

MINUTES OF THE THIRTY NINETH MEETING
OF
FORUM OF REGULATORS (FOR) HELD AT CHANDIGARH.

Venue : **“TERRACE” Hall, First Floor
Hotel The Taj, Sector-17-A
Chandigarh.**

Dates : **17th - 19th January, 2014**

List of Participants : **At Annexure-I (enclosed).**

The meeting was chaired by Shri Gireesh B. Pradhan, Chairperson, CERC/FOR. The Chairperson, Forum of Regulators welcomed Shri Donray A. Shishak, Chairperson, Nagaland Electricity Regulatory Commission (NERC) to the Forum as he was attending the Forum meeting for the first time. He also welcomed Shri Pravinbhai Patel who took over as Chairperson, GERC on 13th January, 2014.

The FOR thereafter took up agenda items for consideration.

Agenda Item No. 1 : **Confirmation of the Minutes of the 38th Meeting of “FOR” held on 18th November, 2013 at India Habitat Centre (IHC), Lodhi Road, New Delhi.**

The Forum noted and endorsed the minutes of the 38th Meeting of 'FOR' held at India Habitat Centre (IHC), Lodhi Road, New Delhi on 18th November, 2013.

After discussion, the minutes were confirmed.

Agenda Item No. 2 : "PROPOSAL OF AMENDMENT TO ELECTRICITY ACT, 2003".

A presentation on the proposal of Amendment to Electricity Act, 2003 was arranged by the Ministry of Power (copy **enclosed** at **Annexure – II**). The presentation covered amendment under two broad heads, viz., Amendment related to separation of carriage and content in distribution and those relating to provisions other than carriage and content. Ms. Jyoti Arora, Joint Secretary (R&R), Ministry of Power informed the Forum that the Ministry of Power had held consultation with various stakeholders and after considering the comments, including of the Forum of Regulators (FOR), has evolved a draft proposal on the following lines :

- ❖ On the separation of carriage and content, the proposal is to undertake such separation in two stages. In the first stage, the distribution network business and the supply business of the existing distribution companies would be separated. At this stage (spanning one year from the date of amendment), there will be only a functional separation with common ownership. The existing distribution company will be treated as deemed distribution licensee (for network business) and deemed incumbent supply licensee (for supply business). In the second stage (after one year), ownership will also be separated. At the same time, supply licenses will be granted to new entities (subsequent supply licensees). Thus, after the first year, there will be an incumbent supply license and also supply licensees other than incumbent supply licensee (subsequent supply licensee). While the incumbent supply licensee will have USO for all consumers, the subsequent supply licensees will have the Universal Service Obligation (USO) in a phased manner over a period of three years

from the date of grant of license (USO for consumers of 500 kW and above in the first year, USO for consumers upto 100 kW and above in the second year and USO for all consumers from third year onwards).

- ❖ A new entity called the holding company will be formed wherein all the existing PPAs will be transferred. The existing PPAs would be allocated amongst the supply licensees (including the incumbent licensee) on the basis of the consumer load with them and after factoring in the losses at transmission and distribution level. There will be a dynamic allocation of PPAs on year to year basis based on the above principles.
- ❖ Apart from the allocation of the existing PPAs, the holding company will also be responsible for the distribution system planning and operation, management of USO fund and for handling the regulatory assets.
- ❖ The USO fund will be created to take care of the cross subsidies between consumer categories.
- ❖ For the first three years (i.e., till all supply licensees have USO for all consumers) the incumbent supply licensee will be the Provider of Last Resort (POLR), i.e., it will be responsible for supply in the event of default in supply by the other supply licensees. After three years, the Appropriate Commission shall designate one of the supply licensees as POLR on such terms and conditions and after taking into consideration the need for compensation, if any, as may be specified by the Commission.
- ❖ As regards other amendments, the Ministry of Power highlighted that the proposal included amendment to provisions relating to Grid Security, Strengthening of Open Access, ensuring Regulatory Accountability etc.

