Regulatory Role & Engagement in Energy Transformation

Balancing Political, Economic & Environmental Considerations in Regulation of Indian Electricity

CUTS International

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Regulatory Role and Engagement in India's Clean Energy Transformation
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CUTS International in collaboration with The Energy and Resources Institute (TERI), with support from Shakti Sustainable Energy Foundation (SSEF), implemented a project entitled, 'Regulatory Role and Engagement in India's Clean Energy Transformation: Balancing Political, Economic and Environmental Considerations'.

The objective of the project was to analyse and foster regulatory role, engagement and effectiveness in clean energy transformations in five selected states — Madhya Pradesh, Maharashtra, Karnataka, Uttar Pradesh and West Bengal. The ultimate aim was to prepare a policy and practice reform strategy for two selected states to ensure inclusive, proactive and constructive regulatory engagement in facilitating the clean energy transformation.

First of all, we express our deep gratitude and appreciation to SSEF for their support and involvement in the project.

The report has been prepared by Udai Singh Mehta, Ashwini Kumar Swain of CUTS International and Veena Agarwal, TERI. We gratefully acknowledge the efforts of Madhuri Vasnani for editing and Mukesh Tyagi for the layout of the report.

However, any errors or shortcomings in this work remain solely our responsibility and should not be ascribed to any of the above acknowledged people or institution.

Pradeep S Mehta
Secretary General

Abbreviations

APTEL:	Appellate Tribunal for Electricity
ARR:	Annual Revenue Requirement
BEE:	Bureau of Energy Efficiency
CAG:	Comptroller and Auditor General
CSOs:	Civil Society Organisations
CSR:	Corporate Social Responsibility
DSM:	Demand Side Management
EE:	Energy Efficiency
EESL:	Energy Efficiency Services Limited
ESCO:	Energy Service Company
GoK:	Government of Karnataka
HT:	High Tension
INDC:	Intended Nationally Determined Contribution
JNSSM:	Jawaharlal Nehru National Solar Mission
KERC:	Karnataka Electricity Regulatory Commission
KREDL:	Karnataka Renewable Energy Development Limited
MD:	Managing Director
MEDA:	Maharashtra Energy Development Agency
MERC:	Maharashtra Electricity Regulatory Commission
MERC:	Maharashtra Electricity Regulatory Commission
MNRE:	Ministry of New and Renewable Energy
MPERC:	Madhya Pradesh Electricity Regulatory Commission
MSEDCL:	Maharashtra State Electricity Distribution Company Limited
MSW:	Municipal Solid Waste
NAPCC:	National Action Plan on Climate Change
NEP:	National Electricity Policy
PPAs:	Power Purchase Agreements

RE:	renewable energy
REC:	Renewable Energy Certificate
REDAs:	Renewable Energy Development Agencies
RoE:	Return on Equity
RPO:	Renewable Purchase Obligation
SAC:	State Advisory Committee
SDAs:	State Designated Agencies
SERCs:	State Electricity Regulatory Commissions
SHP:	Small Hydro Power
SLDC:	State Load Dispatch Centre
SNAs:	State Nodal Agencies
ToD:	Time of Day
UDAY:	Ujwal DISCOM Assurance Yojana
UPERC:	Uttar Pradesh Electricity Regulatory Commission
UPNEDA:	Uttar Pradesh New and Renewable Energy Development Agency
UPPCL:	Uttar Pradesh Power Corporation Limited
WBGEDCL:	West Bengal Green Energy Development Corporation Limited
WBREDA:	West Bengal Renewable Energy Development Agency
WBSEDCL:	West Bengal State Electricity Distribution Company Limited

1. Introduction

Driven by domestic energy security and global climate considerations, India is seeking a transformation in the way electricity is being produced and consumed in the country. With ambitious renewable energy (RE) targets and enhanced energy efficiency (EE) pledge, the country seems to be committed to the ongoing global energy transformation. However, Indian electricity is faced with this unique challenge of bridging the demand-supply gap by providing an appropriate power generation backbone and revolutionising the power generation bases with a major share of renewables, simultaneously.

The governments have put in place a broad policy framework for promotion of RE and EE, which has been evolving with technological evolutions and catering to domestic policy priorities. India aims to install additional 60 GW of wind power capacity and 100 GW of solar power capacity by 2022, to meet its revised target of 175 GW of RE installed capacity, which is about five times current installed capacity.[1] Similarly, India has an ambitious plan for enhanced EE. The last target of 10 GW saving by 2014-15 is claimed to be achieved through various schemes of Bureau of Energy Efficiency (BEE).

EE targets for industries and other segments are being revised incrementally to tame the need for additional capacity addition. Building on these, India's Intended Nationally Determined Contribution (INDC) lays out a 2030 target to achieve about 40 percent cumulative electric installed capacity from fossil fuel free energy resources. Since policies are not self-implementing, agencies and actors will play a critical role in policy execution and achievement of the targets, as key facilitators or as blockers.

While not new to the energy mix and planning, importance of clean energy in domestic and global energy planning and supply system, has picked up pace during the last decade. Clean energy production and consumption bring in new and exciting challenges for energy regulators and policymakers, while offering the possibility to address energy needs in a sustainable manner. While dedicated and new agencies are being set up to promote clean energy, the traditional agencies would have a stronger and crucial role in facilitating the clean energy transformation.[2]

With the traditional mandate to issue licences and implement tariff levels, the sector regulators in India would affect the pace and pattern of transition away from a fossil-fuel driven electricity sector, in times to come. The governments are usually engaged in designing macro policies that cannot be expected to identify and address all micro issues. In that case, it is the responsibility of regulators to craft rules (or micro policies). Simultaneously, as seen in case of industrial

[1] http://pib.nic.in/newsite/PrintRelease.aspx?relid=133220
[2] Swain A and O Charnoz (2012), 'In Pursuit of Energy Efficiency in India's Agriculture: Fighting 'Free Power' or Working with it?'

policies, governments often tend to pick 'winners', by favouring a particular technology and occasionally make mistakes in selecting winners. The sector regulators must focus on cost-effectiveness of public spending, through proper monitoring and evaluation and find ways to let the loser go. The regulators can play a critical role in execution of government policies for clean energy promotion by identifying suitable technologies and practices, and creating public support for the same.[3]

Moreover, in the context of sustainable development, it is critical to integrate economic, social and environmental considerations in regulatory decision making. With specialised knowledge, independent position and accountable public authority, sector regulators are well positioned to monitor the transformation and create a social legitimacy for the same.[4]

In the existing legal and regulatory setup in India, the Central and state governments promote RE and EE through fiscal incentives and enabling polices. While such policies and incentives are largely routed and executed through the line departments, sector regulators perceive to have a limited role in clean energy promotion. There seems to be inadequate clarity on the role of sector regulators in new developments, subsequently limiting their proactive engagement in the clean energy transformation.

However, promotion of clean energy is very much dependent on sectoral management, infrastructure and financial health to support new technologies and absorb associated transaction costs. After more than a decade since the Electricity Act 2003 has been in place with specific mandates for sectoral regulators, the sector is still grappling with past problems, especially at the distribution end. There have been several studies highlighting the fragile infrastructure, poor financial health of discoms, and regulatory inefficiency in addressing these issues (World Bank, CUTS, TERI). Some of the major distortions include the contentious process of regulatory appointment, uneconomic tariff setting and frequent delays in tariff revision to support governments' perceived protection for certain consumer categories, continued cross-subsidisation and delay in government subsidy disbursements, poor execution of standards of performance and lack of penal action on the state-owned discoms.

There seems to be a nexus between state governments, state-owned discoms and sectoral regulators that has impacted sectoral efficiency and consumer experience with the service delivery (CUTS, 2015). It is important to understand this nexus and how it affects regulatory capability to promote clean energy transformations. Further it is time to look for solutions to address the existing distribution challenges and regulatory distortions that constrains regulators' role and engagement in promoting clean energy transformation.

In this backdrop, this report is a modest attempt to analyse the current state of regulators' engagement challenges, opportunities, etc. in promotion of clean energy. While the existing literature provides insight into the role of government agencies and departments in the energy transformation, the role of electricity regulators has received limited attention. On the other

[3] Swain A (2014), 'India's Green Industrial Policy', Economic & Political Weekly 49 (9), 19
[4] Bartle, I. and P Vass, (2007), 'Self-regulation within the Regulatory State: Towards a New Regulatory Paradigm', Public Administration, 85 (4), pp. 885-905.

hand, the literature provides in-depth analysis of regulatory performance on traditional roles and mandates but does not cover how regulators cope with the energy transformation and how the new dynamics around RE and EE is factored in regulatory decision making.

This report aims to fill the gap by analysing the mandate of State Electricity Regulatory Commissions (SERCs) to promote RE and EE as defined in the central and state legislations and policies, SERCs' performance on those mandates, variation across the states and gaps constraining regulators' engagement. The objective is to identify the potential areas of policy and practice reforms so that regulatory role and engagement can be consolidated in India's clean energy transformation.

The report explains the research focus and methodology. It discusses the broad regulatory structure in Indian electricity and mandate of regulators on clean energy, by looking into the Central and state legislations. It analyses performance of SERCs on those mandates and identifies variations and gaps across states, on selected parameters and provides inter-linkages and missing links between regulatory practice and the big picture around energy transformation in India. The report, building on the previous analysis and state experiences, suggests a range of policy and practice reforms to consolidate regulatory role and engagement in the energy transformation, and provides justification for such reforms.

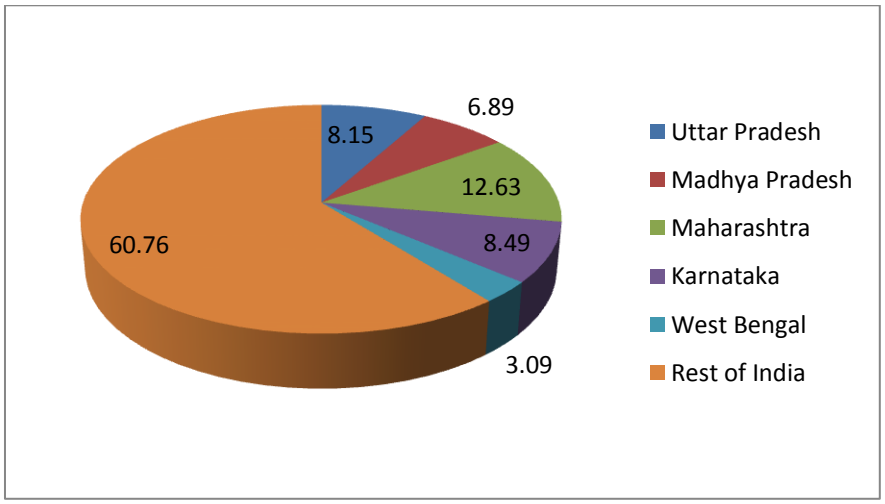
2. Research Focus

While the study recognises that clean energy transformation is a larger goal and involves larger set of actors and agencies, it identifies sector regulators as important actors in the process and, thus focusses on their role.

To understand the current state of regulatory role and engagement, the study has looked into five selected states with varying level of RE and EE focus and achievements. In selecting states, the potential of RE has been considered in the state *vis-à-vis* achievements and existing policies. In addition, electrification status, infrastructure development and discom performance and financial health have also been considered. While EE are relatively new areas for most states, many of the selected five states have picked up RE earlier. On the basis of preliminary analysis of these parameters, following five states in three broad categories have been identified: a) Leaders: Maharashtra and Karnataka; b) Emerging: Madhya Pradesh; and c) Laggards: Uttar Pradesh and West Bengal.

