.8%
RPO Level	**%**	**2.0%**	**2.0%**	**3.8%**	**5.6%**	**7.4%**	**9.2%**	**11.0%**
Impact on PPC	Paisa/ unit	1.9	1.6	5.8	9.5	13.3	16.5	19.1
Incremental impact on PPC	Paisa/ unit		-0.2	4.2	3.7	3.7	3.2	2.6
Discounted Impact on PPC	**Paisa/ unit**			**5.8**	**8.7**	**11.1**	**12.6**	**13.4**
Discounted Incremental Impact	**Paisa/ unit**			**4.2**	**2.9**	**2.4**	**1.5**	**0.8**
SCENARIO-2								
Increase in RPO Level:				1.0%	2.0%	2.0%	2.0%	2.0%
RPO Level	**%**	**2.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**	**9.0%**	**11.0%**
Impact on PPC	Paisa/ unit	1.9	1.6	4.2	8.4	12.6	16.2	19.2
Incremental impact on PPC	Paisa/ unit		-0.2	2.6	4.2	4.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**4.2**	**7.7**	**10.5**	**12.4**	**13.4**
Discounted Incremental Impact	**Paisa/ unit**			**2.6**	**3.5**	**2.8**	**1.9**	**1.0**

ANNEXURE 7- Rajasthan

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	36,898	39,693	42,724	46,015	49,562	53,109	56,655	
PPC without RE	Rs./Unit	2.40	2.54	2.70	2.86	3.03	3.21	3.40	6.00%
Cost of power purchase, without RE	Rs. Crores	8,856	10,098	11,521	13,153	15,017	17,057	19,288	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**4.70%**	**5.00%**	**6.20%**	**7.40%**	**8.60%**	**9.80%**	**11.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	35,164	37,708	40,075	42,610	45,300	47,904	50,423	
Renewable Energy Purchase	MUs	1,734	1,985	2,649	3,405	4,262	5,205	6,232	
- Non Solar	MUs	1,734	1,985	2,628	3,359	4,188	5,098	6,090	
- Solar	MUs	-	-	21.4	46.0	74.3	106.2	141.6	
RE (Non-Solar) Tariff	Rs./Unit	3.97	4.02	4.61	4.61	4.84	4.84	4.84	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	8,439	9,593	10,807	12,180	13,726	15,385	17,166	
Renewable Energy Purchase Costs	Rs. Crores	689	790	1,126	1,509	1,963	2,463	3,009	
Total Power Purchase Costs	Rs. Crores	9,129	10,383	11,933	13,689	15,688	17,848	20,175	
Total Per unit Cost of power	Rs./Unit	2.47	2.62	2.79	2.97	3.17	3.36	3.56	
Difference in Power Purchase Cost	**Rs./Unit**	**0.074**	**0.072**	**0.096**	**0.116**	**0.135**	**0.149**	**0.157**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

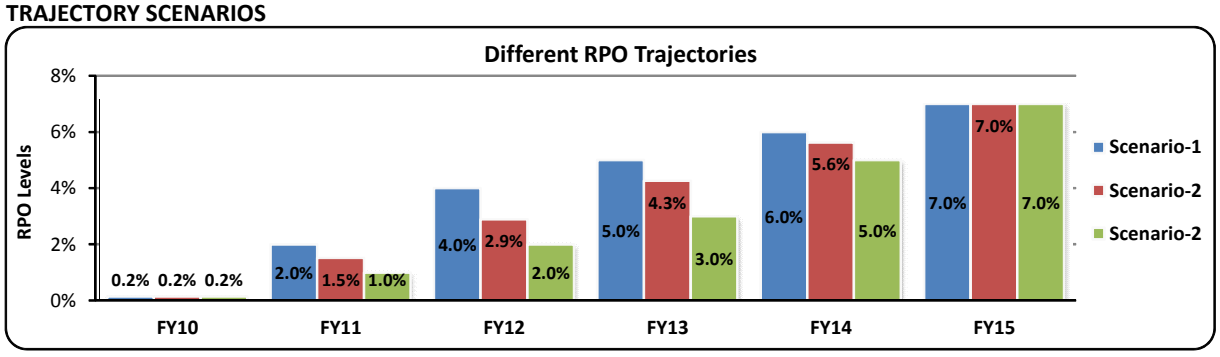
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	1.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**4.7%**	**5.0%**	**7.0%**	**8.0%**	**9.0%**	**10.0%**	**11.0%**
Impact on PPC	Paisa/ unit	7.4	7.2	11.2	12.7	14.1	15.1	15.5
Incremental impact on PPC	Paisa/ unit		-0.2	4.0	1.5	1.4	1.0	0.4
Discounted Impact on PPC	**Paisa/ unit**			**11.2**	**11.6**	**11.8**	**11.6**	**10.9**
Discounted Incremental Impact	**Paisa/ unit**			**4.0**	**0.4**	**0.2**	**-0.3**	**-0.7**
SCENARIO-2								
Increase in RPO Level:				1.2%	1.2%	1.2%	1.2%	1.2%
RPO Level	**%**	**4.7%**	**5.0%**	**6.2%**	**7.4%**	**8.6%**	**9.8%**	**11.0%**
Impact on PPC	Paisa/ unit	7.4	7.2	9.6	11.6	13.5	14.9	15.7
Incremental impact on PPC	Paisa/ unit		-0.2	2.5	2.0	1.9	1.3	0.8
Discounted Impact on PPC	**Paisa/ unit**			**9.6**	**10.6**	**11.3**	**11.4**	**10.9**
Discounted Incremental Impact	**Paisa/ unit**			**2.5**	**1.0**	**0.7**	**0.1**	**-0.4**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	1.0%	2.0%
RPO Level	**%**	**4.7%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**	**11.0%**
Impact on PPC	Paisa/ unit	7.4	7.2	9.3	10.9	12.5	13.7	15.7
Incremental impact on PPC	Paisa/ unit		-0.2	2.1	1.7	1.6	1.1	2.1
Discounted Impact on PPC	**Paisa/ unit**			**9.3**	**10.0**	**10.5**	**10.5**	**11.0**
Discounted Incremental Impact	**Paisa/ unit**			**2.1**	**0.8**	**0.5**	**0.0**	**0.5**

ANNEXURE 8- Madhya Pradesh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	34,790	37,310	40,106	43,207	46,903	50,600	54,297	
PPC without RE	Rs./Unit	1.97	2.11	2.26	2.42	2.59	2.77	2.96	7.00%
Cost of power purchase, without RE	Rs. Crores	6,865	7,878	9,061	10,445	12,132	14,004	16,079	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.10%**	**0.15%**	**1.52%**	**2.89%**	**4.26%**	**5.63%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	34,755	37,254	39,496	41,958	44,905	47,751	50,496	
Renewable Energy Purchase	MUs	35	56	610	1,249	1,998	2,849	3,801	
- Non Solar	MUs	35	56	590	1,205	1,928	2,748	3,665	
- Solar	MUs	-	-	20.1	43.2	70.4	101.2	135.7	
RE (Non-Solar) Tariff	Rs./Unit	3.92	4.34	4.49	4.49	4.72	4.72	4.72	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	6,858	7,866	8,923	10,143	11,615	13,216	14,954	
Renewable Energy Purchase Costs	Rs. Crores	14	23	299	619	1,009	1,453	1,949	
Total Power Purchase Costs	Rs. Crores	6,872	7,889	9,222	10,761	12,624	14,669	16,903	
Total Per unit Cost of power	Rs./Unit	1.98	2.11	2.30	2.49	2.69	2.90	3.11	
Difference in Power Purchase Cost	**Rs./Unit**	**0.002**	**0.003**	**0.040**	**0.073**	**0.105**	**0.131**	**0.152**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

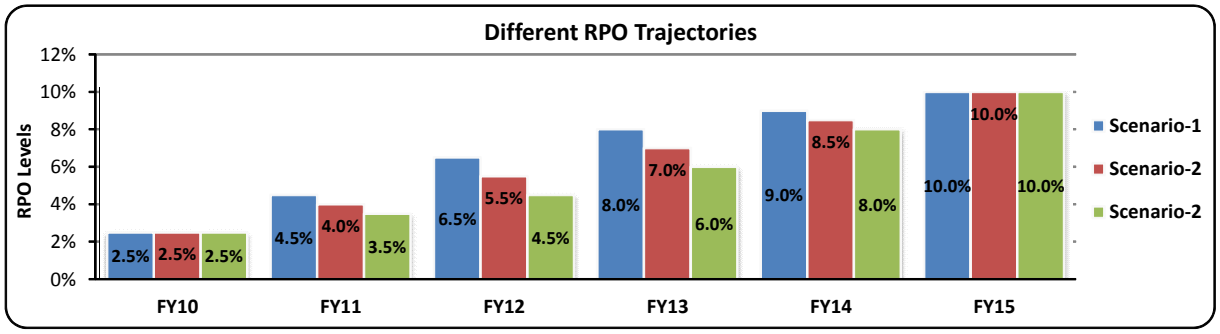
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.9%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.1%**	**0.2%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	0.2	0.3	5.1	9.6	11.8	13.6	15.0
Incremental impact on PPC	Paisa/ unit		0.1	4.8	4.5	2.2	1.8	1.3
Discounted Impact on PPC	**Paisa/ unit**			**5.1**	**8.8**	**9.9**	**10.4**	**10.5**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.7**	**1.1**	**0.5**	**0.0**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.1%**	**0.2%**	**1.5%**	**2.9%**	**4.3%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	0.2	0.3	4.0	7.3	10.5	13.1	15.2
Incremental impact on PPC	Paisa/ unit		0.1	3.7	3.3	3.2	2.6	2.0
Discounted Impact on PPC	**Paisa/ unit**			**4.0**	**6.7**	**8.8**	**10.0**	**10.6**
Discounted Incremental Impact	**Paisa/ unit**			**3.7**	**2.7**	**2.1**	**1.3**	**0.6**
SCENARIO-2								
Increase in RPO Level:				0.9%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.1%**	**0.2%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	0.2	0.3	2.9	5.5	8.0	12.1	15.3
Incremental impact on PPC	Paisa/ unit		0.1	2.6	2.6	2.5	4.1	3.3
Discounted Impact on PPC	**Paisa/ unit**			**2.9**	**5.0**	**6.7**	**9.2**	**10.7**
Discounted Incremental Impact	**Paisa/ unit**			**2.6**	**2.1**	**1.7**	**2.5**	**1.5**