Discussion :-

The above proposal of the Ministry of Power was discussed at length. Various issues were raised by the Members. It was opined that dynamic allocation would be a complex exercise. This should be examined from the legal angle, to ascertain as to whether the PPA entered between the two contracting parties can be reallocated/reassigned on a dynamic basis to parties on year on year basis. It was also apprehended that this might enhance the risk for the generating companies. It was advised that the generating companies should also be consulted before a final view was taken. It was also felt that the mandatory USO as well as mandatory allocation of the existing PPA might reduce scope for competition. The Forum felt the strong need for addressing the issue of consumer interface with various utilities. Creation of multiple agencies should not put the consumer into hardship. There should be a common interface for the consumers for redressal of their grievances. A view was also expressed to have separate dispensation for smaller States and hilly States. Such States should be given an option to continue with the existing model. The provision of POLR should also be thought, through carefully and suitable provision be made.

Consensus :

After discussion, the following consensus was evolved :

- ✓ There was a general agreement on the need for separation of carriage and content at the distribution level. This is in line with the earlier decision taken in the FOR.

- ✓ The issue of consumer interface with various utilities, especially metering, billing, payment and grievance redressal should be thought through and articulated clearly in the model being evolved by the MOP.
- ✓ Legality of the issue of dynamic allocation of PPAs should be examined. It would be desirable to avoid complexity. Care should be taken to ensure that the risks of the contracting parties do not get enhanced.
- ✓ In the context of dynamic allocation, there was a possibility of mismatch between PPA allocation and the consumer load with different supply licensees. This should be addressed adequately.
- ✓ The question as to who would be responsible for commercial losses, and how would the manpower cost of the incumbent licensee be taken care of should be resolved.
- ✓ The question as to who would own the meter should be settled with due regard to the need for transparency and dispute free billing and interface with the consumers.
- ✓ The cost implication of the transition from the present system to the proposed model should also be assessed and properly taken care of.
- ✓ As regards other amendments, the Forum agreed as under –
 - Section 11 : The proviso proposing restriction of direction against 'intra-State' open access transaction only, will indirectly legitimize use of section 11 against 'inter-State' transactions and defeat the very objective behind the proposal of amendment to this section. The said proviso should be dropped. Ideally, the expression 'maintain and

operate' should be defined to clarify that it does not include 'supply' including supply through open access.

- Section 76 (5)(b) : The proposal for amendment to section 76 (5)(b) should be dropped and the existing provision of 'Chairperson of Authority' as an ex-officio Member of the Commission should be retained.
- Section 85 (5A) : The Forum reiterated its earlier decision in this context and recommended that 'the selection committee constituted to select Chairperson and Members of Central Commission may forward names of the two persons in case of delay in appointment of Chairperson or Members of the State Commission'.
- Review of performance of the Regulators should be left to the Forum of Regulators.

Agenda Item No. 3 : DISCUSSION ON "DRAFT CERC (TERMS AND CONDITIONS OF TARIFF) REGULATIONS, 2014 FOR THE TARIFF PERIOD FROM 01.04.2014 TO 31.03.2019".

A presentation was made by Shri Sushanta K. Chatterjee, Joint Chief (RA), CERC (copy **enclosed** at **Annexure – III**). In his presentation, he highlighted salient features of the proposed terms and conditions of tariff for the period 2014 – 2019 as circulated by CERC. He explained the major changes proposed by the CERC involving inter alia, provisions relating to actual tax reimbursement on the ROE component; linkage of incentive to Plant Load Factor (PLF); tightening of operational norms; and provision seeking to address shortage of fuel supply etc. The proposed regulations of CERC were discussed. The Members present expressed their appreciation for the positive changes on

account of ROE and the linkage of incentive to PLF. The Members, however, expressed their concern over the increasing trend of O&M expenses of the utilities and remarked that this had an adverse impact on the distribution companies. They requested CERC to look into this aspect and rationalize the O&M expenses to the extent possible. After discussion, the following consensus was evolved :

- ❖ CERC should undertake further analysis on rationalization of O&M expenses, especially, by comparing similar expenses for other generating companies in the country and by evolving normative man-mega watt ratio for a generating company.
- ❖ The proposed sharing of gains on account of Station Heat Rate (SHR) etc. may be in the ratio of 60:40 as against the proposal of 75:25.
- ❖ The proposal of ROE and incentive should be retained in the final regulations as proposed in the draft regulations.
- ❖ The Tariff Regulations should be finalized at the earliest to enable the SERCs to take a final view on their State specific Tariff Regulations. This is considered necessary in view of the fact that the SERCs are guided by the principles and methodologies of generation and transmission Tariff of CERC as per section 61 (a) of the Act.