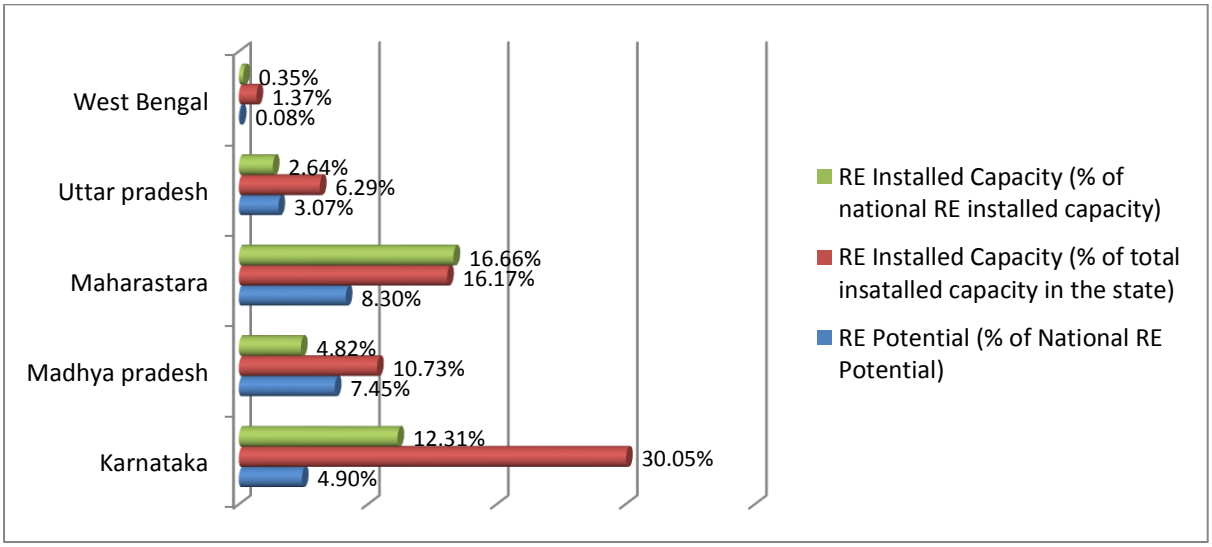
RE deployment being the centre piece, the selected five states together account for about 40 percent of India's 175 GW RE target (see Figure 1) and thus are critical to success of India's energy transformation. Figure 2 provides current state of RE development in the states *vis-à-vis* their RE potential. The selected states also have an exhaustive set of policies and regulations in place for promotion of clean energy transformation (see Table 1).

Figure 1: State-wise Share of India's 175 GW RE Target



Source: Report of the Expert Group on 175 GW RE by 2022, NITI Ayog; http://niti.gov.in/writereaddata/files/writereaddata/files/document_publication/report-175-GW-RE.pdf

Figure 2: RE Potential and Achievement in States



Source: Ministry of New and Renewable Energy (MNRE), State Renewable Energy Development Agencies

Table 1: Clean Energy Policies and Regulations across Selected States

Year	Karnataka	Madhya Pradesh	Maharashtra	Uttar Pradesh	West Bengal
2018	• Solar Rooftop Policy	• Industrial Rooftop Solar Policy		• Draft Regulations for Solar and Wind Deviation Charges	• Industrial Rooftop Solar Policy
2017	• Draft KERC (Terms and Conditions for Determination of Tariff for Distribution and retail sale of Electricity) (Third Amendment) Regulations,2017	• Solar Energy Policy	• Net metering policy for domestic solar rooftops	• Solar Energy Policy • 24x7 Power for All'	• Solar Energy Policy
2016	• RE Policy	• Policy for Rooftop Renewable Energy Projects	• Solar Energy Policy		
2015	• RE Procurement Regulation • DSM Regulation	• Forecasting, scheduling, deviation for	• RE Policy • Net-metering for	• Net-metering for rooftop	

Year	Karnataka	Madhya Pradesh	Maharashtra	Uttar Pradesh	West Bengal
	• EE & Conservation Policy	Solar & Wind Regulation • DSM Regulation (DRAFT)	rooftop SPV Regulation	SPV Regulation • Wind Policy (DRAFT) • Biomass Policy (DRAFT)	
2014	• Solar Policy			• Rooftop Solar Policy • Captive & RE Generating Plants Regulation • DSM Regulation	
2013				• Solar Policy	• Cogeneration & Generation of RE Regulation • REC Regulation
2012		• Wind Policy • Solar Policy			• RE Policy
2011		• Small Hydro Policy • Biomass Policy			
2010		• Cogeneration & Generation from RE Sources Regulation	• RPO Regulation • DSM Regulation	• RPO Regulation	• Cogeneration & Generation of RE Regulation
2009	• RE Policy • Load Forecast Regulation				
2008			• Generation from non-conventional sources, Policy	• Small Hydro Policy	• Cogeneration & Generation of RE Regulation
2007					
2006					• Cogeneration & Generation of RE Regulation

Year	Karnataka	Madhya Pradesh	Maharashtra	Uttar Pradesh	West Bengal
2005			• RPO Regulation • Small Hydro Policy	• T&C for tariff & sale of RE Regulation	
2004					
2003					

Green represents regulations and Red represents policies

To understand the regulatory mandate and practice around clean energy, the study draws on data and information from various sources (see Table 2). First set of information on defined mandate of SERCs was gathered through documentary analysis of the Central and state level policies and regulations. This analysis helped to explain the coherence and disjoints between national thinking and state level actions, and the emerging governance structure for clean energy.

For analysis of the regulatory practice around RE and EE, the study involved semi-structured interviews with a range of stakeholders, including the regulatory staff, regulated entities, State Advisory Committee (SAC) members, consumer groups and civil society organisations (CSOs), relevant government departments and subject experts. The goal was to map the perception and observation of various stakeholders on regulatory role and engagement and how that can be further strengthened to expedite India's energy transformation. The findings were further complemented with review of existing literature.

Table 2: Research Focus and Data Source

	Regulatory Mandate	Regulatory Practice
Documentary Analysis	Analysis of Central and state legislations	Analysis of SERC proceedings
Literature Survey	Literature on independent regulation in Indian electricity	Literature on independent regulation in Indian electricity
Semi-structured Interviews	Consultation with SERCs, regulated entities, government agencies, consumer groups and subject experts	Consultation with SERCs, regulated entities, government agencies, consumer groups and subject experts

Building on the findings, the report provides a narrative around current state of regulatory action for promotion of RE and EE at state level, constraints faced by regulators, and identifies the creative manoeuvres taken by some regulators to cope with the challenges. Drawing from the state experiences, the report makes a case for the strong role of regulations and suggests reforms in this regard. The approach here has been to propose two set of reforms focussed on the policy and practice.

- ***Policy reforms recommendations***, which would require government action and legislative changes to take effect and enable regulators to have proactive engagement in the energy transformation as a key actor.
- ***Practice reform recommendations***, which will draw on the state experiences, and focus on manoeuvres and tactics that regulators can use to cope with the constraints and challenges in the way of contributing to the energy transformation.

The objective is to carve out a pathway for regulators within the limit of resources and institutional bottlenecks. The report also identifies the need for additional reforms in broad regulatory structure that would facilitate the energy transformation.

3. Role and Mandate of Regulators

To understand regulatory performance and proactiveness in promotion of clean energy options, it is important to identify the role assigned to regulators. This section looks into various Central and state level legislations to identify any specific role assigned to regulators. Is there a clear mandate for regulators? If so, has that mandate changed with time and technological evolution? The section starts with a brief account of the regulatory development in Indian electricity and existing governance architecture, followed by an analysis of clean energy policy evolution, and tries to identify the role and position of regulators in advancing clean energy transformation.

Independent Electricity Regulation in India

Independent regulation entered Indian electricity as part of the global drive for electricity restructuring and reforms. After initial opening up of the generation segment for private participation in 1991, the focus of electricity reform in India shifted to distribution reforms. The shift was internally driven by the falling quality of supply, rising financial losses in the sector and alarming level of theft. Externally, there was a push from the multilateral donor agencies to adopt a global model of electricity supply industry structured around private ownership and market competition. The new approach to electricity reforms, packaged as the World Bank power sector reform programme, envisioned vertically unbundled utilities for generation, transmission and distribution business, with a key role for independent sector regulators.

Independent electricity regulatory commissions were proposed with the fundamental objective to create an apolitical space for economic decision making in the sector, to build credibility among private investors and protect consumer interest. As pointed in Orissa power reforms strategy, establishment of a regulatory commission (separate from the state government) was meant "to ensure the sustainability of tariff reform and viability of utilities meeting the regulatory commission's performance standards, inter alia to attract sufficient private investment and protect the interests of consumers."[5] To achieve that objective, regulators were expected to 'insulate' the sector "from the government and ensure its operational, managerial and financial autonomy."

Even in the absence of adequate success evidence from Orissa, the new approach to electricity regulation spread to other states, and was adopted at national level, in form of the Electricity Regulatory Commission Act of 1998. Subsequently, the sweeping Electricity Act of 2003 retained and extended the same approach. The fact that most of the electricity utilities in India are under government ownership, the new approach to regulation has been questioned at large.

[5] Document of The World Bank, Report No. 14298-IN: http://documents.worldbank.org/curated/en/575491468750299822/text/multi0page.txt

The Electricity Act of 2003, consolidating the incremental reform innovations and experiences of states during 1990s, marked a shift in governance of Indian electricity. Three important changes were sought with the shift in governance to:

- bring in market competition in both generation and distribution segments of the industry, with greater private sector participation;
- separate economic decision-making in the sector from political influences and considerations; and
- institutionalise consumer participation and protection in the regulatory process. The newly created independent electricity regulatory commissions were key to bring in these changes. While the Act signalled these broad objectives and put the onus on the regulators, it has been criticised for inadequate spelling out of regulators' role in its implementation.[6]

After more than a decade, the sector is far from achieving these changes. There is partial success in terms of private sector participation and market competition, limited to the generation segment. Mechanisms for consumer participation and protection have been adopted by the electricity regulatory commissions, but predominantly symbolically to comply with the legislation than substantively.[7] However, separation between the political and economic content of regulatory decision-making still remain contentious and far from attained. Consequently, the independent sector regulators have not been as effective as desired and lack democratic legitimacy. The state of regulatory governance in Indian electricity seems to have partly contributed to sustained and further aggrieved governance and financial crises in the sector.

Reflections on regulatory practice in Indian electricity suggest that creation of independent regulators has not been accompanied by critical thinking on their role, or attention to the political, legal and institutional contexts within which they operate. Dubash & Rao (2006) claim that independent regulation in the Indian electricity sector is more discretionary than codified, and remains as much political as techno-economic. Ambiguous procedures, weak norms and individual discretion in regulatory practice, and weak technical capacity, institutional legitimacy and democratic legitimacy have been key barriers to balance and integrate competing considerations in regulatory decision-making.

While regulators grapple with challenges around their traditional roles, it is important to understand how they have coped with new responsibilities and opportunities emergent from the ongoing energy transformation. As policies on clean energy promotion has evolved, driven by domestic and external considerations and technological advancement, what roles have been carved out for sector regulators? In the context of ongoing energy transformation, are the efficiency focussed techno-economic regulators becoming redundant or more relevant?

[6] Navroz K. Dubash Navroz K and Rao Narasimha (2007), 'The Practice and Politics of Regulation: Regulatory Governance in Indian Electricity', MacMillan, New Delhi, India

[7] CUTS (2015), 'Consumer Participation and Protection in Electricity Regulation: A case Study of Five States in India

Evolution of Clean Energy Policy in India

India's tryst with clean energy is not recent. India started its RE programme in 1981 with the establishment of the Commission for Additional Sources of Energy, with the responsibility of formulating policies and programmes, coordinating and intensifying research and development and ensuring implementation of government policies in regard to all matters concerning new and RE sources. The Commission resulted in the creation of an independent Department of Non-Conventional Energy Sources in 1982. The department was later converted into a separate and independent Ministry of Non-conventional Energy Sources in 1992. In 2006, it was renamed as Ministry of New and Renewable Energy (MNRE). In 1987, the Indian Renewable Energy Development Agency was established to provide financial assistance for RE projects. State level Renewable Energy Development Agencies have been created to implement projects at the state level.