ANNEXURE 9- Uttar Pradesh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	53,796	58,783	64,198	70,041	75,589	81,138	86,686	
PPC without RE	Rs./Unit	2.62	2.79	2.98	3.18	3.39	3.61	3.85	6.65%
Cost of power purchase, without RE	Rs. Crores	14,085	16,415	19,120	22,248	25,607	29,315	33,403	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**2.44%**	**2.50%**	**4.00%**	**5.50%**	**7.00%**	**8.50%**	**10.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	52,483	57,313	61,630	66,189	70,298	74,241	78,018	
Renewable Energy Purchase	MUs	1,313	1,470	2,568	3,852	5,291	6,897	8,669	
- Non Solar	MUs	1,313	1,470	2,536	3,782	5,178	6,734	8,452	
- Solar	MUs	-	-	32.1	70.0	113.4	162.3	216.7	
RE (Non-Solar) Tariff	Rs./Unit	3.26	4.47	4.47	4.47	4.69	4.69	4.69	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	13,742	16,005	18,355	21,024	23,815	26,823	30,063	
Renewable Energy Purchase Costs	Rs. Crores	428	498	1,033	1,659	2,394	3,214	4,119	
Total Power Purchase Costs	Rs. Crores	14,169	16,502	19,388	22,683	26,208	30,037	34,182	
Total Per unit Cost of power	Rs./Unit	2.63	2.81	3.02	3.24	3.47	3.70	3.94	
Difference in Power Purchase Cost	**Rs./Unit**	**0.016**	**0.015**	**0.042**	**0.062**	**0.080**	**0.089**	**0.090**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

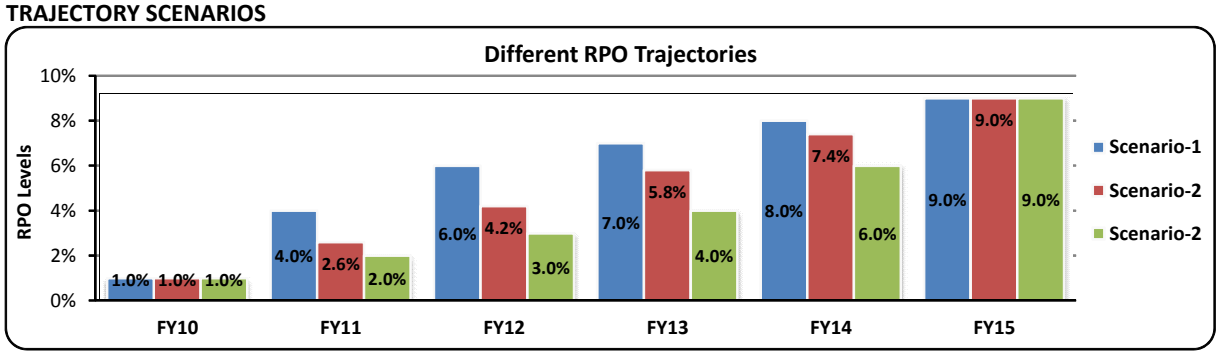
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.5%	1.0%	1.0%
RPO Level	**%**	**2.4%**	**2.5%**	**4.5%**	**6.5%**	**8.0%**	**9.0%**	**10.0%**
Impact on PPC	Paisa/ unit	1.6	1.5	4.9	7.5	9.0	9.2	8.8
Incremental impact on PPC	Paisa/ unit		-0.1	3.4	2.6	1.5	0.2	-0.4
Discounted Impact on PPC	**Paisa/ unit**			**4.9**	**6.9**	**7.6**	**7.1**	**6.2**
Discounted Incremental Impact	**Paisa/ unit**			**3.4**	**1.9**	**0.7**	**-0.5**	**-0.9**
SCENARIO-2								
Increase in RPO Level:				1.5%	1.5%	1.5%	1.5%	1.5%
RPO Level	**%**	**2.4%**	**2.5%**	**4.0%**	**5.5%**	**7.0%**	**8.5%**	**10.0%**
Impact on PPC	Paisa/ unit	1.6	1.5	4.2	6.2	8.0	8.9	9.0
Incremental impact on PPC	Paisa/ unit		-0.1	2.7	2.0	1.7	0.9	0.1
Discounted Impact on PPC	**Paisa/ unit**			**4.2**	**5.7**	**6.7**	**6.8**	**6.3**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**1.5**	**1.0**	**0.2**	**-0.5**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.5%	2.0%	2.0%
RPO Level	**%**	**2.4%**	**2.5%**	**3.5%**	**4.5%**	**6.0%**	**8.0%**	**10.0%**
Impact on PPC	Paisa/ unit	1.6	1.5	3.4	4.9	6.9	8.6	9.2
Incremental impact on PPC	Paisa/ unit		-0.1	1.9	1.5	1.9	1.7	0.6
Discounted Impact on PPC	**Paisa/ unit**			**3.4**	**4.5**	**5.7**	**6.5**	**6.4**
Discounted Incremental Impact	**Paisa/ unit**			**1.9**	**1.1**	**1.2**	**0.8**	**-0.1**

ANNEXURE 10- Punjab

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	36,900	40,226	43,810	47,670	51,150	54,631	58,112	
PPC without RE	Rs./Unit	2.70	2.86	3.03	3.22	3.41	3.61	3.83	6.00%
Cost of power purchase, without RE	Rs. Crores	9,963	11,513	13,291	15,329	17,436	19,739	22,257	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.75%**	**1.00%**	**2.60%**	**4.20%**	**5.80%**	**7.40%**	**9.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	36,623	39,824	42,671	45,668	48,184	50,588	52,882	
Renewable Energy Purchase	MUs	277	402	1,139	2,002	2,967	4,043	5,230	
- Non Solar	MUs	277	402	1,117	1,954	2,890	3,933	5,085	
- Solar	MUs	-	-	21.9	47.7	76.7	109.3	145.3	
RE (Non-Solar) Tariff	Rs./Unit	4.05	4.69	4.69	4.69	4.93	4.93	4.93	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	9,888	11,398	12,945	14,686	16,424	18,279	20,254	
Renewable Energy Purchase Costs	Rs. Crores	112	171	547	988	1,502	2,077	2,711	
Total Power Purchase Costs	Rs. Crores	10,000	11,569	13,492	15,673	17,927	20,355	22,965	
Total Per unit Cost of power	Rs./Unit	2.71	2.88	3.08	3.29	3.50	3.73	3.95	
Difference in Power Purchase Cost	**Rs./Unit**	**0.010**	**0.014**	**0.046**	**0.072**	**0.096**	**0.113**	**0.122**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

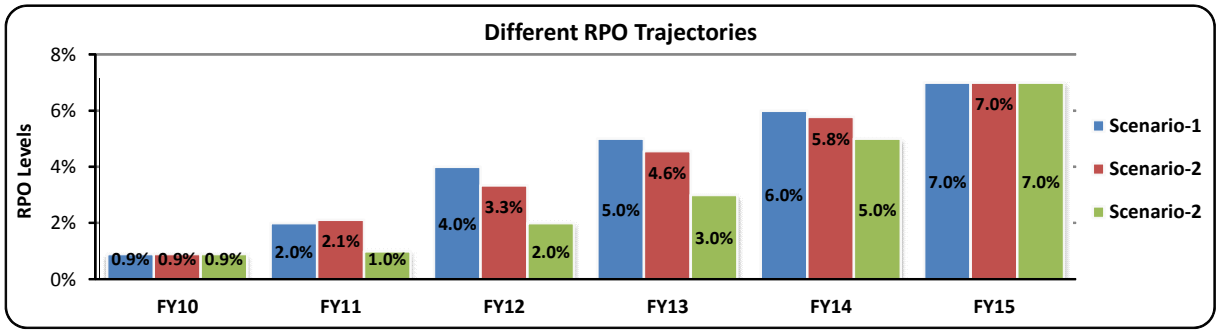
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				3.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.8%**	**1.0%**	**4.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**
Impact on PPC	Paisa/ unit	1.0	1.4	6.9	9.9	11.0	11.7	11.8
Incremental impact on PPC	Paisa/ unit		0.4	5.5	3.0	1.2	0.7	0.1
Discounted Impact on PPC	**Paisa/ unit**			**6.9**	**9.0**	**9.2**	**8.9**	**8.3**
Discounted Incremental Impact	**Paisa/ unit**			**5.5**	**2.1**	**0.2**	**-0.3**	**-0.7**
SCENARIO-2								
Increase in RPO Level:				1.6%	1.6%	1.6%	1.6%	1.6%
RPO Level	**%**	**0.8%**	**1.0%**	**2.6%**	**4.2%**	**5.8%**	**7.4%**	**9.0%**
Impact on PPC	Paisa/ unit	1.0	1.4	4.6	7.2	9.6	11.3	12.2
Incremental impact on PPC	Paisa/ unit		0.4	3.2	2.6	2.4	1.7	0.9
Discounted Impact on PPC	**Paisa/ unit**			**4.6**	**6.6**	**8.0**	**8.6**	**8.5**
Discounted Incremental Impact	**Paisa/ unit**			**3.2**	**2.0**	**1.4**	**0.6**	**-0.1**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	3.0%
RPO Level	**%**	**0.8%**	**1.0%**	**2.0%**	**3.0%**	**4.0%**	**6.0%**	**9.0%**
Impact on PPC	Paisa/ unit	1.0	1.4	3.6	5.4	7.1	9.7	12.4
Incremental impact on PPC	Paisa/ unit		0.4	2.2	1.8	1.7	2.6	2.7
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**5.0**	**6.0**	**7.4**	**8.7**
Discounted Incremental Impact	**Paisa/ unit**			**2.2**	**1.4**	**1.0**	**1.4**	**1.3**

