

**Minutes of the**  
**62<sup>nd</sup> Meeting of the Forum of Regulators**

**Venue** : **Central Electricity Regulatory Commission  
Conference Room  
Upper Ground Floor  
Chanderlok Building  
Janpath  
New Delhi-110001**

**Day / Date** : **Friday, the 15 December, 2017**

**List of Participants** : **Enclosed as Annexure-I**

**Opening Session**

The meeting was chaired by Shri Gireesh B. Pradhan, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). The Chairperson, CERC / FOR welcomed the Members of the Forum to the 62<sup>nd</sup> Meeting of Forum of Regulators. He also extended a warm welcome to Shri Ngangom Sarat Singh, Chairperson, Joint Electricity Regulatory Commission (Manipur & Mizoram) and Shri Suresh Kumar Agarwal, Chairperson, Uttar Pradesh Electricity Regulatory Commission, who were attending the meeting of the Forum for the first time after assuming charge.

In his opening remarks, the Chairperson informed that the Forum had met 62 times since its inception (and 25 times since he took over in 2013 October) apart from the Working Group Meetings, Technical Committee Meetings etc. He stated that he would demit office of Chairperson, CERC shortly and briefly discussed about the progress made by the Forum of Regulators over the last four years.

- He expressed satisfaction over the number of issues brought by SERCs / JERCs for discussion / sharing of best practices etc and observed that the trend reflects the way SERCs / JERCs owned the Forum and complimented the Members for their active participation. He felt that the re-designed logo of FoR allows reflecting the intent of harmonization, coordination and uniformity of approach of the Forum.
- He also referred to the accepted norm of having one out of four FoR Meetings outside New Delhi. The agenda for FoR Meetings now reflected issues and problems being faced by State Regulators much more than before.
- He observed that efforts made by the Forum to carry out studies on different subjects and designing Model Regulations, are significant and facilitated the SERCs / JERCs to formulate State-level Regulations in a time-bound manner.
- He appreciated the significant role played by the FoR Working Groups, which gave its considered view made appropriate recommendations on crucial subjects. He lauded the efforts of the FoR Standing Technical Committee, under the Chairmanship of Shri A.S. Bakshi, Member, CERC. He observed that the Standing Technical Committee played a stellar role on various issues related to RE integration.
- While referring to the importance of documentation of record of activities, he appreciated the efforts made to bring out compendium of all Study Reports, Working Group Reports, and Minutes of the Meetings of FoR. He hoped that availability of relevant reference material, would facilitate the Regulators take informed decisions.

- He noted that Government relies on the collective wisdom of the Forum and seeks its advice on matters of importance. While referring the considered opinions sent to the Government, he recalled the efforts of FoR made specially in cases of amendments to the Tariff Policy and amendments to the Electricity Act, 2003.
- While referring to the e-Court Project SAUDAMINI (System for Adjudication Using Digital Access & Management of Information through Network Integration) launched by CERC, he informed the forum that the technical discussions are in progress between CERC IT Team and NIC for development of a generic software facilitating implementation of the same across the board for all Member ERCs.
- He informed the Forum that as recommended by the FoR Task Force on North-Eastern States, a focused capacity building programme for Regulators and Regulatory Staff of SERCs of NE States was conducted and shared that feed-back of the participants was very encouraging. He thanked the SERCs for their active participation.
- While noting down the unfinished tasks viz. Open Access Registry, Implementation of RPO Web-tool in States etc. he hoped that these would be taken forward for logical conclusion.
- He felt that profound responsibility has been bestowed upon the Regulators to oversee the transition in the best interest of the investors as well as the consumers.
- While taking note of journey of reforms from the stage of acute shortage of supply and to the present stage of reported over capacity and stranded assets,

he advised the Forum that it would be unfair to think that such issues on the generation side are only the domain of the Government and not of the Regulators. The law carves out a role for Regulators to advise the Government on all sectoral issues and also play a direct role wherever it is mandated.

- He observed that going forward, the pace of change in the power sector is expected to be very fast. New and emerging technologies are likely to disrupt the traditional way of power system operation. With more and more of renewable energy coming in, roof-top solar getting popular, emerging technologies like energy storage and electric vehicles coming in a big way, the face of power sector will undergo a transformation. He urged the Regulators to gear up to adapt the Regulations to facilitate these changes seamlessly.
- He stated that the Forum could achieve substantial progress due to active participation of its Members. The Members have owned the Forum, participated in all deliberations, gave their insights, shared their experiences and best practices etc. He felt that the cross sectoral perspectives brought by Members having background other than electricity, enriched the deliberations.

He thanked the Members of the Forum for their cooperation and interaction during the tenure. He thanked Shri Sanoj Kumar Jha, Secretary, Ms. Shubha Sarma, former Secretary and the FoR Secretariat led by Dr. Sushanta K. Chatterjee for their support.

Thereafter, the Forum took up the agenda items for consideration.

### **Business Session**

#### **Agenda Item No. 1                      Confirmation of Minutes of the 61<sup>st</sup> Meeting of FoR held on 22.9.2017.**

The Forum considered the minutes of the 61<sup>st</sup> Meeting of Forum of Regulators held on 22.9.2017 at Chennai and endorsed the minutes.

#### **Agenda Item No. 2                      Capacity Building Programme for Regulators and Regulatory Staff of SERCs / JERC of North- Eastern States.**

Joint Chief (Regulatory Affairs), CERC briefed the Forum that as per recommendations of the FoR Task Force on North Eastern States, a specially designed Capacity Building Programme was conducted for the Regulators and Regulatory Staff of SERCs / JERC of North Eastern States, by the FoR Secretariat in association with the Indian Institute of Corporate Affairs. He informed the Forum that feed-back of the participants was encouraging.

The Forum appreciated the efforts and accorded its *ex post facto* approval to the expenditure of Rs. 14.56 lacs out of FoR Reserves which was incurred towards conducting the above capacity building programme.

**Agenda Item No. 3**

**References from Ministry of Power 100% Discount in the Electricity Bills consumer by person with disabilities Pass through of various duties / taxes / sur-charges levied post bidding Delay in capital cost approval**

The Forum discussed the references received from Ministry of Power on 100% Discount in the Electricity Bills consumer by person with disabilities, pass through of various duties / taxes / sur-charges levied post bidding and delay in capital cost approval. The Forum decided that Members may examine these issues in their respective SERCs along with a detailed analysis.

**Agenda Item No. 4**

**FoR Study on “Impact Assessment of FoR Studies and Capacity Building Programmes”**

The Forum of Regulators commissioned a study on the “Impact Assessment of FoR Studies and Capacity Building Programmes” conducted during the last five years and to analyze if these activities are in line with the overall functions and objectives of the Forum. M/s PWC was selected to provide the consulting assistance to the Forum, through a transparent bidding process.

A presentation (enclosed as **Annexure-II**) was made by the representatives of M/s PWC. The study includes a designed survey on the impact of studies and capacity building programmes. A detailed analysis was carried out on the total 103 responses received in terms of relevance, efficiency, effectiveness, impact and sustainability of the studies and capacity building programmes of FoR..

The study recommended for appointment of a working group for specific Studies/CBPs for greater coordination and ensuring accountability from all stakeholders, interest survey to gauge key topics to be covered in Studies and CBPs, checklist of critical parameters necessary for impactful Studies and CBPs to be fulfilled at every stage of Study and CBP lifecycle, online forum for regular discussions on pertinent issues, communication template for coordination between FoR Secretariat and SERCs etc.

The Forum after detailed deliberation, endorsed the study report.

**Agenda Item No. 5**

**FoR Standing Technical Committee Report on Implementation of Framework on Renewables at the State-Level**

The Chairperson launched the Volumes I & II of the First Report of the FoR Standing Technical Committee. Ms. Shruti Deorah, Adviser (Renewable Energy), CERC, made a presentation (enclosed as **Annexure-III**) on the Report of the FoR Standing Technical Committee.

The Technical Committee of Forum of Regulators (FOR) was formed under the Chairmanship of Member CERC, Shri A.S. Bakshi, comprising of Technical Members of State Commissions of renewable rich States to facilitate roll-out of Framework on Forecasting, Scheduling and Deviation Settlement of wind & solar generators in RE rich states. The Committee during the last two years met 16 times and held detailed deliberations.

The key initiatives of the Committee, inter alia include, Report on Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST), Model Framework for Forecasting, Scheduling and Deviation Settlement for RE sources at the State level, Model Deviation Settlement Mechanism (DSM) Regulations, Development of Generic RPO Webtool & Model RPO Regulations, examination of issues related to Regional Co-operation for optimum utilization of Generation Resources, Report on roll-out of Smart Meters, Model Regulations for Intra-State Hydro Generating Stations, study on introduction of 5-minute Time Block etc.

The Committee recommended all States for undertaking implementation of SAMAST report recommendations on an urgent basis, put in place DSM Regulations for all grid-connected entities and Forecasting/Scheduling Framework for RE sources, coordinate implementation of RPO web-tool for ease of reporting and compliance monitoring, along with amendments to RPO Regulations, lay down an enabling framework for balancing of variable RE power, through introduction of Ancillary Services and intra-day trading, evolve Hydro Regulations for better utilization of hydro stations for peaking.

The Forum thanked the Chairman, Shri A.S. Bakshi, Member, CERC and Members of the Committee for the efforts and urged the Committee to continue with the remaining tasks assigned to it.



## **Agenda Item No. 6**

### **Working Group on Issues Related to Open Access**

As per decision taken in 55<sup>th</sup> FoR Meeting, a Working Group of FoR was constituted to examine the issues affecting the implementation of Open Access. A presentation (enclosed as **Annexure-IV**) was made by Assistant Secretary (FoR) on the report of the Working Group.

The Working Group held two meetings and deliberated upon all issues relevant to implementation of Open Access including the issues highlighted in the consultation paper forwarded by the Ministry of Power. The Working Group made the following recommendations in their report.

- Measures like scheduling of power for certain slot of time i.e. for at least 24 hour, may be strictly followed, to prevent frequent shifting.
- Uniform methodology may be adopted for determination of various charges such of OA Charges, CSS and Additional surcharges.
- Impact assessment for DISCOMS as well as OA users may be conducted.
- Methodology specified in the Tariff Policy, 2016 for calculation of cross-subsidy surcharge on the basis of ACOS, may be adhered to.
- Tariff should reflect actual breakup of fixed and variable charges and gradually revise the fixed charges.

The Forum, after detailed deliberation, endorsed the Report of the Working

Group on Open Access.

**Agenda Item No. 7**

**Presentation on the generic software of the E-Court for the State Electricity Regulatory Commissions.**

The Forum in its 54<sup>th</sup> and 60<sup>th</sup> Meetings deliberated upon the e-Court Project SAUDAMINI (System for Adjudication Using Digital Access & Management of Information through Network Integration) launched by CERC, and decided to develop a generic software on the same lines for implementation in various SERCs / JERCs. Accordingly, CERC IT Team carried out technical discussions with NIC team for development of a generic software. A presentation (enclosed as **Annexure-V**) on the developments was made by Ms. Vaishali Rana, Assistant Chief (MIS), CERC.

The development of generic software and its roll-out in SERCs inter alia include Conducting Gap Analysis, Fund Transfer to NIC/NICSI, Preparation and Approval of SRS, Software Development & Testing, Security Audit of application / Touch Screens Procurement, Hiring NIC cloud service (VM), Deployment of application on Cloud web server, Roll out & Issuing guidelines of Generic e-Court portal to all stakeholders and staff etc. Apart from one time expenditure by FoR to the tune of Rs. 30 lacs towards development of generic software, the SERCs require to meet the expenditure towards procurement of hardware, cloud hosting, product support and maintenance, internet / hiring of leased line etc. In order to minimize the time for implementation of it was suggested to designate one nodal officer in each SERC for providing inputs and interacting with the NIC's implementation

team. Simultaneously, the SERCs may initiate preparing the standard masters as per the details to be provided by NIC and procure hardware.

The Forum noted the progress and suggested that a minimum of five SERCs, including one from North Eastern Region may be included to carry out the gap analysis and NIC may share the standard masters as well as the list of pre-requisites to the SERCs at the earliest. The Forum, in continuation to the decision taken in 60<sup>th</sup> FoR Meeting approving an expenditure of Rs. 30 lacs towards development of generic software, accorded its approval to meet this expenditure out of FoR Reserves.

**Agenda Item No. 8**

**Reference from Ministry of New and Renewable Energy (MNRE) on RPO Trajectory and RPO Compliance.**

The Forum discussed the reference received from the Ministry of New and Renewable Energy (MNRE) regarding aligning of State RPO targets with that of national trajectories, invoking penal provisions in cases of non-compliance in meeting the RPO targets besides discouraging carry-forward of RPO targets to the next ensuing periods.

The Chairperson primarily observed that carry-forward of RPO targets to the next ensuing period is against the spirit of the Act and policies for development of renewable energy sources. In the context of the communication from MNRE, the Forum felt that in the interest of balance of responsibility between the Government and the Regulator, it would be advisable if the MNRE only raises issues and avoids

directing / advising the Regulators to perform any specific function.

**Agenda Item No. 9**

**Any other item with the permission of the Chair**

***a. Deemed Distribution licensee status to Railways.***

Members of the Forum referred the issue related to deemed distribution licensee status to Railways and sought to know how the matter was dealt in other SERCs / JERCs. The Chairperson, FoR observed that MERC has dealt the matter implementation and directed FoR Secretariat to obtain the detailed information from MERC and circulate among the Members of FoR for further deliberation in the next meeting.

Thereafter, Members of the Forum led by Shri Anand Kumar, Chairperson, GERC, Justice Shri G. Bhavani Prasad, Chairperson, APERC and Shri Ismail Ali Khan, Chairperson, TSERC felicitated Shri Gireesh B. Pradhan, Chairperson, CERC / FoR for his outstanding contribution to the working of the Forum as well as for the development of power sector at national level.

Shri A.S. Bakshi, Member, CERC thanked Chairperson, CERC / FoR for his leadership, enriching the discussions in the Forum by sharing his insights and rich experience in power sector. The Forum wished him success in future endeavours. The Chairperson, CERC / FOR thanked the Members of Forum.

Secretary, CERC thanked the staff of “FOR” Secretariat for their arduous efforts in organizing the meeting.

The meeting ended with a vote of thanks to the Chair.

\*\*\*\*\*

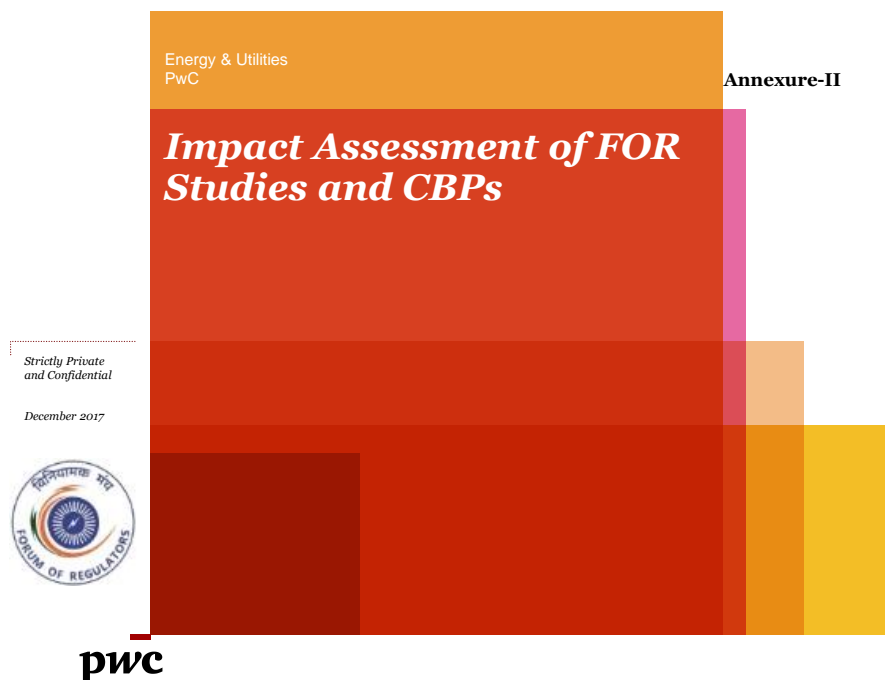
/ANNEXURE – I/

**LIST OF PARTICIPANTS ATTENDED THE 61<sup>ST</sup> MEETING**  
**OF**  
**FORUM OF REGULATORS (FOR)**  
**HELD ON 15<sup>TH</sup> DECEMBER, 2017 AT NEW DELHI**

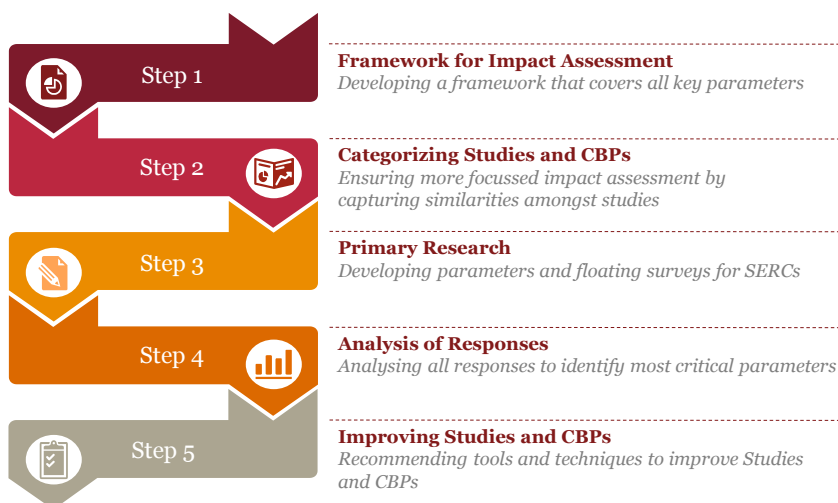
<b>SL. NO.</b>	<b>NAME AND DESIGNATION</b>	<b>ERC</b>
<b>1.</b>	Shri Gireesh B. Pradhan Chairperson	CERC
<b>2.</b>	Shri M.K. Shankaralinge Gowda Chairperson	KERC
<b>3.</b>	Shri Narayan Singh Chairperson	CSERC
<b>4.</b>	Shri Anand Kumar Chairperson	GERC
<b>5.</b>	Shri I.A. Khan Chairperson	TSERC
<b>6.</b>	Shri Vishvanath Hiremath Chairperson	RERC
<b>7.</b>	Ms. Kusumjit Sidhu Chairperson	PSERC
<b>8.</b>	Shri U.N. Behera Chairperson	OERC
<b>9.</b>	Shri Subhash Kumar Chairperson	UERC
<b>10.</b>	Shri S.K.B.S. Negi Chairperson	HPERC
<b>11.</b>	Shri Arbind Prasad Chairperson	JSERC
<b>12.</b>	Shri S. Akshyakumar Chairperson	TNERC
<b>13.</b>	Shri M.K. Goel Chairperson	JERC Goa and UTs
<b>14.</b>	Shri R.P. Singh Chairperson	APSERC
<b>15.</b>	Shri Preman Dinaraj Chairperson	KSERC
<b>16.</b>	Shri S.K. Negi Chairperson	BERC

<b>17.</b>	Shri W.M.S. Pariat Chairperson	MSERC
<b>18.</b>	Shri R.N. Sen Chairperson	WBERC
<b>19.</b>	Shri Imlikumzuk Ao Chairperson	NERC
<b>20.</b>	Shri Jagjeet Singh Chairperson	HERC
<b>21.</b>	Shri G. Bhawani Prasad Chairperson	APERC
<b>22.</b>	Shri S.K. Agarwal Chairperson	UPERC
<b>23.</b>	Shri N. Sarat Singh Member	JERC Manipur & Mizoram
<b>24.</b>	Shri D. Chakravarty Member	AERC
<b>25.</b>	Shri B.P. Singh Member	DERC
<b>26.</b>	Shri A.K. Singhal Member	CERC
<b>27.</b>	Shri A.S. Bakshi Member	CERC
<b>28.</b>	Dr. M.K. Iyer Member	CERC
<b>29.</b>	Shri Sanoj Kumar Jha Secretary	CERC
<b>30.</b>	Shri M.K. Anand Chief (Finance)	CERC
<b>31.</b>	Shri T. Rout Chief (Legal)	CERC
<b>32.</b>	Shri S.C. Shrivastava Chief (Engg.)	CERC
<b>33.</b>	Ms. Geetu Joshi Chief (Economics)	CERC
<b>34.</b>	Dr. S.K. Chatterjee Joint Chief (Regulatory Affairs)	CERC

\*\*\*\*\*



## Undertaking Impact Assessment of Studies and CBPs







Approach

Analysis &amp; Findings

Way Forward

## Selection of impact assessment framework

Establishing key factors for the selection of IA approach

Key approaches in Impact Assessment	Contribution of factors			Explanation of factors			Effects of factors	
	Establishes causality	'Necessity' and 'Sufficiency' of factors	Flexibility for additional parameters & re-evaluation	Influence of factors	Stakeholder involvement	Uniformity, Parity, Comparability	Long-term effects and threats	Enables decision making
<b>OECD/DAC Principles: Relevance, Efficiency, Effectiveness, Impact, Sustainability</b>	✓	✓	✓	✓	✓	✓	✓	✓
<b>Theory of Change: Inputs, Activities, Output, Outcomes</b>	✓			✓	✓	✓	✓	✓
<b>Cost-Benefit Analysis</b>	✓					✓		✓
<b>Participatory/Consultative</b>	✓		✓	✓	✓			
<b>Criteria-based/Scenario based</b>	✓			✓				
<b>Formative/Time-series approach</b>			✓		✓		✓	✓
<b>Intervention-based: Experimental/Sample</b>	✓							✓

*OECD/DAC Principles allow comprehensive understanding of all parameters across the lifecycle of a project, provide substantial focus on impact, and enables the development of a decision matrix for future action*

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
3



Approach

Analysis &amp; Findings

Way Forward

## Impact Assessment of Studies

Categorization of studies to derive insights for each type of study

<b>Technical performance</b>
<ul style="list-style-type: none"> <li>• Best Practices and Strategies for Distribution Loss Reduction</li> <li>• Study on Performance of Distribution Utilities</li> <li>• Framework for a national scheme for feeder segregation of rural &amp; agricultural consumers &amp; suggest measures on effective metering</li> <li>• Assessment of component-wise AT&amp;C losses</li> </ul>
<b>Commercial performance and tariff reforms</b>
<ul style="list-style-type: none"> <li>• Road map for reduction in cross subsidy</li> <li>• Study on Performance of Distribution Utilities</li> </ul>
<b>Promotion of consumer interests</b>
<ul style="list-style-type: none"> <li>• Review of functioning of CGRF and Ombudsman</li> <li>• Standardization of Electricity Bill</li> </ul>
<b>Promotion of renewable energy and DSM</b>
<ul style="list-style-type: none"> <li>• Policy and Regulatory Interventions to Support Community Level Off-Grid Projects</li> <li>• Report on Green Energy Corridors</li> </ul>
<b>Other Sector Reforms</b>
<ul style="list-style-type: none"> <li>• Roll out Plan for Introduction of Competition in Retail Sale of Electricity</li> <li>• FOR study on "Providing 24x7 Power Supply</li> <li>• Introducing Competition in Retail Electricity Supply in India</li> </ul>

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
4



Approach

Analysis &amp; Findings

Way Forward

Studies

## Framework for Impact Assessment of Studies

A lifecycle approach based on OECD Impact Assessment Principles

Parameters	Planning		Execution	Application	
	Relevance	Efficiency	Effectiveness	Impact	Sustainability
	Relevance of Topics	Time Allocation to Studies	Involvement for Content	Increase in Awareness	Requirement of FOR Interventions
	Involvement for Topics	Communication from FOR	SERCs Review of Studies	Enhancing Global View	Withstanding future challenges
	Relevance to SERC Issues	Overall Efficiency	Including Stakeholder Concerns	Enhancing National View	Overall Sustainability
	Consideration of Resources		Quality of Analysis, Quality of Research	Contribution to Regulations	
	Relevance to SERC Challenges		Feasibility of Study	Contribution to Issue Resolution	
	Overall Relevance		State Suitability	Overall Impact	
			Cost Effectiveness, Technology		
			Report Structure		
			International Cases		
			National Cases		
			Overall Effectiveness		

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
5



Approach

Analysis &amp; Findings

Way Forward

CBPs

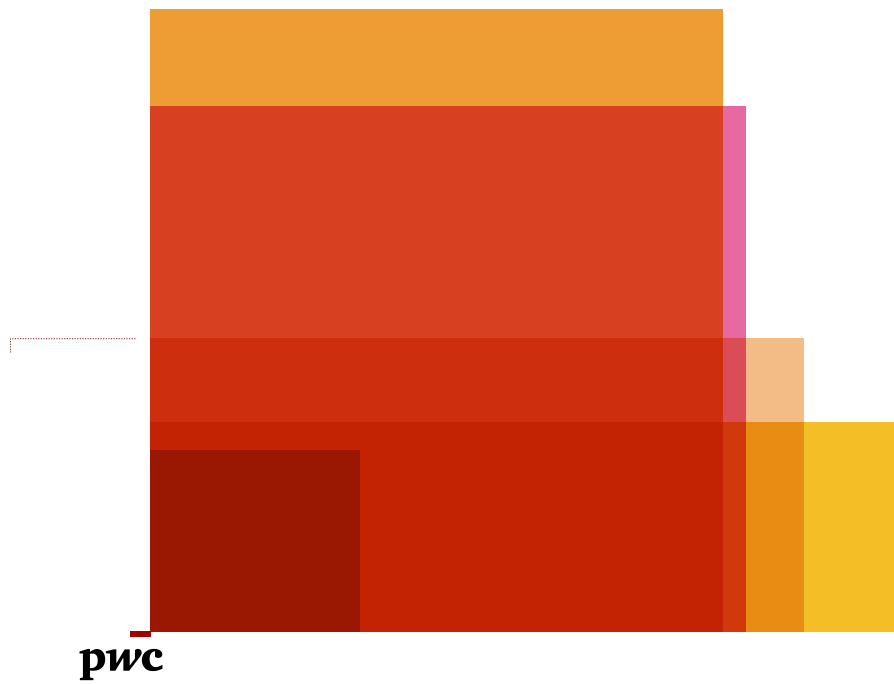
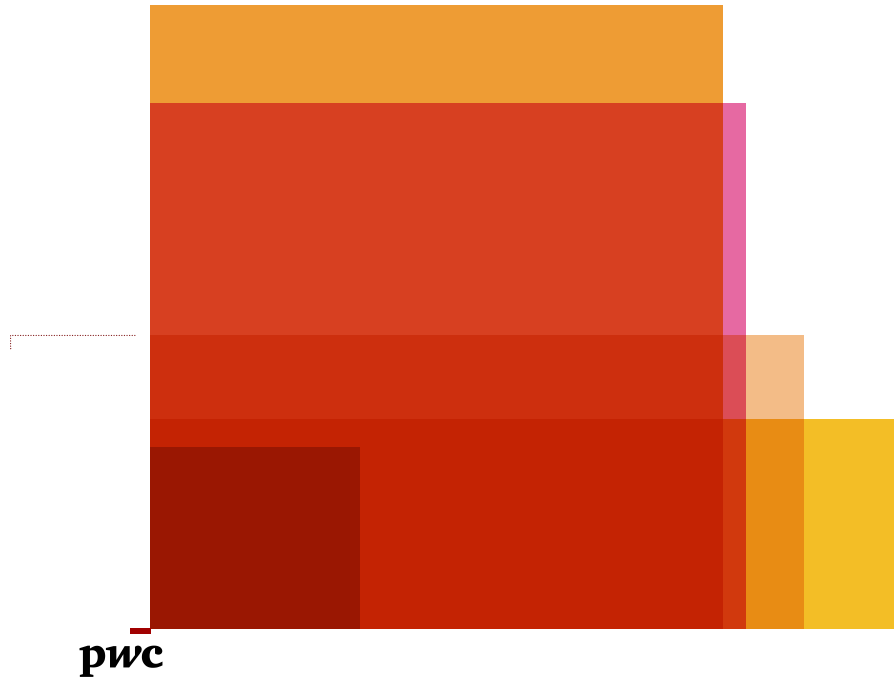
## Framework for Impact Assessment of CBPs