Agenda Item No. 4 : DISCUSSION ON “THE NEED FOR INSULATING THE PRICING OF PUBLIC UTILITY SERVICES LIKE DRINKING WATER, IRRIGATION, POWER AND PUBLIC TRANSPORT FROM POLICY FLUCTUATIONS THROUGH STATUTORY PROVISIONS” (REFERENCE TOR OF 14TH FINANCE COMMISSION)".

It was decided that this issue could be taken up in the next meeting of FOR.

Agenda Item No. 5 : PRESENTATION ON POWER SECTOR : FUEL SECURITY ISSUES.

A presentation was made by the representative of M/s. GVK. The Forum noted the issues highlighted.

Agenda Item No. 6 : SMART GRID REGULATORY REQUIREMENTS / SMART GRID PILOTS IN DISTRIBUTION.

A presentation was made by the representatives of PGCIL and PFC on Smart Grid Regulatory Requirements/Smart Grid Pilots in Distribution and APDRP (copy **enclosed** at **Annexure – IV & V**). The issues were discussed in detail. It was opined that the cost of smart meter was quite prohibitive. Financial support from APDRP could be considered to make it affordable for consumers. It was also felt that there should be an interface between smart grid initiatives and APDRP programme. The IT based infrastructure created under APDRP should be used to promote smart grid. After discussion, the following consensus was evolved :

- The Smart Grid Regulations should be simple and easy to understand and implement.
- Consultation/awareness programmes for Regulators and regulatory staff should be undertaken on the subject.
- Smart Grid programme should be rolled out in phases starting with metering, addressing issues related to theft etc.

- Draft Regulations evolved by the Technical Committee of the Ministry of Power be circulated to all SERCs for their comments. This issue may be taken up once again in the next meeting of FOR for detailed discussion based on the comments received from various SERCs.

Agenda Item No. 7 : PROMOTION OF RENEWABLE ENERGY SOURCES : LATEST DEVELOPMENT, GOI INITIATIVES AND REGULATORY SUPPORT.

A presentation was made by Shri Rakesh H. Shah, Advisor (RE), CERC (copy **enclosed** at **Annexure – VI**).

(I) On the issue of pronouncement of APTEL judgement, the Forum appreciated the judgement and noted for suitable action by the Appropriate Commission.

(II) On the issue of Review of Floor and Forbearance Prices for Solar Projects, it was informed that the FOR Working Group on Renewables had already considered the proposal for introducing vintage based and technology based multiplier of REC for solar. It was felt that legality of the aspect should be examined and the quantum of multiplier should be fixed after due consideration of the overall revenue for a project developer. After discussion, the following consensus was evolved :-

- The concept of introduction of REC multiplier for solar was endorsed in principle.

- It was decided that a detailed note be prepared on the desirability and feasibility of merger of solar and non-solar REC in future, and the issue be taken up for discussion in the next meeting of FOR.

(III) On the issue of Draft Model Regulations for Rooftop Solar Grid Interactive systems based on Net metering, the Forum was informed that CEA had already come up with the Regulations on Technical Standards of Connectivity of the Distributed Generation Resources. CEA had also floated the Draft Regulations on Metering for such generation sources. It was agreed that the Appropriate Commission would frame Regulations for RE Solar Grid Interactive Systems based on the model guidelines/regulations evolved by FOR and after duly considering of the Regulations on Connectivity and Metering issued by CEA.