ANNEXURE 11- West Bengal

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	30,331	32,310	34,465	36,845	40,295	43,746	47,197	
PPC without RE	Rs./Unit	2.01	2.08	2.16	2.24	2.32	2.41	2.49	3.67%
Cost of power purchase, without RE	Rs. Crores	6,097	6,732	7,445	8,251	9,355	10,528	11,775	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.80%**	**0.90%**	**2.12%**	**3.34%**	**4.56%**	**5.78%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	30,088	32,019	33,734	35,614	38,458	41,218	43,893	
Renewable Energy Purchase	MUs	243	291	731	1,231	1,837	2,529	3,304	
- Non Solar	MUs	243	291	713	1,194	1,777	2,441	3,186	
- Solar	MUs	-	-	17.2	36.8	60.4	87.5	118.0	
RE (Non-Solar) Tariff	Rs./Unit	3.60	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	6,048	6,672	7,287	7,975	8,928	9,920	10,951	
Renewable Energy Purchase Costs	Rs. Crores	87	108	322	565	873	1,224	1,617	
Total Power Purchase Costs	Rs. Crores	6,135	6,780	7,609	8,541	9,801	11,143	12,568	
Total Per unit Cost of power	Rs./Unit	2.02	2.10	2.21	2.32	2.43	2.55	2.66	
Difference in Power Purchase Cost	**Rs./Unit**	**0.013**	**0.015**	**0.048**	**0.079**	**0.111**	**0.141**	**0.168**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

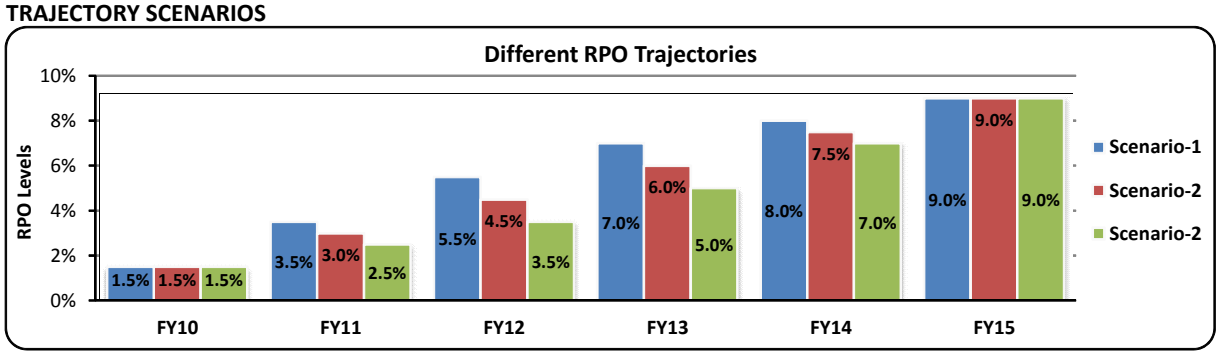
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.1%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.8%**	**0.9%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	1.3	1.5	4.5	9.2	11.9	14.4	16.7
Incremental impact on PPC	Paisa/ unit		0.2	3.0	4.7	2.7	2.5	2.3
Discounted Impact on PPC	**Paisa/ unit**			**4.5**	**8.4**	**10.0**	**11.0**	**11.7**
Discounted Incremental Impact	**Paisa/ unit**			**3.0**	**3.9**	**1.5**	**1.0**	**0.7**
SCENARIO-2								
Increase in RPO Level:				1.2%	1.2%	1.2%	1.2%	1.2%
RPO Level	**%**	**0.8%**	**0.9%**	**2.1%**	**3.3%**	**4.6%**	**5.8%**	**7.0%**
Impact on PPC	Paisa/ unit	1.3	1.5	4.8	7.9	11.1	14.1	16.8
Incremental impact on PPC	Paisa/ unit		0.2	3.3	3.1	3.2	3.0	2.7
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**7.2**	**9.3**	**10.8**	**11.7**
Discounted Incremental Impact	**Paisa/ unit**			**3.3**	**2.4**	**2.1**	**1.5**	**1.0**
SCENARIO-2								
Increase in RPO Level:				0.1%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.8%**	**0.9%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	1.3	1.5	2.4	5.1	7.9	12.6	17.0
Incremental impact on PPC	Paisa/ unit		0.2	0.9	2.7	2.8	4.7	4.4
Discounted Impact on PPC	**Paisa/ unit**			**2.4**	**4.7**	**6.6**	**9.7**	**11.9**
Discounted Incremental Impact	**Paisa/ unit**			**0.9**	**2.3**	**2.0**	**3.1**	**2.2**

ANNEXURE 12- Uttarakhand

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	7,669	8,311	9,011	9,780	10,527	11,273	12,020	
PPC without RE	Rs./Unit	1.80	1.89	1.98	2.08	2.18	2.28	2.40	4.92%
Cost of power purchase, without RE	Rs. Crores	1,378	1,567	1,782	2,030	2,292	2,575	2,881	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**1.30%**	**1.50%**	**3.00%**	**4.50%**	**6.00%**	**7.50%**	**9.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	7,569	8,186	8,741	9,340	9,895	10,428	10,938	
Renewable Energy Purchase	MUs	100	125	270	440	632	845	1,082	
- Non Solar	MUs	100	125	266	430	616	823	1,052	
- Solar	MUs	-	-	4.5	9.8	15.8	22.5	30.0	
RE (Non-Solar) Tariff	Rs./Unit	3.63	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,360	1,543	1,729	1,938	2,154	2,382	2,622	
Renewable Energy Purchase Costs	Rs. Crores	36	47	116	197	292	398	515	
Total Power Purchase Costs	Rs. Crores	1,396	1,590	1,845	2,135	2,446	2,780	3,137	
Total Per unit Cost of power	Rs./Unit	1.82	1.91	2.05	2.18	2.32	2.47	2.61	
Difference in Power Purchase Cost	**Rs./Unit**	**0.024**	**0.028**	**0.069**	**0.108**	**0.146**	**0.182**	**0.213**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

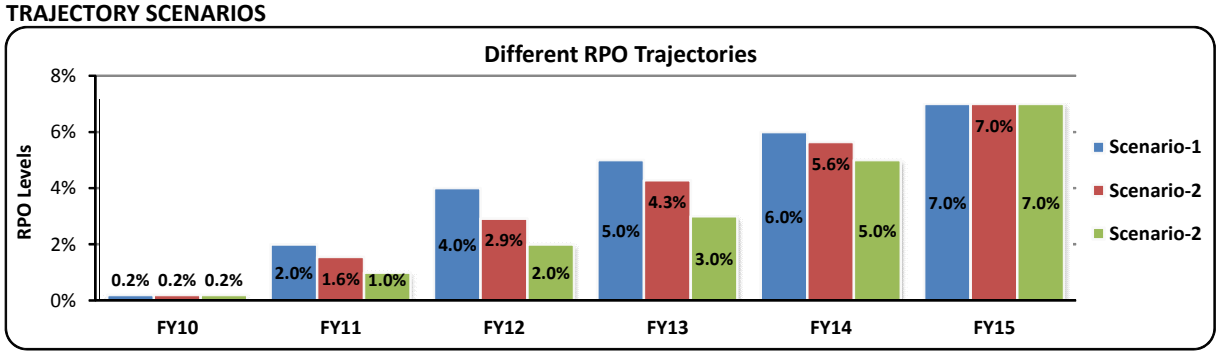
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.5%	1.0%	1.0%
RPO Level	**%**	**1.3%**	**1.5%**	**3.5%**	**5.5%**	**7.0%**	**8.0%**	**9.0%**
Impact on PPC	Paisa/ unit	2.4	2.8	8.1	13.0	16.8	19.1	21.1
Incremental impact on PPC	Paisa/ unit		0.4	5.3	4.9	3.8	2.3	2.0
Discounted Impact on PPC	**Paisa/ unit**			**8.1**	**11.9**	**14.0**	**14.6**	**14.8**
Discounted Incremental Impact	**Paisa/ unit**			**5.3**	**3.8**	**2.2**	**0.6**	**0.2**
SCENARIO-2								
Increase in RPO Level:				1.5%	1.5%	1.5%	1.5%	1.5%
RPO Level	**%**	**1.3%**	**1.5%**	**3.0%**	**4.5%**	**6.0%**	**7.5%**	**9.0%**
Impact on PPC	Paisa/ unit	2.4	2.8	6.9	10.8	14.6	18.2	21.3
Incremental impact on PPC	Paisa/ unit		0.4	4.1	3.8	3.9	3.5	3.1
Discounted Impact on PPC	**Paisa/ unit**			**6.9**	**9.9**	**12.2**	**13.9**	**14.9**
Discounted Incremental Impact	**Paisa/ unit**			**4.1**	**2.9**	**2.4**	**1.6**	**1.0**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.5%	2.0%	2.0%
RPO Level	**%**	**1.3%**	**1.5%**	**2.5%**	**3.5%**	**5.0%**	**7.0%**	**9.0%**
Impact on PPC	Paisa/ unit	2.4	2.8	5.8	8.5	12.5	17.2	21.5
Incremental impact on PPC	Paisa/ unit		0.4	3.0	2.8	4.0	4.7	4.2
Discounted Impact on PPC	**Paisa/ unit**			**5.8**	**7.8**	**10.5**	**13.2**	**15.0**
Discounted Incremental Impact	**Paisa/ unit**			**3.0**	**2.0**	**2.6**	**2.7**	**1.8**

ANNEXURE 13- Haryana

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	26,331	28,701	31,266	34,047	36,863	39,679	42,495	
PPC without RE	Rs./Unit	2.68	2.84	3.01	3.19	3.38	3.58	3.79	5.93%
Cost of power purchase, without RE	Rs. Crores	7,069	8,162	9,419	10,865	12,462	14,210	16,121	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.10%**	**0.20%**	**1.56%**	**2.92%**	**4.28%**	**5.64%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	26,305	28,643	30,779	33,052	35,285	37,441	39,520	
Renewable Energy Purchase	MUs	26	57	488	994	1,578	2,238	2,975	
- Non Solar	MUs	26	57	472	960	1,522	2,159	2,868	
- Solar	MUs	-	-	15.6	34.0	55.3	79.4	106.2	
RE (Non-Solar) Tariff	Rs./Unit	3.79	4.52	4.52	4.52	4.74	4.74	4.74	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	7,062	8,146	9,272	10,548	11,929	13,408	14,993	
Renewable Energy Purchase Costs	Rs. Crores	10	24	240	494	800	1,146	1,532	
Total Power Purchase Costs	Rs. Crores	7,072	8,170	9,512	11,042	12,729	14,555	16,525	
Total Per unit Cost of power	Rs./Unit	2.69	2.85	3.04	3.24	3.45	3.67	3.89	
Difference in Power Purchase Cost	**Rs./Unit**	**0.001**	**0.003**	**0.030**	**0.052**	**0.072**	**0.087**	**0.095**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