A lifecycle approach based on OECD Impact Assessment Principles

Parameters	Planning		Execution	Application	
	Relevance	Efficiency	Effectiveness	Impact	Sustainability
	Relevance of Topics	Quality of CBP arrangement	SERCs Involvement	Increase in Awareness	Requirement of FOR Interventions
	Involvement for Topics	Structuring and Scheduling	Stakeholder Concerns	Enhancing Global View	Withstanding future challenges
	Relevance to SERC Issues	Suitability of attendees	Content Coverage	Enhancing National View	Overall Sustainability
	Consideration of Resources	Suitability of speakers	Feasibility of Recommendations	Contribution to Regulations	
	Relevance to SERC Challenges	Adequate prior information	State Suitability of Recommendations	Contribution to Issue Resolution	
	Overall Relevance	Quality of material	Cost effectiveness	Overall Impact	
		Partner Performance	Technology Incorporation		
		Overall Efficiency	Quality of Presentations		
			Time for Discussions		
			Including National Cases		
			Overall Effectiveness		

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
6





Approach

Analysis &amp; Findings

Way Forward

## Approach for analysis

**Rating Analysis** – how all parameters fared across study/CBP lifecycle

### Evaluation criteria ratings

1. Relevance
2. Efficiency
3. Effectiveness
4. Impact
5. Sustainability

Overall mapping of  
Quality of Studies vs Impact of  
Studies

**Cross-sectional  
analysis**

- Type of Study / CBP

- Designation

- Region

**Statistical Analysis** – perceived criticality of parameters

*Regression  
Analysis*

*Factor  
Analysis*

*Discriminant  
Analysis*

**Most  
significant  
parameters**  
under each  
evaluation  
criteria

Grouping of  
parameters using  
Principal  
Components

Most differentiating  
parameters for  
impact –  
Discriminant  
Analysis

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
9



Approach

Analysis &amp; Findings

Way Forward

## Rating Analysis

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

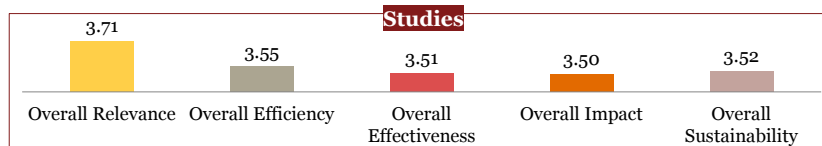
December 2017  
10

Approach

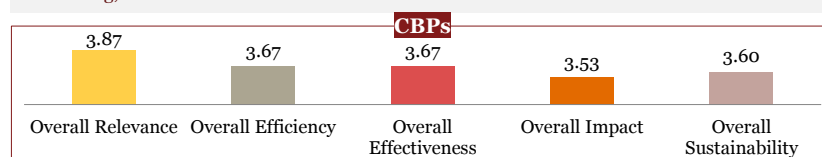
Analysis &amp; Findings

Way Forward

## Rating of Parameters | Evaluation Criteria



- SERCs perceive studies as **highly relevant** to the functions of SERCs and the current issues being faced by them
- SERCs desire more involvement for providing state-levels inputs as well as their own capacity building; Smaller states seek more discussions and interactions



- SERCs have perceived the CBPs as **highly relevant** to prevailing issues being faced by SERCs; **Participants seek more interactive formats of CBPs**

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
11

Approach

Analysis &amp; Findings

Way Forward

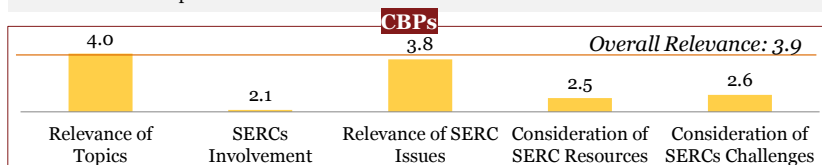
Analysis –  
Studies

Analysis –  
CBPs

## Rating of Parameters | Relevance of Studies & CBPs



- SERCs are lesser satisfied with their involvement, a trend more noticeable for Chairman and Members, Central and North-Eastern states
- Chairman, Member and Secretary are more concerned about due consideration of SERC resources and capabilities



- Programme material may be better suited to participants if they are involved in planning of CBP topics and content

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
12

Approach

Analysis &amp; Findings

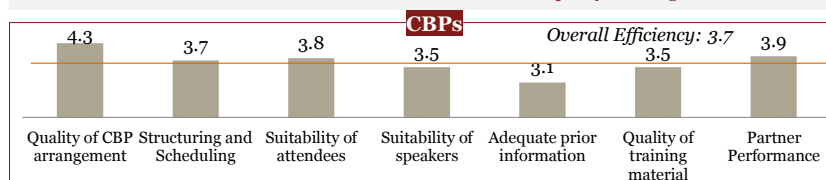
Way Forward

Analysis –  
StudiesAnalysis –  
CBPs

## Rating of Parameters | Efficiency of Studies & CBPs



- Overall, satisfactory rating of efficiency parameters; Central and North-Eastern states less satisfied with timely communication from FOR
- MPERC would like its officers to be involved more as it aids capacity building



- SERCs find arrangement, facilities and performance of execution agency commendable; however inadequate info dissemination before CBPs are held
- More days sought for CBPs, to include interactive sessions and field visits

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
13

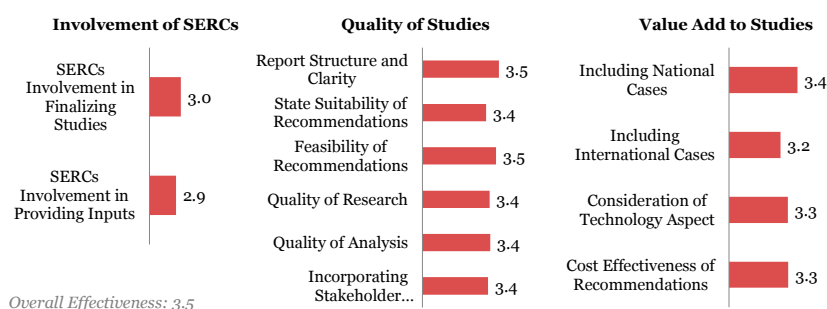
Approach

Analysis &amp; Findings

Way Forward

Analysis –  
Studies

## Rating of Parameters | Effectiveness of Studies



- Comprehensiveness and quality of study reports perceived satisfactory, but involvement of SERCs in development of Studies still a concern
- International examples considered crucial; esp. by North, West and Central regions
- Further incorporation of technology aspect desired in technical and renewable studies
- State specific scenarios desired by several states, lack of which is attributed to lack of their involvement

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
14

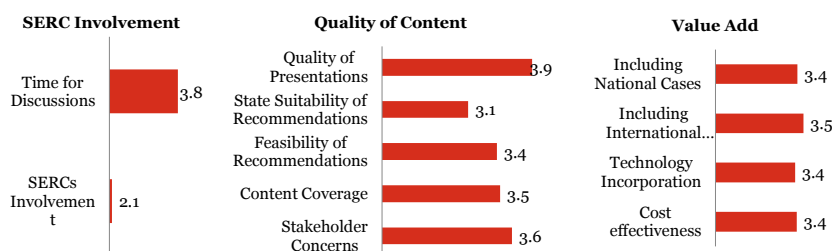
Approach

Analysis &amp; Findings

Way Forward

Analysis –  
CBPs

## Rating of Parameters | Effectiveness of CBPs



Overall Effectiveness: 3.7

- While the quality of content has been rated high, suitability to states has been rated lower
- State involvement continues to be a concern in the development of CBP material
- State suitability, cost effectiveness of recommendations, and technology incorporation have scope of improvement
- Legal issue may also be addressed; more focus on South East Asian regulatory models

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
15

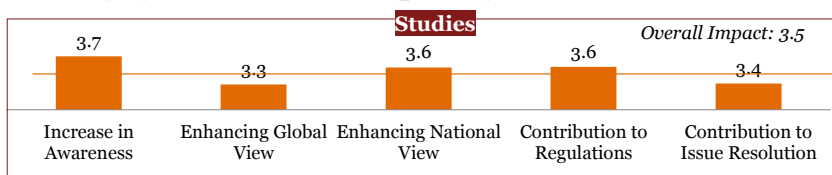
Approach

Analysis &amp; Findings

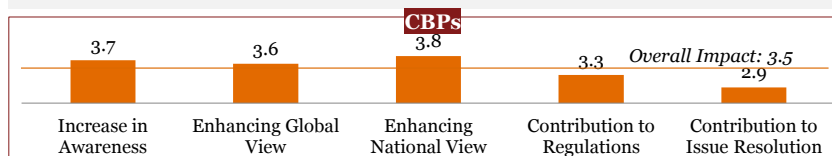
Way Forward

Analysis –  
Studies Analysis –  
CBPs

## Rating of Parameters | Impact of Studies & CBPs

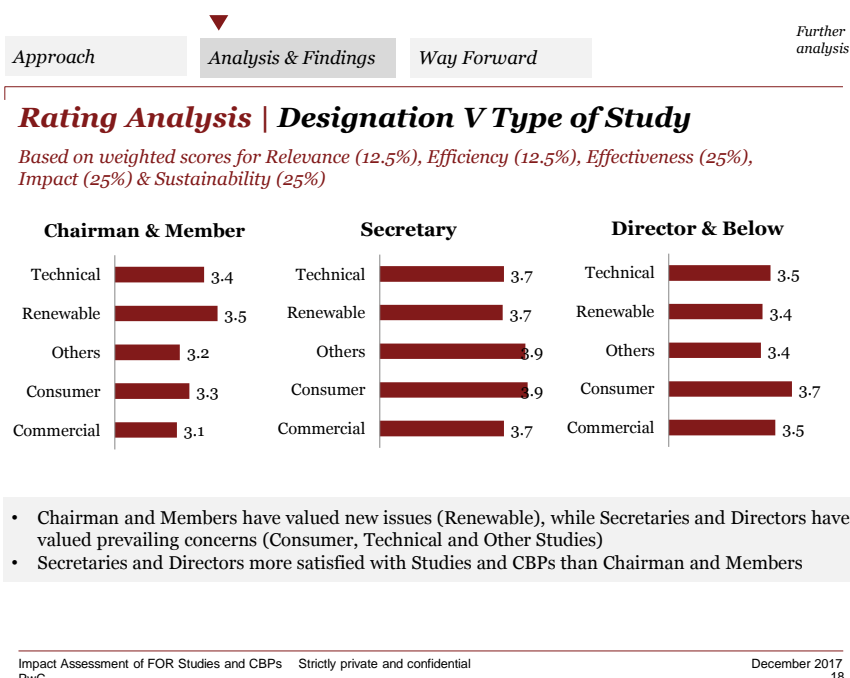
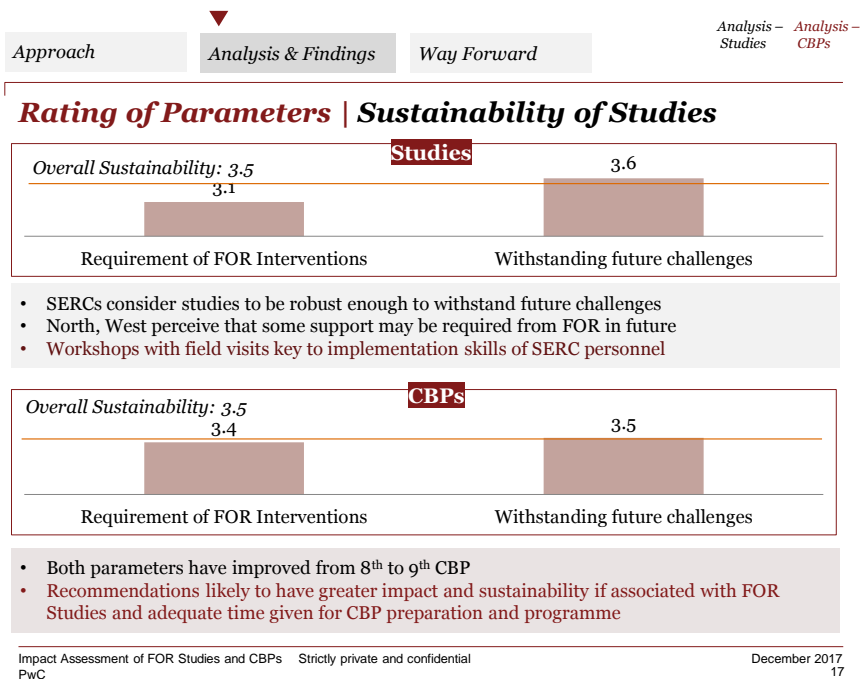


- SERCs value the increase in knowledge base and awareness due to Studies
- Inadequate focus on enhancing global outlook as compared to national outlook
- Scope of improvement in how Studies contribute to resolution of actual issues
- Secretaries and Directors have perceived greater influence of Studies on SERC work



- 8<sup>th</sup> and 9<sup>th</sup> CBP rated high in increasing awareness about relevant issues
- Lack of follow up of CBPs felt across CBPs held in the past 5 years

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
16





Approach

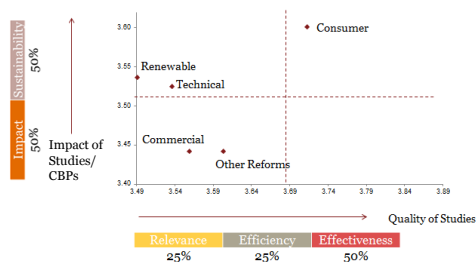
Analysis &amp; Findings

Way Forward

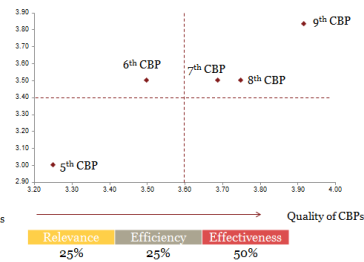
Further  
analysis

## Mapping of Quality of Studies V Impact of Studies

### Studies



### CBPs



- The applicability of Commercial and Other studies may be improved, while more in-depth knowledge sought in renewable, technical and commercial topics
- The quality of CBPs have improved over time, though the applicability of CBPs has been perceived to improve significantly in the 9<sup>th</sup> CBP

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
19

Approach

Analysis &amp; Findings

Way Forward

## Statistical Analysis

### Regression Analysis

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
20

Approach	Analysis & Findings	Way Forward	Further analysis
<b>Most significant parameters – Regression Analysis</b>			Regression Output
<b>Relevance of Studies and CBPs – All Responses</b>			
Parameters for Studies	Beta	Sig.	
Relevance of Topics	0.350	0.000	
SERCs Involvement	-0.004	0.963	
Relevance of Issues	0.457	0.000	
Resources Consideration	0.094	0.237	
SERCs Challenges	0.104	0.160	
<ul style="list-style-type: none"> <li><b>Relevance of Studies' topics</b> and <b>Relevance of Studies to issues faced by states</b> express <b>Overall Relevance</b> the best in the respondents' outlook</li> <li>Resource consideration perceived significant by Chairmen &amp; Members</li> <li>Involvement for determining new topics desired; a scientific method may be developed for the same</li> </ul>			
Parameters for CBPs	Beta	Sig.	
Relevance of Topics	0.794	0.014	
SERCs Involvement	0.714	0.005	
Relevance of SERC Issues	0.247	0.404	
Consideration of SERC Resources	-0.775	0.002	
Consideration of SERCs Challenges	0.009	0.953	
<ul style="list-style-type: none"> <li><b>Relevance of CBPs' topics</b> and <b>Involvement of SERCs in planning for CBPs</b> express <b>Overall Relevance</b> the best in the respondents' outlook</li> </ul>			
Impact Assessment of FOR Studies and CBPs Strictly private and confidential			December 2017
Adjusted R Square>0.9			

Approach	Analysis & Findings	Way Forward	Further analysis
<b>Most significant parameters – Regression Analysis</b>			
<b>Efficiency of Studies and CBPs – All Responses</b>			
Parameters for Studies	Beta	Significance	
Adequate Time Allocation to Studies	0.570	0.000	
Timely Communication from FOR	0.422	0.000	
<ul style="list-style-type: none"> <li>Parameters associated with conduct of studies considered acceptable by SERCs; both parameters define Overall Efficiency significantly on an overall basis</li> <li>For Directors and below, timely communication from FOR strongest indicator of efficient conduct of studies</li> </ul>			
Parameters for CBPs	Beta	Sig.	
Quality of CBP arrangement	0.325	0.238	
Structuring and Scheduling	-0.153	0.485	
Suitability of attendees	0.213	0.425	
Suitability of speakers	-0.018	0.958	
Adequate prior information	-0.050	0.707	
Quality of training material	0.215	0.459	
Partner Performance	0.469	0.091	
<ul style="list-style-type: none"> <li>Many parameters associated with efficiency, but <b>arrangement and logistics of CBPs</b>, and <b>associated partners' performance</b> most significant in making CBPs efficiently conducted for SERCs</li> </ul>			
Impact Assessment of FOR Studies and CBPs Strictly private and confidential			December 2017
Adjusted R Square>0.9			

Approach

Analysis &amp; Findings

Way Forward

Further  
analysis

### Most significant parameters – Regression Analysis

#### Effectiveness of Studies – All Responses

Parameters for Studies	Beta	Sig.
SERCs Involvement in Providing Inputs	-0.076	0.176
SERCs Involvement in Finalizing Studies	0.010	0.872
Incorporating Stakeholder Concerns	0.028	0.728
Quality of Analysis	0.344	0.002
Quality of Research	0.149	0.169
Feasibility of Recommendations	0.160	0.084
State Suitability of Recommendations	0.041	0.668
Cost Effectiveness of Recommendations	-0.032	0.740
Consideration of Technology Aspect	0.056	0.447
Report Structure and Clarity	0.086	0.438
Including International Cases	-0.045	0.531
Including National Cases	0.276	0.008

- Parameters that define comprehensiveness of reports found to express **Overall Efficiency** strongly for respondents
- Inclusion of state scenarios and national case studies consistently regarded significant to make studies effective

Impact Assessment of FOR Studies and CBPs Strictly private and confidential

December 2017

Adjusted R Square&gt;0.9

Approach

Analysis &amp; Findings

Way Forward

### Most significant parameters – Regression Analysis

#### Effectiveness of CBPs– All Responses

Parameters for CBPs	Beta	Sig.
SERCs Involvement	0.078	0.106
Stakeholder Concerns	-0.118	0.186
Content Coverage	-	-
Feasibility of Recommendations	2.687	0.002
State Suitability of Recommendations	-0.517	0.062
Cost effectiveness	0.085	0.325
Technology Incorporation	-0.090	0.425
Quality of Presentations	1.443	0.002
Time for Discussions	-1.498	0.005
Including International Cases	-	-
Including National Cases	-1.094	0.003

- Quality of presentations and feasibility of recommendations proposed in the CBPs hold most significance for SERCs in making CBPs effective

Impact Assessment of FOR Studies and CBPs Strictly private and confidential

December 2017

Adjusted R Square&gt;0.9

Approach

Analysis & Findings

Way Forward

Further  
analysis

### Most significant parameters – Regression Analysis

#### Impact of Studies and CBPs– All Responses

Parameters for Studies	Beta	Sig.
Increase in Awareness	0.328	0.002
Enhancing Global View	0.201	0.020
Enhancing National View	0.094	0.414
Contribution to Regulations	0.107	0.338
Contribution to Issue Resolution	0.270	0.007

- Contribution to awareness of issues and adding value through global outlook considered crucial for studies to be impactful, which are eventually considered in issue resolution process by SERCs
- For Chairmen and Members, knowledge of other states and contribution of studies to regulations more significant

Parameters for CBPs	Beta	Sig.
Increase in Awareness	0.539	0.007
Enhancing Global View	0.002	0.993
Enhancing National View	0.078	0.802
Contribution to Regulations	0.139	0.440
Contribution to Issue Resolution	0.245	0.183

- Contribution to awareness of issues most crucial for SERCs in perceiving CBPs as impactful
- Important for SERCs to refer CBP learnings in resolution of issues

Impact Assessment of FOR Studies and CBPs Strictly private and confidential

December 2017

Adjusted R Square>0.9

Approach

Analysis & Findings

Way Forward

Further  
analysis

### Most significant parameters – Regression Analysis

#### Sustainability of Studies and CBPs – All Responses

Parameters for Studies	Beta	Sig.
Requirement of FOR Interventions	0.058	0.004
Withstanding future challenges	0.931	0.000

- The ability of studies to withstand future challenges considered as the strongest expression of sustainability
- Future support from FOR regarded significant in Other studies

Parameters for CBPs	Beta	Sig.
Requirement of FOR Interventions	-0.050	0.514
Withstanding future challenges	1.045	0.000

- The ability of CBP learnings to withstand future challenges considered as the strongest expression of sustainability

Impact Assessment of FOR Studies and CBPs Strictly private and confidential

December 2017

Adjusted R Square>0.9

Approach

Analysis &amp; Findings

Way Forward

## Statistical Analysis

### Factor Analysis (Principal Components)

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
27

Approach

Analysis &amp; Findings

Way Forward

Further  
analysis

## Grouping of Parameters – Principal Components Analysis

### Primary groupings for Studies

Factor  
analysis  
output

Group 1	Group 2	Group 3	Group 4
SERC Involvement and Consideration	Alignment of Studies with SERC functions	Quality & Comprehensiveness of Studies	Applicability of Studies
Relevance_SERCsInvolvement	Relevance_Topics	Effectiveness_Research	Effectiveness_StateSuitability
Relevance_SERCsResources	Relevance_SERCsIssues	Effectiveness_ReportStructure	Effectiveness_CostEffectiveness
Relevance_SERCsChallenges	Effectiveness_StakeholderConcerns	Effectiveness_International	Effectiveness_Technology
Efficiency_TimelyCommunication	Effectiveness_Analysis	Effectiveness_National	Impact_IssueResolution
Effectiveness_SERCsInvolvement	Effectiveness_Feasibility	Impact_Awareness	
Effectiveness_SERCsFeedback	Impact_NationalView	Impact_GlobalView	
		Impact_Regulations	

Global perspective considered important for Renewable and Other studies and grouped separately

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
28

Approach	Analysis & Findings	Way Forward	Further analysis
----------	---------------------	-------------	------------------

### Grouping of Parameters – Principal Components Analysis

Primary groupings across cross sectional analysis

Subset	Group 1 SERC Involvement and Consideration	Group 2 Alignment of Studies with SERC functions	Group 3 Quality and Comprehensiveness of Studies	Group 4 Applicability of Studies	Group 5 Value Add (Global Outlook, Other aspects)
Commercial					
Technical					
Consumer					
Renewable, DSM					
Others					
Chairman, Mem.					
Secretary					
Directors & below					
North					
North-East					

- Similar concerns across lifecycle of a study have come together
- Coverage of various issues to make studies comprehensive considered vital

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
29

Approach	Analysis & Findings	Way Forward
----------	---------------------	-------------

### Grouping of Parameters – Principal Components Analysis

Primary groupings for CBPs

Group 1	Group 2	Group 3
Conduct and delivery of CBPs	Involvement of SERCs	Applicability of CBPs
Efficiency_Arrangement	Relevance_Topics	Effectiveness_StakeholderConcerns
Efficiency_Attendees	Relevance_SERCsInvolvement	Effectiveness_StateSuitability
Efficiency_Speakers	Relevance_SERCsIssues	Effectiveness_CostEffectiveness
Efficiency_TrainingMaterial	Relevance_SERCsResources	Impact_Regulations
Efficiency_PartnerPerformance	Efficiency_Structuring	
Effectiveness_SERCsInvolvement	Impact_GlobalView	
Effectiveness_Coverage	Impact_NationalView	
Effectiveness_Feasibility	Impact_IssueResolution	
Effectiveness_Presentation		
Effectiveness_Discussions		
Effectiveness_International		
Impact_Awareness		
Sustainability_FutureChallenges		

All parameters related to conduct of CBP treated similarly, while involvement of SERCs and consideration of state-specific challenges treated separately

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
30

## Statistical Analysis

### Discriminant Analysis

### Most discriminating variables – Structure Matrix

Variables which discriminate between Overall Impact rating of 3, 4 and 5

Structure Matrix	
Most Discriminating Parameters	Absolute size of correlation with function
Effectiveness – Incorporation of National Case Studies	0.653
Effectiveness – Quality of Research	0.520
Effectiveness – Quality of Analysis	0.437
Impact – Enhancing national outlook	0.426
Impact – Enhancing knowledge base and awareness	0.407

- These variables are most responsible for variance in rating of Overall Impact
- Effectiveness and Impact parameters which are responsibility for Quality of Studies are most discriminating in rating of Impact

Approach

Analysis & Findings

Way Forward

### ***Most discriminating variables – Structure Matrix***

Variables which discriminate between Overall Sustainability rating of 3, 4 and 5

Structure Matrix	
Most Discriminating Parameters	Absolute size of correlation with function
Effectiveness – Incorporation of National Case Studies	0.440
Impact – Contribution of Studies to formulation of regulations	0.436
Impact – Contribution of Studies to actual resolution of issues	0.429
Relevance – Relevance of Study topics to issues faced by SERCs	0.406
Effectiveness – Incorporation of Stakeholder Concerns	0.404

- These variables are most responsible for variance in rating of Overall Sustainability
- Parameters that have actually contributed to actionable conclusions are responsible for variance in perception of sustainability of studies

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
33

Approach

Analysis & Findings

Way Forward

## ***Qualitative Responses***

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
34



Approach

Analysis & Findings

Way Forward

## Summary of Qualitative Responses - Studies

### General feedback – Involvement of SERC personnel in conduct of Studies

1. **Involving SERCs and other stakeholders** to make studies better, and making them easier to adopt and implement
2. Officers as per expertise may be appointed to a monitoring cell to aid FOR in execution of Studies
3. A platform to interact with other ERCs is required - More interactive and brainstorming sessions
4. Thorough discussions with consultants required from the beginning
5. Ensuring **involvement of experienced personnel from SERCs**
6. Involving senior staff for finalization of studies to improve quality of studies
7. **Topics selections** may be done in more scientific manner and which are globally present.