(IV) The Forum was also informed about the consensus evolved in the Working Group on Renewables regarding eligibility of RE generator selling electricity component through open access route. The FOR Working Group on RE has recommended the following in this context :

"A renewable energy generator selling electricity through open access to third party user should be made eligible for issuance of RECs subject to condition that it should not be availing any concessional open access charges like: transmission and wheeling charges & losses, cross subsidy charges, banking facility. Such charges applicable to other normal open access transaction and also applicable to generators and distribution licensee, as may be determined by the Appropriate Commission should be made applicable a renewable energy generator selling electricity component through open access to become eligible for issuance of RECs."

The Forum noted and endorsed above recommendation of the Working Group.

Any Other Issues -

In the wake of the ensuing General Elections in April, 2014, the issue as to whether the SERCs can finalize their Tariff Orders during the currency of the model Code of Conduct, came up for discussion. It was felt that the Electricity Regulatory Commissions are independent statutory authorities under the Act. Given that the Government had distanced itself from Tariff Regulations and in view of the fact that tariff fixation process was an exercise undertaken by the SERCs in pursuance of the provisions of the Act, and the Regulations framed thereunder, issuance of Tariff Order can not be treated as an action of the Government or for that matter an action of the executive to extend benefit to any specific section of the society for political gain. It was argued that the SERCs should not be prevented from exercising statutory power under the Act during the currency of the model Code of Conduct before the General Election or any State Assembly election. The Forum requested that Chairperson, FOR to write to the Chief Election Commissioner of India to seek confirmation on this understanding and the views of the Election Commission in this context be circulated to all SERCs for information and necessary action.

The Forum appreciated the efforts made by PSERC under the chairmanship of Ms. Romila Dubey, Chairperson, PSERC, Chandigarh for the arrangements made for the meeting.

A vote of thanks was extended by Shri Sushanta K. Chatterjee, Joint Chief (RA), CERC/FOR. He conveyed his sincere thanks to all the dignitaries present in the meeting. He also thanked the staff of “FOR” Secretariat for their arduous efforts at organizing the meeting.

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

LIST OF PARTICIPANTS ATTENDED THE THIRTY NINETH
MEETING

OF

FORUM OF REGULATORS (FOR)

HELD DURING 17TH – 19TH JANUARY, 2014 AT CHANDIGARH

S. No.	NAME	ERC
01.	Shri Gireesh B. Pradhan Chairperson	CERC – in Chair.
02.	Dr. V. Bhaskar Chairperson	APERC
03.	Shri Digvijai Nath Chairperson	APSERC
04.	Shri Umesh Narayan Panjiar Chairperson	BERC
05.	Shri P.D. Sudhakar Chairperson	DERC
06.	Shri Pravinbhai Patel Chairperson	GERC
07.	Shri R.N. Prasher Chairperson	HERC
08.	Shri Subhash Chander Negi Chairperson	HPERC
09.	Shri Anand Kumar Chairperson	MSERC
10.	Shri Donray A. Shishak Chairperson	NERC
11.	Ms. Romila Dubey Chairperson	PSERC
12.	Shri D.C. Samant Chairperson	RERC
13.	Shri Jag Mohan Lal Chairperson	UERC

14.	Shri Tapan Chatterjee Member	AERC
15.	Shri D.S. Pawar Member	J&KSERC
16.	Shri T. Munikrishanaiah Member	JSERC
17.	Shri P. Parameswaran Member	KSERC
18.	Shri S.K. Chaturvedi Member	JERC for all UTs except Delhi
19.	Shri Alok Gupta Member	MPERC
20.	Shri Bijoy Kumar Misra Member	OERC
21.	G. Rajagopal Member	TNERC
22.	Shri Sujit Dasgupta Member	WBERC
23.	Shri Sushanta K. Chatterjee Joint Chief (RA)	CERC
SPECIAL INVITEES		
01.	Shri V.S. Verma Member	CERC
02.	Shri A.K. Singhal Member	CERC
03.	Ms. Jyoti Arora Joint Secretary (R&R)	MOP
04.	Shri Pranay Kumar Director (R&R)	MOP
05.	Shri Sandesh Sharma Director	CEA
06.	Shri Pankaj Batra Chief Engineer	CEA
07.	Shri N.S. Sodha Executive Director	PGCIL