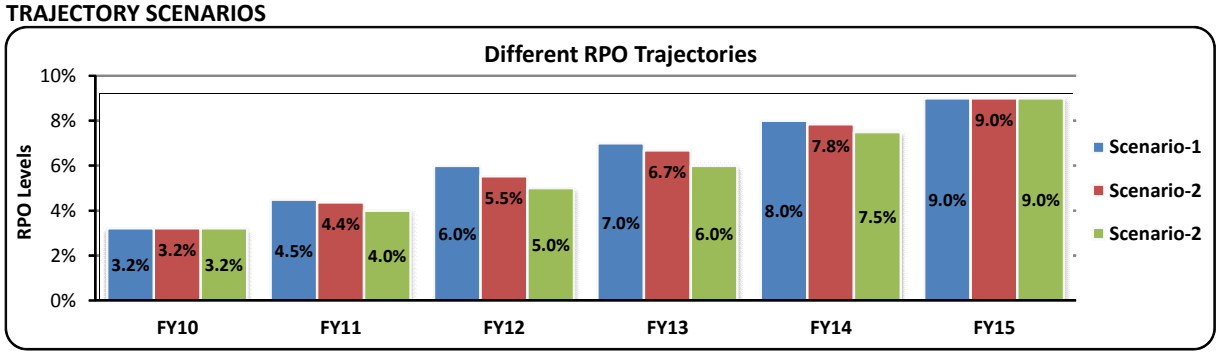
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.8%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.1%**	**0.2%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	0.1	0.3	3.6	6.6	8.0	8.9	9.3
Incremental impact on PPC	Paisa/ unit		0.2	3.4	3.0	1.4	0.9	0.4
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.1**	**6.7**	**6.8**	**6.5**
Discounted Incremental Impact	**Paisa/ unit**			**3.4**	**2.4**	**0.6**	**0.1**	**-0.3**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.1%**	**0.2%**	**1.6%**	**2.9%**	**4.3%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	0.1	0.3	3.0	5.2	7.2	8.7	9.5
Incremental impact on PPC	Paisa/ unit		0.2	2.7	2.2	2.0	1.5	0.8
Discounted Impact on PPC	**Paisa/ unit**			**3.0**	**4.8**	**6.1**	**6.6**	**6.6**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**1.8**	**1.3**	**0.6**	**0.0**
SCENARIO-2								
Increase in RPO Level:				0.8%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.1%**	**0.2%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	0.1	0.3	2.1	4.0	5.7	8.1	9.7
Incremental impact on PPC	Paisa/ unit		0.2	1.9	1.8	1.7	2.4	1.5
Discounted Impact on PPC	**Paisa/ unit**			**2.1**	**3.6**	**4.8**	**6.2**	**6.8**
Discounted Incremental Impact	**Paisa/ unit**			**1.9**	**1.5**	**1.1**	**1.5**	**0.5**

ANNEXURE 14- Chhattisgarh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	14,556	15,913	17,397	19,025	20,997	22,969	24,941	
PPC without RE	Rs./Unit	1.91	2.00	2.10	2.21	2.31	2.43	2.55	4.92%
Cost of power purchase, without RE	Rs. Crores	2,780	3,189	3,658	4,197	4,860	5,578	6,355	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**3.22%**	**3.22%**	**4.38%**	**5.53%**	**6.69%**	**7.84%**	**9.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	14,087	15,401	16,636	17,972	19,592	21,167	22,696	
Renewable Energy Purchase	MUs	469	512	761	1,052	1,404	1,802	2,245	
- Non Solar	MUs	469	512	753	1,033	1,373	1,756	2,182	
- Solar	MUs	-	-	8.7	19.0	31.5	45.9	62.4	
RE (Non-Solar) Tariff	Rs./Unit	3.29	4.85	4.85	4.85	5.10	5.10	5.10	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	2,691	3,086	3,498	3,965	4,535	5,140	5,783	
Renewable Energy Purchase Costs	Rs. Crores	154	175	308	463	659	881	1,129	
Total Power Purchase Costs	Rs. Crores	2,845	3,262	3,806	4,428	5,194	6,021	6,912	
Total Per unit Cost of power	Rs./Unit	1.95	2.05	2.19	2.33	2.47	2.62	2.77	
Difference in Power Purchase Cost	**Rs./Unit**	**0.044**	**0.046**	**0.085**	**0.122**	**0.159**	**0.193**	**0.223**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

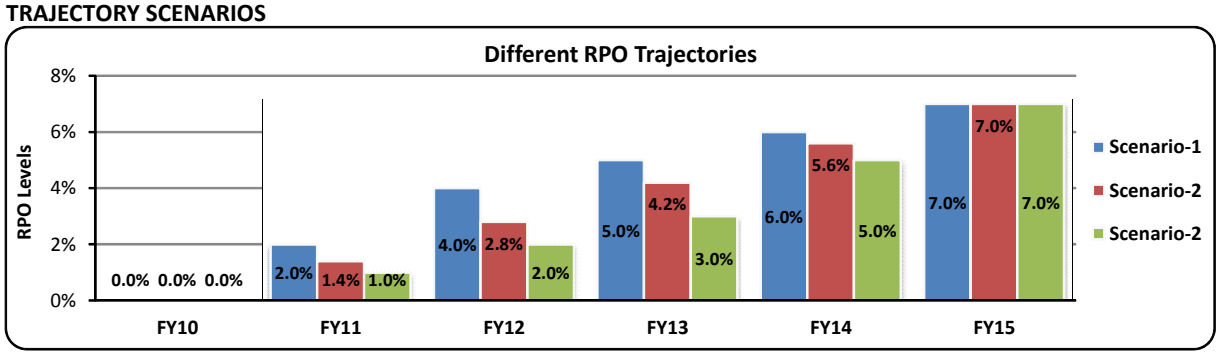
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.3%	1.5%	1.0%	1.0%	1.0%
RPO Level	**%**	**3.2%**	**3.2%**	**4.5%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**
Impact on PPC	Paisa/ unit	4.4	4.6	8.8	13.4	16.7	19.6	22.2
Incremental impact on PPC	Paisa/ unit		0.1	4.3	4.5	3.3	2.9	2.6
Discounted Impact on PPC	**Paisa/ unit**			**8.8**	**12.2**	**14.0**	**15.0**	**15.6**
Discounted Incremental Impact	**Paisa/ unit**			**4.3**	**3.4**	**1.7**	**1.1**	**0.5**
SCENARIO-2								
Increase in RPO Level:				1.2%	1.2%	1.2%	1.2%	1.2%
RPO Level	**%**	**3.2%**	**3.2%**	**4.4%**	**5.5%**	**6.7%**	**7.8%**	**9.0%**
Impact on PPC	Paisa/ unit	4.4	4.6	8.5	12.2	15.9	19.3	22.3
Incremental impact on PPC	Paisa/ unit		0.1	3.9	3.6	3.8	3.4	3.0
Discounted Impact on PPC	**Paisa/ unit**			**8.5**	**11.1**	**13.3**	**14.8**	**15.6**
Discounted Incremental Impact	**Paisa/ unit**			**3.9**	**2.6**	**2.2**	**1.5**	**0.8**
SCENARIO-2								
Increase in RPO Level:				0.8%	1.0%	1.0%	1.5%	1.5%
RPO Level	**%**	**3.2%**	**3.2%**	**4.0%**	**5.0%**	**6.0%**	**7.5%**	**9.0%**
Impact on PPC	Paisa/ unit	4.4	4.6	7.5	10.7	14.1	18.5	22.4
Incremental impact on PPC	Paisa/ unit		0.1	2.9	3.3	3.4	4.4	3.9
Discounted Impact on PPC	**Paisa/ unit**			**7.5**	**9.8**	**11.8**	**14.1**	**15.7**
Discounted Incremental Impact	**Paisa/ unit**			**2.9**	**2.4**	**2.0**	**2.3**	**1.5**

ANNEXURE 15- Delhi

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	22,123	23,944	25,875	27,986	30,526	33,065	35,605	
PPC without RE	Rs./Unit	2.65	2.82	3.00	3.20	3.41	3.63	3.86	6.48%
Cost of power purchase, without RE	Rs. Crores	5,863	6,757	7,775	8,953	10,398	11,993	13,751	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	22,123	23,944	25,513	27,202	29,244	31,214	33,113	
Renewable Energy Purchase	MUs	-	-	362	784	1,282	1,852	2,492	
- Non Solar	MUs	-	-	349	756	1,236	1,786	2,403	
- Solar	MUs	-	-	12.9	28.0	45.8	66.1	89.0	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	5,863	6,757	7,666	8,703	9,962	11,321	12,788	
Renewable Energy Purchase Costs	Rs. Crores	-	-	184	398	651	940	1,265	
Total Power Purchase Costs	Rs. Crores	5,863	6,757	7,850	9,100	10,612	12,261	14,053	
Total Per unit Cost of power	Rs./Unit	2.65	2.82	3.03	3.25	3.48	3.71	3.95	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.029**	**0.053**	**0.070**	**0.081**	**0.085**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