### General feedback – Enhancing quality of studies

1. Incorporating state-specific data and scenarios to improve quality of studies and provide clarity for decision making, especially for forward-looking studies
2. Incorporating **point of view of smaller states**
3. **Legal aspects** may be incorporated; case studies on legal issues also required.
4. Analysis can be more objective with a **viable number of limited alternatives**
5. **Updating data** at regular intervals should be explored
6. **Geographical and climatic variations** should be incorporated
7. A few studies are medium term in sustainability, and with many changes pending in the power sector, states inclined to adopt a wait and watch approach

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
35

Approach

Analysis & Findings

Way Forward

Detailed responses

## Summary of Qualitative Responses - CBPs

### General feedback – Conduct of sessions

1. For internationally held CBPs, **field visits along with the CBP** and involving the country's regulator
2. Number of **days can be increased** for greater expertise building
3. More interactions for relevant topics; and **dedicated session** for brainstorming and discussions
4. Participation of other relevant stakeholders (CERC, FOR, MoP etc.)

### General feedback – Programme content

1. **Pre-CBP material to be sent for better preparation** of participants
2. **International perspective** to improve across topics
3. Programme material to be **better suited to participants**
4. Training on basic issues as well for which SERC personnel need expertise

### Specific feedback

1. 6<sup>th</sup> CBP: Summary discussions required on balancing tariff recovery with Discom performance
2. 7<sup>th</sup> CBP: Legal and regulatory issues to be given more focus
3. 8<sup>th</sup> CBP: More focus on South Asian regulatory models
4. 9<sup>th</sup> CBP: Involvement of host country's regulator or experts in CBP

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
36

Approach

Analysis &amp; Findings

Way Forward

## Summary of Results

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
37

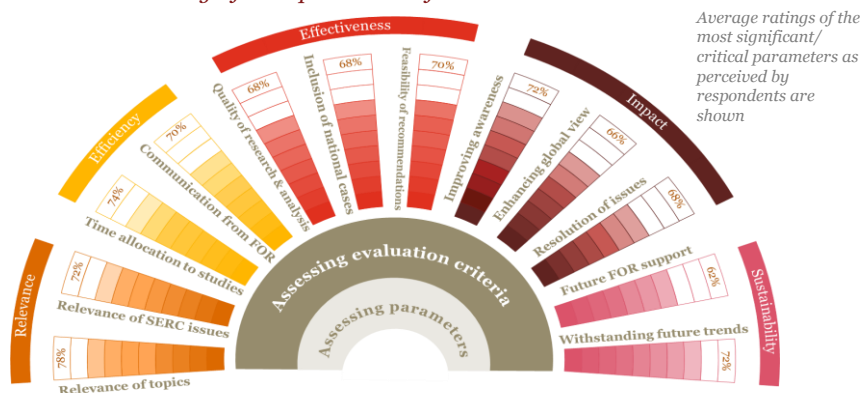
Approach

Analysis &amp; Findings

Way Forward

## Snapshot of Results - Studies

How the most significant parameters fared



- Key 'Relevance' and 'Efficiency' parameters (planning stage) rated above average
- However, only select parameters at execution and planning stage have been rated above average
- Parameters related to adding value to and improving applicability of Studies may be improved

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
38

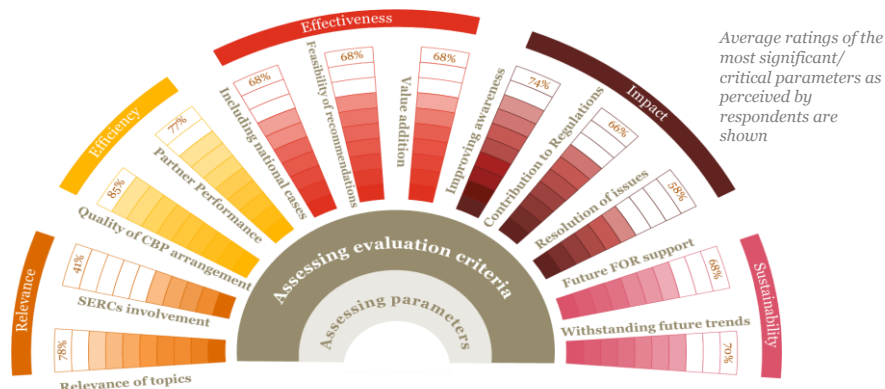
Approach

Analysis &amp; Findings

Way Forward

## Snapshot of Results - CBPs

How the most significant parameters fared



- 'Efficiency' parameters (planning and conduct of CBPs) rated high
- Akin to Studies, parameters related to adding value to and improving applicability of CBPs may be improved
- Involvement of SERCs in planning of CBPs perceived to be much lower than other parameters

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
39

Approach

Analysis &amp; Findings

Way Forward

## Way Forward

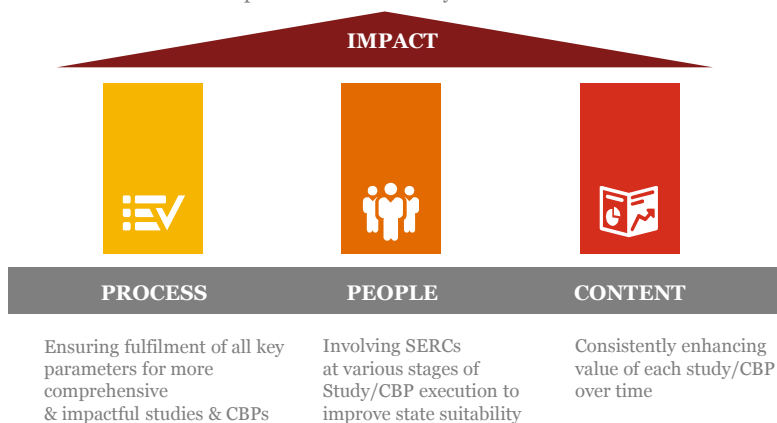
Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
40

## Way Forward | Key Focus Areas

Focussing on 3 pillars of study development for greater impact of Studies & CBPs

Greater impact and sustainability of Studies & CBPs



Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
41

## Way Forward | Key Focus Areas

Pillars	Planning Stage	Execution Stage	Application Stage
<b>Process</b>	<ul style="list-style-type: none"> <li>Working groups comprising of select SERC personnel</li> <li>Establishing a <b>communication template</b> for methodical exchange of information</li> </ul>	<ul style="list-style-type: none"> <li><b>Framework to shortlist appropriate states</b>/other countries for case studies</li> <li><b>Framework/checklist to cover critical parameters</b> for in-depth, well rounded content</li> </ul>	<ul style="list-style-type: none"> <li>Reinforcing Study recommendations through <b>focused discussions</b> in CBPs and other forums</li> <li>Formulate roadmap to tackle complex issues in successive steps/studies</li> </ul>
<b>People</b>	<ul style="list-style-type: none"> <li>Floating <b>interest survey</b> to SERCs for deciding topics of Studies and CBPs</li> <li>Utilizing survey and working group feedback for customizing content</li> </ul>	<ul style="list-style-type: none"> <li><b>Online discussion forum</b> for discussions on best practices, along with invited experts/stakeholders</li> <li>Periodic communication between stakeholders</li> </ul>	<ul style="list-style-type: none"> <li><b>Survey for capturing feedback</b> immediately after completion of Studies, CBPs</li> <li>Produce state-wise challenges as an outcome of each Study and CBP</li> </ul>
<b>Content</b>	Using parameter checklist to outline outcomes during planning with added focus on <b>international benchmarking, state representation, and enablers for implementation.</b>	Interim review of content from relevant stakeholders, with an <b>early focus on state-specific challenges</b> and adoption of possible solutions.	<ul style="list-style-type: none"> <li>Outlining enablers for recommendations and tailor recommendations for laggard and leading states</li> <li>Discussion on long-term relevance of Studies a must</li> </ul>

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
42

Approach

Analysis &amp; Findings

Way Forward

### Checklist for Critical Parameters

Parameters	Planning Stage: Finalizing Scope of Work & Proposal	Execution Stage: Interim review of Study findings	Application Stage: Finalizing Study Report
Relevance of topic to SERC functions and priority areas	✓		
Relevance of topic to prevailing issues and required state outcomes	✓		
Mechanism for coordination between stakeholders	✓	✓	✓
Time for completion of Study	✓	✓	✓
Quality of research methodologies allowed		✓	✓
Quality of analysis undertaken		✓	✓
Inclusion of suitable National Case Studies		✓	✓
Inclusion of suitable International Case Studies		✓	✓
Feasibility of given recommendations/way forward		✓	✓
Increase in Awareness of relevant stakeholders			✓
Mechanism or roadmap for use in formulation of regulations/ policies/ concept papers, etc.			✓
Ability to withstand relevant future challenges			✓

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
43

Approach

Analysis &amp; Findings

Way Forward

### Conclusion

Areas of improvement	Areas of strength	Recommended tools and techniques
<ul style="list-style-type: none"> <li>Greater inclusion and involvement of SERCs across lifecycle of Studies and CBPs</li> <li>Allowing more interaction between SERCs for communication of best practices</li> <li>Ensuring coverage of parameters as perceived significant by SERCs by all Studies and CBPs</li> <li>Greater focus on adoption of recommendations by SERCs for the purpose of fulfilling their functions and resolution of pertinent issues</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of knowledge and awareness regarding complex issues with the help of Studies and CBPs</li> <li>Incorporation of national case studies and best practices employed in various states</li> <li>Sustainability of recommendations and ability to withstand future trends</li> </ul>	<ul style="list-style-type: none"> <li><b>Appointment of a working group</b> for specific Studies/CBPs for greater coordination and ensuring accountability from all stakeholders</li> <li><b>Interest survey</b> to gauge key topics to be covered in Studies and CBPs</li> <li><b>Checklist of critical parameters</b> necessary for impactful Studies and CBPs to be fulfilled at every stage of Study and CBP lifecycle</li> <li><b>Online forum</b> for regular discussions on pertinent issues</li> <li><b>Communication template</b> for coordination between FOR Secretariat and SERCs</li> </ul>

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
44

**Thank you**

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
45

[Back](#)

### CBP Topics

CBP	Topics Covered	Location	Dates held
<b>5th Capacity Building Programme for Officers of ERC</b>	<ul style="list-style-type: none"> <li>Renewable Energy Resources and Economics</li> <li>Renewable Energy Tariffs Regulations and Design</li> <li>Off Grid Energy Access - Regulatory Issues and Experiences</li> <li>Grid Integration of Renewable Energy Sources</li> <li>REC Market and Regulation</li> <li>Market for Energy Efficiency</li> <li>Mitigation Initiatives Through Agriculture Demand Side Management</li> <li>Experience with Implementing JNNSM</li> <li>Low-carbon Development Path for Asia</li> <li>Policy and regulations for Energy Demand Management</li> <li>MSW Policy and WTE in Thailand</li> <li>RE in Thailand - Policy and Implementation</li> <li>Prof. Thierry Lefevre - OERC- Presentation</li> <li>Asian Experience with Policy and Regulation for Renewable</li> </ul>	IIT Kanpur & Bangkok	18th-23rd October, 2012
<b>6th Capacity Building Programme for Officers of ERC</b>	<ul style="list-style-type: none"> <li>Renewable Energy Resources</li> <li>Renewable Energy Tariffs Regulations and Design</li> <li>Grid Integration of Renewables</li> <li>Renewable Energy Certificates</li> <li>Wind Forecasting</li> <li>Framework for Implementing Energy Efficiency Scheme at Utility Level</li> <li>Smart Grid Issues and Prospects for India</li> <li>Rooftop Solar PV - Addressing Policy, Regulatory and Operational Barriers</li> <li>ERCs Role to Enhance Power Supply Security</li> <li>Development of cross-border trade</li> <li>Waste-to-Energy in Thailand</li> <li>RE in Thailand - Policy and Implementation</li> </ul>	IIT Kanpur & Bangkok.	09th-14th February, 2014
<b>7th Capacity Building Programme for Officers of ERC</b>	<ul style="list-style-type: none"> <li>Economics of Power Markets – 2015</li> <li>REC Market in India - Issues and Prospects</li> <li>Developing A Market For Energy Efficiency In India</li> <li>Short Term Power Procurement and Open Access</li> <li>Smart Grid Concept &amp; Deployment</li> <li>Developing Regional Power Market in South Asia – 2015</li> <li>Renewable Energy Generation Tariff Determination in Practice</li> <li>Solar Rooftop - Policy, Regulation and Experience across Indian States</li> <li>Legal and Regulatory Issues in the Power Sector - Recent Judgements</li> </ul>	IIT Kanpur .	28th – 30th January, 2015

[Back](#)**CBP Topics**

CBP	Topics Covered	Location	Dates held
<b>8th Capacity Building Programme for Officers of ERC</b>	<ul style="list-style-type: none"> <li>Singapore's Electricity Industry</li> <li>International Coal Market and Contracts</li> <li>Models for the Electricity Sector and Comparison of Electricity Market Reforms</li> <li>Energy Efficient Buildings</li> </ul>	Singapore.	18th – 20th February, 2015
<b>9th Capacity Building Programme for Officers of ERC</b>	<ul style="list-style-type: none"> <li>Economics of Regulation for the Power Sector</li> <li>Renewable Energy Generation Tariff Determination in Practice</li> <li>Retail Competition in Electricity - Issues and Strategy</li> <li>Market for Renewable Energy Certificates, Concepts, Status and Challenges</li> <li>Short-term Power Procurement and Open Access</li> <li>Solar Rooftop - Policy, Regulation and Experience across, Indian States</li> <li>Developing a Regional Power Market in South Asia</li> <li>Developments in the Coal Sector - Implications for the Power Sector</li> <li>Regulation of Power Sector in Singapore - Development and Current Practices, EMA</li> <li>Implementation of Retail Competition in Singapore</li> <li>Forecasting of Wind and Solar Power</li> <li>Power Sector Regulation / Electricity Market Evolution In Singapore/ASEAN</li> <li>Performance Standards and Monitoring in Electric Utilities, Singapore Power</li> <li>Electricity Contracts and Power Market Operation in Singapore</li> <li>Implementing Smart Grid Project in Singapore</li> </ul>	IIT Kanpur and Singapore	21 – 26 November, 2015

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
47

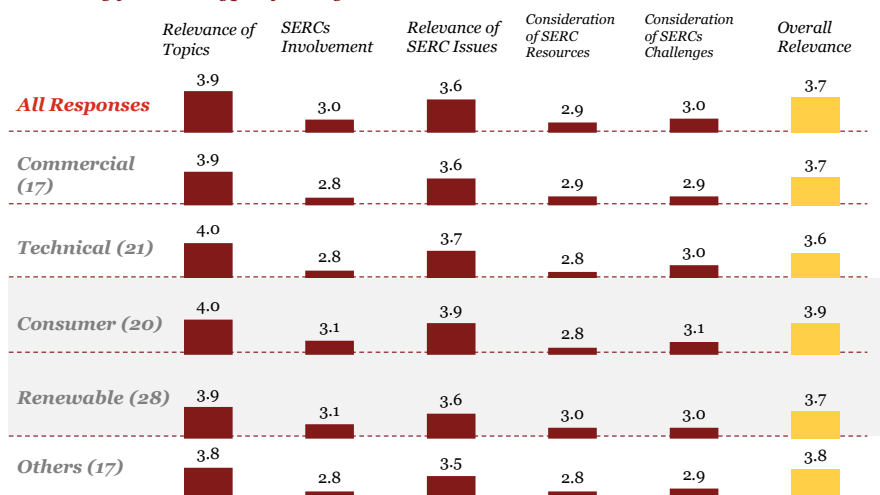
Type of Study

Designation

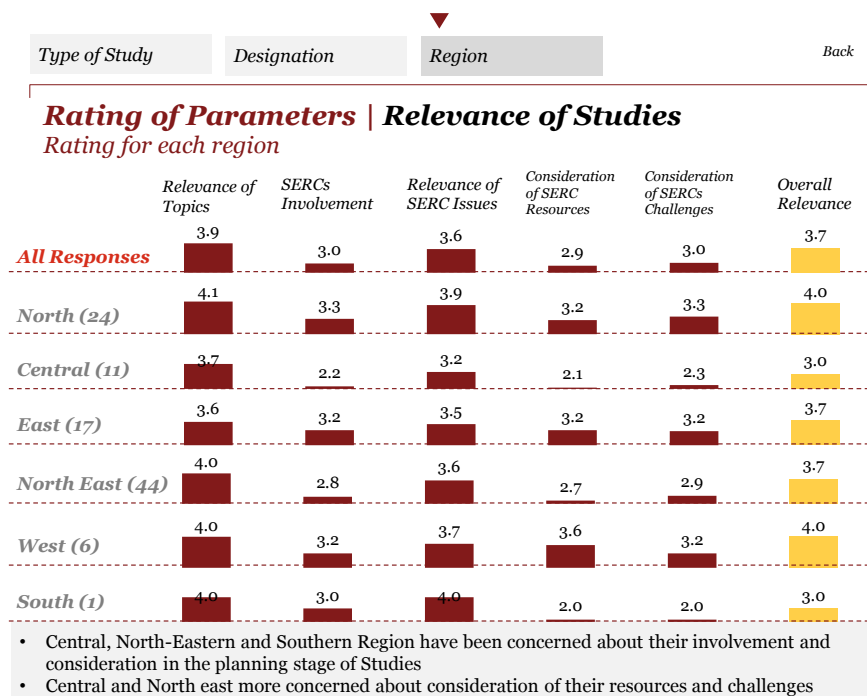
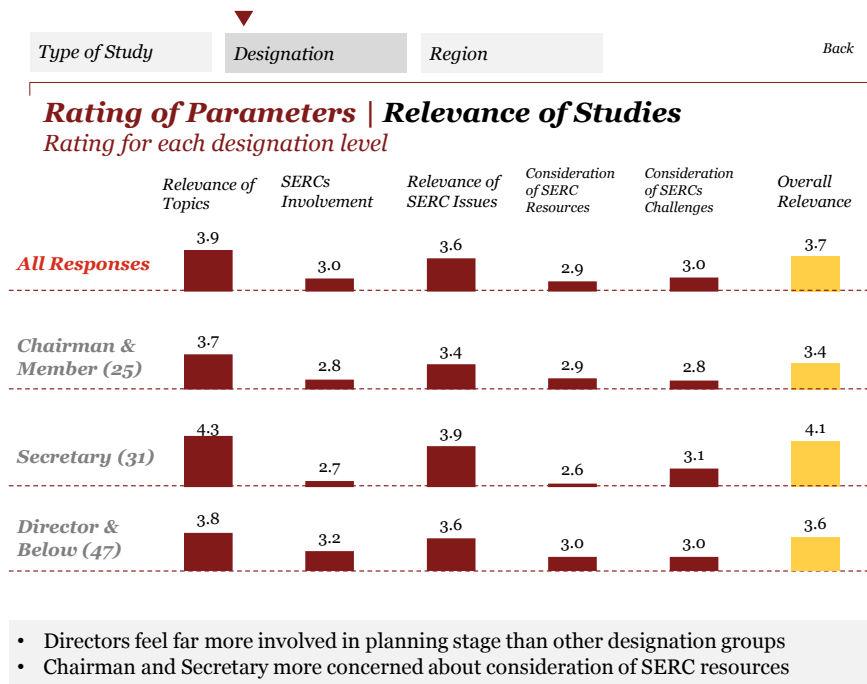
Region

[Back](#)**Rating of Parameters | Relevance of Studies**

Rating for each type of study



- Concerns of involvement at planning stage perceived for all types of studies by SERCs

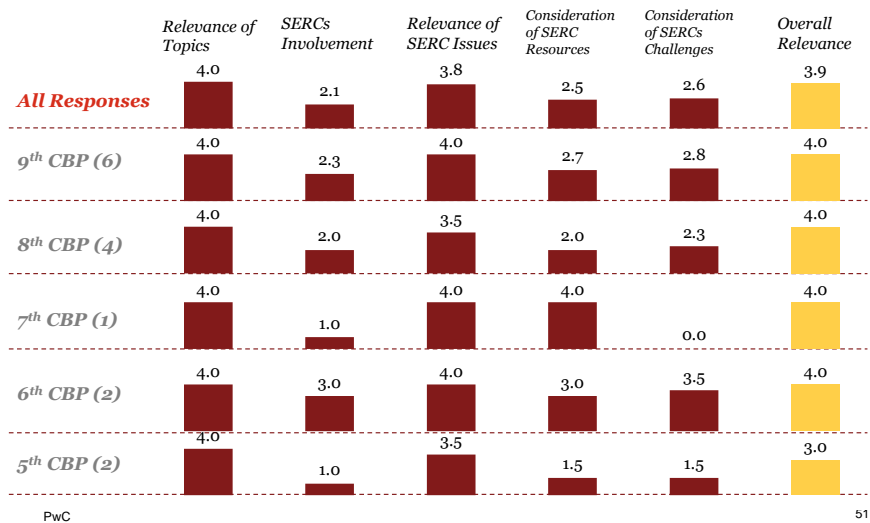




[Back](#)

## Rating of Parameters | Relevance of CBPs

Rating for each CBP



Type of Study

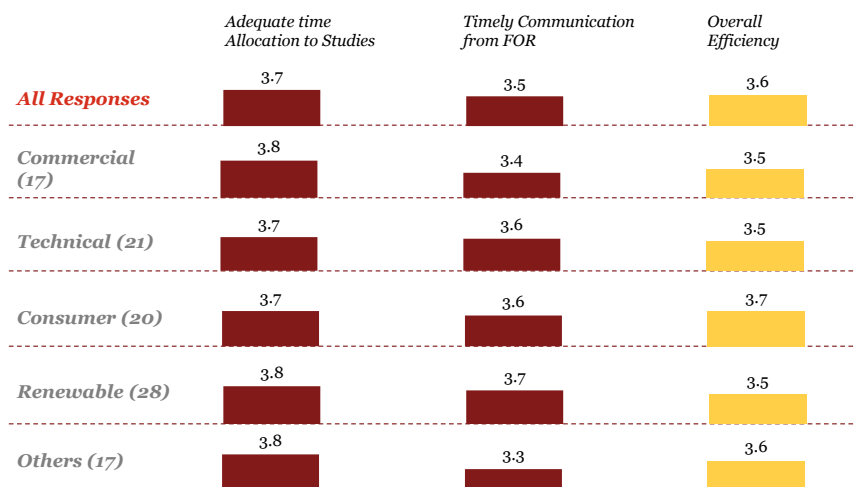
Designation

Region

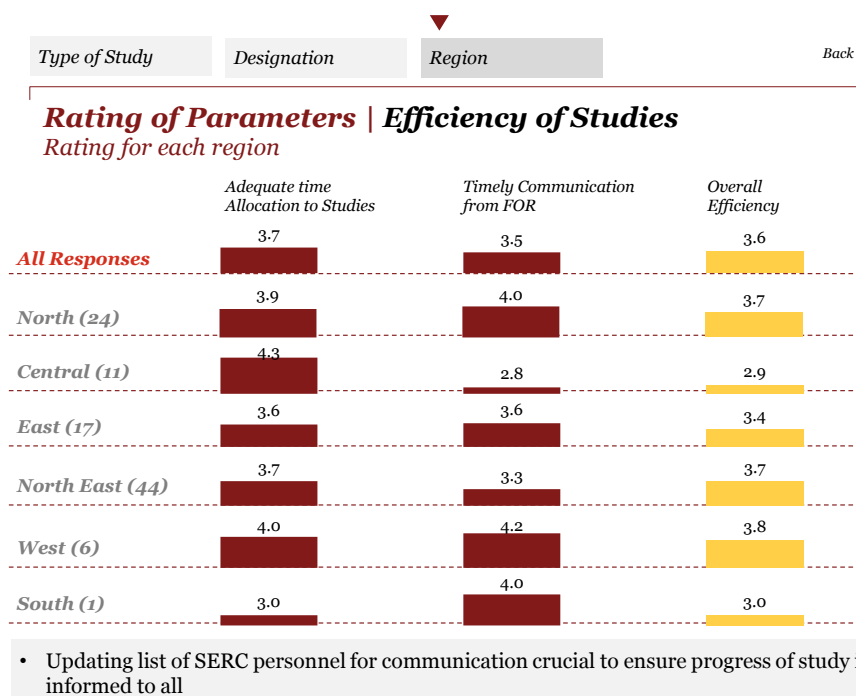
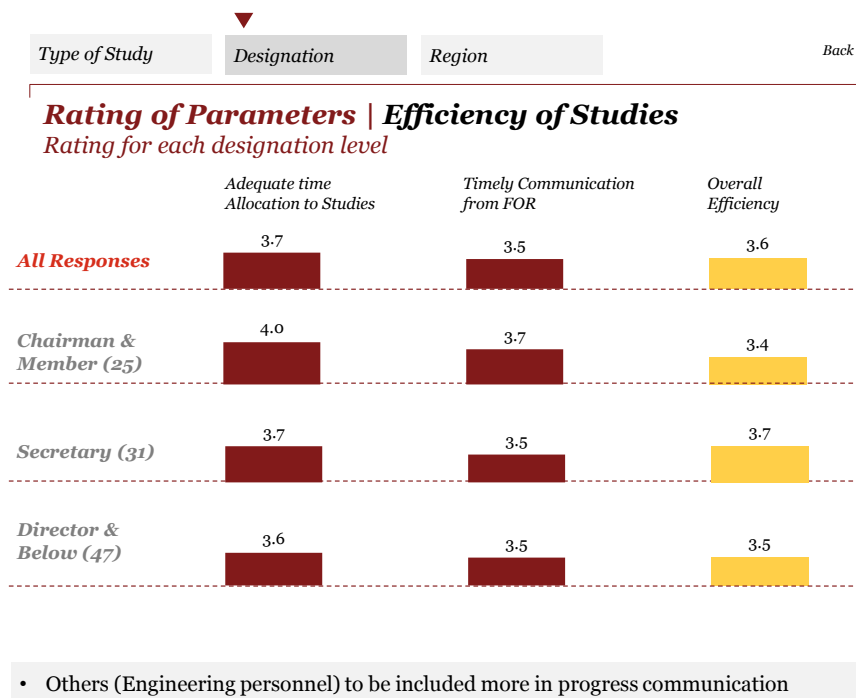
[Back](#)