Simultaneously, India has made several significant efforts toward greater EE. While early initiatives were focused on 'energy conservation' for domestic energy security, more recent ones emphasise 'energy efficiency' for both energy security and climate mitigation. There has been also a noticeable evolution and transformation in the concept, context and the institutions of energy efficiency. An Inter-Ministerial Working Group on Utilisation and Conservation of Energy was formed in 1981, which resulted in the first-ever concrete proposal for reducing energy consumption in India.

In 1983, an Advisory Board on Energy was set up to provide energy policy guidance directly to the Prime Minister's Office, which commissioned a draft Energy Conservation Bill for enactment by the Parliament. However, the legislation got enacted in 2001, as the Energy Conservation Act that provided energy conservation norms and required a range of designated consumers to adhere to them. Though the Act does not differ much in form and content from the 1988 Energy Conservation Bill, its notable difference is that it facilitated the creation of a new administrative body, the BEE in order to facilitate the implementation of the Energy Conservation Act.[8]

Since electricity is a concurrent subject, both the Central and state governments have jurisdiction over the sector. In practice, the Centre has mainly been responsible for planning and inter-state and international matters related to electricity and state governments have taken almost complete responsibility of matters within the state. As per this arrangement, the Centre formulates broad regulations in the electricity sector and state governments make state-specific rules within the regulatory framework defined by the Centre. Moreover, in order to incentivise RE and EE, the Central Government designs guidelines, policies and various fiscal incentives, which states may or may not adopt.

The Electricity Act, 2003 was the first Central Act that specifically included the subject of promotion of RE under its domain and divided the responsibility for the same between the Central and state governments and identified roles for sector regulators. While there is no specific provision in the Act that directly mandates utilities and/or SERCs to encourage EE,

[8] Swain, Ashwini and Charnoz, O (2012), 'High returns, low attention, slow implementation: the policy paradoxes of India's clean energy development' AFD Working Paper

Section 61 of the Act mandates SERCs to determine tariff after considering factors that would encourage efficiency, economical use of resources and optimum investments. However, the ***Energy Conservation Act, 2001*** provides regulatory mandate for standards and labelling of equipment and appliances; energy conservation building codes (ECBCs) for commercial buildings; and energy consumption norms for energy intensive industries. Instead of SERCs, this Act lays more responsibilities for EE over the Central and state governments. Following the Act, there have been several policies and regulations to promote RE and EE. Some of the key policies and regulations and their provisions are listed in the Table 3.

Table 3: Central Policies to Promote RE and EE

Name of the Policy	Provisions promoting RE	Provisions promoting EE
National Action Plan on Climate Change (NAPCC)	➢ Sets target of five percent RE purchase by 2009-10 with one percent increment each year till 2019-20	➢ Perform, Achieve and Trade Scheme ➢ Market Transformation for EE ➢ Energy EE Platform ➢ Framework for Energy Efficient Economic Development
National Electricity Policy, 2005	➢ Renewable Purchase Obligation (RPO) ➢ RE purchase by discoms through competitive bidding process ➢ Differential tariffs by CERC for RE ➢ Progressive increase in share of electricity from non-conventional sources	➢ Renovation and modernisation of generating plants ➢ Demand Side Management (DSM) ➢ EE labels on appliances ➢ Appropriate tariff structure to manage peak load
Integrated Energy Policy, 2006	➢ Phase out capital subsidy by 2007 ➢ Regulators should mandate feed-in-laws for RE	
National Tariff Policy, 2006	➢ SERCs to determine minimum state-specific RPOs ➢ discoms to procure RE at preferential tariffs determined by SERCs ➢ RE procurement for future requirements to be done through competitive bidding	
National Tariff Policy, 2011 (Amendment)	➢ Solar RPOs in states to start with 0.25 percent and increase to three percent by 2022 ➢ Solar specific REC mechanism	
The Electricity (Amendment) Bill, 2014	➢ Design a separate National Renewable Energy Policy ➢ RGO on coal and lignite based thermal power plants ➢ Specific exemptions to RE sources	

Name of the Policy	Provisions promoting RE	Provisions promoting EE
	from open access surcharge ➢ Separate penal provisions for non-compliance of RPO	
National Solar Mission, 2015	➢ RE target of 175GW by 2022—Solar-100GW (40GW rooftop); Wind-60GW; Biomass- 10GW, Small Hydro-5GW ➢ Capital subsidy for rooftop solar	
Draft Renewable Energy Act, 2015	➢ Implementation thrust to RPOs ➢ Supportive ecosystem including RE policy and plan, resource assessment, monitoring mechanisms etc. ➢ Dedicated renewable electricity investment zones ➢ Set up National Renewable Energy Fund and push states to set up their own green funds	
National Tariff Policy, 2016 (Amendment)	➢ Competitive bidding to be the norm for RE procurement (shift away from preferential tariff) ➢ Renewable Generation Obligations (RGO) ➢ Waived inter-state transmission charges for RE ➢ Solar RPO to be eight percent for all states by 2022 ➢ Regulator to frame norms for ancillary services to support power systems/grid operations with expanding RE	
BEE Policies		➢ Standards and Labelling Scheme ➢ Energy Conservation and Building Code ➢ Agriculture Demand Side Management ➢ *Bachat Lamp Yojana*
Draft National Electricity Plan, 2017-2022		➢ Incremental energy savings through improved power quality ➢ Grid stability and minimising transmission losses

State policies on non-conventional energy have evolved over time based on the growing thrust on RE sources at the Centre, which in turn, has been influenced by growing climate change discourse world-wide. Policies and regulations were issued by states for the first time around 2005-2006. To begin with, RE figured as a part of the overall energy policy of states, followed by separate policies on RE that covered the entire gamut of RE sources. Post the national mission on solar, several states introduced specific policies for solar followed by further focussed ones for rooftop solar.

Some states have introduced separate policies for wind, biomass and small hydro depending on the potential of these resources in the state. Broadly most policies focus on the role of State Government as a facilitator of RE projects in the state. This role is often played by the 'nodal agency' which in almost all states is the Renewable Development Agency. The State Government specifies the fiscal incentives and tax breaks that will be made available to the RE project developers. Some of the policies are more specific and besides setting the RE targets, clearly specify the role of all institutions involved in the development of RE, including the role of the SERCs. Of the five states, **Karnataka** is the first state to come out with a policy on EE.

While **West Bengal** was one of the first to experiment with RE, particularly for decentralised energy solutions, it came out with a comprehensive policy for cogeneration and generation of electricity from Renewable Sources of Energy only in 2012. Although the State currently has a total renewable installed capacity of 193 MW, the policy aimed to achieve ambitious target of 1040 MW and 2706 MW till the end of 12th and 13th plan, respectively. This capacity is almost evenly spread out among different renewable sources – wind, solar, co-generation, and biomass. Interestingly, the policy states that 'all the electricity generated from the RE projects established within the state of West Bengal is to be preferably sold to the distribution licencees within the state'.

The Policy clearly identifies the main responsibilities of the regulatory commission – tariff, technical specifications, open access and wheeling charges. The policy identifies two separate agencies for promoting RE. While the West Bengal Renewable Energy Development Agency (WBREDA) would promote new RE technologies, a separate agency, West Bengal Green Energy Development Corporation Limited (WBGEDCL) will be the nodal agency and l facilitate large scale investment and involvement in the RE sector of the State.

Uttar Pradesh's Energy Policy of 2009 briefly discussed both RE and energy conservation. The focus amongst renewables was on biomass, solar and small hydro. The policy proposed coming out with a detailed energy conservation policy but this is yet to come out. The State announced policy guidelines for development of small hydro in 2008 which identified a potential of 167 MW. A biomass policy was announced in 2010 and a new draft was prepared in 2015 which targeted 100 MW of biomass energy. A thrust was given to solar when in 2013 the State Government came out with a solar policy and thereafter a Rooftop Solar Photovoltaic Power Plant Policy in 2014. Under the policy, the State had set a target of grid-connected rooftop solar power plants of 10 MW each for private and public institutions to be achieved by March 2017.

The 2014 rooftop policy clearly focusses on the role of the regulatory commission. As per the policy, "the Nodal Agency shall approach Uttar Pradesh Electricity Regulatory Commission (UPERC) for announcement of appropriate regulatory framework for large scale deployment and adoption of rooftop solar photovoltaic power plants". The policy, however, does not see any role for the regulator in implementation. An empowered committee announced for policy implementation comprises secretaries of concerned departments, heads of utilities and the head of Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA).

Recently, the UP government has announced the UP Mini Grid Policy, which seeks to provide more regular supply to rural households by using locally available RE sources. It is a first of its kind policy on regulation of mini-grids and focusses on private sector participation. In 2017, the State has formulated a draft UP Solar Power Policy for promotion of both ground mounted and rooftop solar. In this draft, the State has aligned its goal with those set by the Centre, i.e. eight percent solar by 2022, which includes 10700 MW of solar and 4300 MW of rooftop solar by FY 22.

The **Karnataka S**tate Government came out with new Renewable Energy Policy (2014-20) for renewable sources which covers all RE sources other than solar. The policy envisages a minimum capacity addition of 3600 MW by 2020 and yearly targets from various renewable sources has been proposed as well. In order to harness the solar potential, the Government of Karnataka (GoK) had issued a Solar Policy (2011-16). Subsequently on account of technological advancement and Centre's ambitious mission in solar segment, it was felt necessary to set higher revised targets.

A new Solar Policy (2014-21) was announced that aimed to achieve minimum of three percent solar energy of the total projected consumption by 2021 in a phased manner; and thereby, proposed to add 2000 MW of solar by end of the period. The Government of Karnataka, in January 2017, notified certain amendments to the Solar Policy 2014-21, wherein it is proposed to install a minimum of 6000 MW of solar power projects, including grid connected rooftop generation projects up to 2400 MW by March 2021. The policy also concurs with the Solar RPO target of eight percent for the State as fixed by the MNRE, by March 2021.

Karnataka is one of the first to come out with a State Energy Efficiency and Conservation Policy (2015-19). The policy aimed to conserve around 300 MUs of electricity consumption in the medium term. The main objectives of the policy are launching and monitoring of energy efficiency programmes in larger volume thereby reducing overall cost of electricity to consumers, curtailing down increase in demand by formulating proper strategies and reducing emission of greenhouse gases. The policy is targeted to focus on five major sectors, such as Municipal, Domestic, Agricultural, Commercial and Industrial for bringing in EE. The policy has clearly specified the role of each institution involved ranging from the Energy Department, discoms, REDA and the Regulator. While Karnataka Renewable Energy Development Limited (KREDL) is the nodal agency for facilitating and implementation of this policy, it clearly sees the role of the Karnataka Electricity Regulatory Commission (KERC) in DSM.

The policy states that "the distribution utilities shall be guided by and governed under regulatory oversight. KERC may formulate suitable regulations, issue directions/orders to facilitate promotion of EE/EC in the state". The policy also discussed the options available for funding of DSM activities. These include state budgetary support, through the ARR and through energy service company (ESCO) arrangements.