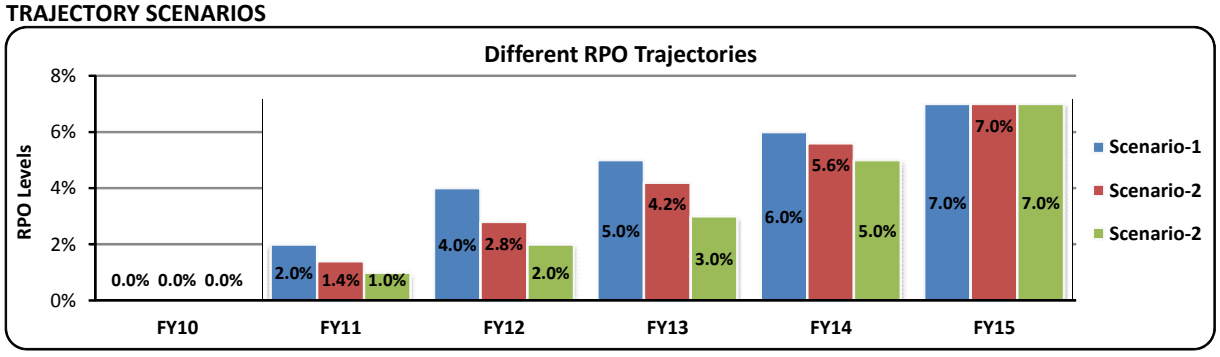
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.8	6.9	7.9	8.5	8.5
Incremental impact on PPC	Paisa/ unit		0.0	3.8	3.1	1.0	0.5	0.0
Discounted Impact on PPC	**Paisa/ unit**			**3.8**	**6.3**	**6.6**	**6.5**	**5.9**
Discounted Incremental Impact	**Paisa/ unit**			**3.8**	**2.5**	**0.3**	**-0.2**	**-0.6**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.9	5.3	7.0	8.1	8.5
Incremental impact on PPC	Paisa/ unit		0.0	2.9	2.4	1.8	1.1	0.4
Discounted Impact on PPC	**Paisa/ unit**			**2.9**	**4.8**	**5.9**	**6.2**	**5.9**
Discounted Incremental Impact	**Paisa/ unit**			**2.9**	**1.9**	**1.1**	**0.3**	**-0.3**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.3	4.1	5.6	7.5	8.5
Incremental impact on PPC	Paisa/ unit		0.0	2.3	1.9	1.5	1.9	1.0
Discounted Impact on PPC	**Paisa/ unit**			**2.3**	**3.8**	**4.7**	**5.8**	**5.9**
Discounted Incremental Impact	**Paisa/ unit**			**2.3**	**1.5**	**0.9**	**1.1**	**0.2**

ANNEXURE 16- Bihar

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	8,796	10,381	12,114	13,950	15,765	17,581	19,396	
PPC without RE	Rs./Unit	1.99	2.08	2.18	2.28	2.38	2.49	2.60	4.58%
Cost of power purchase, without RE	Rs. Crores	1,750	2,160	2,637	3,175	3,753	4,376	5,049	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	8,796	10,381	11,945	13,559	15,103	16,596	18,038	
Renewable Energy Purchase	MUs	-	-	170	391	662	985	1,358	
- Non Solar	MUs	-	-	164	377	638	949	1,309	
- Solar	MUs	-	-	6.1	13.9	23.6	35.2	48.5	
RE (Non-Solar) Tariff	Rs./Unit	4.31	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,750	2,160	2,600	3,086	3,595	4,131	4,696	
Renewable Energy Purchase Costs	Rs. Crores	-	-	82	188	324	486	674	
Total Power Purchase Costs	Rs. Crores	1,750	2,160	2,681	3,274	3,919	4,618	5,370	
Total Per unit Cost of power	Rs./Unit	1.99	2.08	2.21	2.35	2.49	2.63	2.77	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.037**	**0.071**	**0.106**	**0.137**	**0.165**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

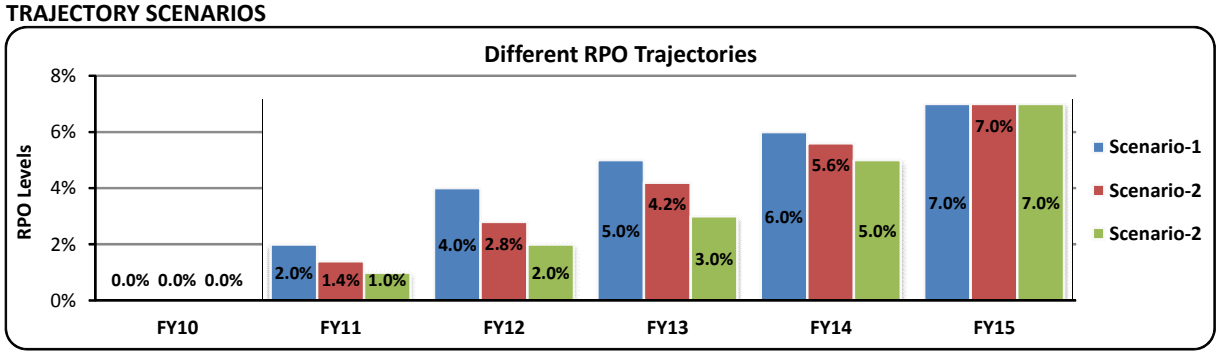
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	5.0	9.5	12.1	14.3	16.3
Incremental impact on PPC	Paisa/ unit		0.0	5.0	4.6	2.5	2.3	2.0
Discounted Impact on PPC	**Paisa/ unit**			**5.0**	**8.7**	**10.1**	**11.0**	**11.4**
Discounted Incremental Impact	**Paisa/ unit**			**5.0**	**3.8**	**1.4**	**0.9**	**0.5**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.7	7.1	10.6	13.7	16.5
Incremental impact on PPC	Paisa/ unit		0.0	3.7	3.4	3.5	3.1	2.8
Discounted Impact on PPC	**Paisa/ unit**			**3.7**	**6.5**	**8.9**	**10.5**	**11.6**
Discounted Incremental Impact	**Paisa/ unit**			**3.7**	**2.8**	**2.3**	**1.6**	**1.1**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.8	5.5	8.2	12.6	16.6
Incremental impact on PPC	Paisa/ unit		0.0	2.8	2.6	2.7	4.5	4.0
Discounted Impact on PPC	**Paisa/ unit**			**2.8**	**5.0**	**6.8**	**9.7**	**11.6**
Discounted Incremental Impact	**Paisa/ unit**			**2.8**	**2.2**	**1.8**	**2.8**	**2.0**

ANNEXURE 17- Jharkhand

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	5,090	5,642	6,299	7,088	7,867	8,647	9,426	
PPC without RE	Rs./Unit	2.01	2.08	2.15	2.23	2.31	2.39	2.47	3.48%
Cost of power purchase, without RE	Rs. Crores	1,023	1,173	1,356	1,579	1,813	2,062	2,327	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	5,090	5,642	6,211	6,890	7,537	8,162	8,766	
Renewable Energy Purchase	MUs	-	-	88	198	330	484	660	
- Non Solar	MUs	-	-	85	191	319	467	636	
- Solar	MUs	-	-	3.1	7.1	11.8	17.3	23.6	
RE (Non-Solar) Tariff	Rs./Unit	4.31	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,023	1,173	1,337	1,535	1,737	1,947	2,164	
Renewable Energy Purchase Costs	Rs. Crores	-	-	42	96	162	239	327	
Total Power Purchase Costs	Rs. Crores	1,023	1,173	1,379	1,630	1,899	2,186	2,491	
Total Per unit Cost of power	Rs./Unit	2.01	2.08	2.19	2.30	2.41	2.53	2.64	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.037**	**0.072**	**0.109**	**0.143**	**0.174**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

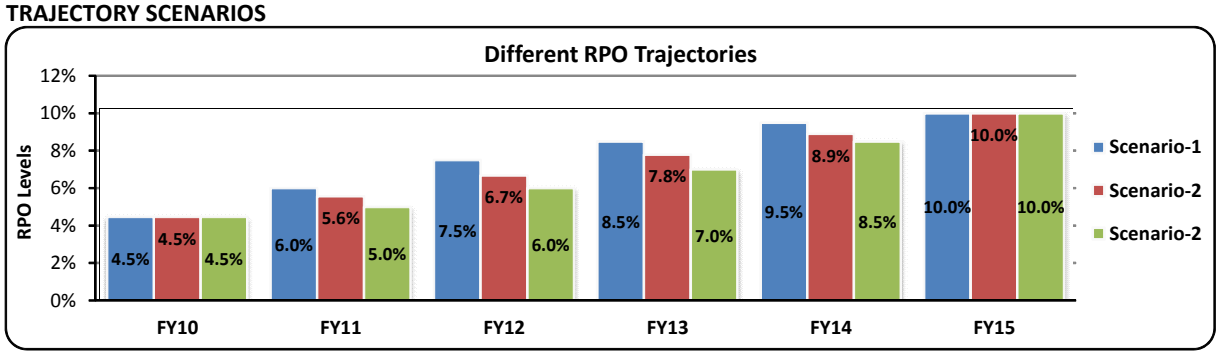
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	5.0	9.7	12.4	14.9	17.2
Incremental impact on PPC	Paisa/ unit		0.0	5.0	4.7	2.7	2.5	2.3
Discounted Impact on PPC	**Paisa/ unit**			**5.0**	**8.9**	**10.4**	**11.4**	**12.1**
Discounted Incremental Impact	**Paisa/ unit**			**5.0**	**3.9**	**1.5**	**1.0**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.7	7.2	10.9	14.3	17.4
Incremental impact on PPC	Paisa/ unit		0.0	3.7	3.5	3.6	3.4	3.1
Discounted Impact on PPC	**Paisa/ unit**			**3.7**	**6.6**	**9.1**	**10.9**	**12.2**
Discounted Incremental Impact	**Paisa/ unit**			**3.7**	**2.9**	**2.5**	**1.8**	**1.3**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.9	5.6	8.4	13.1	17.6
Incremental impact on PPC	Paisa/ unit		0.0	2.9	2.7	2.8	4.8	4.4
Discounted Impact on PPC	**Paisa/ unit**			**2.9**	**5.1**	**7.0**	**10.1**	**12.3**
Discounted Incremental Impact	**Paisa/ unit**			**2.9**	**2.2**	**1.9**	**3.0**	**2.2**