## Rating of Parameters | Efficiency of Studies

Rating for each type of study



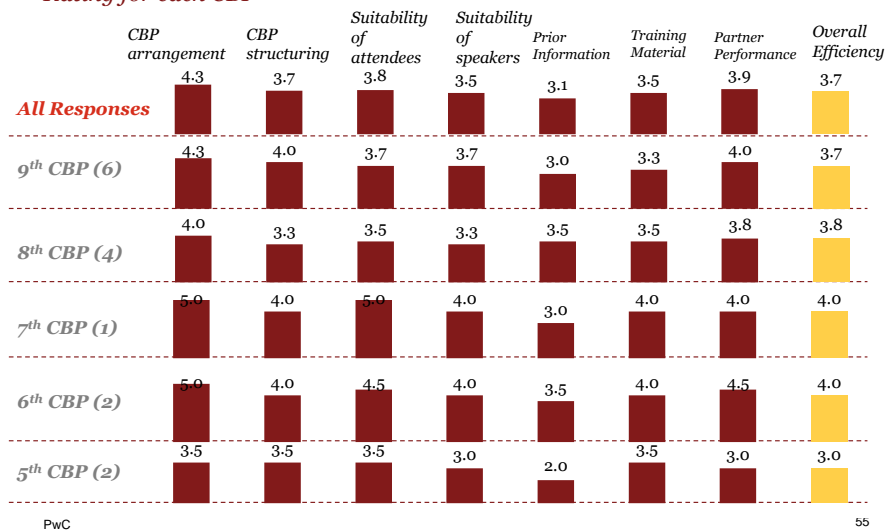
- Relatively lesser communication for other studies



[Back](#)

## Rating of Parameters | Efficiency of CBPs

Rating for each CBP



Type of Study

Designation

Region

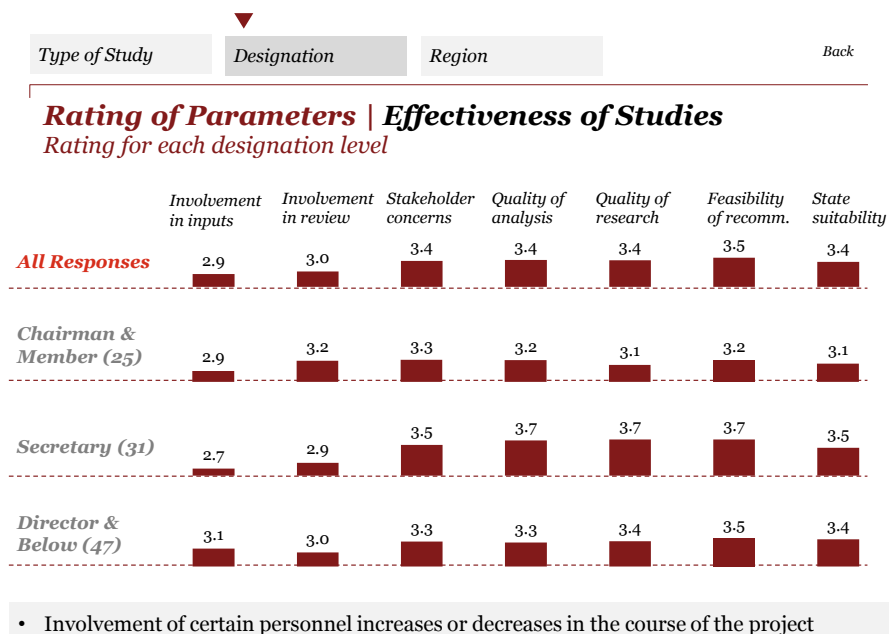
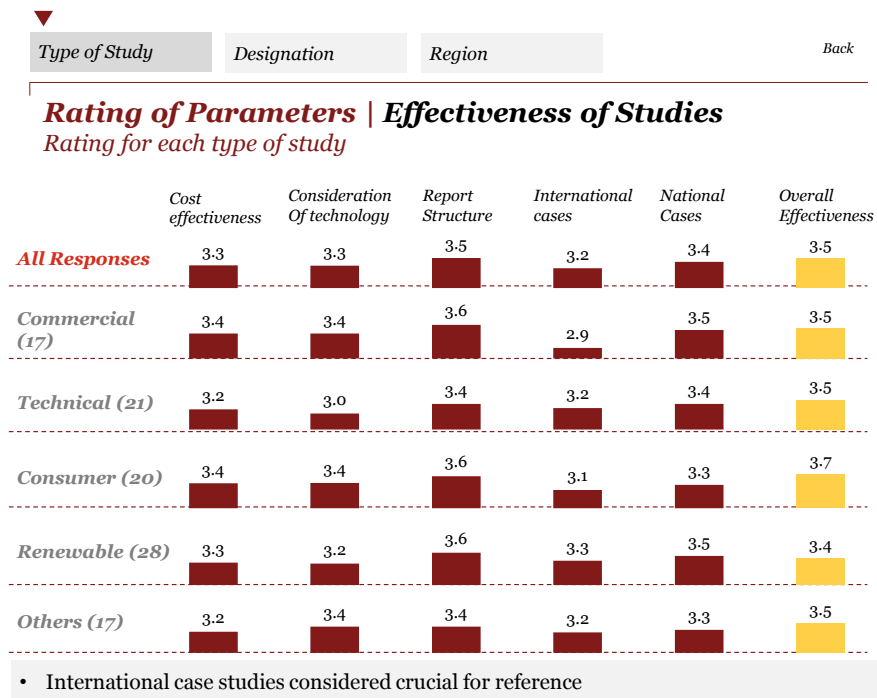
[Back](#)

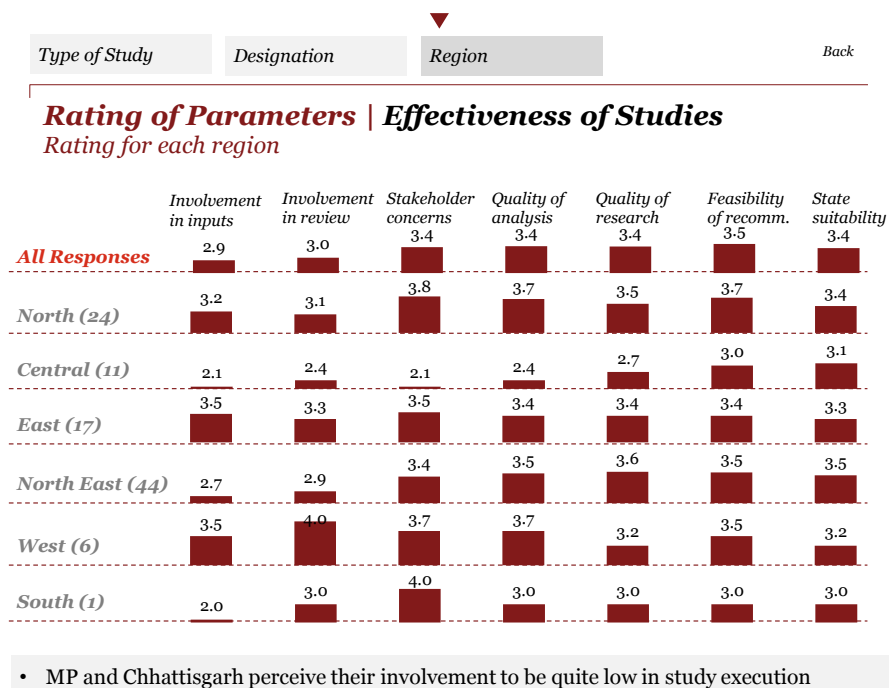
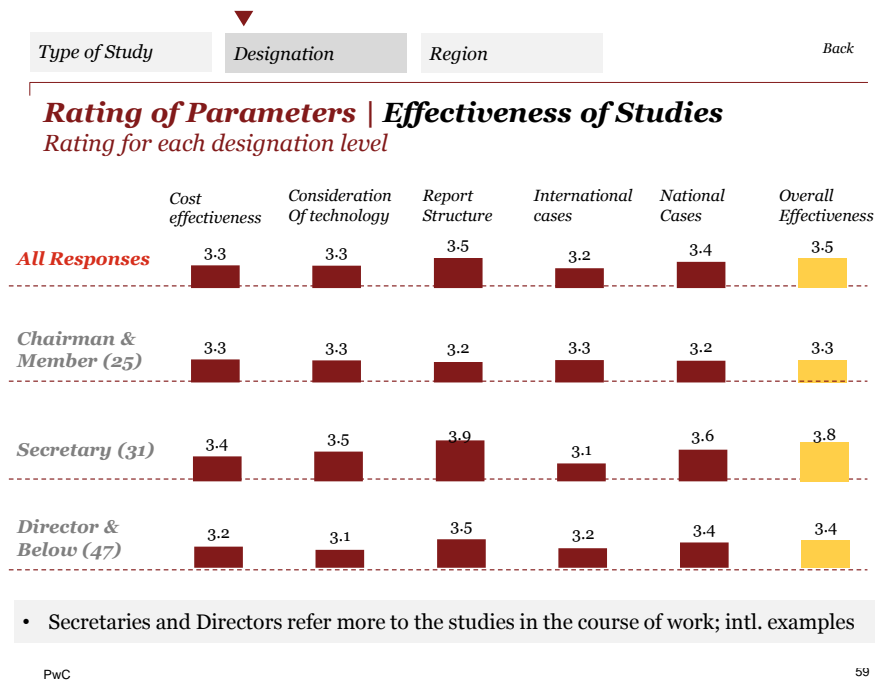
## Rating of Parameters | Effectiveness of Studies

Rating for each type of study



- Parameters related to implementability of studies crucial in technical & renewable studies





Type of Study	Designation	Region	Back
---------------	-------------	--------	------

## Rating of Parameters | Effectiveness of Studies

Rating for each region

	Cost effectiveness	Consideration Of technology	Report Structure	International cases	National Cases	Overall Effectiveness
<b>All Responses</b>	3.3	3.3	3.5	3.2	3.4	3.5
<b>North (24)</b>	3.6	3.5	3.8	3.0	3.5	3.8
<b>Central (11)</b>	3.1	3.0	2.5	3.0	3.2	2.9
<b>East (17)</b>	3.2	3.3	3.5	3.3	3.4	3.4
<b>North East (44)</b>	3.2	3.3	3.8	3.3	3.4	3.6
<b>West (6)</b>	3.2	3.0	3.0	3.0	3.2	3.5
<b>South (1)</b>	3.0	4.0	4.0	3.0	3.0	3.0

- Scope for improvement in providing perspective on technology, cost effectiveness, international examples

Back

## Rating of Parameters | Effectiveness of CBPs

Rating for each CBP

	SERCs Involvement	Stakeholder Concerns	Content Coverage	Feasibility of Recommendations	State Suitability	Cost effectiveness
<b>All Responses</b>	2.1	3.6	3.5	3.4	3.1	3.4
<b>9<sup>th</sup> CBP (6)</b>	2.7	3.8	3.7	3.5	3.0	3.2
<b>8<sup>th</sup> CBP (4)</b>	1.8	3.8	3.3	3.3	3.3	3.5
<b>7<sup>th</sup> CBP (1)</b>	1.0	4.0	4.0	4.0	3.0	3.0
<b>6<sup>th</sup> CBP (2)</b>	2.5	4.0	4.0	4.0	4.0	4.0
<b>5<sup>th</sup> CBP (2)</b>	1.0	2.5	2.5	3.0	2.5	4.0

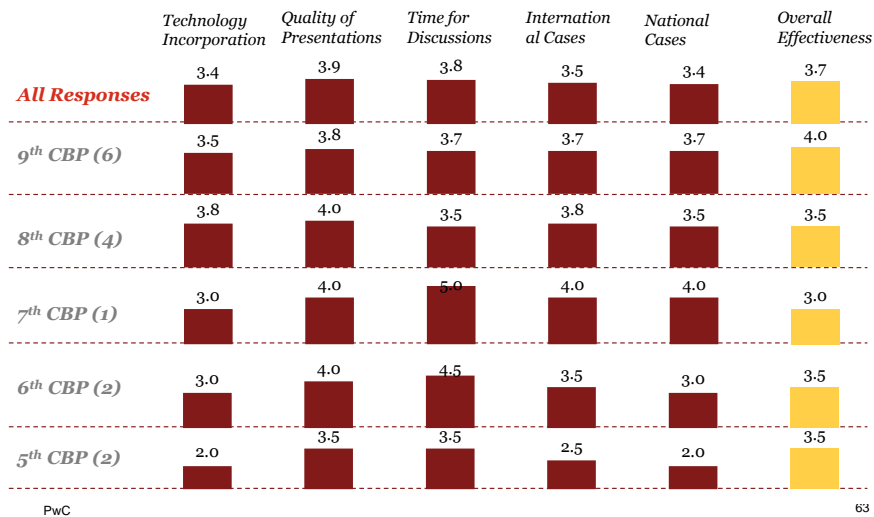
PwC

62

[Back](#)

## Rating of Parameters | Effectiveness of CBPs

Rating for each CBP



Type of Study

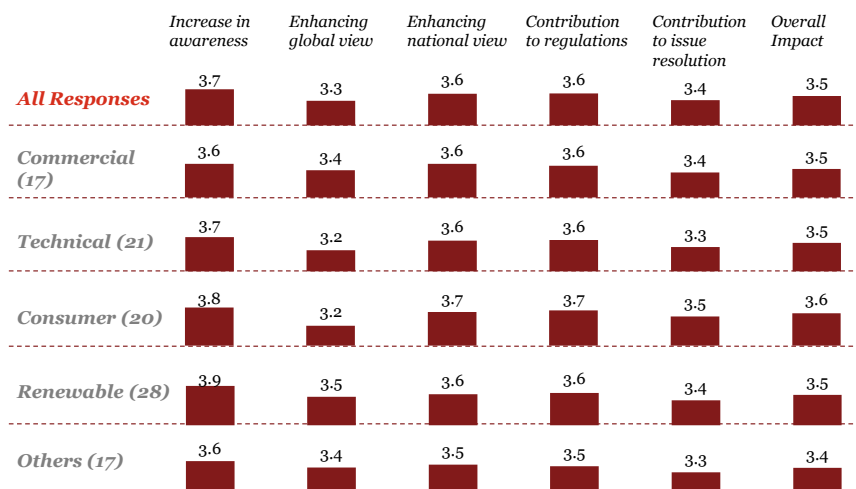
Designation

Region

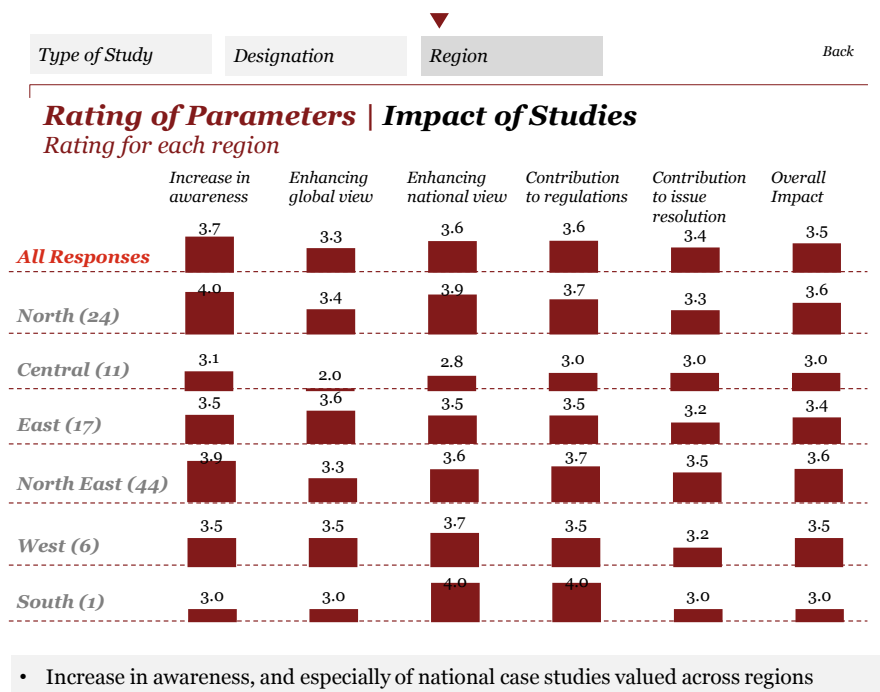
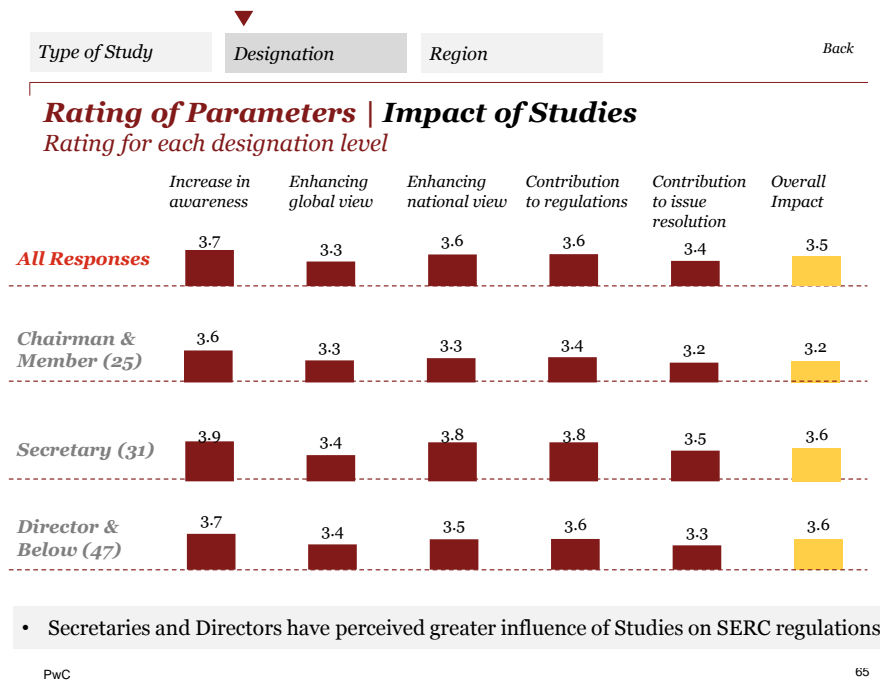
[Back](#)

## Rating of Parameters | Impact of Studies

Rating for each type of study



- Studies useful in formulation of regulations and issuance of orders, but lesser in resn.

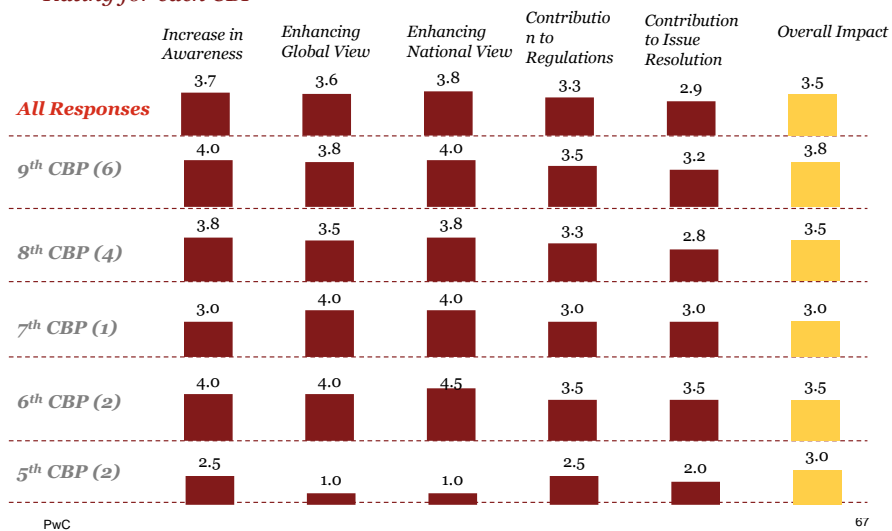




[Back](#)

## Rating of Parameters | Impact of CBPs

Rating for each CBP



Type of Study

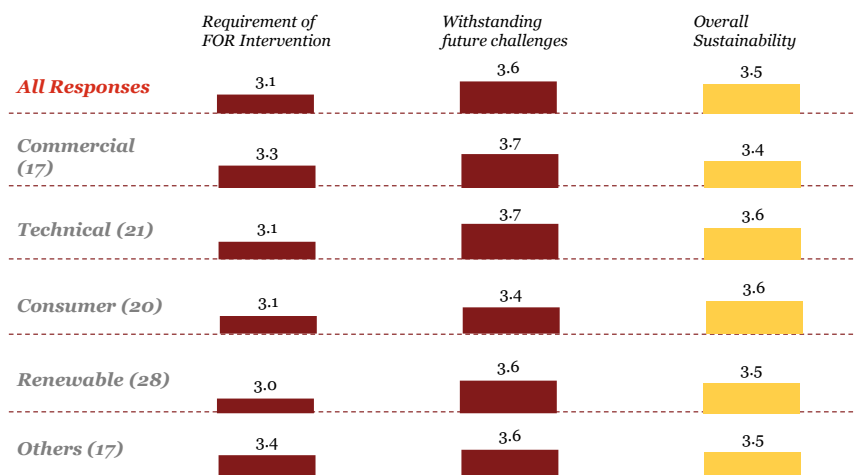
Designation

Region

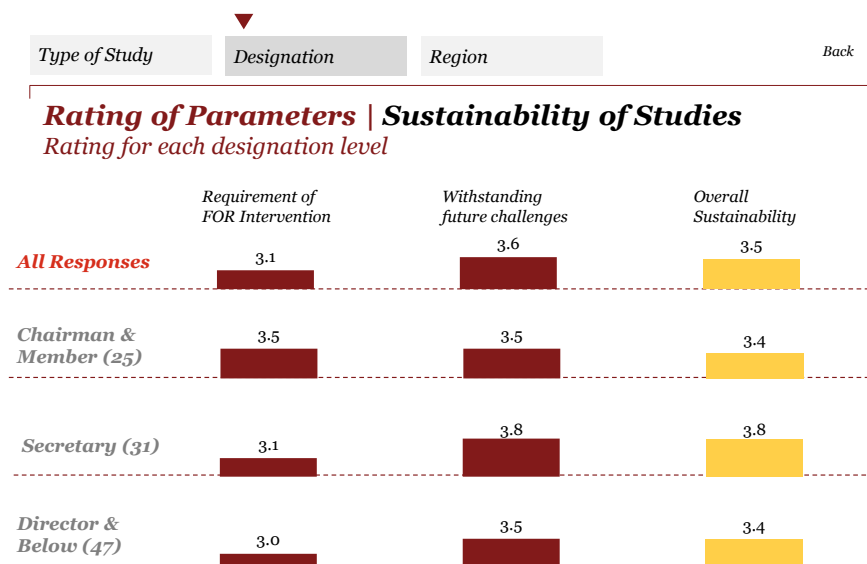
[Back](#)

## Rating of Parameters | Sustainability of Studies

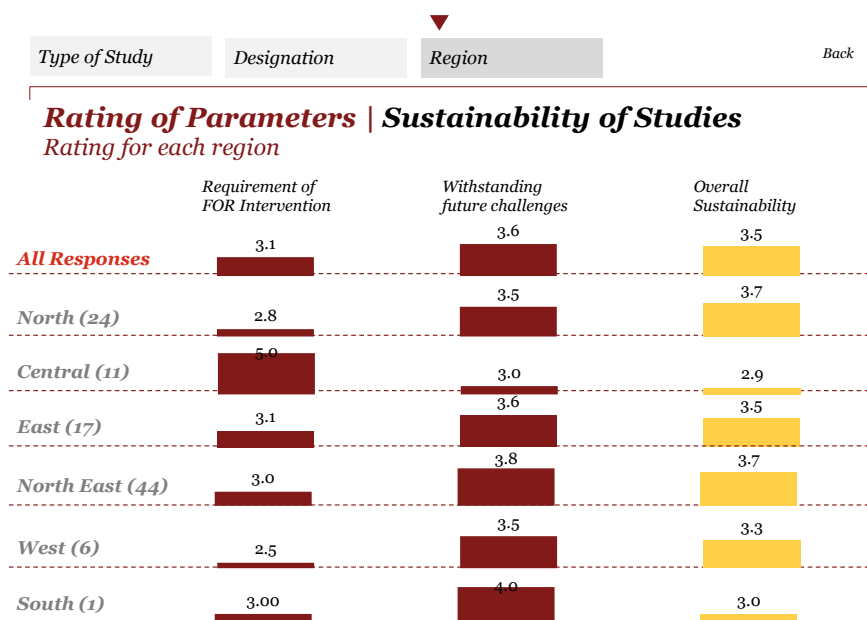
Rating for each type of study



- Study recommendations perceived to withstand future challenges



- Secretaries and Directors feel that FOR interventions may be required in the future

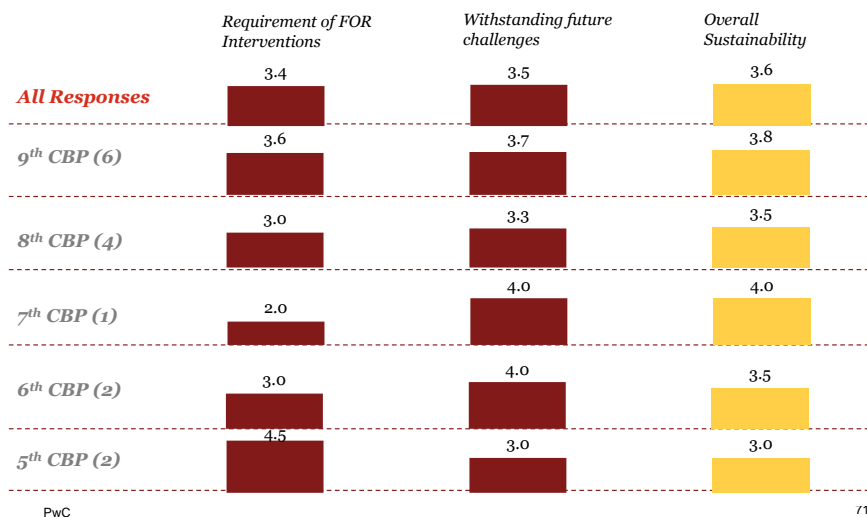


- Study recommendations perceived to withstand future challenges

Back

## Rating of Parameters | Sustainability of CBPs

Rating for each CBP



## Classifying parameters | Group 1 (>3.5 rating)

Evaluation Criteria	Questions	Grouping Criteria			
		All	Type of Study	Region	Designation
Relevance	Were the topics of the Studies relevant to the functions of the SERC?	✓	✓	✓	✓
Relevance	Were the topics of the Studies relevant to the crucial issues/challenges being faced by the SERC?	✓	✓	✓	✓
Efficiency	Was the time allocated to the execution of the Studies adequate?	✓	✓	✓	✓
Efficiency	Did FOR communicate/seek inputs and feedback from the SERC for the execution of the Studies in a timely manner?	✓	✓	✓	<3.5 Bar S, D
Effectiveness	How would you rate the clarity, structure, and presentation of the Study reports?	✓	✓	✓	<3.5 Bar C,M,D

- The overarching agenda and conduct of studies perceived to be commendable

### **Classifying parameters | Group 1 (>3.5 rating)**

Evaluation Criteria	Questions	Grouping Criteria			
		All	Type of Study	Region	Designation
Impact	Did the Studies contribute in creating awareness and enhancing the knowledge base of SERC members?	✓	✓	<3.5 Bar C,E,S	✓
Impact	Did the Studies contribute in providing a national viewpoint of the issues addressed?	✓	✓	✓	✓
Impact	Did the Studies contribute to formulation of subsequent regulations/orders/guidelines/concept papers?	✓	✓	✓	✓
Sustainability	Can the recommendations of the Studies withstand practical challenges in the future?	✓	✓	✓	✓