Madhya Pradesh came out with a Policy for non-conventional energy sources (2006-2011). Thereafter, the State has come out with separate policies for small hydel, biomass, wind and solar. The small Hydel Policy of 2011 (amended on February 15, 2013) and the biomass policies were issued in 2011 (and subsequently amended in 2013). A wind policy was introduced in 2012 (amended on February the 21, 2013) in order to tap the 5,500 MW of wind energy potential in the state. It lists out the policy guidelines regarding process of project allotment, grid interfacing and evacuation arrangements, sale of power etc. The State Government also formulated the Solar Policy in 2012 to reflect the current statutory status of power generation and distribution including a regulatory framework. The 2012 solar policy aims to encourage private sector participation and provide the guidelines for settling targets, capacity cap, tariff, grid connectivity and evacuation etc.

The Solar and Small Hydel Policy has clearly specified that the Madhya Pradesh Electricity Regulatory Commission (MPERC) shall have exclusive jurisdiction on provisions of the policy within the regulatory mandate of the EA 2003, pertaining to notification of tariff for sale of power, PPAs, wheeling, banking, distribution, and transmission loss charges etc. Compliances of guidelines, directives, regulations, rules etc. issued by MPERC shall be binding on all concerned parties. The Commission will also have jurisdiction with regard to promotion of non-conventional energy sources, facilities for transmission of energy and sharing of purchase of power amongst the MPPTCL/Transmission Licencee/Distribution Licencee etc. The policy lists all the fiscal incentives that the State Government will provide. Wheeling facility is provided with the State Government providing a 4% grant and 100% banking of energy will be permitted where 2% of the banked energy shall be paid by developer as banking fees.

Maharashtra was one of the first states to make some policy developments towards renewable segment. The Government of Maharashtra announced a policy for Development of Small Hydro Power (SHP) Projects through Private Sector Participation in 2005. The policy did not have very specific targets but aimed at creating a conducive environment for private investors in harnessing hydro potential. The role of the regulator was designated in providing regulatory framework for tariff determination for evacuation arrangement and fixing banking charges. The State then came out with a Policy for Power Generation from Non-Conventional Sources of Energy, 2008.

More recently, the State has come out with Policy for Grid-connected Power Projects based on New and Renewable (Non-conventional) Energy Sources, 2015. The policy aims to achieve the ambitious target of 14,400 MW capacity installations based on new and RE sources in the next five years. Moreover, the capacity to be added is almost evenly distributed between different renewable sources – wind, solar, hydro, co-generation, biomass, and industrial waste. The policy also emphasis on hybrid power projects in combination with solar energy. The Policy clearly

defined responsibilities of the regulatory body in tariff determination for hybrid projects, formulating a separate open access regulation, along with setting preferential open access charges. It demarcated the role of Maharashtra Energy Development Agency (MEDA) as the implementing body and also provided for the formation of Regional Committee that will monitor the overall progress of the policy and will be headed by the principal secretary of energy.

Recently, the State Government has announced a comprehensive solar off-grid policy, 2016 with a target to add 200 MW capacity over the next five years and thereby is aimed to save at least 500 MW during this period. With the provision of providing lucrative incentives to the off-grid project developers, the policy encourages public and private entities to tap this renewable source of electricity in a big way. The Central, State Government and the Clean Energy Fund were identified as funding sources for the policy.

Role of Regulators

The Central and state policies tend to focus on the broad vision and target around RE and EE. However, these policies have failed to identify agencies accountable for execution. In case of Central policies and legislations, most of the changes are expected from state governments. Yet, there are some mandates left for sector regulators, as defined in the early legislations. The Electricity Act of 2003 requires the SERCs to:

- 'Promote RE by suitable measures for grid connectivity and sale of electricity'.
- Fix RPOs for distribution licencee (open access and CPP consumers)
- Determine generic tariff for different RE sources
- Create conditions for trading of RECs
- Specifying banking and wheeling arrangements, guidelines for evacuation arrangements

While the Act provides these broad mandates on RE for regulators, it is somewhat silent on the EE aspect. The only passing reference is made in Section 61, where it seeks the regulators to determine tariff after considering factors that would encourage efficiency, economical use of resources and optimum investments (GoI, 2003).

Despite the sector's dynamic nature, as evident from significant changes around clean energy more recently, there has not been any significant change in the proposed role of regulators. The Electricity Amendment Bill of 2014 was a missed opportunity to redefine the role of regulators in the emergent context. While it provides for regulators to encourage net metering, smart grids and decentralised distributed generation, it does not specify a definite pathway for the same. The only addition to regulatory mandate is in the National Tariff Policy of 2016, which requires regulators to frame norms for ancillary services to support power systems or grid operations especially with expanding RE.

Subsequently, there have been ambiguities on specific engagement of regulators in promotion of clean energy. Though the Electricity Act requires SERCs to promote RE, it does not codify a pathway for that. On the other hand, EE is considered to be within the domain of state governments. As observed, in most cases, regulators tend to focus on complying with the legislation, by limiting their engagement to setting the RPO targets and tariff levels. Yet, there

are some instances where the regulators have tried to manoeuvre within the given mandate and shown proactiveness. The following section discusses experiences of states on certain parameters.[9]

[9] The paper does not focus on some of the technical regulations that have been recently introduced for RE integration with the grid by SERCs

4. Insights from State Experiences

Given the limited and vaguely-defined mandates to regulators on promotion of clean energy, can they contribute to India's energy transformation? This section looks into state experiences on certain parameters to understand barriers and opportunities for regulatory engagement in the process. The section looks into six different parameters of regulatory process.

Renewable Purchase Obligation

The Renewable Purchase Obligation (RPO) is being implemented throughout the country to create demand for RE. Under the Electricity Act 2003, the National Electricity Policy 2005 and the Tariff Policy 2006, SERCs obligates entities, such as distribution licencee, open access consumers and captive consumers to purchase a certain percentage of power from RE sources. Subsequent to the launch of the Solar Mission, most states announced solar-specific RPO as well in the range of 0.25 to 0.5 percent and were expected to go up three percent by 2022.

Subsequently, the Central Government announced a 175 GW renewable target by 2022 with a huge thrust of 100 GW from solar. Taking into consideration, these new RE targets, the Ministry of Power issued guidelines in July 2016 notifying a long-term growth trajectory of RPO for solar and non-solar energy for three years – 2016-17, 2017-18 and 2018-19 as given below. It was suggested to the State to consider aligning their RPO targets in line with this trajectory. The targets will be finally fixed till 2021-22. There is, however, some ambiguity in how states would revise their targets, as the Central targets exclude hydro.

Long term trajectory	2016-17 (in %)	2017-18 (in %)	2018-19 (in %)
Non-solar	8.75	9.50	10.25
Solar	2.75	4.75	6.75
Total	11.50	14.25	17.00

States have been amending their RPO regulations time to time to take cognisance of the growing impetus on RE. In some states, new targets were prescribed once the control period prescribed in their regulations got over. In such cases, new RPO regulations were prescribed. In other cases, amendments were made to the existing RPO regulations, post the announcement of the Jawaharlal Nehru National Solar Mission (JNNSM) and subsequently post the announcement of the 175 GW target. However, not all states have revised their targets and, in some cases, targets have not necessarily been aligned with the suggested central targets. In the subsequent section, this paper examines the extent to which RPO targets have been revised in the study states.

Maharashtra Electricity Regulatory Commission (MERC) in its latest RPO regulation in April 2016 specified target at one percent solar and 10 percent non-solar, starting 2016-17 and going on to 3.5 percent solar and 11.5 percent non-solar by 2019-20.

Karnataka ERC amended its regulations in November 2015 and introduced targets till 2019-20. The State has set different target levels for different discoms based on the paying capacity of the discoms and the RE potential in their respective region. In case of at-least three of the discoms, it targets even exceed the National Action Plan on Climate Change (NAPCC) target by 2019-20. Subsequently in November 2017, KERC announced another amendment, the Fifth Amendment in which it enhanced the solar RPO from 1.25 percent in 2017-18 and 1.75 percent in 2018-19 to 3.5 percent and 6.75 percent respectively. Though the non-solar RPOs remain the same for all Escoms, it excludes hydro power purchase. *(Since the revised solar target have been announced excluding hydro, it is difficult to say whether effectively targets have increased in actual MU terms)*. The non-solar RPO remains unchanged. The proposed amendments also seek to add a clause that permits distribution licencees which have achieved compliance up to 85 percent to carry forward the shortfall to the next financial year. However, the carry forward option will not be allowed for more than two consecutive financial years.

Madhya Pradesh ERC has been revising its RPO targets almost every year in the last few years. Most recently in August 2017, it announced a sixth amendment to its RPO regulations and prescribed an eight solar and a nine percent non-solar target by 2021-22. It has set very aggressive targets for solar which are in line with the Centre's suggested targets. West Bengal's RPO regulation of 2013 fixed RPO target in 2013-14 at four percent going up to six percent in 2017-18. A revised RPO regulation has been on the anvil but not yet been introduced. Uttar Pradesh issued its RPO regulations in 2010, when it set RPO targets at four percent for 2010-11 to increase to six percent in 2012-13. The regulations specified that unless new regulations are issued, the RPO target would increase by one percent every year. Since then, under the Ujwal DISCOM Assurance Yojana (UDAY), the Government of India has agreed that the State can defer even these existing RPO targets till 2019-20 when it is in a financial better position.

Monitoring Agency

There remains some ambiguity on the monitoring process with several agencies being involved. Most regulations specify a 'nodal state agency' which is mandated to monitor the compliance of RPO target by the discom on a quarterly basis. Though in most cases, the nodal agency is the State Renewable Energy Development Agency; this has not been clearly stated in all regulations. The actual practice differs from state to state. In Maharashtra, the regulator gets quarterly information from the MEDA but it also verifies the targets independently with the SLDC. In Karnataka, KERC gets compliance monitoring report from the State Load Dispatch Centre (SLDC) only.

In Uttar Pradesh, till recently the Uttar Pradesh Power Corporation Limited (UPPCL) was monitoring compliance with RPO and only recently this function has been assigned to the UP New and Renewable Development Agency (UPNEDA). The UPERC has recently issued two *suo-motto* orders for monitoring the RPO compliance but most of the state discoms have not even appeared before the Commission. In West Bengal, while the SLDC is the designated agency to

submit the quarterly report as per the WBERC's regulations on REC, WBGEDCL is the agency that currently submits the compliance report to the Commission. In Madhya Pradesh, MP *Urja Vikash Nigam*, as the nodal agency, is responsible for monitoring.

Renewable Energy Certificate (REC) Costs

Most state regulations direct utilities to purchase REC in case of shortfall in meeting RPO target through actual RE purchase. In practice however, regulators have not made any separate provision for purchase of RE through REC in the Annual Revenue Requirement (ARR). The Comptroller and Auditor General (CAG) report on the renewable sector has also noted that for the years between 2010 and 2014, only around 4.77 percent of RPO compliance was made through the REC route.

The West Bengal RPO regulation, in fact, restricts the amount of RE and the price at which RE power can be bought. The West Bengal (Cogeneration and Generation of Electricity from Renewable Sources of Energy Regulations), 2013, stipulates that no distribution licencee should purchase more than five percent of the projected consumption in the distribution area from RE. It also states that "due to such procurement of renewable and/or cogeneration energy the average cost of supply to the consumer as determined under Tariff Regulations shall not be increased by more than 2 paisa/kWh". The West Bengal regulations have also listed out five conditions under which the discom will not be held liable for purchase of RPO. These include non-availability of RE, non-availability of REC within the price capping, failure of contracted plant to generate, discontinuity of supply by RE developer and other reasons for termination of contract. During the stakeholder consultations, it was revealed that the West Bengal regulations are being revised and the new conditions will soon be announced.

Provisions for Penalty for Non-Compliance

Some of the states have a provision for creating a 'regulatory fund' in which discom will be required to deposit a charge as determined by the Commission to the extent of non-compliance with RPO. This fund set aside will be used as per the direction of the Commission. In Karnataka, recently the regulator has withdrawn the arrangement for regulatory fund (for reasons of administrative difficulty) and simply asked the obligated entities to buy REC.