ANNEXURE 18- Himachal Pradesh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	6,246	6,481	6,931	7,506	8,079	8,653	9,227	
PPC without RE	Rs./Unit	2.40	2.54	2.68	2.84	3.00	3.18	3.36	5.80%
Cost of power purchase, without RE	Rs. Crores	1,497	1,643	1,859	2,130	2,426	2,749	3,101	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**4.20%**	**4.47%**	**5.58%**	**6.68%**	**7.79%**	**8.89%**	**10.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	5,984	6,191	6,545	7,004	7,450	7,883	8,304	
Renewable Energy Purchase	MUs	262	290	386	502	629	770	923	
- Non Solar	MUs	262	290	383	494	617	752	900	
- Solar	MUs	-	-	3.5	7.5	12.1	17.3	23.1	
RE (Non-Solar) Tariff	Rs./Unit	3.63	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,434	1,569	1,755	1,988	2,237	2,504	2,791	
Renewable Energy Purchase Costs	Rs. Crores	95	107	154	209	273	344	421	
Total Power Purchase Costs	Rs. Crores	1,529	1,676	1,909	2,196	2,510	2,848	3,212	
Total Per unit Cost of power	Rs./Unit	2.45	2.59	2.75	2.93	3.11	3.29	3.48	
Difference in Power Purchase Cost	**Rs./Unit**	**0.052**	**0.052**	**0.072**	**0.089**	**0.104**	**0.115**	**0.120**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

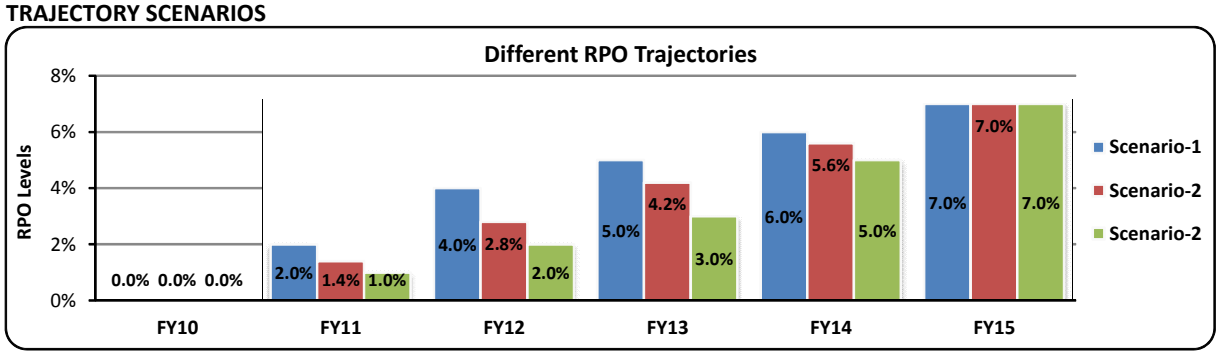
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				1.5%	1.5%	1.0%	1.0%	0.5%
RPO Level	**%**	**4.2%**	**4.5%**	**6.0%**	**7.5%**	**8.5%**	**9.5%**	**10.0%**
Impact on PPC	Paisa/ unit	5.2	5.2	7.9	10.1	11.3	12.1	11.9
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.2	1.3	0.8	-0.3
Discounted Impact on PPC	**Paisa/ unit**			**7.9**	**9.2**	**9.5**	**9.3**	**8.3**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**1.3**	**0.3**	**-0.2**	**-1.0**
SCENARIO-2								
Increase in RPO Level:				1.1%	1.1%	1.1%	1.1%	1.1%
RPO Level	**%**	**4.2%**	**4.5%**	**5.6%**	**6.7%**	**7.8%**	**8.9%**	**10.0%**
Impact on PPC	Paisa/ unit	5.2	5.2	7.2	8.9	10.4	11.5	12.0
Incremental impact on PPC	Paisa/ unit		0.0	2.0	1.7	1.6	1.1	0.5
Discounted Impact on PPC	**Paisa/ unit**			**7.2**	**8.1**	**8.7**	**8.8**	**8.4**
Discounted Incremental Impact	**Paisa/ unit**			**2.0**	**0.9**	**0.6**	**0.1**	**-0.4**
SCENARIO-2								
Increase in RPO Level:				0.5%	1.0%	1.0%	1.5%	1.5%
RPO Level	**%**	**4.2%**	**4.5%**	**5.0%**	**6.0%**	**7.0%**	**8.5%**	**10.0%**
Impact on PPC	Paisa/ unit	5.2	5.2	6.3	7.9	9.3	11.1	12.1
Incremental impact on PPC	Paisa/ unit		0.0	1.1	1.6	1.5	1.7	1.1
Discounted Impact on PPC	**Paisa/ unit**			**6.3**	**7.2**	**7.8**	**8.5**	**8.5**
Discounted Incremental Impact	**Paisa/ unit**			**1.1**	**0.9**	**0.6**	**0.7**	**0.0**

ANNEXURE 19- Jammu & Kashmir

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	8,564	9,161	9,814	10,529	11,295	12,060	12,825	
PPC without RE	Rs./Unit	2.20	2.29	2.38	2.47	2.57	2.68	2.78	3.98%
Cost of power purchase, without RE	Rs. Crores	1,885	2,097	2,335	2,605	2,906	3,226	3,567	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	8,564	9,161	9,677	10,235	10,820	11,384	11,927	
Renewable Energy Purchase	MUs	-	-	137	295	474	675	898	
- Non Solar	MUs	-	-	132	284	457	651	866	
- Solar	MUs	-	-	4.9	10.5	16.9	24.1	32.1	
RE (Non-Solar) Tariff	Rs./Unit	4.31	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,885	2,097	2,303	2,532	2,784	3,046	3,318	
Renewable Energy Purchase Costs	Rs. Crores	-	-	66	142	232	333	445	
Total Power Purchase Costs	Rs. Crores	1,885	2,097	2,369	2,674	3,016	3,379	3,762	
Total Per unit Cost of power	Rs./Unit	2.20	2.29	2.41	2.54	2.67	2.80	2.93	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.034**	**0.066**	**0.097**	**0.126**	**0.152**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

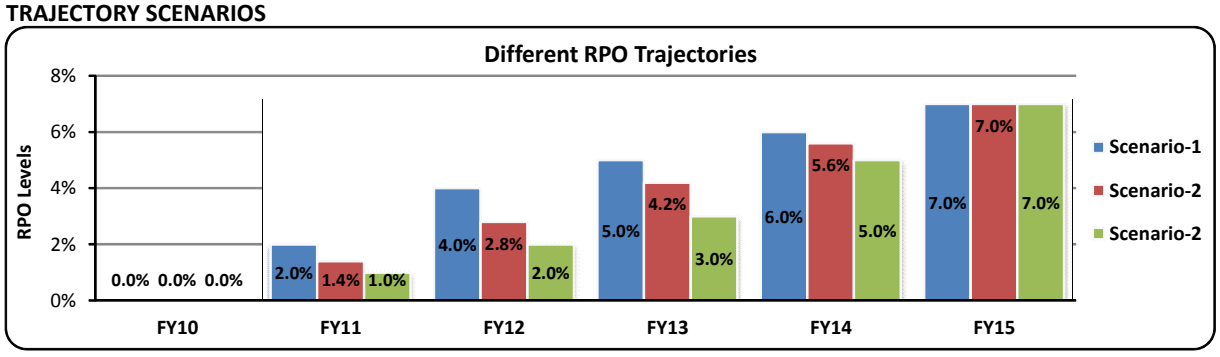
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.6	8.8	11.1	13.2	15.0
Incremental impact on PPC	Paisa/ unit		0.0	4.6	4.2	2.3	2.1	1.8
Discounted Impact on PPC	**Paisa/ unit**			**4.6**	**8.0**	**9.3**	**10.1**	**10.5**
Discounted Incremental Impact	**Paisa/ unit**			**4.6**	**3.4**	**1.2**	**0.8**	**0.4**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.4	6.6	9.7	12.6	15.2
Incremental impact on PPC	Paisa/ unit		0.0	3.4	3.1	3.2	2.9	2.6
Discounted Impact on PPC	**Paisa/ unit**			**3.4**	**6.0**	**8.2**	**9.7**	**10.6**
Discounted Incremental Impact	**Paisa/ unit**			**3.4**	**2.6**	**2.2**	**1.5**	**1.0**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.6	5.1	7.6	11.7	15.3
Incremental impact on PPC	Paisa/ unit		0.0	2.6	2.4	2.5	4.1	3.7
Discounted Impact on PPC	**Paisa/ unit**			**2.6**	**4.6**	**6.3**	**8.9**	**10.7**
Discounted Incremental Impact	**Paisa/ unit**			**2.6**	**2.0**	**1.7**	**2.6**	**1.8**

ANNEXURE 20- Orissa

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	20,173	22,403	24,720	27,384	29,794	32,204	34,614	
PPC without RE	Rs./Unit	1.96	2.06	2.16	2.27	2.38	2.49	2.62	4.92%
Cost of power purchase, without RE	Rs. Crores	3,958	4,611	5,339	6,205	7,083	8,033	9,059	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	20,173	22,403	24,374	26,617	28,543	30,401	32,191	
Renewable Energy Purchase	MUs	-	-	346	767	1,251	1,803	2,423	
- Non Solar	MUs	-	-	334	739	1,207	1,739	2,336	
- Solar	MUs	-	-	12.4	27.4	44.7	64.4	86.5	
RE (Non-Solar) Tariff	Rs./Unit	4.31	4.31	4.31	4.31	4.53	4.53	4.53	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	3,958	4,611	5,264	6,031	6,786	7,583	8,425	
Renewable Energy Purchase Costs	Rs. Crores	-	-	167	369	613	890	1,201	
Total Power Purchase Costs	Rs. Crores	3,958	4,611	5,431	6,400	7,398	8,473	9,626	
Total Per unit Cost of power	Rs./Unit	1.96	2.06	2.20	2.34	2.48	2.63	2.78	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.037**	**0.071**	**0.106**	**0.137**	**0.164**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