- Overall rating of impact and sustainability parameters commendable; increase in awareness of issues highly valued by SERCs

### **Classifying parameters | Group 2 (>3, <3.5 rating)**

Evaluation Criteria	Questions	Grouping Criteria			
		All	Type of Study	Region	Designation
Effectiveness	What was the extent of feedback sought by FOR from the SERC for review/finalization of Studies?	✓	✓	✓	<3 Bar C, M, S
Effectiveness	Were the concerns of all relevant stakeholders adequately addressed in the recommendations provided in the Studies?	✓	✓	>3.5	✓
Effectiveness	How would you rate the quality of analysis and insights in the Studies?	✓	✓	>3.5	✓
Effectiveness	How would you rate the quality of research methodology adopted in the Studies?	✓	✓	✓	✓
Effectiveness	Were the Studies' recommendations feasible for implementation?	✓	>3.5	✓	✓
Effectiveness	Were the Studies' recommendations suitable to state-specific challenges?	✓	✓	✓	✓

### **Classifying parameters | Group 2 (>3, <3.5 rating)**

Evaluation Criteria	Questions	Grouping Criteria			
		All	Type of Study	Region	Designation
Effectiveness	Were the Studies' recommendations cost-effective?	✓	✓	✓	✓
Effectiveness	Did the Studies' recommendations incorporate state-of-the-art technologies or innovations?	✓	✓	✓	✓
Effectiveness	How would you rate the incorporation of international case studies and best practices?	✓	✓	✓	✓
Effectiveness	How would rate the incorporation of national and state-specific case studies?	✓	✓	✓	✓
Impact	Did the Studies contribute in providing a global viewpoint of the issues addressed?	✓	✓	✓	✓
Impact	Did the Studies contribute to actual resolution of prevalent issues in the state?	✓	✓	✓	✓
Sustainability	Would the SERCs require further support or intervention from FOR for implementation of the Studies?	✓	✓	<3 Bar N, NE, W	✓

- Contribution of study content in actual resolution of issues has been moderate

### **Classifying parameters | Group 3 (<3 rating)**

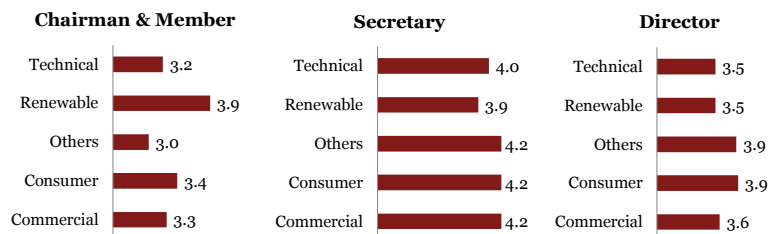
Evaluation Criteria	Questions	Grouping Criteria			
		All	Type of Study	Region	Designation
Relevance	What was the level of involvement of the SERC in selecting the topics of the Studies?	✓	✓	>3 Bar N,E,W	✓
Relevance	Were the SERC's resources/constraints considered before setting of topics of the Studies?	✓	✓	✓	✓
Relevance	Were the implementation challenges of the state considered before setting of topics of the Studies?	✓	✓	✓	✓
Effectiveness	What was the level of involvement of the SERC in providing inputs for preparation of the Studies' content?	✓	✓	✓	✓

- Involvement in planning and execution stage of conducting studies perceived as a concern consistently across various groupings

▼	▼		
Type of Study	Designation	Region	Back

## Rating Analysis | Designation V Type of Study

### Relevance of Studies



- Chairman and Members have considered new issues (Renewable) as more relevant, while Directors have considered prevailing concerns (Consumer, Technical and Other Studies) more relevant

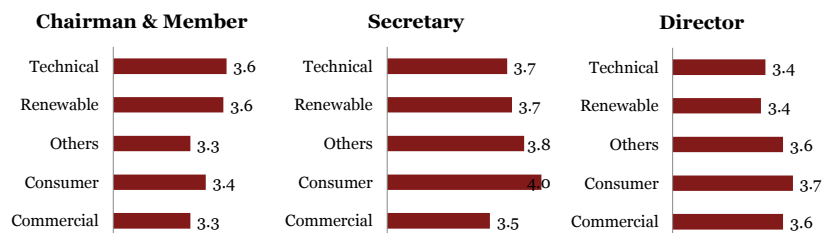
Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
77

▼	▼		
Type of Study	Designation	Region	Back

## Rating Analysis | Designation V Type of Study

### Efficiency of Studies



- Secretary and Directors seem to be most satisfied with conduct of studies, while Members and Others are less convinced
- Chairman seem to be satisfied with conduct and progress of renewable and technical studies

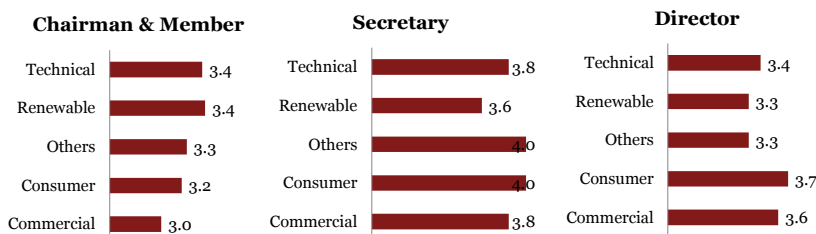
Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
78

▼	▼		
Type of Study	Designation	Region	Back

## Rating Analysis | Designation V Type of Study

### Effectiveness of Studies

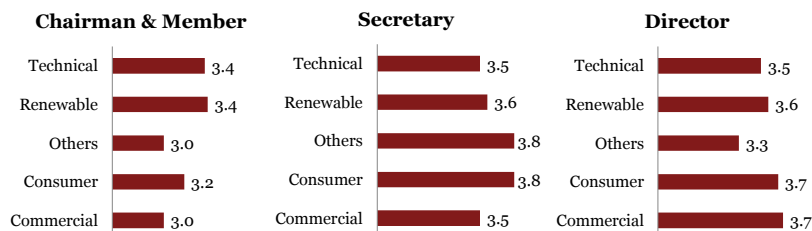


- Secretary and Directors have considered quality of studies and reports commendable, while Chairman, Members and Others indicate that there is scope of improvement

▼	▼		
Type of Study	Designation	Region	Back

## Rating Analysis | Designation V Type of Study

### Impact of Studies

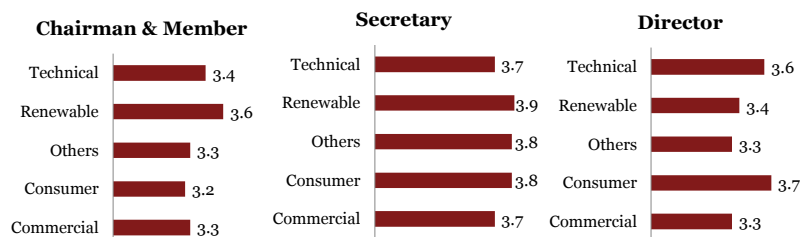


- Chairmen have found Renewable and Technical Studies to be more impactful, while Others have found Commercial and Consumers studies more impactful

▼	▼		
Type of Study	Designation	Region	Back

## Rating Analysis | Designation V Type of Study

### Sustainability of Studies



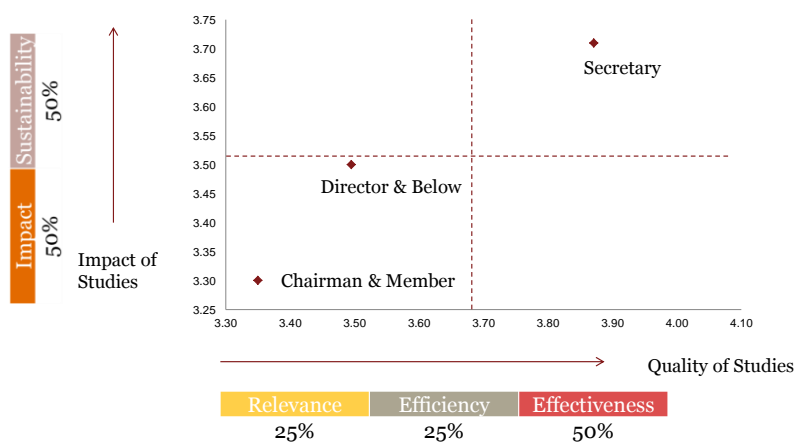
- Technical studies found to be more enduring than others, with commercial studies found to be relatively untenable
- Consumer, Renewable and Technical Studies found to be fairly sustainable

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
81

Back

## Mapping of Quality of Studies V Impact of Studies

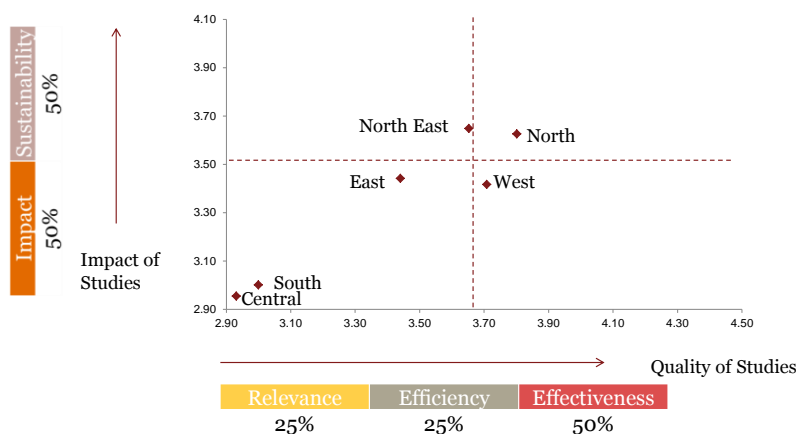


- Secretaries find Studies most useful; however Chairman & Member desire improvement on both fronts of quality and applicability



Back

## Mapping of Quality of Studies V Impact of Studies



- North and North East find studies more impactful than others; Central region desires improvement on both fronts



Type of Study

Designation

Region

Back

## Most significant parameters – Regression Analysis

### Relevance of Studies – Type of Study

Parameters	Commercial		Technical		Consumer		Renewable		Other Sector Reforms	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Relevance of Topics	0.32	0.002	0.06	0.731	0.41	0.093	0.37	0.056	0.43	0.162
SERCs Involvement	-0.02	0.910	0.31	0.101	-0.24	0.200	-0.19	0.169	0.83	0.034
Relevance of Issues	0.62	0.000	0.56	0.011	0.40	0.088	0.48	0.030	0.48	0.299
Resources Consideration	-0.04	0.839	-0.14	0.320	0.36	0.031	0.26	0.068	-0.83	0.106
SERCs Challenges	0.12	0.439	0.21	0.167	0.06	0.706	0.08	0.500	0.09	0.813

- For other sector reforms, involvement of SERCs felt to be a significant parameter
- Consideration of SERC resources during planning stage significant for consumer and renewable studies

PwC

54

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Most significant parameters – Regression Analysis

#### Relevance of Studies - Designation

Parameters	Secretary		Director		Chairman & Member	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Relevance of Topics	0.389	0.031	0.272	0.016	0.121	0.538
SERCs Involvement	-0.163	0.450	0.176	0.196	0.097	0.388
Relevance of Issues	0.638	0.002	0.315	0.014	0.402	0.056
Resources Consideration	0.155	0.363	0.170	0.137	0.333	0.066
SERCs Challenges	-0.023	0.864	0.072	0.517	0.051	0.753

- Chairman, Member and Director identify resource constraint as a significant parameter in addition to relevance of topics

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
85

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Most significant parameters – Regression Analysis

#### Relevance of Studies - Region

Parameters	North		Central		North East		East	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Relevance of Topics	0.255	0.073	-0.199	0.380	0.591	0.000	0.129	0.571
SERCs Involvement	0.222	0.076	-0.088	0.733	0.072	0.615	-0.024	0.884
Relevance of Issues	0.641	0.000	0.458	0.054	0.323	0.051	0.707	0.046
Resources Consideration	-0.061	0.640	0.502	0.047	-0.002	0.985	-0.013	0.955
SERCs Challenges	-0.056	0.620	0.336	0.041	0.016	0.900	0.199	0.276

- Central region in particular perceives that consideration of SERC resources and challenges most significant for Studies to be relevant

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
86

[Back](#)

## Snapshots of regression outputs

Coefficients <sup>a,b</sup>					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	Relevance_Topics	.331	.082	.350	4.036
	Relevance_SERCs Involvement	-.005	.099	-.004	.963
	Relevance_SERCs Issues	.466	.098	.457	4.751
	Relevance_SERCs Resources	.117	.099	.094	1.189
	Relevance_SERCs Challenges	.127	.090	.104	1.415

a. Dependent Variable: Overall\_Relevance

b. Linear Regression through the Origin

Model Summary				
Model	R	R Square <sup>a</sup>	Adjusted R Square	Std. Error of the Estimate
1	.992 <sup>a</sup>	.985	.984	.47694

a. Predictors: (Constant), Relevance\_SERCsChallenges, Relevance\_Topics, Relevance\_SERCsResources, Relevance\_SERCsInvolvement, Relevance\_SERCsIssues

b. For regression through the origin (the no-intercept model), R Square measures the proportion of the variability in the dependent variable about the origin explained by regression. This CANNOT be compared to R Square for models which include an intercept.

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
87

Type of Study

Designation

Region

[Back](#)

## Most significant parameters – Regression Analysis

### Efficiency of Studies – Type of Study

Parameters	Commercial		Technical		Consumer		Renewable		Other Sector Reforms	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Adequate Time Allocation to Studies	0.630	0.014	0.542	0.012	0.745	0.012	0.298	0.006	0.867	0.008
Timely Communication from FOR	0.362	0.123	0.452	0.031	0.234	0.031	0.703	0.000	0.125	0.624

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
88

Type of Study	▼	Designation	Region	Back
---------------	---	-------------	--------	------

### **Most significant parameters – Regression Analysis**

#### **Efficiency of Studies - Designation**

Parameters	Secretary		Director		Chairman & Member	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Adequate Time Allocation to Studies	0.809	0.000	0.164	0.115	0.675	0.006
Timely Communication from FOR	0.185	0.093	0.831	0.000	0.317	0.158

Type of Study	▼	Designation	Region	Back
---------------	---	-------------	--------	------

### **Most significant parameters – Regression Analysis**

#### **Efficiency of Studies - Region**

Parameters	North		Central		North East		East	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Adequate Time Allocation to Studies	0.045	0.881	0.395	0.541	0.650	0.000	0.354	0.120
Timely Communication from FOR	0.949	0.007	0.601	0.382	0.343	0.002	0.640	0.009



Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Effectiveness of Studies – Type of Study

Parameters	Commercial		Technical		Consumer		Renewable		Other Sector Reforms	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
SERCs Involvement in Providing Inputs	-0.273	0.000	0.377	0.076	-0.170	0.076	-0.055	0.693	-0.336	0.204
SERCs Involvement in Finalizing Studies	0.293	0.000	-0.181	0.352	-0.205	0.352	0.184	0.264	0.155	0.497
Incorporating Stakeholder Concerns	0.000	1.000	0.159	0.454	-0.181	0.454	-0.192	0.243	0.503	0.275
Quality of Analysis	-0.641	0.000	0.335	0.167	-0.115	0.167	0.358	0.164	0.239	0.533
Quality of Research	1.950	0.000	0.248	0.538	0.863	0.538	0.539	0.056	0.216	0.536
Feasibility of Recommendations	0.000	1.000	-0.003	0.990	0.436	0.990	-0.228	0.403	-0.292	0.481
State Suitability of Recommendations	0.000	1.000	-1.117	0.046	-0.528	0.046	-0.261	0.414	-0.535	0.268
Cost Effectiveness of Recommendations	-0.312	0.000	-0.307	0.196	0.426	0.196	0.515	0.103	0.193	0.530
Consideration of Technology Aspect	0.318	0.000	-0.202	0.312	-0.115	0.312	-0.147	0.405	0.200	0.618
Report Structure and Clarity	-0.344	0.000	1.459	0.005	0.098	0.005	0.289	0.274	0.409	0.327
Including International Cases	0.000	1.000	-0.801	0.008	0.321	0.008	-0.107	0.655	0.242	0.530
Including National Cases	0.000	1.000	1.033	0.004	0.155	0.004	0.112	0.684	0.112	0.684

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
91

Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Effectiveness of Studies - Designation

Parameters	Secretary		Director		Chairman & Member	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
SERCs Involvement in Providing Inputs	-0.376	0.003	0.256	0.037	-0.011	0.858
SERCs Involvement in Finalizing Studies	0.203	0.129	-0.158	0.112	0.056	0.428
Incorporating Stakeholder Concerns	0.108	0.584	0.073	0.566	-0.055	0.487
Quality of Analysis	0.207	0.438	0.170	0.287	0.263	0.038
Quality of Research	-0.250	0.175	0.355	0.063	0.329	0.013
Feasibility of Recommendations	0.084	0.632	0.085	0.495	0.467	0.001
State Suitability of Recommendations	0.051	0.808	-0.082	0.546	-0.302	0.094
Cost Effectiveness of Recommendations	0.333	0.112	0.080	0.588	-0.114	0.447
Consideration of Technology Aspect	-0.059	0.790	0.088	0.287	-0.146	0.162
Report Structure and Clarity	0.036	0.896	0.301	0.119	0.080	0.594
Including International Cases	0.138	0.291	-0.104	0.383	0.218	0.073
Including National Cases	0.513	0.058	-0.062	0.688	0.218	0.022

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
92

Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Effectiveness of Studies - Region

Parameters	North		Central		North East		East	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
SERCs Involvement in Providing Inputs	0.044	0.844	.	.	-0.175	0.025	0.000	.
SERCs Involvement in Finalizing Studies	0.099	0.772	.	.	0.071	0.391	0.976	.
Incorporating Stakeholder Concerns	-0.020	0.956	.	.	0.216	0.146	0.000	.
Quality of Analysis	0.832	0.134	.	.	0.172	0.320	1.023	.
Quality of Research	-0.202	0.669	.	.	0.000	0.997	0.000	.
Feasibility of Recommendations	-0.531	0.278	.	.	0.054	0.689	0.000	.
State Suitability of Recommendations	0.673	0.225	.	.	0.228	0.139	0.976	.
Cost Effectiveness of Recommendations	0.505	0.219			-0.268	0.139		
Consideration of Technology Aspect	-0.354	0.228	.	.	0.101	0.288	0.000	.
Report Structure and Clarity	0.174	0.766	.	.	0.141	0.471	-1.052	.
Including International Cases	0.095	0.569	.	.	-0.059	0.676	-0.927	.
Including National Cases	-0.321	0.426	.	.	0.515	0.004	0.000	.

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
93

Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Impact of Studies – Type of Study

Parameters	Commercial		Technical		Consumer		Renewable		Other Sector Reforms	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Increase in Awareness	1.291	0.004	0.186	0.416	0.940	0.416	0.206	0.321	0.229	0.490
Enhancing Global View	0.046	0.800	0.447	0.065	-0.085	0.065	0.344	0.153	0.198	0.455
Enhancing National View	-0.563	0.089	0.026	0.932	0.475	0.932	0.053	0.826	0.116	0.790
Contribution to Regulations	-0.660	0.088	0.160	0.484	-0.425	0.484	0.197	0.430	0.084	0.774
Contribution to Issue Resolution	0.884	0.006	0.184	0.485	0.088	0.485	0.201	0.415	0.374	0.112

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
94

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Most significant parameters – Regression Analysis

#### Impact of Studies - Designation

Parameters	Secretary		Director		Chairman & Member	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Increase in Awareness	0.920	0.004	0.465	0.002	-0.067	0.701
Enhancing Global View	0.234	0.079	0.138	0.292	0.330	0.272
Enhancing National View	-0.163	0.524	-0.014	0.930	0.463	0.098
Contribution to Regulations	-0.457	0.097	0.192	0.210	0.351	0.107
Contribution to Issue Resolution	0.465	0.038	0.220	0.061	-0.077	0.752

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
95

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Most significant parameters – Regression Analysis

#### Impact of Studies - Region

Parameters	North		Central		North East		East	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Increase in Awareness	0.814	0.080	.	.	0.255	0.106	-1.054	.
Enhancing Global View	0.149	0.419	.	.	0.100	0.467	2.048	.
Enhancing National View	-0.322	0.510	.	.	0.180	0.285	0.000	.
Contribution to Regulations	0.193	0.512	.	.	0.204	0.238	0.000	.
Contribution to Issue Resolution	0.164	0.485	.	.	0.260	0.059	0.000	.

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
96



Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Sustainability of Studies – Type of Study

Parameters	Commercial		Technical		Consumer		Renewable		Other Sector Reforms	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Requirement of FOR Interventions	0.086	0.428	-0.046	0.611	0.096	0.611	-0.024	0.749	0.248	0.063
Withstanding future challenges	0.909	0.000	1.033	0.000	0.893	0.000	1.009	0.000	0.750	0.000

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
97



Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Sustainability of Studies - Designation

Parameters	Secretary		Director		Chairman & Member	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Requirement of FOR Interventions	-0.093	0.190	0.062	0.349	0.269	0.017
Withstanding future challenges	1.080	0.000	0.926	0.000	0.730	0.000

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
98



Type of Study

Designation

Region

Back

### Most significant parameters – Regression Analysis

#### Sustainability of Studies - Region

Parameters	North		Central		North East		East	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Requirement of FOR Interventions	0.160	0.137	-	-	0.009	0.923	0.225	0.057
Withstanding future challenges	0.837	0.000	0.995	0.000	0.975	0.000	0.775	0.000

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
99

Back

### Snapshots of Factor Analysis outputs

Rotated Component Matrix <sup>a</sup>													
	Component												
	1	2	3	4	5	6							
Relevance_Topics	-.273	.675	.127	.300	.043	.280	Effectiveness_State	.047	.343	.250	.641	-.060	-.015
Relevance_SERCs	.849	.093	.114	.114	.056	-.090	Sustainability	.281	.097	.056	.827	.106	.089
Involvement	.013	.592	.412	.272	.196	-1.153E-6	Effectiveness_Cost	.149	.427	.346	.540	-.011	.028
Relevance_SERCs	.897	.076	.183	.055	-.009	-.037	Effectiveness_Technology	-.131	.353	.529	.391	.201	.117
Resources	.729	.354	-.038	.158	.105	-.126	Effectiveness_Report	.343	-.110	.705	.230	.030	.037
Challenges	.177	.130	.094	.064	.003	.907	Structure	.311	.385	.626	.212	.102	.142
Efficiency_TimeAllocation	.733	.020	.077	.051	.166	.290	Effectiveness_International	.035	.300	.691	.139	.065	.084
Communication	.917	.022	.114	.014	.005	.088	Impact_Awareness	.349	.427	.613	-.104	.097	-.272
Effectiveness_SERCs	.754	-.101	.319	.165	.098	.215	Impact_GlobalView	.323	.739	.384	.052	.177	-.151
Feedback	.425	.478	.151	.055	.461	.155	Impact_NationalView	.158	.210	.493	.404	.481	-.248
Effectiveness	.373	.585	.427	.155	.141	.281	Impact_Regulations	-.101	.383	.336	.520	.413	.097
StakeholderConcerns	.095	.492	.604	.060	.212	.168	Impact_IssueResolution	-.461	-.125	.069	-.293	-.542	-.171
Effectiveness_Analysis	.096	.756	.101	.335	.056	.008	Sustainability_FORintervention	.019	.092	.179	-.043	.839	-.044
Effectiveness_Research							Sustainability_Future						
Effectiveness_Feasibility							Challenges						

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.  
a. Rotation converged in 9 iterations.Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
100



Type of Study      Designation      Region      [Back](#)

### Grouping of Parameters – Principal Components Analysis

#### Type of Study - Commercial

Group 1	Group 2	Group 3	Group 4
Comprehensiveness of Studies	SERC Involvement and Consideration	-	Applicability of Studies
Relevance_Topics	Relevance_SERCsInvolvement	Efficiency_TimeAllocation	Effectiveness_Feasibility
Relevance_SERCsIssues	Relevance_SERCsResources	Effectiveness_SERCsFeedback	Effectiveness_StateSuitability
Effectiveness_Analysis	Relevance_SERCsChallenges	Effectiveness_CostEffectiveness	
Effectiveness_Research	Efficiency_TimelyCommunication	Impact_IssueResolution	
Effectiveness_Technology	Effectiveness_SERCsInvolvement	Sustainability_FutureChallenges	
Effectiveness_National	Effectiveness_StakeholderConcerns		
Impact_Awareness			
Impact_GlobalView			
Impact_NationalView			
Impact_Regulations			

- The parameters of quality of report structure, incorporation of international case studies, and requirement of FOR intervention remained ungrouped



Type of Study      Designation      Region      [Back](#)

### Grouping of Parameters – Principal Components Analysis

#### Type of Study - Technical

Group 1	Group 2	Group 3	Group 4
SERC Involvement and Consideration	Comprehensiveness of Studies	Applicability of Studies	Alignment of Studies with SERC functions
Relevance_SERCsInvolvement	Effectiveness_Analysis	Effectiveness_Research	Relevance_Topics
Relevance_SERCsResources	Effectiveness_Feasibility	Effectiveness_StateSuitability	Relevance_SERCsIssues
Efficiency_TimelyCommunication	Effectiveness_Technology	Effectiveness_ReportStructure	Efficiency_TimeAllocation
Effectiveness_SERCsInvolvement	Impact_GlobalView	Impact_Awareness	
Effectiveness_SERCsFeedback	Impact_NationalView	Impact_IssueResolution	
Effectiveness_StakeholderConcerns	Impact_Regulations		
	Effectiveness_National		



Type of Study      Designation      Region      [Back](#)

### Grouping of Parameters – Principal Components Analysis

#### Type of Study - Consumer

Group 1	Group 2	Group 3	Group 4	Group 5
SERC Involvement and Consideration	Comprehensiveness of Studies	Applicability of Studies	Alignment to ground-level issues	Alignment of Studies with SERC functions
Relevance_SERCsInvolvement	Efficiency_TimeAllocation	Effectiveness_Feasibility	Effectiveness_StateSuitability	Relevance_Topics
Relevance_SERCsResources	Effectiveness_Analysis	Impact_GlobalView	Effectiveness_CostEffectiveness	Relevance_SERCsIssues
Relevance_SERCsChallenges	Effectiveness_Research	Impact_NationalView	Impact_IssueResolution	Effectiveness_ReportStructure
Efficiency_TimelyCommunication	Effectiveness_National			
Effectiveness_SERCsInvolvement	Impact_Awareness			
Effectiveness_SERCsFeedback				
Impact Assessment of FOR Studies and CBPs PwC		Strictly private and confidential		December 2017 103



Type of Study      Designation      Region      [Back](#)