Applicability of penalty and the penalty mechanism for non-compliance differs from state. Some regulations (as in West Bengal) fix penalty limited to the amount fixed under Section 142 of the Electricity Act, 2003. Some regulations (as in Maharashtra) leave it to the discretion of the regulator to decide whether and what part of the cost of the regulatory fund will be passed on to the consumer. Recently, the West Bengal regulator in its tariff order for West Bengal State Electricity Distribution Company Limited (WBSEDCL) for 2015-16 warned the utility that from 2016-17, the discom will incur a reduction of five percent from Return on Equity (RoE) for non-compliance of RPO.

Of the study states, Madhya Pradesh Electricity Regulatory Commission, in an order dated October 20, 2014, imposed a token penalty of Rs. 25,000 for non- compliance of RPO. The order was an outcome of the petition filed by M/S Green Energy Association in the matter of non-compliance of solar RPO by the obligated entities for the period of FY 2011-12 to FY 2013-14.

Green Power then took up this issue with the Appellate Tribunal For Electricity (APTEL) and APTEL in its order dated April 28, 2015, recognised that the amount of Rs 25,000 was too little but also acknowledged that the state regulator had been correct in making this judgement based on the circumstances of the case (i.e. that the highest penalty is restricted at Rs 1 lakh and making up for the non-compliance for three years at prevailing REC prices would be difficult on the Discom).

The APTEL, however, asked the state regulator to reconsider the penalty. In response to the case going before the APTEL, the MPERC issued a *suo-moto* order petition (No 43 of 2015), in which it reconsidered the case, demanded a more frequent submission on compliance of both solar and non-solar obligation in the state. It demanded an explanation of where the amount set aside for procuring the RPO for three years had been utilised. Finally, in its order dated September 06, 2016, MPERC increased the amount of penalty to Rs 1 lakh towards non-compliance of the RPO for the FY 2014-15 & 2015-16. The Commission further directed the respondent 'to make all out efforts to ensure that the RPO for the future financial years be complied with positively'.

In the past and what was then considered a landmark order, the Maharashtra Electricity Regulatory Commission (MERC) on July 22, 2013 ordered Obligated Entities in Maharashtra to demonstrate compliance to RPO targets for four years starting from FY 2010-11 to FY 2013-14 cumulatively by March 31, 2014 or face requisite fines that could be as high as Rs. 13.40/unit. This order, however, not implemented in spirit in the later years, and utilities, particularly MSEDCL was allowed to carry forward its RPO in subsequent years. No penalties have so far been levied for inadequate compliance with RPO. However, compliance level has improved over the years and made the utilities more serious about meeting its obligations. UPERC has been coming out with *suo-moto* orders to review the status of compliance of RPO (such as in 2017). It has been urging discoms to meet the obligations of earlier years along with subsequent year targets. Compliance, however, remains weak.

Compliance Level

Overall, RPO compliance levels are low across the country. As against the NAPCC target of eight and nine percent for 2012-13 and 2013-14, the national achievement was only 4.28 and 4.51 percent, respectively. Till 2013-14, of 24 states, only six states complied with RPO targets (CAG, 2015). Of the study states, Karnataka has had the highest compliance and in fact exceeded the target for 2015-16. Maharashtra and Madhya Pradesh also had a higher level of compliance in 2015-16. West Bengal and Uttar Pradesh, in particular, have had low levels of compliance despite even setting lower targets for the discoms (MoP).[10]

The trend to be noted is that targets as well as compliance is high in states where renewable projects are coming up and hence RPO seems more of a tool with state governments and regulators to create a demand for renewables (with RE as a state development activity). Stakeholder discussions at the state level showed little interest in the Centre's climate change

[10] Agenda Note for National Review Meeting of State Principal Secretaries and State Nodal Agencies of Renewable Energy at New Delhi on January 23-24, 2017

and clean energy agenda. Table 4 gives state-wise RPO targets, penalty provisions and compliance levels in the study states.

Table 4: State-wise RPO Targets and Compliance

State	Revised Targets set till	Is RPO targets in line with NAPCC trajectory	Does provision exist for penalty for non-compliance	Has the regulator taken steps to monitor RPO compliance	Has penalty been levied	level of compliance till 2015-16
Karnataka	2019-20	Yes	as per the EA, 2003 (Rs 1 lakh)	Yes during ARR process & reporting from SLDC to actual compliance	No	126 percent compliance level against an overall RPO target of 10.25 in 2015-16
Madhya Pradesh	2021-22	Yes, in line with recent MoP targets	Yes. But only for the solar target, a lump sum amount of 25,000	No.	Yes	70.6 percent compliance level against an overall RPO target of seven percent in 2015-16
Maharashtra	2019-20	Yes	RPO Regulatory Charges, equivalent to the highest applicable preferential tariff during the year. Fund to be used as per the MERC.	Yes. The State Agency (MEDA) submits quarterly report & MERC cross-checks with SLDC	No	79.4 percent compliance level against an overall RPO target of nine percent in 2015-16
Uttar Pradesh	2012-13	No	No	Yes, separate *suo-moto* orders	No	43 percent compliance level against an overall target of six percent in 2015-16
West Bengal	2017-18	No	Section 142 of the Electricity Act, 2003; in case of WBSEDCL and DVL, reduction of five percent from RoE from 2016-17 onwards	Yes, during ARR process	No	55.6 percent compliance level against an overall target of 5.5 in 2015-16

Source: Author's compilation

Tariff Determination, Wheeling, Banking and Open Access Charges

Section 61(h) of the Electricity Act, 2003 specifies that tariff setting should be guided by the need to promote renewable energy sources. The National Tariff Policy requires that the SERCs should initially fix preferential tariffs and subsequently discoms should procure RE through competitive bidding. In the long run, the policy suggests that RETS will have to compete with all others sources in terms of full costs.

Independent regulators, with power to determine RE tariffs, can play an important role in promoting RE through incentives for investors. SERCs also determine the wheeling and banking charges/conditions, and open access charges and surcharges which send signals to investors. Typically, the latter are generally set/exemptions made under the broader policy framework of the state government.

Feed in Tariffs

While the central regulator determines the generic levelled tariff for various RE technologies as benchmarks, SERCs have freedom to determine tariffs based on the peculiar conditions in their respective states. Traditionally cost-plus tariffs are followed for tariffs for wind, biomass, and bagasse-based cogeneration projects. For solar PV, barring initial instances in Gujarat, reverse auctions have been carried to arrive at the most competitive bid with the SERC tariffs acting as ceiling tariffs. Recently in February 2017, competitive bidding was carried out for wind by SECI and it is envisaged that wind too will gradually move towards competitive bidding in states.

In earlier years, CERC had been regularly determining the generic tariff for all renewable resources including solar and wind. This tariff was applicable primarily for projects bid under JNNSM and for which NVVN was to be the offtaker. Since projects under JNNSM have been bid under reverse auction, CERC tariffs give a direction/upper bound for tariffs, capital costs and other costs. In April 2017, the Central Electricity Regulatory Commission notified its Terms and Conditions for Tariff determination from the Renewable Energy Sources Regulations, 2017.

In a major departure from the past, the CERC has reframed from setting generic tariffs for solar PV and wind. The control period of these regulations has also been reduced from five to three years. The CERC has also done away with its earlier distinction between tariff period and useful life and has henceforth decided to equate the tariff/PPA period with the useful life of that technology. SERCs so far have been issuing RE tariff regulations and subsequent order for setting generic tariffs for wind and solar but in recent orders the SERCs have clarified that these tariffs should work as ceiling tariffs in a competitive bidding scenario, not only for solar but also wind.

At the state level, regulators set the generic tariff for different renewable sources but differ in terms of how frequently they review the generic tariffs. In many instances, renewable tariffs are fixed for number of years (earlier 5 followed by 3), some review every year of the control period and at times, tariff is reviewed in between control periods. These generic tariffs, in case of solar PV tend to set the ceiling while in case of wind (till most recently), it was the rate at which the

developers were to sell to the Discom. In line with the general trend of rapid decline in tariffs, particularly for solar PV, regulators have been revising the generic tariff downwards.

The Karnataka Electricity Regulatory Commission (KERC) in October 2013 brought down wind tariffs to Rs 4.2 per unit. This had to be revised by the Commission in 2015 to Rs 4.5 per unit after a number of wind developers approached the Appellate Tribunal. The tariff of Rs 4.5 per unit was made applicable retrospectively for projects of 2013. KERC, in its recent order in September 2017 on wind has issued a generic tariff of Rs 3.74 per unit as against Rs 4.5 per unit in the earlier order in February 2015. As per the order, this has been determined taking cognisance, amongst other factors, the tariff of Rs 3.45 per unit determined in February 2017 through SECI's competitive bidding of 1000 wind capacity.

The new tariff would be applicable from September 2017-March 2018. In case of projects where PPAs have been signed before the said date, the earlier tariff would be applicable only if projects are completed within the time span agreed in the PPA. Interesting, where PPAs have been signed between the Discom and developer but not approved by KERC, the new tariff would apply. The control period for the existing tariff Rs 4.5 per unit was applicable till March 2018 but reviewed earlier. While, from a public interest point of view, this seems a positive move, it may make investors uncertain.

In April 2016, the Madhya Pradesh Electricity Regulatory Commission (MPERC) reduced the levelled tariff for wind energy from Rs 5.92 per kWh to Rs 4.78 per KWh. The tariff will be applicable to all new wind energy projects commissioned after April 01, 2016. This reduction of Rs 1.14 per unit in tariff is being considered a very steep reduction by the developers. Madhya Pradesh is not signing advance power purchase agreements (PPAs) and is only doing that after the plant is ready for commissioning. There are concerns that developers took up projects assuming old tariffs but now new lower tariffs will be applicable that are markedly less. The MPERC has also clarified that the state power procurement company can purchase power either at this rate determined by the Commission or through competitive bidding, in which case, Rs 4.78 per unit will act as the ceiling. In case of solar PV, the Commission has determined the tariff at Rs 5.45 per unit (for 25 years) for projects commissioned from April 2016. Overall, there seems more consistency in MPERC's approach where the new tariff for wind and solar has been determined for a three-year period.

Of the study states, Maharashtra Electricity Regulatory Commission (MERC) is following the most systematic approach which reviews the tariff at the beginning of each financial year of the control period. MERC has determined tariffs for 2017-18 for non-conventional energy based on its 2015 RE Tariff Regulation. The wind tariff has been determined for different zones ranging from Rs 5.4 per unit I Zone 1 to Rs 3.7 per unit for Zone 4. For solar PV tariff for 2017-18 has been fixed at Rs 5.13 per unit. Unlike, many other states, Maharashtra fixes the tariff for a 13-year period instead of standard 25 years. This could also explain comparatively higher tariffs fixed in the state.

Uttar Pradesh regulatory approach seems more *ad hoc*, reflecting the lack of general interest in RE. UPERC last issued a generic tariff for Solar PV in 2014-15 when it fixed tariff at Rs 7.06 per

unit. In May 2017, a discussion paper was circulated which suggested the need for reviewing the tariff. The paper recommended setting the generic tariff at Rs 4.54 per unit for 2017-18. Interestingly this paper also recommended generic tariffs retrospectively for 2015-16, 2016-17 as well.