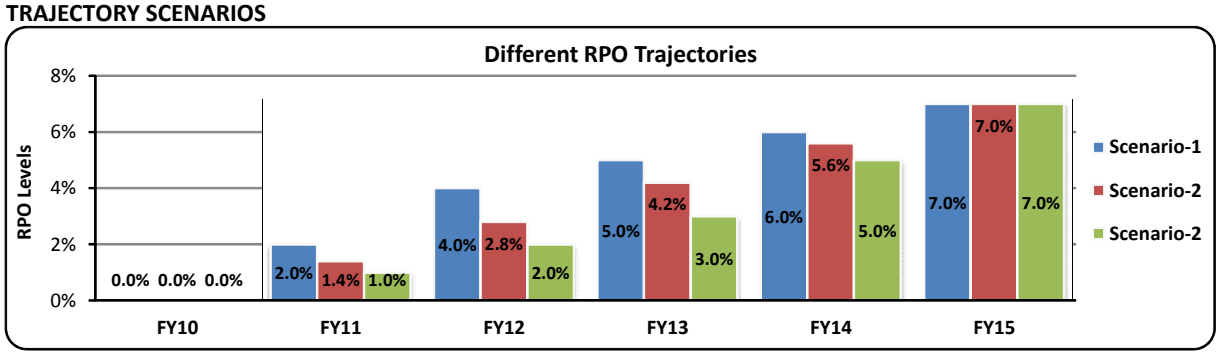
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	5.0	9.6	12.1	14.3	16.2
Incremental impact on PPC	Paisa/ unit		0.0	5.0	4.6	2.5	2.2	1.9
Discounted Impact on PPC	**Paisa/ unit**			**5.0**	**8.8**	**10.1**	**10.9**	**11.3**
Discounted Incremental Impact	**Paisa/ unit**			**5.0**	**3.8**	**1.3**	**0.8**	**0.4**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.7	7.1	10.6	13.7	16.4
Incremental impact on PPC	Paisa/ unit		0.0	3.7	3.4	3.4	3.1	2.7
Discounted Impact on PPC	**Paisa/ unit**			**3.7**	**6.5**	**8.8**	**10.4**	**11.5**
Discounted Incremental Impact	**Paisa/ unit**			**3.7**	**2.8**	**2.3**	**1.6**	**1.0**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.9	5.5	8.2	12.6	16.5
Incremental impact on PPC	Paisa/ unit		0.0	2.9	2.6	2.7	4.4	3.9
Discounted Impact on PPC	**Paisa/ unit**			**2.9**	**5.0**	**6.8**	**9.6**	**11.5**
Discounted Incremental Impact	**Paisa/ unit**			**2.9**	**2.2**	**1.8**	**2.8**	**1.9**

ANNEXURE 21- Assam

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	4,567	5,245	6,058	7,038	8,053	9,067	10,082	
PPC without RE	Rs./Unit	2.27	2.39	2.51	2.65	2.79	2.93	3.09	5.27%
Cost of power purchase, without RE	Rs. Crores	1,036	1,253	1,523	1,862	2,243	2,659	3,112	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	4,567	5,245	5,973	6,841	7,714	8,560	9,376	
Renewable Energy Purchase	MUs	-	-	85	197	338	508	706	
- Non Solar	MUs	-	-	82	190	326	490	681	
- Solar	MUs	-	-	3.0	7.0	12.1	18.1	25.2	
RE (Non-Solar) Tariff	Rs./Unit	3.63	3.63	3.63	3.63	3.81	3.81	3.81	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	1,036	1,253	1,502	1,810	2,149	2,510	2,894	
Renewable Energy Purchase Costs	Rs. Crores	-	-	35	82	143	216	302	
Total Power Purchase Costs	Rs. Crores	1,036	1,253	1,537	1,892	2,292	2,726	3,196	
Total Per unit Cost of power	Rs./Unit	2.27	2.39	2.54	2.69	2.85	3.01	3.17	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.023**	**0.042**	**0.061**	**0.074**	**0.084**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

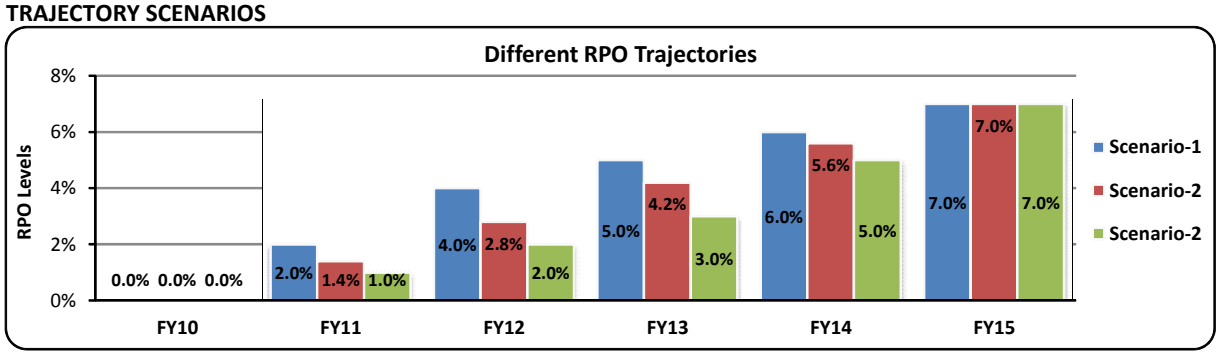
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.0	5.4	6.7	7.6	8.2
Incremental impact on PPC	Paisa/ unit		0.0	3.0	2.4	1.3	0.9	0.6
Discounted Impact on PPC	**Paisa/ unit**			**3.0**	**4.9**	**5.6**	**5.8**	**5.7**
Discounted Incremental Impact	**Paisa/ unit**			**3.0**	**2.0**	**0.7**	**0.2**	**-0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.3	4.2	6.1	7.4	8.4
Incremental impact on PPC	Paisa/ unit		0.0	2.3	1.9	1.8	1.4	0.9
Discounted Impact on PPC	**Paisa/ unit**			**2.3**	**3.9**	**5.1**	**5.7**	**5.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.3**	**1.6**	**1.2**	**0.6**	**0.2**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	1.9	3.4	5.0	7.0	8.5
Incremental impact on PPC	Paisa/ unit		0.0	1.9	1.6	1.5	2.1	1.4
Discounted Impact on PPC	**Paisa/ unit**			**1.9**	**3.1**	**4.1**	**5.4**	**5.9**
Discounted Incremental Impact	**Paisa/ unit**			**1.9**	**1.3**	**1.0**	**1.2**	**0.5**

ANNEXURE 22- Meghalaya

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	1,386	1,505	1,636	1,766	1,880	1,994	2,107	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	319	364	414	469	524	583	647	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	1,386	1,505	1,613	1,716	1,801	1,882	1,960	
Renewable Energy Purchase	MUs	-	-	23	49	79	112	148	
- Non Solar	MUs	-	-	22	48	76	108	142	
- Solar	MUs	-	-	0.8	1.8	2.8	4.0	5.3	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	319	364	409	456	502	551	602	
Renewable Energy Purchase Costs	Rs. Crores	-	-	12	25	40	57	75	
Total Power Purchase Costs	Rs. Crores	319	364	420	481	542	607	677	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**

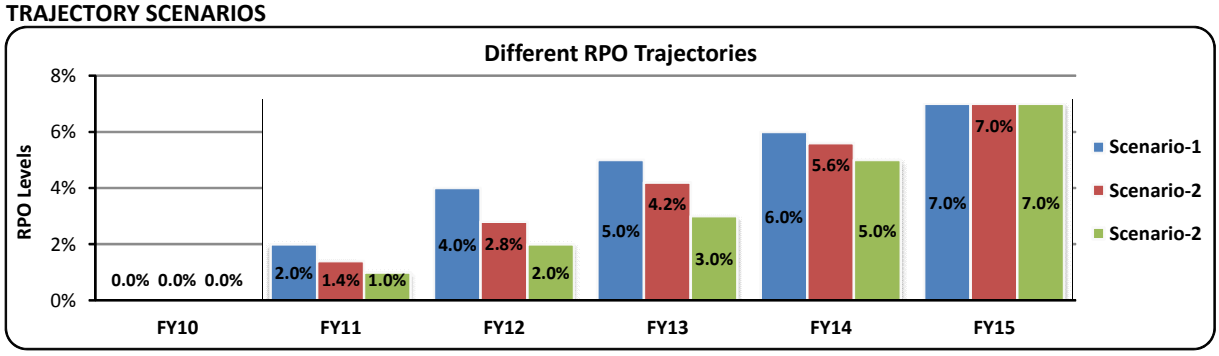
ANNEXURE 23- Other NE States

(Arunachal Pradesh, Manipur, Mizoram, Nagaland, Tripura and Sikkim)

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	2,505	2,741	2,976	3,274	3,579	3,884	4,189	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	577	662	754	870	998	1,137	1,286	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	2,505	2,741	2,934	3,183	3,429	3,667	3,896	
Renewable Energy Purchase	MUs	-	-	42	92	150	218	293	
- Non Solar	MUs	-	-	40	88	145	210	283	
- Solar	MUs	-	-	1.5	3.3	5.4	7.8	10.5	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	577	662	743	846	956	1,073	1,196	
Renewable Energy Purchase Costs	Rs. Crores	-	-	21	47	76	110	149	
Total Power Purchase Costs	Rs. Crores	577	662	765	892	1,033	1,183	1,345	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

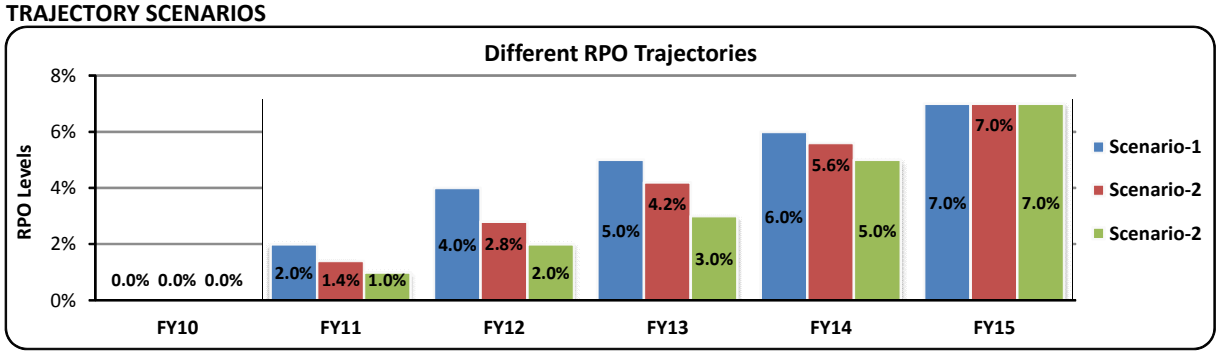
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**