### Grouping of Parameters – Principal Components Analysis

#### Type of Study - Renewable

Group 1	Group 2	Group 3	Group 4
SERC Involvement and Consideration	Comprehensiveness and Applicability	Alignment with SERC functions	Value Add
Relevance_SERCsInvolvement	Relevance_SERCsIssues	Efficiency_TimelyCommunication	Effectiveness_Research
Relevance_SERCsResources	Effectiveness_Technology	Effectiveness_Feasibility	Impact_GlobalView
Relevance_SERCsChallenges	Effectiveness_ReportStructure	Effectiveness_StateSuitability	
Effectiveness_SERCsInvolvement	Effectiveness_National	Effectiveness_CostEffectiveness	
Effectiveness_SERCsFeedback	Impact_Awareness	Effectiveness_International	
	Impact_Regulations		
	Impact_IssueResolution		
Impact Assessment of FOR Studies and CBPs PwC		Strictly private and confidential	
		December 2017 104	



Type of Study

Designation

Region

Back

## Grouping of Parameters – Principal Components Analysis

### Type of Study – Other Sector Reforms

Group 1	Group 2	Group 3
Comprehensiveness and Applicability	SERC Involvement and Consideration	Global Outlook
Relevance_Topics	Relevance_SERCsInvolvement	Effectiveness_International
Effectiveness_Analysis	Relevance_SERCsIssues	Impact_GlobalView
Effectiveness_Research	Relevance_SERCsResources	
Effectiveness_Feasibility	Relevance_SERCsChallenges	
Effectiveness_StateSuitability	Efficiency_TimelyCommunication	
Effectiveness_Technology	Effectiveness_SERCsInvolvement	
Effectiveness_National		
Impact_Awareness		
Impact_NationalView		
Impact_Regulations		
Impact_IssueResolution		

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
105

Type of Study

Designation

Region

Back

## Grouping of Parameters – Principal Components Analysis

### Designation – Chairman & Member

Group 1	Group 2	Group 3	Group 4	Group 5
State Suitability	SERC Involvement and Consideration		Alignment to SERC functions	Study Outcomes
Efficiency_Timely Communication	Relevance_SERCsResources	Relevance_SERCsInvolvement	Relevance_Topics	Effectiveness_ReportStructure
Effectiveness_SERCsFeedback	Relevance_SERCsChallenges	Efficiency_TimeAllocation	Relevance_SERCsIssues	Impact_Awareness
Effectiveness_Analysis	Effectiveness_SERCsInvolvement	Effectiveness_StakeholderConcerns	Effectiveness_National	Impact_GlobalView
Effectiveness_StateSuitability	Effectiveness_Feasibility	Effectiveness_Research	Impact_Regulations	Impact_NationalView
Effectiveness_CostEffectiveness		Effectiveness_Technology		
Effectiveness_International		Impact_IssueResolution		

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
106

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Grouping of Parameters – Principal Components Analysis

#### Designation – Secretary

Group 1	Group 2	Group 3	Group 4	Group 5
SERC Involvement and Consideration	Value Add and Applicability of Studies	Alignment to SERC functions	Comprehensiveness and Quality of Studies	Global Outlook
Relevance_SERCsInvolvement	Effectiveness_CostEffectiveness	Relevance_Topics	Effectiveness_Research	Effectiveness_International
Relevance_SERCsResources	Effectiveness_Technology	Relevance_SERCsIssues	Effectiveness_StateSuitability	Impact_GlobalView
Relevance_SERCsChallenges	Impact_Awareness	Effectiveness_Analyses	Effectiveness_ReportStructure	
Efficiency_TimelyCommunication	Impact_Regulations	Effectiveness_Feasibility	Effectiveness_National	
Effectiveness_SERCsInvolvement	Impact_IssueResolution	Impact_NationalView		
Effectiveness_SERCsFeedback				

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
107

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Grouping of Parameters – Principal Components Analysis

#### Designation – Director & Below

Group 1	Group 2	Group 3
SERC Involvement, Quality of Report	Alignment to SERC functions	-
Relevance_SERCsInvolvement	Effectiveness_Feasibility	Effectiveness_Research
Relevance_SERCsIssues	Effectiveness_StateSuitability	Effectiveness_ReportStructure
Relevance_SERCsResources	Effectiveness_CostEffectiveness	Sustainability_FutureChallenges
Relevance_SERCsChallenges	Effectiveness_Technology	
Efficiency_TimelyCommunication	Effectiveness_International	
Effectiveness_SERCsInvolvement		
Effectiveness_SERCsFeedback		
Effectiveness_StakeholderConcerns		
Effectiveness_Analysis		
Effectiveness_National		
Impact_GlobalView		
Impact_NationalView		
Impact_Regulations		
Impact_IssueResolution		

Strictly private and confidential  
PwC

December 2017  
108

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Grouping of Parameters – Principal Components Analysis

#### Designation – East

Group 1	Group 2	Group 3	Group 4	Group 5
Comprehensiveness and Applicability	Applicability of studies		Involvement and consideration	
Relevance_Topics	Relevance_SERCsChallenges	Effectiveness_StateSuitability	Efficiency_TimelyCommunication	Relevance_SERCsInvolvement
Relevance_SERCsIssues	Effectiveness_CostEffectiveness	Effectiveness_International	Effectiveness_SERCsInvolvement	Effectiveness_Research
Effectiveness_SERCsFeedback		Impact_Regulations		Relevance_SERCsResources
Effectiveness_Analysis		Impact_IssueResolution		
Effectiveness_Feasibility				
Effectiveness_Technology				
Effectiveness_ReportStructure				
Effectiveness_National				
Impact_Awareness				
Impact_GlobalView				
Impact_NationalView				
Impact Assessment of FUK Studies and CBPs		Strictly private and confidential		December 2017 / 109
PwC				

Type of Study	Designation	Region	Back
---------------	-------------	--------	------

### Grouping of Parameters – Principal Components Analysis

#### Designation – North East

Group 1	Group 2	Group 3	Group 4
Comprehensiveness and Applicability	SERC Involvement and Consideration	Value Add	Applicability of Studies
Relevance_Topics	Relevance_SERCsInvolvement	Effectiveness_CostEffectiveness	Impact_Awareness
Relevance_SERCsIssues	Relevance_SERCsResources	Effectiveness_Technology	Sustainability_Future Challenges
Effectiveness_Analysis	Relevance_SERCsChallenges	Effectiveness_ReportStructure	
Effectiveness_Research	Efficiency_TimelyCommunication	Impact_Regulations	
Effectiveness_Feasibility	Effectiveness_SERCsInvolvement		
Effectiveness_StateSuitability	Effectiveness_SERCsFeedback		
Effectiveness_National	Effectiveness_International		
Impact_GlobalView			
Impact_NationalView			
Impact_IssueResolution			
and CBPs		Strictly private and confidential	December 2017 / 110

### Summary of Qualitative Responses

Type of Study	Observations/Feedback
Technical	<ol style="list-style-type: none"> <li>1. A strong policy of the government may be required for effective control of the AT&amp;C losses which continue to pose a big threat to the power sector.</li> <li>2. More emphasis should be given on un-metered Ag connections and improvement in losses.</li> <li>3. Push from Central Govt. for conducting/implementing the study on pilot basis in selected areas.</li> <li>4. It would be beneficial for the state if executing agencies can come and advise on how to go about the implementation.</li> </ol>
Consumer	<ol style="list-style-type: none"> <li>1. Other topics for the benefit of the consumers may be considered (supply code, performance standards, and improvements in current regulations, etc.)</li> </ol>
Renewable & DSM	<ol style="list-style-type: none"> <li>1. Implementation issues due to lack of suitable staff at SERC's; capacity building required with the medium of studies and greater involvement</li> <li>2. Direct help in preparation of Regulations</li> </ol>
Other Sector Reforms	<ol style="list-style-type: none"> <li>1. Recommendations to be more specific; enormous alternatives make the study more subjective and focus is lost.</li> <li>2. Recommendations more suited to big states</li> </ol>

[Back](#)

### Snapshots of Discriminant Analysis Outputs

Structure Matrix		
	Function	
	1	2
Effectiveness_National	.653 <sup>*</sup>	-.050
Effectiveness_Research	.520 <sup>*</sup>	.008
Effectiveness_Analysis	.437 <sup>*</sup>	-.094
Impact_NationalView	.426 <sup>*</sup>	-.079
Impact_Awareness	.407 <sup>*</sup>	.329
Effectiveness_Feasibility	.407 <sup>*</sup>	-.319
Impact_GlobalView	.394 <sup>*</sup>	.056
Impact_IssueResolution	.379 <sup>*</sup>	-.060
Effectiveness_State Suitability	.367 <sup>*</sup>	-.166
Relevance_SERCs Issues	.340 <sup>*</sup>	-.001
Effectiveness_International	.320 <sup>*</sup>	.242
Impact_Regulations	.318 <sup>*</sup>	.023
Effectiveness_Report Structure	.263 <sup>*</sup>	.073
Effectiveness_StakeholderConcerns	.262 <sup>*</sup>	.007
Relevance_Topics	.226 <sup>*</sup>	.050
Effectiveness_Technology	.226 <sup>*</sup>	.090

Functions at Group Centroids		
Over all	Function	
	1	2
3	-1.935	.567
4	.960	-.799
5	4.182	3.310

Unstandardized canonical discriminant functions evaluated at group means

[Back](#)**List of Respondents**

Region	State	Designation	Name
North	Haryana	Joint Director	Vikas Kadian
North	Himachal Pradesh	Secretary	Chaman Dila
North	Punjab	Joint Director	Harbinder Singh Bedi
North	Punjab	Deputy Director	Rajesh Gupta
North	Punjab	Director	Inder Mohan Singh
North	Uttarakhand	Secretary	Neeraj Sati
North	Uttarakhand	Director	Deepak Pandey
North	Uttar Pradesh	Deputy Director	SS Dhingra
Central	Chhattisgarh	Chairman	Narayan Singh
Central	Chhattisgarh	Director	SP Shukla
Central	Madhya Pradesh	Deputy Director	Ashok Upadhyay
East	Bihar	Secretary	Parmanand Singh
East	Bihar	Member	RK Choudhary
East	Jharkhand	Member	Rabindra Narayan Singh
East	Jharkhand	Secretary	Arvind Kumar Mehta
East	Orissa	Joint Director	Anil Kumar Panda

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
113[Back](#)**List of Respondents**

Region	State	Designation	Name
North East	Arunachal Pradesh	Secretary	Rakesh Kumar
North East	JERC (M&M)	Asst. Chief Engg.	H Thanthianga
North East	JERC (M&M)	Chief Engg.	Lalchharliana Pachau
North East	Nagaland	Asst. Engg.	Er. Hekavi Ayemi
North East	Nagaland	Secretary	W. Y. Yanthan
North East	Nagaland	Chairman	Er. Imlikumzuk Ao
North East	Sikkim	Asst. Director	Sonam Palzor
North East	Sikkim	Director	Jigme D Denjongpa
North East	Sikkim	Secretary	Karma Tenzing
North East	Sikkim	Chairman	NR Bhattarai
North East	Tripura	Chairman	Niharendu Chakraborty
North East	Tripura	Secretary	Er. Hare Krishna Das
West	Gujarat	Chairman	Anand Kumar
West	Maharashtra	Deputy Director	Sachin Bayas
West	Maharashtra	Director	Prafulla Shrihari Varhade
West	Maharashtra	Deputy Director	Ghanashyam Patil
South	Telangana	Joint Director	P.Sarada

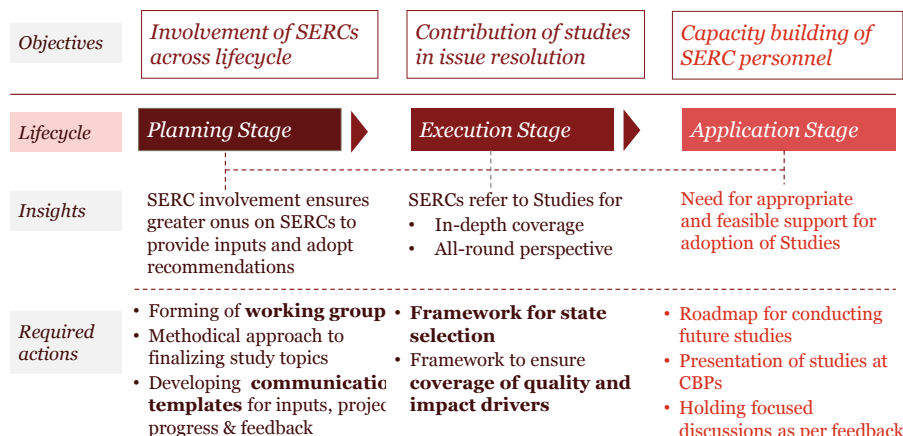
Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
114



Back

## Way Forward | Process Enhancement

Ensuring fulfilment of all key parameters across study lifecycle



Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
115

Back

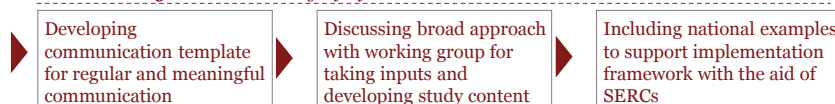
## Way Forward | Stakeholder Involvement

Involving SERCs at various stages to enhance state suitability

**Planning Stage** - Ensuring that adequate inputs are taken from SERCs



**Execution Stage** – Greater exchange of information



**Finalization and Application Stage** – Making it easier for states to adopt recommendations



Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
116

Back

## Way Forward | Value Enhancement

### Consistently enhancing value of each study

Continue improving on significant parameters

Relevance to state-level issues	Development of Study Content	Applicability of Studies
<ul style="list-style-type: none"> <li>Ensuring that most pressing issues are covered in upcoming studies</li> <li>Laggard states are targeted better in the studies</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring delivery on each relevant parameter</li> <li>Steps for better adoption and support required should be encapsulated</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring that immediate feedback post circulation of studies is acted upon</li> </ul>

Looking to add more value to studies to build more perspectives

Global Outlook	Incorporation of technology	Long-term relevance
<ul style="list-style-type: none"> <li><b>Relevant international case examples</b> to complement recommendations</li> <li><b>Mapping international cases</b> into Step-Jump-Leap scale of feasibility</li> <li>Learning from <b>other sectors</b> in global context</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring that <b>relevant and supporting technologies</b> are incorporated</li> <li><b>Key stakeholders in technology interventions</b> to be taken into consideration</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring sustainability of study recommendations:               <ul style="list-style-type: none"> <li><b>Alignment with larger vision</b> for the sector</li> <li><b>Flexibility</b> for varying regulatory changes/state conditions over 3-5 years</li> </ul> </li> </ul>

Back

## Way Forward | Process Enhancement

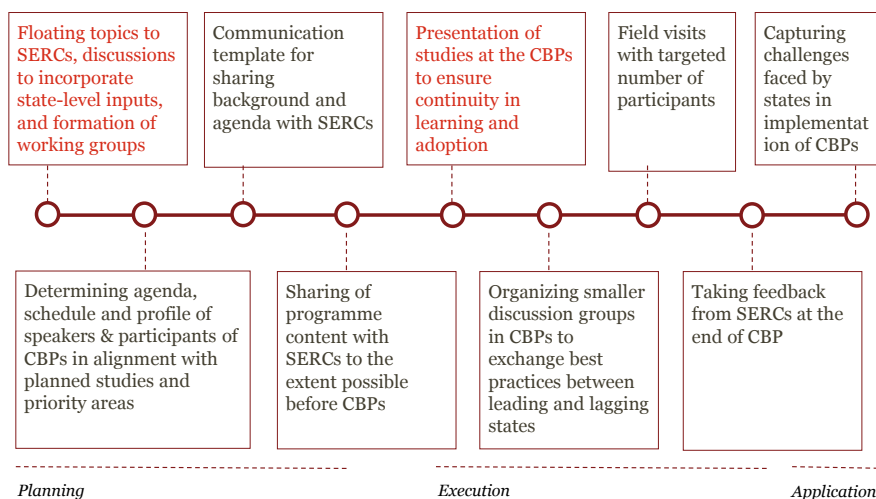
### Ensuring fulfilment of key parameters across the lifecycle of CBP

Objectives	Involvement of SERCs across lifecycle	Contribution of CBPs in issue resolution	Capacity building of SERC personnel
Lifecycle	Planning Stage	Execution Stage	Application Stage
Insights	Linkage between CBPs, FOR studies and pre and post CBP activities could be improved	Learning from CBPs <ul style="list-style-type: none"> <li>In-depth coverage</li> <li>All-round perspective</li> <li>Experiences of other states and discussion on new ideas</li> </ul>	SERC-specific issues (staffing, expertise, state issues) may be addressed as a follow up
Required actions	<ul style="list-style-type: none"> <li>Discussions with working group on               <ul style="list-style-type: none"> <li>Deciding topics for CBPs</li> <li>Profile of speakers &amp; participants</li> </ul> </li> <li><b>Communication template</b> for background, agenda, relevant material</li> <li>Timely feedback from SERCs</li> </ul>	<ul style="list-style-type: none"> <li>Additional <b>interactive sessions</b> and focused discussions</li> <li>Option of <b>field visits</b> to be floated early</li> <li>Framework to ensure coverage of quality and impact drivers</li> </ul>	<ul style="list-style-type: none"> <li>Interaction of lagging SERCs with FOR and relevant consultants on carrying forward CBP takeaways</li> <li>Capturing challenges faced and addressing them in subsequent Studies &amp; CBPs</li> </ul>
PwC			118

Back

## Way Forward | Stakeholder Involvement

*Involving SERCs at various stages to enhance state suitability*



## Classifying parameters | Group 1 (>3.5 rating)

Evaluation Criteria	Questions or Parameters	All	CBP-wise
Effectiveness	Were the concerns of all relevant stakeholders adequately addressed in the recommendations provided in the CBP?	✓	✓
Effectiveness	How would you rate the clarity, structure, and presentation of the CBP presentation/training material?	✓	✓
Effectiveness	How would you rate the time allocated for discussions/brainstorming by SERCs?	✓	✓
Effectiveness	How would you rate the incorporation of international case studies and best practices in strengthening the quality of analysis and recommendations in the CBP?	✓	✓
Impact	Did the CBP contribute in creating awareness and enhancing the knowledge base of SERC members?	✓	✓
Impact	Did the CBP contribute in providing a global viewpoint of the issues addressed?	✓	✓
Impact	Did the CBP contribute in providing a national viewpoint of the issues addressed?	✓	✓
Sustainability	Can the recommendations of the CBP withstand practical challenges in the future?	✓	✓

- Overall rating of impact and sustainability parameters commendable; increase in awareness of issues and a global outlook highly valued by SERCs

### **Classifying parameters | Group 1 (>3.5 rating)**

<b>Evaluation Criteria</b>	<b>Questions or Parameters</b>	<b>All</b>	<b>CBP-wise</b>
Relevance	Were the topics of the CBP relevant to the functions of the SERC?	✓	✓
Relevance	Were the topics of the CBP relevant to the crucial issues/challenges being faced by the SERC?	✓	✓
Efficiency	How would you rate the quality of coordination and logistical arrangements for organization of the CBP?	✓	✓
Efficiency	Was the time allocated to the CBP optimally scheduled and structured?	✓	✓
Efficiency	Was the right type of audience sought for the CBP?	✓	✓
Efficiency	How would you rate the suitability of speakers for the selected topics at the CBP?	✓	✓
Efficiency	How would you rate the quality of training material provided at the CBP?	✓	<3.5, Bar 9,8,5
Efficiency	How would you rate the performance of the knowledge partner in organizing the CBP?	✓	✓

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
121

### **Classifying parameters | Group 2 (>3, <3.5 rating)**

<b>Evaluation Criteria</b>	<b>Questions or Parameters</b>	<b>All</b>	<b>CBP-wise</b>
Efficiency	Were you adequately informed of the topics to be discussed at the CBP? (and material provided in advance as applicable)	✓	✓
Effectiveness	How would you rate the coverage of relevant content in the CBP?	✓	>3.5, Bar 8,5
Effectiveness	Were the CBP recommendations feasible for implementation?	✓	✓
Effectiveness	Were the CBP recommendations suitable to state-specific challenges?	✓	✓
Effectiveness	Were the CBP recommendations cost-effective?	✓	✓
Effectiveness	Did the CBP recommendations incorporate state-of-the-art technologies or innovations?	✓	✓
Effectiveness	How would rate the incorporation of national and state-specific case studies in highlighting prevalent issues in the CBP?	✓	>3.5 – 9,8 <3 – 5
Impact	Did the CBP contribute to formulation of subsequent regulations/orders/ guidelines/concept papers?	✓	✓
Sustainability	Would the SERCs require further support or intervention from FOR for implementation of the CBP recommendations?	✓	>3.5 – 9,5 <3 – 7

PwC

122

### **Classifying parameters | Group 3 (<3 rating)**

Evaluation Criteria	Questions	Grouping Criteria	
		All	CBP-Wise
Relevance	What was the level of involvement of the SERC in selecting the topics of the CBP?	✓	✓
Relevance	Were the SERCs resources/constraints considered before setting of topics of the CBP?	✓	✓
Relevance	Were the implementation challenges of the state considered before setting of topics of the CBP?	✓	✓
Effectiveness	What was the level of involvement of the SERC in providing inputs for preparation of the CBP presentation/training material?	✓	✓
Impact	Did the CBP contribute to actual resolution of prevalent issues in the state?	✓	>3, Bar 9th, 7 <sup>th</sup> , 6th

- Involvement in planning and execution stage of conducting CBPs perceived as a concern
- Low impact of scheduled CBPs on resolution of ground-level issues

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
123

[Back](#)

### **Summary of Qualitative Responses**

#### **6<sup>th</sup> CBP**

##### **Programme Content**

1. Pre-CBP material to be sent for better preparation of participants
2. International perspective to improve
3. Programme material to be better suited to participants
4. Larger discussions on balancing tariff recovery and performance monitoring
5. Training on basic issues as well for which SERC personnel need expertise

##### **Conduct of Sessions**

1. For internationally held CBPs, field visits along with the CBP and involving the country's regulator
2. Number of days can be increased for greater capacity building
3. More interactions for relevant topics
4. Dedicated session for brainstorming and discussions

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
124

[Back](#)

## Summary of Qualitative Responses

### 7<sup>th</sup> CBP

#### Programme Content

1. Pre-CBP material to be sent for better preparation of participants
2. Topic selection should involve SERCs and CBP participants
3. Legal and regulatory issues to be given more focus
4. Performance benchmarking may be considered on various parameters
5. Issue of SERC staffing and capabilities may be addressed
6. Training on basic issues as well for which SERC personnel need expertise

#### Conduct of Sessions

1. For internationally held CBPs, field visits along with the CBP and involving the country's regulator
2. Involving personnel from utilities

[Back](#)

## Summary of Qualitative Responses

### 8<sup>th</sup> CBP

#### Programme Content

1. More focus on South Asian regulatory models, in addition to model international models

#### Conduct of Sessions

1. For internationally held CBPs, field visits along with the CBP and involving the country's regulator
2. Number of days can be increased for greater capacity building

[Back](#)

## Summary of Qualitative Responses

### 9<sup>th</sup> CBP

#### Programme Content

1. Summary of latest developments in the power sector

#### Conduct of Sessions

1. Dedicated session for brainstorming and discussions
2. Participation of other relevant stakeholders (CERC, FOR, MoP etc.)
3. Field visits a must to complement CBPs
4. Involvement of the country's regulatory authority

[Back](#)

## List of CBP attendees

CBP	Dates	Location
6th Capacity Building Programme	9-15 Feb, 2014	IIT Kanpur, Bangkok
Name	Designation	Name of ERC
Sanjay Verma	Director (Tariff)	HERC
H.S. Bedi	Joint Director, Regulations	PSERC
L. Pachuaui	Chief Engineer	JERC (M&M)
H.S. Sheshadri	Deputy Director (Transmission)	KERC
K.L. Panda	Director (Engineering)	OERC
B.Jayasankar	Senior Economic Analyst	KSERC
Kalipada Bhar	Secretary	WBERC
R.K.Gupta	Director (L&R)	MPERC
Pankaj Sharma	Joint Director	HPERC
Abhishek Moza	Deputy Secretary	DERC
H.K.Das	Deputy Director (Technical & Tariff)	TERC
D.K.Sarmah	Joint Director (Tariff)	AERC
Surendra Singh	Deputy Director (Tariff)	CSERC
D. Ravichandran	Dy. Director (Engineering)	TNERC
Partha Sen	Deputy Chief (Finance)	CERC
Devendra Saluja	Deputy Chief (Engineering)	CERC
Abdul Hamid	Secretary	JKSERC
Arun Kumar Srivastava	Secretary	UPERC
Himanshu Khurana	Deputy Director (Technical)	RERC
K.Sreedhar Reddy	Deputy Director	APERC

[Back](#)**List of CBP attendees**

CBP	Dates	Location
7th Capacity Building Programme	28-30 Jan, 2015	IIT Kanpur
Name	Designation	Name of ERC
Prabhat Kishor Dimri	Director (Technical)	UERC
Parmanand Singh	Secretary	BERC
A.Srinivas	Secretary	APERC
Rakesh Negi	Deputy Director	HPERC
Rakesh Kumar	Secretary	Arunachal Pradesh ERC
Virinder Kumar Sarngal	Superintendent Engineer	JKSERC
Palcen Dorjee Chaktha	Director (Technical)	Sikkim ERC
Tapan Mahanta	Deputy Director (Engineering)	AERC
Himanshu Khurana	Deputy Director (Technical)	RERC
Kamlesh Dilliwar	Deputy Director (Engineering)	CSERC
Thiru E. Pugazhenth	Assistant Director	TNERC
Amit Bhargava	Director (Tariff)	UPERC
Antaryami Sahoo	Deputy Director (Tariff)	TSERC
Prashant Kumar	Joint Director (Tariff, Finance)	DERC

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
129[Back](#)**List of CBP attendees**

CBP	Dates	Location
8th Capacity Building Programme	18-20 Feb	Singapore
Name	Designation	Name of ERC
Prabhat Kishor Dimri	Director (Technical)	UERC
Parmanand Singh	Secretary	BERC
A.Srinivas	Secretary	APERC
Rakesh Negi	Deputy Director	HPERC
Rakesh Kumar	Secretary	Arunachal Pradesh ERC
Virinder Kumar Sarngal	Superintendent Engineer	JKSERC
Palcen Dorjee Chaktha	Director (Technical)	Sikkim ERC
Tapan Mahanta	Deputy Director (Engineering)	AERC
Kamlesh Dilliwar	Deputy Director (Engineering)	CSERC
Thiru E. Pugazhenth	Assistant Director	TNERC
Antaryami Sahoo	Deputy Director (Tariff)	TSERC
Prashant Kumar	Joint Director (Tariff, Finance)	DERC

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwCDecember 2017  
130



[Back](#)**List of CBP attendees**

CBP	Dates	Location
9th Capacity Building Programme	21-26 Nov, 2015	IIT Kanpur, Singapore
Name	Designation	Name of ERC
P.V.Sivaprasad	Director (Finance, Tariff)	KSERC
Priyabrata Pattanaik	Director (Regulatory affairs)	OERC
Jigme Dorjee Denzongpa	Director (Legal)	Sikkim ERC
Shailendra Saxena	Secretary	MPERC
Amit Bhargava	Director (Tariff)	UPERC
Prafulla Varhade	Director (Engineering)	MERC
Deepak Pandey	Director (Finance)	UERC
P.Sarada	Deputy Director	TSERC
Pardeep Chauhan	Deputy Director	HPERC
Villy Kaul	Deputy Secretary (Legal)	JKSERC
Surbhi Jain	Additional Director (Accounts)	HERC
Y.K.Nagaraja	Deputy Director (Generation)	KERC
Mukesh Wadhwa	Joint Director (Engineering)	DERC
Surobin Roy	Financial Analyst	CSERC
S.Anada	Joint Director (Technical)	GERC
A.V.Vaikunta Srinivasan	Assitant Director (Finance)	TNERC
L. Pachauu	Chief Engineer	JERC (M&M)