Table 5: Latest Tariffs and Frequency of Revision of Generic Tariff

		Rs/unit	Applicable for Year	Frequency of review of generic tariff	Order Date
Maharashtra	Wind	5.4 -3.7	2017-18	Every Year of control period	28th April 2017
	Solar PV	5.13	2017-18	Every Year of control period	"do"
Karnataka	Wind	3.74	Sept 2017 to March 2018	Same tariff for FY 2013-18 but revised earlier	September 2017
	Solar PV	4.36	2017-18	Time to time, Revision in April 2017 came after last revised of July 2015	April 2017
Madhya Pradesh	Wind	4.78	2016-17 to 2018-19	Earlier review in Five and subsequently every three years	March 2016
	Solar PV	5.45	2016-17 to 2018-19	Earlier review in five and subsequently three years	August 2016
Uttar Pradesh	Wind	NA	NA	NA	NA
	Solar PV	7.06	2014-15	5-year period from 2014-15	April 2014

States tend to provide concessions on the transmission, banking and wheeling of RE. Some states make exemption/reduction on open access charges for RE consumers – cross-subsidy surcharge and additional charges. Cross-subsidy surcharge is in fact one of the larger concessions with some states giving complete waiver for RE consumers and some part waiver. The extent of waiver also differs in states between solar and wind, with currently there are better concessions for solar. There are also different arrangements for banking with some states offering lower charges and longer periods for banking.

Broadly, the decisions to make concessions are made at the policy level, with the regulator fixing the exact amount of concession given to RE consumers. These concessions differ from state to state with some states removing these concessions over time as RE share in their respective states increase and with falling RE prices.

Table 6: Concessions Offered by State in T&D of RE for Open Access Consumers

	Maharashtra	Karnataka	Madhya Pradesh	Uttar Pradesh
State Transmission Charges	No Concession	No Concession	No Concession	No concession as per existing 2014 regulations (full exemption for solar as per Draft Solar Policy 2017)
Distribution (Wheeling Charges)	No concession	No charges for Solar OA/CPP (Non-REC), five percent in kind for wind	Two percent if kind of injected energy with grant of four percent energy by Government of MP	No concession as per existing 2014 regulations (full exemption for solar as per Draft Solar Policy 2017)
Cross-Subsidy Surcharge	Was 25 percent up to April 2017, no concession subsequently	0 percent for solar but no concession for wind	0 percent	No concession as per existing 2014 regulations (full exemption for solar as per Draft Solar Policy 2017)
Additional Charge	No concession	Not levied	No Concession	No Concession
Banking Charge	Two percent of banked energy	0 Charged for solar, two percent for wind	Two percent of banked energy	Six percent for solar & 12.5 percent of energy banked for others
Banking Period	1 year	1 year for non-rec, 1 month for REC	1 year	2 years
Discom buy back	Total excess, limited to 10 percent of total yearly generation at APPC	APPC for captive REC projects & 85 percent of respective RE tariff for non-REC projects	For inadvertent flow of solar energy into system @APPC, for inadvertent flow of wind Rs 2.5 per unit.	Scheduled tariff applicable in the year energy was banked

Source: Prayas 2017 and authors own

Other Tariff Related Initiatives/Features in Study States

Karnataka has a provision for a 'Green Tariff' - 50 paisa per unit as the additional tariff over and above the normal tariff to be paid by HT-consumers, who opt for supply of green power from out of the renewable energy procured by distribution utilities over and above their RPO. This 'green tariff' is being purchased by companies like Infosys as part of their Corporate Social Responsibility (CSR) initiative.

Unlike other states, the regulator in West Bengal does not fix generic tariff for renewable energy sources but instead fixes a ceiling price for each renewables source. The price is based on the mutual agreement between Discom and the Developer. The discoms are however directed not to buy RE at prices higher than the ceiling. These ceiling tariffs are not revised every year. The most recent ceiling tariffs are Rs.5.41 per kWh for bio-mass source, Rs.5.71/kWh for wind energy, Rs.4.42/kWh for Small hydro source, Rs.3.34/ kWh for cogeneration source, Rs.8.90/kWh for Solar PV, Rs.5.12/kWh for Municipal Solid Waste (MSW) & Rs.6.24/kWh for Bio-gas Plant. WBERC also directs the Discom not to buy RE beyond the level where its average cost of supply increase by 2 paisa/kwh on buying RE.

Most states allow power purchase cost of RE in the ARR based on the projections from the RE stations in the state. While approving the costs, SERC focus generally on determining whether the said RE stations would generate the power proposed by the utility in the ARR petition. In the ARR, there is no specific discussion on how much RE power is required to meet the RPO obligations and how much amount will have to be set aside to buy REC to meet the remaining RPO after taking into account states own renewable energy availability. To that extent, RPO becomes only a means to create demand within a state for renewable power generated within the state.

The MPERC, in a proposed amendment in August 2016 of its Madhya Pradesh Electricity Regulatory Commission (Cogeneration and Generation of Electricity from Renewable Sources of Energy) (Revision-I) Regulations, 2010 had proposed doing away with the 'must run' status of renewable, asking that 'the generation from co-generation and renewable sources of energy to be subject to 'scheduling' and 'merit order dispatch principles' as decided by the commission from time to time." There was a lot of resistance by developers of RE to this proposed amendment and finally MPERC decided to continue with 'must run' status for RE.

Energy Efficiency and Demand Side Management

Mandate of SERCs on Energy efficiency

Electricity regulators do not have a clear mandate in EE or DSM. Section 61 of the Electricity Act 2003 provides that in determining tariffs, regulators should be guided by factors that encourage competition, efficiency, economical use of resources, good performance and optimum investment". Section 86(2) of the Electricity Act 2003 provides that regulatory commissions shall advise State Government on matters including promotion of competition, efficiency and economy in activities of the electricity industry.

The National Electricity Policy (NEP) suggests that load management techniques should be adopted to reduce the difference between electrical power demand during peak periods and off-peak periods. Specifically, the NEP suggests that differential tariff structure for peak and off peak supply and metering arrangements – Time of Day (ToD) metering – should be conducive to load management objectives.

Since the mandate for regulators around EE is not very clearly laid out, regulators in different states have involved themselves with DSM to different degrees. Since tariff determination is clearly the domain of SERCs, most state regulators have introduced time of day tariffs for industrial and commercial consumers to manage peak load. Several state discoms have implemented BEE led initiatives including *Bachat Lamp Yojana*, Standards and Labelling programme for appliances and National level agricultural and municipal DSM programmes. Regulators typically have not involved themselves directly in these DSM programmes as the costs are generally not factored in the ARR but either supported by governments or borne by end consumers. Most of the BEE led initiatives are handled by the Discom with some technical or financial support from the government routed through the state renewable development agency.

The Forum of Regulators and the BEE commissioned a study in 2010 to assess the existing institutional structures at the State level for implementation of EE and DSM and the institutional gaps hindering large scale off-take of DSM initiatives. This study[11] found that 'one of the reasons for non-deployment of larger scale DSM programmes is the deficiencies in the existing regulatory and policy framework'. These deficiencies included absence of clear mandate to the SERCs to ensure development and implementation of DSM programmes and an absence of Regulations/guidelines for design, development and implementation of DSM activities'. This study recommends that the SERCs are best suited as an agency for specifying regulations/guidelines for DSM and setting DSM goals but it lacks capacity and manpower to undertake technical studies. The report suggested that 'SERCs should involve themselves with – preparation of guidelines and regulations, goal and target setting, evaluation, monitoring and verification, coordination with BEE and dispute resolution.

Subsequently the Forum of Regulators came out with Model Regulations for DSM. Several state regulators have since then issued DSM regulations broadly on lines of the central model regulations.

DSM Regulations in Study States

Of the study states, Maharashtra SERC was the first to come out with DSM regulations in 2010. UPERC and Karnataka subsequently came up with DSM regulations. Madhya Pradesh SERC circulated a draft regulation in 2015 but these regulations are yet to be finalised. West Bengal has not issued any regulations on DSM so far.

[11] "Report on Institutionalising energy efficiency and demand side management in utility sector in India," June 2010, Forum of Regulators

Most regulations require the Discom to undertake load research and prepare a DSM action plan which is to be submitted to the regulator for consideration in the ARR. Maharashtra has the most comprehensive regulation and the regulator provides a separate regulation for assessing the cost and benefits of proposed DSM activities. Unlike other states, where regulations require the regulator to scrutinise DSM related costs and monitoring implementation, Maharashtra has a more active role for the regulator. As per the MERC DSM regulations, the Secretary of MERC acts as the convenor for a 'DSM Consultation Committee' which guides DSM activities in the state. Besides the Secretary, MERC, this committee includes representatives of discoms, renewable development agency, research institute, and consumer representatives. DSM regulations in other states provide for setting up a DSM cell within the Discom.

Table 7: Provisions of DSM Regulations of States

	Karnataka	Maharashtra	UP
DSM Regulations (Title)	KERC (DSM) Regulations, 2015	DSM Implementation Framework Regulations, 2010	UPERC (DSM) Regulations, 2014
Provision of passing DSM cost in ARR	Yes Incurred expenditure is not allowed by the commission in case of failure of program as per the approved plan.	Yes - Fund requirement by licensee for DSM activities need to be used as Annual DSM Budget. Demand Side Management Measures and Programmes' Cost Effectiveness Assessment) Regulations for assessing cost & benefits of regulation	Yes - The licencee needs to submit DSM plan stating the cost at least six months before the start of next Tariff control period
Implementing body for DSM Programme	DSM Cell in Discom	Discom guided by DSM Consultation Committee	DSM Cell
Evaluating role of Regulator	The Commission through a designated 3rd party	A DSM Consultation Committee (DSM-CC) appointed by the commission	The Commission through a designated 3rd party
DSM Targets	The Commission specifies yearly targets for the licencee through the orders	The licencee needs to submit multi-year DSM plan at the time of multi - year tariff filing	The Commission specifies yearly targets for the licensee
DSM enforcement by regulator	Directives by the Commission are more or less same over the years and without any specific targets defined	Directives and guidelines by the commission on the regular basis	Directives and guidelines by the Commission on the regular basis

The MERC has involved with DSM measures from as early as 2010 when it intervened in determining the load shedding protocol. At that time, the utility had approached the High Court claiming that these measures are beyond the mandate of the regulator. However, the MERC

position had been upheld by the High Court. MERC was one of the first commissions to approve the ToD tariff for High Tension (HT) industrial consumers in May 2000. MERC has also approved incentives and penalties for certain categories of consumers based on the power factor and load factor (Prayas, 2014).[12]

In the study states, DSM cells have been constituted in most states but in UP for instance, the Committee is yet to start functioning. In most states, utilities are undertaking load research but are yet to come up with DSM action plans. Though the SERC's are required to lay out specific energy efficiency targets, most regulators have not done so. MERC, in its Multi-Year Tariff (MYT) order 2007-10 did specify a target of two percent of the high cost power purchase to be avoided through DSM, but this was later discontinued (Prayas 2014).[13]

Most of the DSM programmes being implemented in the states are the BEE schemes on LEDs, ACs, fans which are directly implemented by the discoms with Energy Efficiency Services Limited (EESL). Some of the state commissions are allowing some of the cost incurred for DSM through the ARR. For instance, the KERC has allowed Rs 1.4 crore for FY 2013-14 for DSM expenses though mostly around consumer awareness. KERC has from time to time given directions to the Discom to undertake DSM/EE measures but there are no clear DSM targets.

Maharashtra State Electricity Distribution Company Limited (MSEDCL) in its MYT Business Plan for the Second Control Period (2012-12 to 2015-16) proposed small pilot DSM schemes as its DSM Plan. These pertained to replacement of old ceiling fans and old agricultural pumps by star rated appliances. MERC approved these plans in the order dated August 2013 but noted that these would result in very small quantum of energy savings. In the subsequent years, MERC approved DSM expense of Rs.1 crore and Rs. 8 crore for 2013-14 and 2014-15 respectively as revenue expenditure for MSEDCL. During stakeholder discussions with the study team MERC agreed that "outcome of DSM measures has been equivalent to a drop in the ocean" and that "there is a need to revisit the DSM measures". In Uttar Pradesh the BEE DELP initiative is being implemented. The costs of LEDs are either met upfront by the consumer or in instalments through the electricity bill.