Decision on the comments given by Stakeholders on the proposed amendments of the Electricity Act, 2003

101 stakeholders sent their comments till date and the same were deliberated extensively and the decisions taken upon them are being divided in the following heads:

- Definition changes/ inclusions
- Changes relating to open access
- Changes relating to carriage and content
- Changes relating to grid security
- Changes relating to Regulatory Commissions.
- Changes relating to electrical inspectors.
- Changes relating to CEA
- Other major changes

Definition changes/ inclusions

Section	Original / Amendment	Amendment agreed
2(1A)		(1a) “ancillary services” means in relation to power system (or grid operation), the services necessary to support the power system (or grid) operation in maintaining power quality, reliability and security of the grid;
2(8)	"Captive generating plant" means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity for use of members of such co-operative society or association,	(8) "Captive generating plant" means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity primarily for use of members of such co-operative society or association, on terms and conditions as may be prescribed by the Central Government from time to time;

- 2(12) "Cogeneration" means a process which simultaneously produces two or more forms of useful energy (including electricity)
- 2(16) "dedicated transmission lines" means any electric supply-line for point to point transmission which are required for the purpose of connecting electric lines or electric plants of a captive generating plant referred to in section 9 or generating station referred to in section 10 to any transmission lines or sub-stations or generating stations, or the load centre, as the case may be;
- "Cogeneration" means a process which simultaneously produces two or more forms of useful energy (including electricity) **and approved by the Central Electricity Authority;**
- "dedicated transmission lines" means any radial electric supply-line for point to point transmission which is required for the purpose of connecting a captive generating plant or generating station to any transmission line or sub-station(s) or switching station(s) or generating station(s), or the load centre, as the case may be, subject to the condition that such line shall not form a loop with the grid and shall not be shared except with the prior approval of the Appropriate Commission;**

2(17a) "distribution" means distribution of electricity by use of distribution system

"distribution" means conveyance of electricity by use of distribution system

2(27) "franchisee" means a person authorised by a distribution licensee to distribute electricity or by a supply licensee to supply electricity, as the case may be, on its behalf in a particular area, whether in a rural area or outside rural area, within his area of distribution or area of supply;

Future of franchisee is to be considered.

2(31) "Government company" shall have the meaning assigned to it in section 617 of the Companies Act, 1956 (1 of 1956);

"Government company" shall have the meaning assigned to it in Sub-section 45 of Section 2 of the Companies Act, 2013 (18 of 2013);

In view of General Clauses Act, the amendment is not needed.

2(57A) "renewable energy sources" means renewable sources such as small hydro, wind, solar including its integration with combined cycle, biomass, bio fuel co-generation, urban or municipal solid waste and other such sources as prescribed by the central government in Consultation with and prescribed by the Ministry of new and Renewable sources from time to time;

"renewable energy sources" means renewable sources such as small hydro, wind, solar including its integration with combined cycle, biomass, bio fuel co-generation, urban or municipal solid waste and other such sources as prescribed by the central government ~~in Consultation with and prescribed by the Ministry of new and Renewable sources~~ from time to time;

Additional Definitions:

- Smart Grid – To be provided by CEA
- Switching Station
- Renewable Energy Service Company
- Prosumer
- Definition of Decentralised Distribution Generation to be given by CEA

Changes related to NEP & NTP

Section (3a) Notwithstanding anything contained **To be deleted .**
3 (3a) elsewhere in any other provisions of the this
Act and to the extent specified in the the
National Electricity Policy and tariff policy
referred to in sub-sections (1) (2) and (3) to be
mandatory, the provisions thereof shall be
binding on all including the Appropriate
Commissions, Appropriate Government,
authorities, licensees generating companies
consumers.