[Back](#)**List of respondents**

Region	State	Name	Designation	CBP attended
North	J&K	Villy Kaul	Addl. Secretary Law	9th
North	Uttar Pradesh	S	DD	9th
North	Uttarakhand	Deepak Pandey	Director Finance	8th
North	Delhi	Prashant Kumar	Jt. Director (Fin.)	8 <sup>th</sup> , 7th
North	Punjab	Harbinder Singh	Jt. Director (Reg.)	6th
Central	Chhattisgarh	Surobin Roy	Financial Advisor	9th
Central	Chhattisgarh	Kamlesh Dilliwar	Jt Director (Engg)	8th
Central	Chhattisgarh	SP Shukla	Director (Engineering)	5th
	Madhya			
Central	Pradesh	Ashok Upadhyay	Dy. Director (Gen.)	5th
North East	Nagaland	Hekavi N Ayemi	Asst. Engineer	9th
		Prafulla Shrihari	Director (Electrical	
West	Maharashtra	Varhade	Engineering)	9th
		A.V. Vaikunta	Assistant Director (Finance &	
South	Tamil Nadu	Srinivasan	Economic Analyst)	9th
South	Telangana	P.Sarada	Joint Director	8th
South	Karnataka	Sheshadri H.S.	Deputy Director	6th

## Survey Questions - Studies

Relevance					
1	2	3	4	5	6
Were the topics of the Studies relevant to the functions of the SERC?	What was the level of involvement of the SERC in selecting the topics of the Studies?	Were the topics of the Studies relevant to the crucial issues/challenges being faced by the SERC?	Were the SERC's resources/constraints considered before setting of topics of the Studies?	Were the implementation challenges of the state considered before setting of topics of the Studies?	Please rate the overall relevance of the Studies to the goals and functions of the SERC.
Relevance of Topics	SERCs Involvement	Relevance of SERC Issues	Consideration of SERC Resources	Consideration of SERCs Challenges	Overall Relevance

Efficiency		
7	8	9
Was the time allocated to the execution of the Studies adequate?	Did FOR communicate/seek inputs and feedback from the SERC for the execution of the Studies in a timely manner?	Please rate the overall efficiency in the conduct of Studies.
Adequate Time Allocation to Studies	Timely Communication from FOR	Overall Efficiency

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
133

## Survey Questions - Studies

Effectiveness						
10	11	12	13	14	15	
What was the level of involvement of the SERC in providing inputs for preparation of the Studies' content?	What was the extent/amount of feedback sought by FOR from the SERC for review and finalization of Studies?	Were the concerns of all relevant stakeholders adequately addressed in the recommendations provided in the Studies?	How would you rate the quality of analysis and insights in the Studies?	How would you rate the quality of research methodology adopted in the Studies?	Were the Studies' recommendations feasible for implementation?	
SERCs Involvement in Providing Inputs	SERCs Involvement in Finalizing Studies	Incorporating Stakeholder Concerns	Quality of Analysis	Quality of Research	Feasibility of Recommendations	
16	17	18	19	20	21	22
Were the Studies' recommendations suitable to state-specific challenges?	Were the Studies' recommendations cost-effective?	Did the Studies' recommendations incorporate state-of-the-art technologies or innovations?	How would you rate the clarity, structure, and presentation of the Study reports?	How would you rate the incorporation of international case studies and best practices in strengthening the quality of analysis in the Studies?	How would rate the incorporation of national and state-specific case studies in highlighting prevalent issues in the Studies?	Please rate the overall effectiveness of the Studies in contributing to the goals of the SERC.
State Suitability of Recommendations	Cost Effectiveness of Recommendations	Consideration of Technology Aspect	Report Structure and Clarity	Including International Cases	Including National Cases	Overall Effectiveness

## Survey Questions - Studies

Impact					
23	24	25	26	27	28
Did the Studies contribute in creating awareness and enhancing the knowledge base of SERC members?	Did the Studies contribute in providing a global viewpoint of the issues addressed?	Did the Studies contribute in providing a national viewpoint of the issues addressed?	Did the Studies contribute to formulation of subsequent regulations/orders/guidelines/concept papers?	Did the Studies contribute to actual resolution of prevalent issues in the state?	Please rate the overall impact of the Studies on the fulfillment of goals of the SERC.
Increase in Awareness	Enhancing Global View	Enhancing National View	Contribution to Regulations	Contribution to Issue Resolution	Overall Impact

Sustainability		
29	30	31
Would the SERCs require further support or intervention from FOR for implementation of the Studies?	Can the recommendations of the Studies withstand practical challenges in the future?	Please rate the overall sustainability of the Studies for the next 3-5 years.
Requirement of FOR interventions	Withstanding future challenges	Overall Sustainability

Impact Assessment of FOR Studies and CBPs Strictly private and confidential  
PwC

December 2017  
135

## Survey Questions - CBPs

Relevance					
1	2	3	4	5	6
Were the topics of the CBP relevant to the functions of the SERC?	What was the level of involvement of the SERC in selecting the topics of the CBP?	Were the topics of the CBP relevant to the crucial issues/challenges being faced by the SERC?	Were the SERCs resources/constraints considered before setting of topics of the CBP?	Were the implementation challenges of the state considered before setting of topics of the CBP?	Please rate the overall relevance of the CBP to the goals and functions of the SERC.
Relevance of Topics	SERCs Involvement	Relevance of SERC Issues	Consideration of SERC Resources	Consideration of SERCs Challenges	Overall Relevance

Efficiency							
7	8	9	10	11	12	13	14
How would you rate the quality of coordination and logistical arrangements for organization of the CBP?	Was the time allocated to the CBP optimally scheduled and structured?	Was the right type of audience sought for the CBP?	How would you rate the suitability of speakers for the selected topics at the CBP?	Were you adequately informed of the topics to be discussed at the CBP? (and material provided in advance as applicable)	How would you rate the quality of training material provided at the CBP?	How would you rate the performance of the knowledge partner in organizing the CBP?	Please rate the overall efficiency in the organization and conduct of the CBP.
Quality of CBP arrangement	Structuring and Scheduling	Suitability of attendees	Suitability of speakers	Adequate prior information	Quality of training material	Partner Performance	Overall Efficiency

## Survey Questions - CBPs

Effectiveness					
15	16	17	18	19	20
What was the level of involvement of the SERC in providing inputs for preparation of the CBP presentation/training material?	Were the concerns of all relevant stakeholders adequately addressed in the recommendations provided in the CBP?	How would you rate the coverage of relevant content in the CBP?	Were the CBP recommendations feasible for implementation?	Were the CBP recommendations suitable to state-specific challenges?	Were the CBP recommendations cost-effective?
SERCs Involvement	Stakeholder Concerns	Content Coverage	Feasibility of Recommendations	State Suitability of Recommendations	Cost effectiveness
Effectiveness					
21	22	23	24	25	26
Did the CBP recommendations incorporate state-of-the-art technologies or innovations?	How would you rate the clarity, structure, and presentation of the CBP presentation/training material?	How would you rate the time allocated for discussions/brainstorming by SERCs?	How would you rate the incorporation of international case studies and best practices in strengthening the quality of analysis and recommendations in the CBP?	How would rate the incorporation of national and state-specific case studies in highlighting prevalent issues in the CBP?	Please rate the overall effectiveness of the CBP in contributing to the goals of the SERC.
Technology Incorporation	Quality of Presentations	Time for Discussions	Including International Cases	Including National Cases	Overall Effectiveness

## Survey Questions - CBPs

Impact					
27	28	29	30	31	32
Did the CBP contribute in creating awareness and enhancing the knowledge base of SERC members?	Did the CBP contribute in providing a global viewpoint of the issues addressed?	Did the CBP contribute in providing a national viewpoint of the issues addressed?	Did the CBP contribute to formulation of subsequent regulations/orders/guidelines/concept papers?	Did the CBP contribute to actual resolution of prevalent issues in the state?	Please rate the overall impact of the CBP on the fulfillment of goals of the SERC.
Increase in Awareness	Enhancing Global View	Enhancing National View	Contribution to Regulations	Contribution to Issue Resolution	Overall Impact
Sustainability					
33	34		35		
Would the SERCs require further support or intervention from FOR for implementation of the CBP recommendations?	Can the recommendations of the CBP withstand practical challenges in the future?		Please rate the overall sustainability of the CBP for the next 3-5 years.		
Requirement of FOR Interventions	Withstanding future challenges		Overall Sustainability		

## Update on FOR Technical Committee on Implementation of Framework for Renewables at the State Level

DECEMBER 15<sup>TH</sup> , 2017  
62<sup>ND</sup> MEETING OF THE FORUM OF REGULATORS

NEW DELHI



केन्द्रीय विद्युत विनियामक आयोग  
CENTRAL ELECTRICITY REGULATORY COMMISSION



### FOR Technical Committee on Implementation of Framework on Renewables at State level

- Committee formed under chairmanship of Member CERC, Shri A.S. Bakshi
- Comprises Technical Members of State Commissions of RE rich states, viz.
 

Andhra Pradesh;	Rajasthan
Gujarat;	Tamil Nadu
Karnataka;	Madhya Pradesh
Maharashtra;	Telangana
- Committee's mandate\* is to ensure timely action by States on:
  - Deployment of Framework on Forecasting, Scheduling and Deviation Settlement of wind & solar generators;
  - Implementation of Availability Based Tariff (ABT) framework;
  - Introduction of Ancillary Services and Reserves;
  - Implementation of Automatic Generation Control (AGC) and primary control (\* mandate expanded subsequently)

## Key Initiatives by the Technical Committee

3

1. Report on Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST)
2. Model Framework for Forecasting, Scheduling and Deviation Settlement for RE sources at the State level
3. Model Deviation Settlement Mechanism (DSM) Regulations
4. Development of Generic RPO Webtool & Model RPO Regulations
5. Sub-group on Regional Co-operation for optimum utilization of Generation Resources
6. Report on roll-out of Smart Meters
7. Model Regulations for Intra-State Hydro Generating Stations
8. Sub-group on Introduction of 5-minute Time Block

## Modus Operandi of the Technical Committee

4

- Visits to six member States since inception
  - Senior officers of respective State SLDC, Discoms, TRANSCO, etc. are invited
  - In-depth analysis of status of host state w.r.t. critical regulatory frameworks such as DSM and SAMAST, in addition to hydro resource utilization, load forecasting, etc.
  - Sharing of experiences and best practices among the States
  - Participants from other states of the respective region
  - Consultant to the Committee assists States in drafting DPR & Regulations
- Renewed vigour at State level to fast-track execution of Committee's recommendations is critical*

## (1) SAMAST: Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST) Report

5

- Sub-Committee constituted at 2<sup>nd</sup> meeting of Technical Committee
  - Survey of prevailing infrastructure and procedures in 28 States, one-on-one interaction with SLDCs of 13 States
- SAMAST is the building block for advancing States towards intra-state grid discipline, smooth inter-State transactions, integration of renewables, etc.
- SAMAST report encompasses following requirements for implementation:
  - Hardware, including metering
  - IT infrastructure
  - Communication systems
  - Energy Accounting system and Settlement procedures
  - State Regulatory Pool Account
  - Human resources
  - Governance structures

## Update on implementation of SAMAST

6

- Model DPR and Model Implementation Roadmap shared
- FOR endorsed the 'Report on SAMAST' at 55<sup>th</sup> meeting (22<sup>nd</sup> Jul 2016)
- So far **only 5 States** have submitted final DPRs, and 6 States are in the process of finalizing the DPR.
- Part funding sought & sanctioned from Power System Development Fund (PSDF)
  - Madhya Pradesh      Rs. 3.6 Cr
  - Rajasthan            Rs. 11.86 Cr
  - Tamil Nadu          Rs. 11.98 Cr
  - AP & Telengana submitted DPR for financial support, under approval
  - Update for some other States can be found [here](#)
- ALL other States urged to – 1) create group to drive implementation of SAMAST- representatives from SLDC, concerned RLDC & RPC; (2) fast-track preparation of DPR and subsequent activities

## (2) State level F&S Framework on Renewables

7

- FOR endorsed Model Regulations for State Level Forecasting & Scheduling Framework, as prepared by FOR Secretariat, at the 50<sup>th</sup> FOR Meeting (30.9.15)
- Critical for ensuring grid discipline of RE generators & robust management of variable RE power by SLDCs.
- Technical Committee deliberated upon the Framework in detail. At the 6<sup>th</sup> meeting of the Committee (held 22<sup>nd</sup> Aug 2016), consensus was reached on following key aspects:
  - Qualified Coordinating Agency (QCA)
  - Operationalization of Virtual Pool and de-pooling mechanism
  - Funding the deficit in State Imbalance Pool
  - Mechanism for DSM for inter-state transactions of embedded entities
  - Metering arrangement
- Key Highlights of the Model Regulations can be found [here](#)

## Status Update on implementation of the RE Framework at the State level

8

### Current Status:

- Final Regulations issued by 7 SERCs/JERC
  - Andhra Pradesh
  - Chhattisgarh
  - Jharkhand
  - Karnataka
  - Rajasthan
  - Tripura
  - JERC of Mizoram and Manipur
- Draft Regulations issued by 5 SERCs
  - Gujarat
  - Maharashtra
  - Madhya Pradesh
  - Odisha
  - Tamil Nadu
- Comparison of F&S Regulations of selected Member States vis-à-vis FOR Model Regulations can be find [here](#)



### (3) Model Deviation Settlement Mechanism (DSM) Regulations

9

- To facilitate scheduling, energy accounting and deviation settlement of all grid-connected entities (buyers & sellers), while ensuring intra-state grid discipline. *Critical for States to know which entity causes deviations to what extent.*
- Model Regulations agreed in principle at the 8<sup>th</sup> meeting of the Committee held on 2<sup>nd</sup> Dec 2016.
- FOR endorsed the Regulations at its 57<sup>th</sup> Meeting held on 16<sup>th</sup> Dec 2016: [http://www.forumofregulators.gov.in/Data/Working\\_Groups/DSMR.pdf](http://www.forumofregulators.gov.in/Data/Working_Groups/DSMR.pdf)
- States update:
  - Chhatisgarh has notified Intra-state ABT and DSM Regulations on 7<sup>th</sup> Nov 2016
  - Uttarakhand notified DSM Regulations on 6<sup>th</sup> Feb 2017
  - Tamil Nadu , Haryana are currently working on state-level DSM Regulations
- Key Highlights of the Model DSM Regulations can be found [here](#)

### (4) Development of Generic RPO Web-tool & related Regulatory Requirements

10

- SNAs are responsible for RPO compliance & monitoring
- Weak enforcement of RPO due to several reasons, inter-alia an inefficient monitoring framework
- Most States using tedious manual or excel based reporting; insufficient reporting of non-compliance
- A web enabled tool for all OEs can enable easy reporting and monitoring and ensure transparency at the State level.
- RPO compliance monitoring web-tool developed for Rajasthan, under USAID/PACE-D program- presented to FOR in Nov 2016
- FOR referred to Technical Committee for scaling up and generalisation of the web-tool for other States

# Development of Model RPO Regulations & related Regulatory Requirements

11

Regulatory interventions required for rolling out the web tool for monitoring compliance of RPO, as accepted by the Committee:

Mandatory RPO Compliance	Appropriate provisions in RPO Regulations for mandating RPO compliance reporting through the web portal
RPO Calculations	For Distribution Licensee, RPO target percentage shall be computed after grossing up the T&D losses i.e. Input Energy. For other Obligated Entities, RPO target percentage shall be applicable on the actual Electricity Consumption recorded at Drawl point or Consumption point.
Rooftop Solar Projects for RPO	Credit the generation (Gross) from Rooftop Solar Projects to the DISCOMs for their Solar RPO (if the consumer is not an obligated entity), as well as changes required in the RPO/Net Metering Regulations
Amendments in RPO Regulations	SERCs have been advised to incorporate suitable amendments in their RPO Regulations

# Current status and next steps

12

- Generic RPO web-tool developed and configured for Gujarat
- RPO web-tool for Rajasthan launched on 27<sup>th</sup> Nov 2017
- Strong interest expressed by AP
- National-level RPO tool as prepared by TERI at the behest of MNRE has been implemented for Chhattisgarh & Maharashtra
- Decision to roll-out National-level RPO tool to ALL states; data integration with Generic RPO web-tool complete
- Way forward:
  - Modifications to State RPO Regulations to enforce the web-tool
  - Constitution of coordination committee- State Nodal Agency (SNA), State Commission, SLDC, Electrical Inspectorate and Distribution Utilities
  - Communication to the obligated entities

## (5) Sub-group on Regional Cooperation for Optimum Utilization of Generation Resources

13

- Increasing penetration of VRE needs sharing of generation resources across States for balancing purposes
- Sub-group constituted comprising of stakeholders from Northern, Western and Southern Region, headed by Member Secretaries of respective RPCs
- Mandated to examine feasibility and modality of co-operation for ensuring optimum utilization of generation resources.
- RPCs convened various meetings in respective regions
- Meeting of the Heads / Representatives of the Sub-Groups convened on 18<sup>th</sup> Aug 2017 at CERC. Following emerged during the meeting:
  - States unwilling to cooperate with other States on “cost” basis, eg valuing pumped hydro resources.
  - Some Regions predominantly “surplus” in power, leaving little scope for cooperation within region. This necessitates national level framework / product for optimum resource utilization.
  - Inter-state transactions need to be enabled closer to real-time => new intra-day market products at the national level are needed.
  - Various options for intra-day transaction of power between States are discussed [here](#)

## (6) Report on roll-out of Smart Meters

14

Tariff Policy 2016 mandates introduction of Smart Meters. Section 8.4.3 of the Tariff Policy has been reproduced below:

*“The Appropriate Commission may provide incentives to encourage metering and billing based on metered tariffs, particularly for consumer categories that are presently unmetered to a large extent. The metered tariffs and the incentives should be given wide publicity. Smart meters have the advantages of remote metering and billing, implementation of peak and off-peak tariff and demand side management through demand response. These would become essential in future for load-generation balancing due to increasing penetration of intermittent type of generation like wind and solar power.*

***Appropriate Commission shall, therefore, mandate smart meters for:***

***(a) Consumers with monthly consumption of 500 units and more at the earliest but not later than 31.12.2017;***

***(b) Consumers with monthly consumption above 200 units by 31.12.2019.***

*Further, two way smart meters shall be provided to all prosumers, who also sell back electricity to the grid as and when they require.”*

## Report on Smart Meters examines many aspects

15

- Technical Committee was assigned to study advantages, costs, technical feasibility and total requirement of smart meters and provide suitable recommendations
- Discussions with various meter manufacturers, ISGF, DISCOMs and Industry Experts were held. Following points were noted:
  - ~5 crore consumers have consumption of more than 200 units/month.
  - Total numbers of installed meters in the country ~ 25 crores
  - With indigenous manufacturing capability of ~2.5 crore meters/year, total time required to replace all the meters will take about 3-10 years including communication infrastructure
- Based on the discussions, CERC team prepared a report on **“Proposed implementation plan for roll out of Smart Meters”**
- Report includes detailed analysis of various aspects of such a roll-out:
  - Features of Smart Meters;
  - Provision of Time of Use Tariff;
  - Benefit to Consumers & Utilities;
  - Estimated Cost;
  - Financing options;
  - Total Requirement, etc.

## Findings & next steps

16

- Important conclusions of the Report are as below:
  - Installation of smart meters may be taken up in phased manner following a systematic and pragmatic approach
  - Few pilots may be conducted initially to establish cost benefits such as reduction in AT&C losses or overall reduction in tariff before taking up large scale roll out
  - Appropriate view regarding full scale roll out could be taken based on results of such pilots
  - Dynamic pricing by way of Time of use or Time of Day tariff may be introduced
  - As a start, Remote connect/disconnect and load management may be disabled for small consumers consuming less than 500 units
- Report was presented at the 15<sup>th</sup> Meeting of the Technical Committee (30<sup>th</sup> Oct. 2017). Committee members unanimously agreed to the findings of the report
- Letter sent to MoP to include recommendations during planning for deployment of smart meters by the Government

## (7) Model Regulations for Intra-State Hydro Generating Stations

17

- Hydro generation an important source of flexibility to manage challenges of large scale renewable integration into the grid
- In June 2017, POSOCO released Report on “Operational Analysis for Optimization of Hydro Resources & facilitating Renewable Integration in India”
- Key observations of this report:
  - Many existing hydro generating stations can achieve better peaking capability, while honouring associated hydrological constraints & obligations of flood control, drinking water supply & irrigation requirements
  - CERC regulated hydro power stations are providing better peaking compared to intra-state-hydro power stations
  - CERC Regulations have provisions for two-part tariff where-in flexibility services like daily peaking capability & annual mechanical availability of units have been linked to recovery of capacity charge

## Evolution of Model Regulations for Hydro

18

- At the 13<sup>th</sup> Meeting of the Technical Committee, POSOCO presented on ‘Optimization of Hydro resources’. Key highlights:
  - Hydro total installed capacity ~45 GW, about 16 GW are ISTS projects and balance within the States
  - With optimum utilization, hydro can be significantly used for peaking demand
  - Can enhance PLF of thermal plants by ensuring hydro plants are not run during off-peak hours
  - States are also required to adopt aforementioned CERC principles in the state-level hydro tariff regulations
- At the 14<sup>th</sup> meeting, POSOCO presented the Model Regulations. Same were endorsed by the Committee and recommended for consideration by FOR
- Model Regulations were endorsed in principle by FOR at the 61st FOR Meeting held on 22<sup>nd</sup> Sept 2017
- Key Highlights of the Model Regulations are as [here](#).

## (8) Sub-group on Introduction of 5-minute Time Block

19

- Tertiary reserves ancillary services implemented at ISTS level - actions at power plant happen 16-30 mins after instruction by NLDC
- Secondary regulation services through Automatic Generation Control (AGC) soon expected- necessitates moving to 5-minute settlement (atleast for plants under AGC)
- 5-minute scheduling and settlement offers many advantages- reduction of requirement of reserves, more accurate ramping estimates, creating value for flexibility, lowering of overall system costs, etc.
- Sub-group constituted comprising CEA, CTU, RPCs, POSOCO and CERC- to prepare a roadmap for implementation (including requirements for infrastructure, standards and regulations)

## Advantages of moving to 5-minute time-block

20

- **At the meetings of the sub-group, following was deliberated:**
  - Need to move to “fast” markets is recognized
  - 5-minute scheduling & settlement and earmarking of the reserves are interwoven processes
  - 5-minute bidding in OTC/PX markets would lead to more efficient price discovery
  - 5-minute DSM prices would be a vital indicator for imbalance handling caused especially by renewable generation
  - Provisions for 5-minute may be made mandatory for future procurement of meters
  - Requirement of amendments in the CEA Metering Standards
- **Pilot of 5-minute meters:**
  - 5-Minute Meter testing was conducted, witnessed jointly by representatives of POSOCO (NLDC, WRLDC), POWERGRID, Gujarat SLDC and Meter Manufacturers
  - Sub-group agreed that, on a pilot basis, 5-minute capable meters may be installed at 4-5 locations in each Region to gain practical experience

# Way Forward

21

- Technical Committee is now a Standing Committee of the FOR, for on-going support to States on technical matters
- Every State must
  - undertake implementation of SAMAST report recommendations on an urgent basis
  - put in place DSM Regulations for all grid-connected entities and Forecasting/Scheduling Framework for RE sources
  - coordinate implementation of RPO web-tool for ease of reporting and compliance monitoring, along with amendments to RPO Regulations
  - lay down an enabling framework for balancing of variable RE power, through introduction of Ancillary Services and intra-day trading
  - evolve Hydro Regulations for better utilization of hydro stations for peaking

22

## THANK YOU

**FOR QUESTIONS, PLEASE WRITE TO:**  
**JCRA@CERCIND.GOV.IN**  
**SMDEORAH@CERCIND.GOV.IN**

# Update on implementation of SAMAST

23

• Update on Other States:

State (Status Date)	Activities
Assam (23 <sup>rd</sup> Oct 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification &amp; Demarcation of Intra-State Entities,</li><li>• Assessment of meters, IT Infrastructure</li><li>• Draft DPR Prepared and placed for board approval</li></ul>
Bihar (14 <sup>th</sup> Dec 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification &amp; Demarcation of Intra-State Entities,</li><li>• Assessment of meters, IT Infrastructure</li><li>• Provisional DPR Prepared</li></ul>
Chhattisgarh (3 <sup>rd</sup> Nov. 2016)	Following activities in process: <ul style="list-style-type: none"><li>• Notification of Intra-State ABT including RE generators is in process</li><li>• System up gradations would be in line with the recommendations of SAMAST report</li></ul>
Haryana (5 <sup>th</sup> Dec 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification &amp; Demarcation of Intra-State Entities,</li><li>• Assessment of meters &amp;, IT Infrastructure</li><li>• Draft DPR prepared and placed for board approval</li></ul>
Odisha (9 <sup>th</sup> Oct 2017)	Following activities have been completed and some are in process <ul style="list-style-type: none"><li>• Identification &amp; Demarcation of Intra-State Entities,</li><li>• Assessment of meters, AMR Logistics requirements (under approval stage), IT Infrastructure</li><li>• Preparation of DPR in process</li><li>• State Power Committee not in place</li><li>• Proposal for funding for implementation of ADMS at SLDC from PSDF placed before NLDC</li><li>• DSM/Pool Accounted created</li><li>• Required IT infrastructure in place</li></ul> Most of the other recommended activities are also in implementation & approval stage

# Update on implementation of SAMAST

24

• Update on Other States:

State (Status Date)	Activities
Punjab (7 <sup>th</sup> Sept 2017)	<ul style="list-style-type: none"><li>• Roadmap for SAMAST implementation for Punjab and steps for DPR preparation deliberated.</li><li>• Meetings with STU/SLDC are being convened to initiate the work of Preparation of DPR for SAMAST implementation in Punjab</li></ul>
Uttar Pradesh (28 <sup>th</sup> Sept 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification of Intra-State Entities</li><li>• Demarcation of boundaries for Intra-State Entities.</li><li>• Assessment of meters &amp;, IT Infrastructure</li><li>• State Power Committee formed, yet to functionalized</li><li>• DSM Pool A/ C opened</li></ul>
Uttarakhand (2 <sup>nd</sup> Nov 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification of Intra-State Entities</li><li>• Demarcation of boundaries for Intra-State Entities.</li><li>• Assessment of meters &amp;, IT Infrastructure</li></ul> Working Group has been formed and held 2 meetings so far for implementing activities of Intra State ABT and DSM along with recommendations of SAMAST report.
West Bengal (5 <sup>th</sup> Dec 2017)	Following activities have been completed: <ul style="list-style-type: none"><li>• Identification of Intra-State Entities</li><li>• Demarcation of boundaries for Intra-State Entities.</li><li>• Assessment of meters &amp;, IT Infrastructure</li><li>• Draft DPR prepared and placed for board approval</li></ul>