The Commission issued *suo-moto* orders introducing the Discom to the BEE initiatives and urging it to take up the LED schemes on a large scale. EESL is undertaking load research for a few of the discoms in UP. However, frequent changes in the posts of the Managing Director (MD) of the discoms are posing a problem in ensuring continuity of the initiatives. So far, no DSM Plan has been put up to the Commission for consideration. The UPERC is, however, open to allowing DSM costs in the ARR. Madhya PRadesh is also implementing some of the measures through BEE including the installation of energy efficient pumps, energy audits for industry, etc. In West Bengal, the Commission has concentrated mainly on price signals like ToD and power factor surcharge/rebates (Prayas, 2014). In frequent intervals, the WBERC has also urged the utilities to submit a detailed DSM Plan.

[12] Chunkar, Aditya, et al (2014), 'Demand Side Management in India: An Overview of State Level Initiatives, Prayas, Pune
[13] *Ibid*

State Advisory Committees

The Electricity Act, 2003 mandates SERCs to establish SACs, a multi-disciplinary advisory body. The SACs comprise representatives from sectors including commerce, industry, transport, agriculture and labour as well as consumer organisations, non-governmental organisations, academia and research bodies in the electricity sector. Moreover, the chairperson of the SERC is the ex-officio chairperson of the SAC, and members of the SERC as well as few members of the state administrative machinery are ex-officio members of the committee.

As per the Electricity Act, 2003, the SACs shall advice the SERCs on the following issues:-

- Major questions of policy
- Matters related to quality and extent of services provided by distribution licensee
- Protection of consumer interest
- Standards of performance by utilities
- Compliance of licensees with the licence conditions and requirements

The dual aim of setting up such widely represented advisory committee was to ensure that the SERCs are well informed about the impact of their regulations and orders on their respective state economies, as well as to provide a platform to the representatives from key sectors of the state economy to suggest ways to improve such regulations. The ultimate aim was to ensure that the regulatory decision-making process is inclusive.

Although provided for by a central legislation to ensure the presence of the much-needed link between the regulator, consumers and other relevant stakeholders, the effectiveness of the SAC platform has been observed to vary across states. Table 8 provides the status of SACs in five states — Uttar Pradesh, Madhya Pradesh, Karnataka, Maharashtra and West Bengal.

Table 8: State-wise Analysis of SACs

	Regulation on SAC	Frequency of meetings		Availability of minutes of SAC on ERC webpage	Discussions on RE and EE
		As per regulation	Actual		
Madhya Pradesh	MPERC (Constitution of SAC and its Functioning) Regulation, 2004	Four times a year			
Maharashtra	MERC (SAC) Regulations, 2000[#]	Four times a year	Regular till 2013; gap of 30 months between 26th SAC meeting in 2013 and 27th in 2016	Available	None; discussions mostly focus on the subject of tariff reduction
Karnataka	KERC (SAC) Regulations, 2004	Four times a year	More or less regular; Once every	Available	Yes; Discussions on DSM, none on RE; discussions mostly

	Regulation on SAC	Frequency of meetings		Availability of minutes of SAC on ERC webpage	Discussions on RE and EE
		As per regulation	Actual		
			quarter or half yearly		focus on issues related to tariff, loss reduction and subsidies;
Uttar Pradesh	UPERC (Constitution of SAC and its Functioning) Regulation, 2004	Thrice a year	Irregular; gap of 18 months between 13th SAC meeting in 2012 and 14th SAC meeting in 2014	Available	Yes; discussions on sustainable solutions for off-grid RE systems; nodal agency also apprises the SAC members with the status of its RE projects
West Bengal	-	-	Irregular till 2015; Twice a year since 2015	Not Available	No; However, WBERC has formed an expert sub-group committee on RE and energy conservation

Source: Websites of SERCs; Stakeholder consultation by CUTS, CIRC and TERI
 # Under Electricity Regulatory Commissions Act, 1999

A part of the reason behind the above-mentioned variations across states are related to the differential nature of leadership at the SERC level, while other reasons include the level of participation, nature of participants and selection of issues for discussions. For instance, in the SAC of Maharashtra with a balanced participation from governmental and non-governmental organisations, as well as of relatively more proactive and capacitated research groups, the quality of discussions was perceived to be better than in West Bengal and Uttar Pradesh, SACs of which are dominated by representatives from government organisations and lack participation from well-informed consumer organisations.

Regardless of variations, there is a common perception amongst most regulators of the above-mentioned states that SAC as a platform for holding constructive discussions between the regulator and market participants has been of limited use to the SERCs. While the SERCs blame the lack of well-informed consumers and suitable participants in the SAC meetings for the same, it has also been observed that a lack of interest and receptiveness to suggestions provided by SAC members on the part of SERCs is also a vital reason for the relative ineffectiveness of the platform.

Given its design and membership structure, SACs provide an appropriate platform to deliberate and agree on matters like appropriate RE and EE policy and regulations in the state, effectiveness of various incentive/disincentive mechanisms provided to various other sectors like transport, agriculture and industry to promote RE and adopt EE measures, and actions to be

taken for non-compliance of RPOs by discoms. However, most of the discussions in the SACs across these five states mainly focus on matters related to tariff hikes, electricity subsidies and connections rather than on policy and regulatory matters. While in certain states like Uttar Pradesh and Karnataka, issues regarding RE and EE have been raised in the recent SAC meetings, they have not yielded the desired result either due to the peripheral nature of the discussion because of paucity of time or due to other discussions on tariffs and subsidies taking precedence over these discussions.

In order to receive subject-specific advice from a smaller and a more focussed group of experts, some regulatory authorities in states like West Bengal and Maharashtra have constituted separate advisory committees comprising relevant stakeholders. For instance, West Bengal Electricity Regulatory Commission has established sub-group committee on various subjects including standards of performance, RE and energy conservation. However, the minutes of the meetings and the recommendations of these sub-group committees are circulated only amongst its members and are not available in the public domain, which makes it difficult to assess its utility.

Given the perceived ineffectiveness of SACs as a platform to constructively engage with stakeholders with an aim to improve the regulatory framework in the sector, there is a need to take a re-look and possibly revisit the design of the SAC platform. In order to make them more effective, there is a need t:

i) redesign the mandate of SACs to make it more focussed by reducing the scope of discussions;
ii) ensuring a balanced representation from governmental and non-governmental organisations,
iii) making SACs more independent possibly by moving away from the current framework, wherein the Chairperson of the SERC is the ex-officio Chairperson of the committee,
iv) careful selection of members of SACs and further revisions,
v) more organised meetings with a formal agenda clearly mentioning the time allotted to each subject of discussion as per its priority level,
vi) preparation of more structured minutes of meetings with a detailed note on each subject of discussion and concrete results of such discussions, and
vii) preparation of an action plan as a follow up to the meeting and a report on the same prior to the next meeting.

There may also be merit in dividing the SACs into two levels, i.e. smaller subject-specific groups comprising experts to ensure a more focussed and high-quality discussion, which leads to a set of technically feasible and socially acceptable outcomes, presented to the SAC members at the second level.

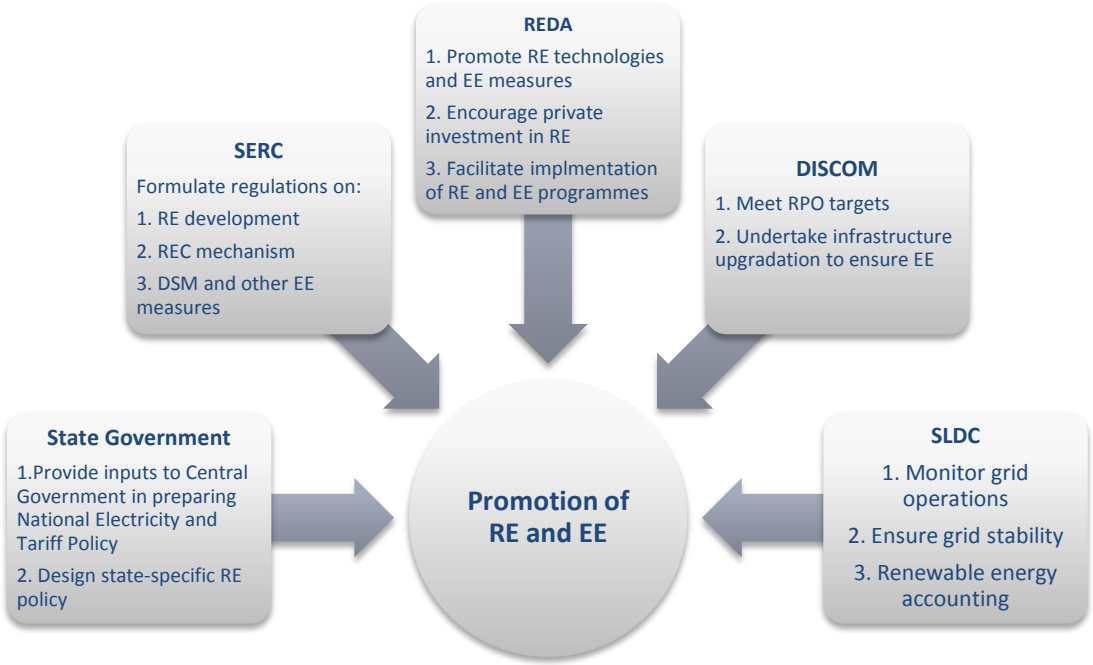
Institutional Capability and Credibility

Institutions play a critical role in facilitating large scale development of RE and EE in any economy. With increasing global pressure to reduce emission intensity of economic growth and domestic pressure to address concerns regarding energy security, there is an increasing policy focus on promotion of RE and EE in the country. Formulation of appropriate policies and their successful implementation requires the existing institutions to not only accept the concept but also facilitate energy transformation (from fossil-based to increasing share of non-fossil energy sources), and establishment of new institutions to take up the new roles of RE and EE promotion.

In line with the central thrust on RE during 1980s, most states had formed state-specific energy development agencies to take up the primary task of promoting RE in their respective states. These were known as Renewable Energy Development Agencies (REDAs) or Energy Development Agencies. They were later designated as the State Nodal Agencies (SNAs) by the MNRE to implement central as well as state policies on RE in their respective states. Moreover, most state governments notified the REDAs as State Designated Agencies (SDAs) to coordinate, regulate and enforce the various provisions of the Energy Conservation Act, 2001 at the state level, while other states handed over this responsibility to the state power departments or discoms.

Further, the existing institutions also took on new responsibilities and ventured into the RE sector in order to facilitate energy transformation in the country. For instance, discoms across states have been obligated to meet a minimum percentage of their power consumption from RE source. Similarly, the additional RE injections to the grid has introduced new challenges for the SLDCs, which are responsible for grid monitoring.

Figure 3: Institutional Framework for Promotion of RE



While a collaborative effort of all the above-mentioned institutions is required to ensure a higher deployment of RE and adoption of EE measures, the following section analyses the role of two of these institutions — SERCs and REDAs — in promotion of RE and EE in the selected states.

SERCs

As mentioned above, the SERCs, being the regulators of the energy market, have been entrusted with one of the most important task of designing effective regulations for development of RE in the state while ensuring the presence of a level playing field for all market players. By designing effective regulations, regulators can contribute to promotion of RE and EE by making the regulatory environment for RE investors and developers more conducive. Moreover, by setting RPO targets and monitoring its compliance, they also play an important role in ensuring achievement of the state-level RE targets, which ultimately feeds into meeting the national target.

While most states have formulated separate regulations on RE and EE, their successful implementation largely depends on various aspects involved in making such regulations. These include consideration given to technical aspects, taking into consideration views/concerns of other stakeholders including the discoms, consumers and subject experts, and assessing its impact (both costs and benefits) on concerned stakeholders as well as feasibility of implementing the proposed regulation.