Changes Relating to Open Access

- 11 (1) The Appropriate Government may, **subject to payment of the compensation determined within the time and in the manner directed by the Appropriate Commission under sub section (2)**, specify that a generating company shall, in extraordinary circumstances operate and maintain any generating station in accordance with the directions of that Government. **PROVIDED that any such direction of the Appropriate Government shall not affect in any manner the capacity of the generating station already committed under a valid and binding contract and open access for conveyance of such capacity duly taken.**
- Provided also that any such direction shall not affect any request made for open access of electricity generated from the generating station for consumption of such electricity within the state**
- PROVIDED further that such direction issued by the Appropriate Government shall not be valid at a time for a period exceeding thirty days.**

Explanation:--For the purposes of this section, the expression "extraordinary circumstances" means circumstances arising out of threat to security of the State, public order or a natural calamity or such other circumstances arising in the public interest.

(2) The Appropriate Commission **shall** offset the adverse financial impact of the directions referred to in sub-section (1) on any generating company in such manner as it considers appropriate.

NOTE: It has been decided to add a proviso to the effect that open access cannot be denied under this provision.

Changes relating to carriage and content

TO BE REDRAFTED AS PER THE MODEL
FINALISED

Changes relating to Grid Security

28(3)(b)	monitor grid operations;	monitor grid operations and promote ancillary services;
29(6)	If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (2) or sub-section (3), he shall be liable to a penalty not exceeding rupees One Crore	If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (2) or sub-section (3), he shall be liable to a penalty not exceeding rupees One Crore in the manner as prescribed by the Central Government.
32(2)(b)	monitor grid operations;	monitor grid operations and promote ancillary services;

Changes relating to Grid Security

- 33(5) If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (1), he shall be liable to a penalty not exceeding rupees fifty lacs
- If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (1), he shall be liable to a penalty not exceeding rupees fifty lacs **in the manner as prescribed by the Central Government.**
- 38(2)(d) any consumer as and when such open access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the central Commission *and surcharge if any determined by the Appropriate Commission of the State in which the consumer is located.*":
- (ii) any consumer as and when such open access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the **appropriate** Commission *and surcharge if any determined by the Appropriate Commission of the State in which the consumer is located.*":

Changes relating to Grid Security

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In case any complaint is filed before the Appropriate Commission by any person or if that Commission is satisfied that any person has contravened any of the provisions of this Act or the rules or regulations made thereunder, or any direction issued by the Commission, the Appropriate Commission may after giving such person an opportunity of being heard in the matter, by order in writing, direct that, without prejudice to any other penalty to which he may be liable under this Act, such person shall pay, by way of penalty, which shall not exceed **fifty** lakh rupees for each contravention and in case of continuing failure with an additional penalty which may extend to **fifty** thousand rupees for every day during which the failure continues after contravention of the first such direction.

In case any complaint is filed before the Appropriate Commission by any person or if that Commission is satisfied that any person has contravened any of the provisions of this Act or the rules or regulations made thereunder, or any direction issued by the Commission, the Appropriate Commission may after giving such person an opportunity of being heard in the matter, by order in writing, direct that, without prejudice to any other penalty to which he may be liable under this Act, such person shall pay, by way of penalty, which shall not exceed **fifty** lakh rupees for each contravention **in the manner as prescribed by the Central Government** and in case of continuing failure with an additional penalty which may extend to **fifty** thousand rupees for every day during which the failure continues after contravention of the first such direction.

Changes relating to Grid Security

- 146 Whoever, fails to comply with any order or direction given under this Act, within such time as may be specified in the said order or direction or contravenes or attempts or abets the contravention of any of the provisions of this Act or any rules or regulations made thereunder, shall be punishable with imprisonment for a term which may extend to three months or with fine which may extend to **fifty** lakh rupees, or with both in respect of each offence and in the case of a continuing failure, with an additional fine which may extend to **fifty** thousand rupees for every day during which the failure continues after conviction of the first such offence:
- Whoever, fails to comply with any order or direction given under this Act, within such time as may be specified in the said order or direction or contravenes or attempts or abets the contravention of any of the provisions of this Act or any rules or regulations made thereunder, shall be punishable with imprisonment for a term which may extend to three months or with fine which may extend to **fifty** lakh rupees **to be levied in the manner as prescribed by the central government**, or with both in respect of each offence and in the case of a continuing failure, with an additional fine which may extend to **fifty** thousand rupees for every day during which the failure continues after conviction of the first such offence:

Changes Related to Tariff

61(i) the National Electricity Policy and tariff policy: the National Electricity Policy and tariff policy:

PROVIDED that the the provisions of the National Electricity Policy and Tariff Policy to the extent specified in such policy shall be binding.