ANNEXURE 24- Dadra & Nagar Haveli

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	3,423	3,838	4,303	4,822	5,427	6,032	6,637	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	788	927	1,090	1,282	1,514	1,765	2,038	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	3,423	3,838	4,243	4,687	5,199	5,694	6,172	
Renewable Energy Purchase	MUs	-	-	60	135	228	338	465	
- Non Solar	MUs	-	-	58	130	220	326	448	
- Solar	MUs	-	-	2.2	4.8	8.1	12.1	16.6	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	788	927	1,075	1,246	1,450	1,666	1,895	
Renewable Energy Purchase Costs	Rs. Crores	-	-	31	69	116	171	236	
Total Power Purchase Costs	Rs. Crores	788	927	1,105	1,314	1,566	1,838	2,131	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

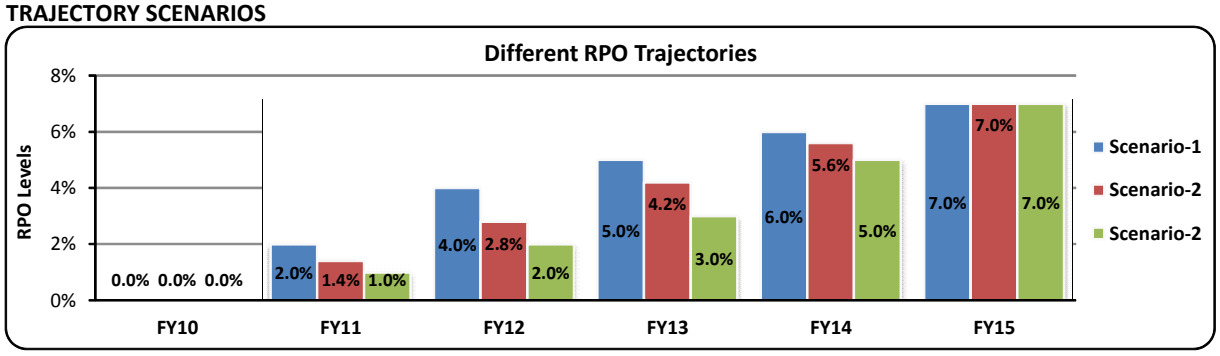
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**

ANNEXURE 25- Goa

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	2,750	3,009	3,286	3,592	3,952	4,312	4,672	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	633	727	833	955	1,102	1,262	1,434	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	2,750	3,009	3,240	3,491	3,786	4,070	4,345	
Renewable Energy Purchase	MUs	-	-	46	101	166	241	327	
- Non Solar	MUs	-	-	44	97	160	233	315	
- Solar	MUs	-	-	1.6	3.6	5.9	8.6	11.7	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	633	727	821	928	1,056	1,191	1,334	
Renewable Energy Purchase Costs	Rs. Crores	-	-	23	51	84	123	166	
Total Power Purchase Costs	Rs. Crores	633	727	844	979	1,140	1,314	1,500	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

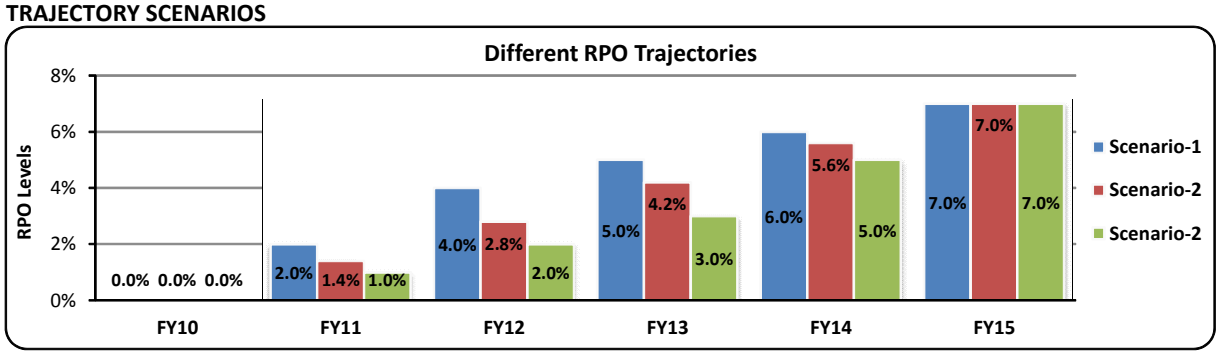
Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**

ANNEXURE 26- Chandigarh

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	1,401	1,526	1,663	1,814	1,980	2,146	2,313	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	322	368	421	482	552	628	710	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	1,401	1,526	1,640	1,763	1,897	2,026	2,151	
Renewable Energy Purchase	MUs	-	-	23	51	83	120	162	
- Non Solar	MUs	-	-	22	49	80	116	156	
- Solar	MUs	-	-	0.8	1.8	3.0	4.3	5.8	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	322	368	416	469	529	593	660	
Renewable Energy Purchase Costs	Rs. Crores	-	-	12	26	42	61	82	
Total Power Purchase Costs	Rs. Crores	322	368	427	494	571	654	743	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**

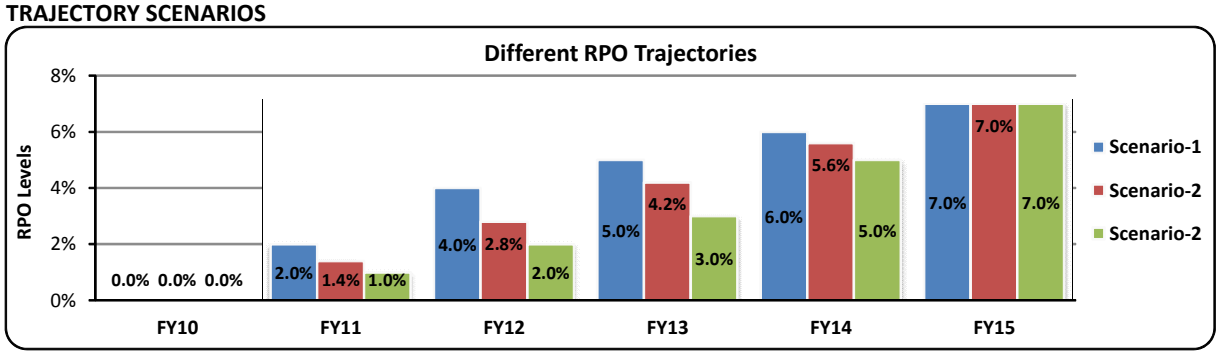
ANNEXURE 27- Other Union Territories

(Daman & Diu, Puducherry, Andaman& Nicobar, Lakshadweep)

CALCULATION DETAILS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15	
Total Energy	MUs	3,548	3,981	4,467	5,015	5,605	6,194	6,784	
PPC without RE	Rs./Unit	2.30	2.41	2.53	2.66	2.79	2.93	3.07	4.92%
Cost of power purchase, without RE	Rs. Crores	817	961	1,132	1,333	1,563	1,813	2,083	
Tariff including portion of energy purchased from renewables									
RPO Level	**%**	**0.00%**	**0.00%**	**1.40%**	**2.80%**	**4.20%**	**5.60%**	**7.00%**	
RPO Level- Solar (incl. in overall RPO)	%	0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	
Energy from Conventional Sources	MUs	3,548	3,981	4,404	4,875	5,369	5,847	6,309	
Renewable Energy Purchase	MUs	-	-	63	140	235	347	475	
- Non Solar	MUs	-	-	60	135	227	334	458	
- Solar	MUs	-	-	2.2	5.0	8.4	12.4	17.0	
RE (Non-Solar) Tariff	Rs./Unit	4.58	4.58	4.58	4.58	4.58	4.58	4.58	
Solar Tariff	Rs./Unit	18.44	18.44	18.44	18.44	18.44	18.44	18.44	
Conventional Energy Purchase Cost	Rs. Crores	817	961	1,116	1,296	1,498	1,711	1,937	
Renewable Energy Purchase Costs	Rs. Crores	-	-	32	71	119	176	241	
Total Power Purchase Costs	Rs. Crores	817	961	1,148	1,367	1,617	1,887	2,178	
Total Per unit Cost of power	Rs./Unit	2.30	2.41	2.57	2.73	2.88	3.05	3.21	
Difference in Power Purchase Cost	**Rs./Unit**	**-**	**-**	**0.036**	**0.068**	**0.096**	**0.120**	**0.140**	

TRAJECTORY SCENARIOS



IMPACT ANALYSIS

Item	Unit	FY09	FY10	FY11	FY12	FY13	FY14	FY15
SCENARIO-1								
Increase in RPO Level:				2.0%	2.0%	1.0%	1.0%	1.0%
RPO Level	**%**	**0.0%**	**0.0%**	**2.0%**	**4.0%**	**5.0%**	**6.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	4.8	9.1	11.0	12.7	14.0
Incremental impact on PPC	Paisa/ unit		0.0	4.8	4.3	2.0	1.7	1.3
Discounted Impact on PPC	**Paisa/ unit**			**4.8**	**8.3**	**9.2**	**9.7**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**4.8**	**3.5**	**0.9**	**0.5**	**0.1**
SCENARIO-2								
Increase in RPO Level:				1.4%	1.4%	1.4%	1.4%	1.4%
RPO Level	**%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**4.2%**	**5.6%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	3.6	6.8	9.6	12.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	3.6	3.2	2.8	2.4	2.0
Discounted Impact on PPC	**Paisa/ unit**			**3.6**	**6.2**	**8.0**	**9.2**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**3.6**	**2.6**	**1.8**	**1.2**	**0.6**
SCENARIO-2								
Increase in RPO Level:				1.0%	1.0%	1.0%	2.0%	2.0%
RPO Level	**%**	**0.0%**	**0.0%**	**1.0%**	**2.0%**	**3.0%**	**5.0%**	**7.0%**
Impact on PPC	Paisa/ unit	-	-	2.7	5.2	7.5	11.0	14.0
Incremental impact on PPC	Paisa/ unit		0.0	2.7	2.5	2.2	3.6	3.0
Discounted Impact on PPC	**Paisa/ unit**			**2.7**	**4.8**	**6.2**	**8.4**	**9.8**
Discounted Incremental Impact	**Paisa/ unit**			**2.7**	**2.0**	**1.4**	**2.2**	**1.4**