The lack of in-house technical expertise was observed to be a limitation in formulating regulations on RE, RPO and DSM across a few states. In order to deal with this, states like Maharashtra engage with external technical consultants to receive techno-economic advice while forming and/or reviewing regulations specifically those related to tariff. While this is seen as a good practice adopted by the regulator to ensure that technically sound regulations are put in place, the stakeholders in the sector have raised concerns regarding lack of a sound mechanism to check on the technical capacity and suitability of such consultants.

Further, the lack of an appropriate monitoring and review mechanism for regulations as well as a mechanism to check compliance with the provisions of the regulation has been observed to be a barrier in their effective implementation. For instance, none of the states have yet been able to comply with the RPO targets set by SERCs. While, limited human resource capacity within the SERC has often been held responsible to affect their ability to check compliance, lack of financial resources is not cited as a limitation in hiring more human resource to the SERCs. The same has been verified in Table 9, which gives details about available human and financial resources to the SERCs of the five states:

Table 9: Status of Human and Financial Resources of SERCs during 2013-14 and 2014-15

State	Human Resource			Financial Resource (in Rs. million)						
	Technical	Non-Technical	Total	Total Receipts (2013-14)	Total Receipts (2014-15)	Total Payments (2013-14)	Total Payments (2014-15)	Surplus (2013-14)	Surplus(2014-15)	State Government grant[#]
Uttar Pradesh	4	6	10	NA	NA	NA	NA	NA	NA	NA
Madhya Pradesh	4	9	13	NA	NA	NA	NA	NA	NA	NA
Maharashtra	9	9	18	1258.8	1471.5	224.8	229.8	1033.9	1241.7	0.1
Karnataka	7	6	13	118.1	453.1*	66.6	69.4*	51.4	383.7*	29
West Bengal	4	5	9	150.9	93.5	36.5	68.5	114.3	24.9	_

Source: Annual reports of SERCs
#figure has been included in calculation of receipts
*figure refers to 2012-13

5. Missing the Woods

As discussed in the previous sections, engagement of SERCs has been limited in the states studied. In most cases, regulators try to comply with the provisions of legislation. Given that the Act does not provide any clear roadmap for their engagement, regulators self-limit themselves to deciding RPOs and traditional role of setting tariff levels, in case of RE. While the law allows deciding RPO targets and RE tariff keeping in mind state context, most of the regulators seem to have followed the central guidelines, as released by the CERC. In instances, such unthoughtful compliance with central guidelines has restricted regulators from implementing other related regulations. For example, high RPO targets, in absence of adequate generation capacity in the state has limited the regulators from levying penalty on non-compliance. In case of EE and DSM, owing to the silence of the Act, most regulators consider it beyond their jurisdiction and believe that it should be taken care of by the utilities or state departments (under EE section, it has been mentioned that most SERCs have formulated DSM regulations).

However, as observed in some cases, there have been occasional variations in approach, but largely driven by the leadership. Commissions like MERC and KERC have taken proactive measures to promote RE and DSM at some points. In case of a change in leadership in the SERCs, such measures have been abandoned. It is important to find out ways to not only sustain these creative manoeuvres, but also to transfer such practices to other states. On the other hand, such discontinued approach raises concerns about the wider eco-system for regulatory governance and regulatory appointment which has been debated for long. What sort of eco-system would support such practice innovations at SERC level? Would a robust and unbiased regulatory appointment process empower the regulators to take more bold steps?

Though not a new phenomenon, clean energy in India has largely been a national agenda, signalled through national policies and incentivised with appropriate fiscal transfers. While some states seem to have adopted the clean energy transformation agenda, many follow or resist it for more political reasons. Such an approach to technological adoption could be biased, devoid of the big picture and may get into lock-in effects. This is where regulators have an important role to play. Being independent of the government and other vested interests, with the power to decide the micro rules for policy execution, the regulators can align the competing interests. For example, while setting the RPOs, it is important to consider the energy mix, projected demand and load pattern. However, in none of the cases, regulators have considered those factors while deciding the RE targets. As pointed by one of the respondents in the existing electricity governance architecture, regulators need to be 'thinkers and planners', "but the current set of regulators are more of bookkeepers".

As observed, the SERCs' objective to promote RE and DSM is more linked with either the concerned state's political aspirations or aligned with the national signals. However, none of the

SERCs have considered the national agenda, be it larger energy security goals or climate mitigation goals. This shows the level of disjoint in policy thinking and coordination.

On the positive side, keeping with the legislation and regulatory guidelines from CERC, most of the SERCs have come up with important regulations, specific to technologies. These regulations have been more effective in identifying the accountable agencies. Given the legislations are new, the real effects are yet to come. The question remains whether the SERCs would be able to ensure compliance of these regulations.

Within the given mandate, regulators are empowered enough to hold regulated entities, especially discoms, accountable for their compliance to clean energy targets. Tariff hearings are right opportunity to question the discoms on their performance and incentivise or penalise accordingly. Though it has been attempted on instances, especially in Maharashtra, but not been a sustained practice. A part of the explanation could be irrational tariff setting, driven by political expediency; when the tariff does not reflect real cost of power, how can it reflect the non-performance of discoms.

As the clean energy technologies and practices come with short-term transaction costs, there is a need for a social support through deliberation and awareness. Regulators, offering a participatory forum for such deliberation, could play a critical role in creating social support for energy transformation. As observed, in all the cases such opportunity has been less exploited. As pointed out earlier, public participation around RE and EE has been limited or non-existent in most cases. While consumers have generally been sensitive on direct tariff issues, clean energy with indirect tariff implication has attracted less public attention. How that awareness or information gap can be filled and thus create a social support for the transformation is an important question.

Given these potentials of regulatory engagement and gaps in India's clean energy transformation, there is a need for a strategy that empowers and enables the regulators to take action and provides guidelines for such engagements.

Reform Strategy

Undoubtedly, Indian electricity sector is on a transformation pathway. On the one hand, the distribution segment is undergoing major reforms in institutional structures, commercial principles and regulatory process. On the other hand, there is an emphasis on transforming the energy mix with greater share of renewable power and improving efficiency in energy consumption. Both sides of the transformation are equally dependent on operational efficiency and financial viability of the distribution business. On the face of it, regulators with the responsibility to determine tariff would play a strong role in both sides of the transformation.

In this report, the focus is on the transformation in the way electricity is produced and consumed. As it is a relatively new phenomenon, there is limited specification on the role the regulators can play in fostering the transformation. However, there is an emerging global discourse on the role economic regulators can play in achievement of wider sustainable

development goals in their respective sector. In case of a public utility service like electricity, which has significant environmental implications, regulatory decisions will have far more social and environmental implications. Given the policy indivisibility, regulators have to balance between competing economic, social, political and economic considerations.

As observed through stakeholder consultations, the prevailing legislation in Indian electricity provides a limited role of SERCs in promotion of RE and EE. RE and EE policies have also failed to chalk out a specific role for SERCs. Subsequently, except in few cases, regulators often self-limit their role to setting the RPO targets and deciding the tariff levels, wherever required. Furthermore, in performing those limited responsibilities, SERCs seek to comply with the central guidelines, often compromising the local context and needs. However, the legislation allows the regulators to make decisions based on the local context, while keeping with the national aspirations. This local context was observed to be missing from the decision-making processes of SERCs. The self-limiting attitude of the regulators or lack of proactiveness can largely be explained by the weaknesses in regulatory eco-system in India and increasing interference from the state governments.

Drawing on the state experiences, the report has tried to identify a reform roadmap to consolidate regulatory mandate and engagement in India's clean energy transformation. The first part of the recommendations focusses on practice changes that regulators can adopt to play stronger and constructive role within the constrained ecosystem. In the second part, it deals with the policy changes that would be required to reform the regulatory ecosystem.

An Action Plan for SERCs

Drawing on the experiences of five states, and the actions and inactions of the SERCs in the respective states, we propose the following five areas, where the regulators can use creative tactics and contribute effectively to the transformation.

Setting RPO Target and Monitoring Compliance

As observed, most of the SERCs take a decision on the RPO based on political expediency rather than economic pragmatism. That makes it difficult to ensure compliance by the obligated entities. With the leeway to set a target that is feasible and conducive to the state context, as set by the legislations, the regulators must consider the local context like current availability of power, projected demand, potential of various RE technologies in the state, and how and which technology can fill in the demand-supply gap in the state. While such information is available and accessible to the regulator, the RPO trajectory should build on that, and in consultation with the relevant stakeholders. In an ideal case, the regulator must make decision around the annual hearings on discoms' ARR, where power procurement plans are approved.

In this case, it would be much easier to monitor and ensure compliance from the obligated entities. However, the compliance mechanism for RPOs either does not exist or is not followed. There is a need for a publicly accessible monitoring mechanism to be put in place, through which even the consumers can hold the obligated entities accountable for their performance.

DSM Strategy

Owing to the silence of the Electricity Act and subsequent policies on regulators' role in promotion of EE measures, regulators have shown little interest with regards to this issue. Moreover, EE measures require action at consumer level in most cases, which is beyond the jurisdiction of regulators. However, regulators can play an important role in planning a DSM strategy. With the available information and the regulatory powers over the distribution utilities, regulators can ask discoms to follow certain DSM measures, select certain performance indicators and hold the utilities accountable for it. Given that regulators have a mandate to set targets at the Discom level loss reduction and take action on non-compliance, DSM offers an ideal balance between loss reduction and energy conservation.

On the positive side, most of the SERCs have recently prepared DSM regulations, which identify a roadmap, with clear responsibilities. However, it is important to follow that roadmap and hold the relevant stakeholders accountable. In an ideal case, the DSM plan should have a time-bound target for the discoms, compliance must be taken as a performance indicator and noncompliance should be penalised.

Tapping the potential of SACs

It was observed that the SAC as an advisory body has been effectively approached across states. While in most cases, SAC meetings are held in regular intervals, the meetings tend to focus more on procedural issues than substantive. With members from diverse backgrounds and representing interests of different consumer groups, the SAC can help the regulators by providing diverse perspective as well as better information. Therefore, it is important to not only organise the SAC meetings, but also to put up important matter like RE and DSM planning in those meetings. Such deliberation should be available on public domain to inform the consumers and get some credibility to the consensus arrived at such meetings.

Public participation (for better social legitimacy)

While public participation has been minimal in the regulatory processes, it has often been concentrated around the direct tariff issues. In case of clean energy issues, there has been hardly any participation. This has been largely due to the lack of consumers' awareness on RE and EE, and lack of understanding on clean energy's effect on the cost and quality of electricity consumption.

In the absence of public participation, regulatory decisions often lack the social legitimacy and support required for effective execution. To gain that effectiveness, the regulators must provide a deliberative space for issues around clean energy and provide explanations. For example, in case of DSM, end consumers participation and contribution would be critical to success. That requires social/public acceptance to any plan or strategy proposed by the regulators. Therefore, the SERCs need to organise public hearings/consultations around the RE and EE issues, facilitate consumer education and seek their participation.

Cost-Benefit Analysis for better regulatory decision-making process

While all the SERCs studied have come out with several regulations around clean energy, as observed, these regulations have been largely influenced or guided by the central policies, model regulations or guidelines. Although alignment with central policies is appreciated, it is also important to consider the externalities of these regulations in light of the local scenario. In many cases, the negative externalities are felt in the long term, and result in lock-in effects. Therefore, the regulators must build in cost-benefit analysis to decision-making. While formulating regulations, the regulators must calculate the benefits *vis-à-vis* the costs of such regulations on all the relevant stakeholders. Institutionalisation of cost-benefit analysis in the regulatory process will not only help avoiding onerous regulations but will also help regulators to better balance the competing interests.

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