[<<Back](#)



## F&S Model Regulations – Key Highlights

25

- Applicability - All wind and solar generators connected to the State grid
  - a. regardless of date of commissioning,
  - b. including those connected via pooling stations
  - c. selling power within or outside the state
- To provide day-ahead and week-ahead schedule
- Revisions can be made on 1.5 hours basis, up to a maximum of 16 revisions/day
- Payment as per actual generation
- Deviation charges are a function of the error % as calculated for every time-block:
- $\text{Error} = 100 \times (\text{Actual Generation} - \text{Scheduled Generation}) / \text{Available Capacity}$
- Deviation Band & Charges:

### Existing Generators

Deviation/Error	Charges per unit
<b>Within +/- 15%</b>	No Penalty
<b>From 15% to 25%</b>	□ 0.50
<b>From 25% to 35%</b>	□ 1.00
<b>Greater than 35%</b>	□ 1.50

### New Generators

Deviation/Error	Charges per Unit
<b>Within +/- 10%</b>	No Penalty
<b>From 10% to 20%</b>	□ 0.50
<b>From 20% to 30%</b>	□ 1.00
<b>Greater than 30%</b>	□ 1.50

[<<Back](#)

## Comparison of F&S Regulations: selected Member States vis-à-vis FOR Model Regulations

26

S. No.	Particulars	FOR Model F&S	APERC (final)	KERC (final)	RERC (final)	MPERC (draft)	TNERC (draft)
1	Applicability	Wind and solar generators selling power within or outside the state	Wind and solar generators selling power to discoms/third party sale/captive consumption through OA within or outside the state	Wind generators combined capacity 10 MW and above. Solar generators capacity 5 MW and above within or outside the state	Wind and solar generators selling power to discoms/third party sale/captive consumption through OA: >5MW connected to state grid	Wind and solar generators selling power within or outside the state	Wind and solar generators (excluding Rooftop PV Solar Projects) selling power within the state
2	Forecasting Responsibility	Wind and solar generator or by QCA Or forecast by SLDC to be accepted	Wind and solar generator or by QCA Or forecast by SLDC accepted	Wind and solar generator or QCA or aggregator Alternatively through REMC	Wind and solar generator or by QCA Or forecast by SLDC accepted	Wind and solar generator or by QCA Or forecast by SLDC accepted	Wind and solar generator or by QCA Or forecast by SLDC accepted
3	Scheduling Requirement	Weekly and day-ahead with maximum 16 revisions during a day	Weekly, day-ahead and intra-day with maximum 16 revisions during a day for wind and max. 9 revision for solar	Weekly, day-ahead and intra-day with maximum 16 revisions during a day	Weekly and day-ahead with maximum 16 revisions during a day	Weekly and day-ahead with maximum 16 revisions during a day	Weekly and day-ahead with maximum 16 revisions during a day

# Comparison of F&S Regulations (contd...)

27

S. No.	Particulars	FOR Model F&S	APERC (final)	KERC (final)	RERC (final)	MPERC (draft)	TNERC (draft)																																																																														
4	Computati on of Error Formula	Available Capacity in denominator	Available Capacity in denominator	Available Capacity in denominator	Available Capacity in denominator	Available Capacity in denominator	Available Capacity in denominator																																																																														
5	Tolerance Band for DSM	10% new wind and solar generator. < = 15% existing wind and solar generator	± 15% for wind and solar generators	± 15% for wind and solar generators	± 15% for wind and solar generators	< = 10% new wind and solar generator , < = 15% existing wind and solar generator	± 10% for wind & solar generators.																																																																														
6	Charges	<div>Existing Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table> <div>New Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per Unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table>	Deviation/Error	Charges per unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	Deviation/Error	Charges per Unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	<div>Existing Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table> <div>New Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per Unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table>	Deviation/Error	Charges per unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	Deviation/Error	Charges per Unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	<div>Existing Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table> <div>New Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per Unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table>	Deviation/Error	Charges per unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	Deviation/Error	Charges per Unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	<div>Existing Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table> <div>New Generators:</div> <table><tr><th>Deviation/Error</th><th>Charges per Unit</th></tr><tr><td>Within +/- 25%</td><td>No Penalty</td></tr><tr><td>From 25% to 25%</td><td>₹ 0.50</td></tr><tr><td>From 25% to 25%</td><td>₹ 1.00</td></tr><tr><td>Greater than 25%</td><td>₹ 1.50</td></tr></table>	Deviation/Error	Charges per unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50	Deviation/Error	Charges per Unit	Within +/- 25%	No Penalty	From 25% to 25%	₹ 0.50	From 25% to 25%	₹ 1.00	Greater than 25%	₹ 1.50
Deviation/Error	Charges per unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per Unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per Unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per Unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
Deviation/Error	Charges per Unit																																																																																				
Within +/- 25%	No Penalty																																																																																				
From 25% to 25%	₹ 0.50																																																																																				
From 25% to 25%	₹ 1.00																																																																																				
Greater than 25%	₹ 1.50																																																																																				
7	Reference point for DSM	Pooling station	Pooling station	Pooling station/ Aggregator Level	Pooling station	Pooling station	Pooling Station																																																																														

<<Back

<<Back

# DSM Model Regulations – Key Highlights

28

- Applicability - Seller(s) and Buyer(s) involved in STOA/MTOA/LTA in intrastate transmission or distribution of electricity (including inter-state wheeling of power)
- Deviation (Each 15 minute):

Seller	Buyer
Actual Injection - Scheduled generation	Actual Drawl - Scheduled Drawl

- Charges payable (overdrawal/under-injection) and receivable (under-drawal/over-injection) for each time-block
- Deviation Charges:

Deviation Charges for each 0.01 Hz Step		
Frequency Range	50.05 - 50.0 Hz	50.0 - 49.8 Hz
Charges	50 Paise/kWh	27.50 Paise/kWh

- Volume Cap: 150 MW or 12% of Schedule (Different caps for RE Rich States)
- No over-drawal/under-injection when Frequency below 49.7 Hz

# DSM Model Regulations – Key Highlights

29

- Change in sign of deviation once every 6 time blocks- violation attracts additional charges @10% of deviation charges
- Capping of Deviation Charges: Generating Stations ( using Coal, Lignite or Gas supplied under APM) regulated by SERC - Cap Rate of Paise 303.04/ unit
- Infirm Power Price:

Source	Price/Unit (Paise)
Coal/Lignite/Hydro	178
APM Gas	282
Imported Coal	303
RLNG	824

Allowed upto 6 months or as allowed by Commission

- State Deviation Pool Account to be operated by SLDC , review by SPC

[<<Back](#)

# Various options exist for intra-day transaction of power between States

30

Various options for inter-State trade of power, as presented by Dr. Chatterjee\*:

S.No.	Options	Pros	Cons
1	Banking - Excess Power is banked with another State in regional grid and utilized back when required	- Voluntary; - No price transaction; - Easy to implement	- Still bilateral - Opaque to cheaper options; - True marginal cost of meeting demand not known; - Elements of Cost and Value missing; - No knowledge of gain or loss
2	Day Ahead Market Price on Power Exchange as reference	- Well accepted reference price; - Dispute free	- Very remote chance of availability of generation sources with marginal cost equal to or less than DAM price; - Liquidity will always be an issue
3	Pool based on variable cost as approved by the Regulator and on Payment of cost	- Visibility of all options for purchase decision; - Dispute free as regulator approved VC; - All resources get paid as per their cost or MC; - Improvement over option 2, liquidity	- Still based on cost and not on value; - VC difficult to ascertain; - Merchant plants can't participate (tariffs not determined by regulator )
4	Pool based on variable cost as approved by the Regulator and on payment of marginal cost	- Same as Option 3; - Improvement over Option 3 – element of 'value' introduced because of marginal cost based payment	- VC difficult to ascertain; - Merchant plants can't participate ; - Payment based on marginal cost may lead to heart burn; - Still administered
5	Pool based on auction (intra-day for the rest of the day)	- Market Discovered Price; - Dispute free; - Not administered; - Akin to DAM but closer to real time	- Preparedness of RPC or PX; - Discoms decision making process; - OA registry, a pre-requisite
6	Pool based on auction (hourly)	- Market Discovered Price; - Dispute free; - Not administered; - Akin to DAM but closer to real time	- Preparedness of RPC or PX; - Discoms decision making process; - OA registry, a pre-requisite
7	Pool based on auction (intra-hour i.e. 15 min. block)	- Market Discovered Price; - Dispute free; - Not administered; - Akin to DAM but closer to real time	- Preparedness of RPC or PX; - Discoms decision making process; - OA registry, a pre-requisite

**NRPC, WRPC & SRPC have recommended Option #5 as a starting point**

[<<Back](#)

\* views were personal

## (8) Model Regulations for Intra-State Hydro Generating Stations: Key Highlights

31

### • Model Regulations – Key Highlights:

Annual Fixed Charges (AFC) comprise of	<ul style="list-style-type: none"> <li>-Return on Equity</li> <li>-Interest on Loan</li> <li>-Interest on Working Capital</li> <li>-Depreciation</li> <li>-Operation &amp; Maintenance Expense</li> </ul>
Return on Equity	<ul style="list-style-type: none"> <li>-15.5% for RoR (Run of River) Hydro Plants</li> <li>-16.5% for Storage &amp; Pumped Storage Type Plants</li> <li>-Additional 0.5% for timely completion</li> <li>-1% deduction in case of commissioning without peaking/ FGMO /PSS /Communication /Blackstart /Synchronous Condenser facility wherever applicable</li> </ul>
Annual Fixed Cost recovery through Two-Part tariff	<ul style="list-style-type: none"> <li>-Capacity Charge (50% of AFC); PAF (Plant Availability Factor) to be more than or equal to NAPF (Normative Plant Availability Factor)</li> <li>-Energy Charge (50% of AFC, Energy rate computed by using Design Energy)</li> </ul>
Submission of Undertaking prior to COD	<ul style="list-style-type: none"> <li>-Successful trial operation for 12 hours</li> <li>-Black Start Capability</li> <li>-Islanded Operation / House load operation</li> <li>-Dead bus charging and line charging capability</li> <li>-Auto synchronization</li> <li>-Peaking Capability (110 %)</li> <li>-Dynamic VAR support as per the capability curve</li> <li>-Frequency Response (Primary &amp; Secondary)</li> <li>-Synchronous Condenser Mode of Operation wherever applicable</li> <li>-Pumped Mode of Operation wherever applicable</li> <li>-Part-load operation</li> <li>-Ramp-up capability</li> <li>-Ramp-down capability</li> <li>-AVR and Power System Stabilizer wherever applicable</li> </ul>

## Key Highlights (contd...)

32

### • Model Regulations – Key Highlights:

Scheduling	<ul style="list-style-type: none"> <li>-By 0600 Hrs, Submission from Station to SLDC for next day</li> <li>-By 0800 hrs: Entitlement of beneficiaries as per allocations</li> <li>-By 1000 hrs: Requisition in the Station by beneficiaries</li> <li>-By 1200 hrs: Optimized Injection Schedule for the Station and the drawal schedule of the beneficiaries from the Station</li> </ul>
Synchronous Condenser Operation	<ul style="list-style-type: none"> <li>-Demonstration of Synchronous Condenser Mode of Operation (SCMO) at-least once in a calendar month as per SLDC instructions</li> <li>-Active power drawn during SCMO to be socialized and included in pooled transmission loss by the SLDC during preparation of state energy accounts</li> <li>-VARh exchange payable @ 25 p/kVARh subject to periodic review by the Commission</li> </ul>
Blackstart	<ul style="list-style-type: none"> <li>-Demonstration of Blackstart at least once every year</li> <li>-Testing of Diesel Generator sets (BSDG) for black start on weekly basis</li> <li>-Fuel stock (useable under black out conditions) to be maintained in sufficient quantity to operate at full for a minimum of 20 hours and/or at 50% of accredited capacity for 40 hours</li> <li>-Reimbursement of O&amp;M expenses incurred during Blackstart</li> <li>-Lumpsum incentive of Rs. 0.5 Lakh for successful demonstration of Blackstart capability by the Station subject to certification by the SLDC</li> </ul>

[<<Back](#)



## 62<sup>th</sup> Forum of Regulators Meeting

### Presentation on the Report of Working Group on Open Access

15.12.2017

New Delhi

## Background



- \* Constituted after discussion on the issue in 55<sup>th</sup> FOR meeting.
- \* Composition: CERC, RERC, AERC, GERC, MERC, TNERC, WBERC, PSERC, CSERC.
- \* Objective: examination of Tariff and Non-tariff barriers for Open Access, Impact on revenue of Discoms, Captive Rules and its impact, recommendation.

# Issues



- \* **Tariff Barriers:**
- \* **Open Access Charges:** though Open Access charges has been mandated in Electricity Act. However applicable [Open Access Charges](#) creates hurdles in competitive rates for open access consumers.
- \* **Cross Subsidy Surcharges:** Cross subsidy surcharges determined by SERCs is applicable to the OA Consumers either taking power through Intra-state or inter-state. [CCS prevailing in States](#)

3

## Issues Cont.. Tariff Barriers



- \* **Additional Surcharges:** In spite of fixed cost of is recovered by way of wheeling charges, an additional surcharges towards fixed cost of Discoms of arising out of his obligation to supply power.
- \* [Prevailing Additional Charges](#)

4

## Non Tariff Barriers



- \* Special Condition imposed on consumers connected through grid like in State of Haryana, Uttarakhand, Punjab, Delhi and Telangana.
- \* Operational constraints due to issues related to scheduling power through OA have also been imposed by SERCs.
- \* Cost implication due to infrastructure requirement i.e. ABT Meters etc.
- \* Invoking Section 11 of Electricity Act, 2003

5

## Financial impact on Discoms



- \* Shifting of Industrial and Commercial Consumers.
- \* Exemption of Renewable Sources from wheeling and CSS.
- \* The Truing up exercise also has significant impact on Actual Cost of Supply (ACOS) as the cost incurred changes during truing up.
- \* Other Operational issues i.e. issues in managing the peak load, due to granting partial open access.

6



## Captive Generation and its Impact on Discoms

- \* Rule 3 of the Electricity Rules, 2005: only unit or units identified for Captive use are required to fulfill the condition of Rule 3.
- \* Various Capital structure have been involved taking benefit of the condition of Captive Generating Station. i.e. 51% consumption and 26% Capital involvement.

7



## Consultation Paper from Ministry of Power

1. **Frequent shifting of Open Access Consumers-** DISCOMs unable to procure power efficiently.
2. **Cross Subsidy Surcharge** - CSS calculated and recovered from OA consumers are Insufficient to recover entire loss of cross subsidy.  
Formula for calculation of CSS varies from State to State.
3. **Additional Surcharge** - Not been calculated appropriately leading to under recovery of power procurement expenses
4. **Stand-By charges** - Structure and calculation not uniform across States, lack of periodic review leading to revenue loss of DISCOMs
5. **Tariff Design and Rationalization** - Structure of demand and energy charges not reflective of actual proportion of fixed and variable cost.

8





## Proposals in the Consultation papers

- \* **Cross Subsidy Surcharges:**
  - \* Clause 8.3(2) and Clause 8.5.1 should be implemented simultaneously.
  - \* SERCs should determine Cross Subsidy Surcharge (CSS) based on category wise cost of supply, thus identifying real cross subsidy.
  - \* Introduction of differential cross subsidy surcharges for peak, normal and off peak.
- \* **Additional Sur-charges:**
  - \* Additional Surcharge could have three components to cover for:
    - (i) Stranded power under long-terms PPAs,
    - (ii) Stranded physical assets and
    - (iii) Cost of carrying regulatory assets or amortization of regulatory assets, as the case may be.
  - \* Criteria for classifying an assets as “Stranded” and methodology for calculation of Stranded Assets may be defined.
  - \* Surcharge on the regulatory assets may be recovered on the same year.

9



## Proposals in the Consultation papers Cont....

- \* **Standby Charges**
  - \* Standby charge should be designed to reflect the actual fixed cost and variable cost.
  - \* As per Para 8.5.6 of the Tariff Policy 2016 the limit of 125% should be applied separately on the rate for fixed charge and variable charge.
  - \* Standby charge should be determined annually by SERCs to reflect the variation in costs over time or Auto- indexation mechanism may be designed for periodic (quarterly/annual) revision of standby charges

10



## Proposals in the Consultation papers Cont....

- \* **Tariff should reflect actual break up between fixed and variable charges**
- \* **Consumers with low load (domestic and small commercial) may be partially exempted for fix cost and;**
- \* **Open Access consumers should get credit for wheeling charges paid by them towards fixed/demand charges payable by them subject to 100% fixed cost recovery and should get appropriate reduction**

11



## Recommendations of the Working Group

- \* Measures like scheduling of power for certain slot of time i.e. for at least 24 hour, may be strictly followed, to prevent frequent shifting.
- \* Uniform methodology for determination of various charges such of OA Charges, CSS and Additional surcharges.
- \* Need to conduct Impact assessment for DISCOMS as well as OA users.
- \* Agreed for methodology of [Tariff Policy, 2016](#) which states that CSS must be calculated on the basis of ACOS.

12

## Recommendations of the Working Group



- \* **Additional Surcharges:** The proposal suggested in Consultation papers to have three component of additional surcharge to fully recover the losses due to stranded capacity and Regulatory assets.
- \* **Stand-by Charges:** only 125% of variable charges for each category should be applicable as standby surcharge as the fixed cost are already recovered in the demand charges in line with the Tariff Policy, 2016.
- \* Standby Charges can be only for long term Open Access Consumers.

13

## Recommendations of the Working Group



- \* **Tariff Design and Rationalization:**
  - \* Members agreed the proposal of consultation paper that the tariff should reflect actual breakup of fixed and variable charges.
  - \* Demand charges are kept low to have minimal impact on low load and domestic consumers as well as open access consumers. SERC to revise the fixed charges gradually.

14

# Thank you



15

Details of Open Access Charges levied by different States on Open Access Consumers

State	Discoms	11 kV	22 kV	33 kV	66 kV	132 kV
		2016-17	2016-17	2016-17	2016-17	2016-17
Haryana	All	0.71	0.71	0.71	0.71	0.71
Uttar Pradesh	All	0.458	0.286	0.286	0.286	0.286
Karnataka	All					
Gujarat	All	0.14	0.14	0.14	0.14	0.14
Meghalaya^	All	1.36	1.36	1.36	1.36	1.36
Daman & Diu	All					
DNH	All					
Chhatisgarh	All			0.279		0.279
Bihar	All					
Orissa	CESU	0.53	0.53	0.53	0.53	0.53
	NESCO	0.69	0.69	0.69	0.69	0.69
	WESCO	0.43	0.43	0.43	0.43	0.43
	SouthCO	0.62	0.62	0.62	0.62	0.62
Himachal Pradesh	All					
Uttarakhand*	All	0.04	0.04	0.04	0.04	0.04

All rates mentioned above are in Rs./ unit

\* charges converted to per unit. The applicable charges are Rs. 861/MW/day for HT industry consumers

^ charges converted to per unit. The applicable charges are Rs. 38840.29/MW/Day for HT industry consumers





#### Details of Cross Subsidy Surcharge levied by different States on Open Access Consumers

State	Discoms	11 kV	22 kV	33 kV	66 kV	132 kV
		2016-17	2016-17	2016-17	2016-17	2016-17
Haryana	All	1.57	1.57	1.57	1.57	1.57
Uttar Pradesh	All	1.05	0.63	0.63	0.63	0.63
Karnataka	All	0.86		0.86	1.18	
Gujarat	All	1.45	1.45	1.45	1.45	1.45
Meghalaya	All	1.75	1.75	1.75	1.75	1.9
Daman & Diu	All	0.42	0.42	0.42	0.42	0.42
DNH	All	0.22	0.22	0.22	0.22	0.22
Chhatisgarh	All			1.21		1.16
Bihar	All	0.78		0.78		0.69
Orissa	CESU	0.79		0.79	0.79	1.44
	NESCO	0.58		0.58	0.58	1.32
	WESCO	0.66		0.66	0.66	1.27
	SouthCO	1.29		1.29	1.29	2.04
Himachal Pradesh	All	0.41	0.41	0.41	0.41	0.41
Uttarakhand	All	0.47	0.47	0.47	0.47	0.47

All rates mentioned above are in Rs./ unit 17



#### Details of Additional Surcharge levied by different States on Open Access Consumers

State	Year	Additional Surcharge (Rs./ unit)
Haryana	2016-17	0.87
Punjab	2016-17	1.13
Gujarat	2016-17	0.44
Himachal Pradesh	2016-17	0.49
Maharashtra	2016-17	1.11
Rajasthan	2016-17	1





## Different Formulae for CSS in SERCs

The formulas used for calculation of CSS by various SERCs:

$$CSS = T - [C(1-L/100) + D + R]$$

$$CSS = (ABR - CoS) \times \text{Factor}$$

$$CSS = (ABR - ACoS) \times \text{Factor}$$

$$CSS = T - (\text{avoided FPC} + \text{Wheeling Charge})$$

*T - applicable Tariff*

*C - Weighted average cost of power purchase by the Licensee, including meeting the Renewable Purchase Obligation renewable power*

*L - System losses; D - Wheeling Charge R - Cost of carrying Regulatory Assets*



19



## Tariff Policy, 2016

### Section 8.3 (2)

“For achieving the objective that the tariff progressively reflects the cost of supply of electricity, the Appropriate Commission would notify a roadmap such that tariffs are brought within  $\pm 20\%$  of the average cost of supply. The road map would also have intermediate milestones, based on the approach of a gradual reduction in cross subsidy”

The First proviso to para 8.5.1 of Tariff Policy 2016 also specifies that Cross Subsidy Surcharge (CSS) should be capped at 20% of the tariff applicable to the category of the consumers



20

## Tariff Policy, 2016

- \* **Para 8.5.6** : In case of outages of generator supplying to a consumer on open access, standby arrangements should be provided by the licensee on the payment of tariff for temporary connection to that consumer category as specified by the Appropriate Commission. Provided that such charges shall not be more than 125 percent of the normal tariff of that category.



21

## Tariff Policy, 2016



### Surcharge formula:

$$S = T - [C / (1 - L/100) + D + R]$$

Where

**S** is the surcharge

**T** is the tariff payable by the relevant category of consumers, including reflecting the Renewable Purchase Obligation

**C** is the per unit weighted average cost of power purchase by the Licensee, including meeting the Renewable

Purchase Obligation

**D** is the aggregate of transmission, distribution and wheeling charge applicable to the relevant voltage level

**L** is the aggregate of transmission, distribution and commercial losses, expressed as a percentage applicable to the relevant voltage level

**R** is the per unit cost of carrying regulatory assets.

Above formula may not work for all distribution licensees, particularly for those having power deficit, the State Regulatory Commissions, while keeping the overall objectives of the Electricity Act in view, may review and vary the same taking into consideration the different circumstances prevailing in the area of distribution licensee.

Provided that the surcharge shall not exceed 20% of the tariff applicable to the category of the consumers seeking open access.

Provided further that the Appropriate Commission, in consultation with the Appropriate Government, shall exempt levy of cross subsidy charge on the Railways, as defined in Indian Railways Act, 1989 being a deemed licensee, on electricity purchased for its own consumption.



22

## **Generic e-Court Software for State Electricity Regulatory Commissions**

**Central Electricity Regulatory Commission  
15<sup>th</sup> December 2017**

### **Background**

- CERC e-Court presentation was given in 54th Meeting of the Forum of Regulators (FOR) held on 8.4.2016 at Varanasi.
- Many SERCs' showed interest in CERC SAUDAMINI project.
- FOR contacted NIC, Delhi for their suggestions and comments.
- NIC proposed that a generic software for e -Court / e-Filing in States may be developed on the model of CERC .



### **Broad Scope (Stakeholders Interface)**

e-Filing of Cases: Filing of cases/ documents in SERC electronically on web.- The s/w facilitates stakeholders to file their petition entering the mandatory information through different templates available in the s/w module by signing-in first. The information includes party details, lower court details (if any), pending and disposed of identical cases, parameters required for petition filing fee calculation etc.

e-Pleading of Cases: After filing of cases/ documents in SERC electronically on e-Filing portal- The s/w facilitates stakeholders to file Reply/Rejoinders/Objections/Comments/written submission by the Parties etc.

### **Broad Scope ( SERC Interface)**

e-Hearing : This covers hearing of cases through softcopies of the petitions. Provide the facility of making e-Notes by the Commission.

MIS: Standard Dashboards and reports as per requirement of SERC.

## **Development & Implementing Organization**

### **Generic Software Development and Deployment - NIC- Courts Division**

- Shri S.B.Singh (Dy. Director General, NIC)
- Shri Manoj Tuli (Senior Technical Director, NIC)
- Technical Manpower hired by NIC through NICS
- SAUDAMINI Source code sharing by CERC

### **Generic Software Monitoring & Implementation**

- Monitoring - Working group Committee
- Implementation - State Electricity Regulatory Commissions

## **Generic e-Court Software – Approach and Methodology**

- Conducting Gap Analysis and setting up of Working Group Committee
- Preparation and Approval of Gap Analysis Report and Fund Transfer to NIC/NICS
- Preparation and Approval of SRS
- Software Development & Testing
- Security Audit of application / Touch Screens Procurement
- Hiring NIC cloud service(VM)
- Deployment of application on Cloud web server
- Roll out & Issuing guidelines of Generic e-Court portal to all stakeholders and staff

## **Tentative Cost for Generic e- Court Software Development**

### **Funded by FOR (One Time – App. 30 Lakhs )**

Gap Analysis

Generic e-Court Software Development & Deployment

Security Audit

One time Software Deployment

Misc. & Contingencies

### **Funded by SERC (Recurring Cost per annum– App 12 Lakhs)**

Cloud Hosting Charges (VM) : App. 5.5 Lakhs per annum

Production Support and Maintenance Cost with one onsite maintenance engineer: App 6 Lakh per annum

Misc. & Contingencies (0.5 Lakhs)

## **Tentative Cost for Hardware & Networking**

### **Hardware (One Time – App. 16 Lakhs ) (Funded by SERC)**

22 Inched Touch Creative Pen Display Screens for e-Hearing – (App 10 Lakhs)

Scanner for Digitization of Records - (App 3 Lakhs)

Desktops & LAN points for e-Hearing – (App 3 Lakhs)

### **Internet Charges (Recurring cost) (Funded by SERC)**

Lease line cost as per the recommendation of NIC

## Tentative Timelines

- Gap Analysis, DPR Approval and Fund Transfer (Tentative Start date 01<sup>st</sup> January 2018) (One Month)
- Generic e-Court Software Development & Testing (Tentative Start date 1<sup>st</sup> February 2018 ) (Three Months)
- Generic e-Court Software Security Audit, Deployment and Roll out (Tentative Start date 1<sup>st</sup> May 2018) (One Month)