~~PROVIDED that the the provisions of the National Electricity Policy and Tariff Policy to the extent specified in such policy shall be binding.~~

62(1)(a) PROVIDED further that there shall be no such determination of tariff by the Appropriate Commission under this clause (a) if it is specified in the national electricity policy or the tariff policy that the procurement of electricity by the supply licensee shall be done only by competitive bidding as per section 63.

PROVIDED further that there shall be no such determination of tariff by the Appropriate Commission under this clause (a) if it is prescribed by the Central Government that the procurement of electricity by the supply licensee having the obligation to supply in the area of supply from certain categories of generating companies shall be done only by competitive bidding as per section 63.

Changes related to Regulatory Commissions

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| 76(5)
(b) | the Chairperson of the Authority shall be the Member, ex officio. | the Chairperson or a member of the Authority nominated by the chairperson of the Authority shall be the Member, ex officio. |
| 79 (1)(c) | to regulate the inter-State transmission of electricity; | to regulate the inter-State transmission of electricity including promotion and development of smart grid; |
| 79(4) | In discharge of its functions, the Central Commission shall be consistent with the National Electricity Policy, National Electricity Plan and tariff policy published under section 3. | In discharge of its functions, the Central Commission shall be guided by the National Electricity Policy, National Electricity Plan and tariff policy published under section 3. |

Regulatory Commissions

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| 85(5A)
) | In case of delay in the constitution of the selection committee for more than two months or in the appointment of Chairperson or members of the State Commission for more than five months, the Central Government shall be entitled to forward the names of two persons possessing the qualification specified in section 84 and the State Government shall appoint one of them to the vacancy. | (5A) In case of delay in the constitution of the selection committee for more than 2 months or in appointment of chairperson or members of the state commission for more than 5 months, the central government shall be entitled to nominate one officer from central Electricity authority not below the rank of Chief Engineer as ex-officio member of that commission |
| 86(1)(
c) | facilitate intra-State transmission and wheeling of electricity | facilitate intra-State transmission and wheeling of electricity and promote and develop smart grid |
| 86(4) | In discharge of its functions, the Central Commission shall be consistent with the National Electricity Policy, National Electricity Plan and tariff policy published under section 3. | In discharge of its functions, the Central Commission shall be guided by the National Electricity Policy, National Electricity Plan and tariff policy published under section 3. |

Regulatory Commissions

- 91(3) The salaries and allowances payable to, and other terms and conditions of service of, the Secretary, officers and other employees shall be such as may be specified with the approval of the Appropriate Government. The salaries and allowances payable to, and other terms and conditions of service of, the Secretary, officers and other employees shall be such as may be specified ~~with the approval of the Appropriate Government.~~
- 94(3) The Appropriate Commission may authorise any person, as it deems fit, to represent the interest of the consumers in the proceedings before it. The Appropriate Commission **shall** authorise any person, as it deems fit, to represent the interest of the consumers in the proceedings before it.

Regulatory Commissions

- 121 (3) (a) The Appellate Tribunal may, from time to time, constitute a committee consisting of not more than three persons of eminence to review the performance of the Appropriate Commissions or any of them and submit a report with recommendations of such committee to the Appellate Tribunal;
- (b) The Committee appointed under sub clause (a) shall be entitled to take the assistance of experts and consultants to be engaged with the approval of the Appellate Tribunal;
- (c) The Appellate Tribunal after considering the report of the committee and after giving an opportunity to the Appropriate Commission, forward the performance review to the Appropriate Government and also to the Appropriate Commission to be included in the Annual Report under section 101 or 104, as the case may be.
- (1) The Forum of Regulators may, from time to time, constitute a committee consisting of not more than three persons of eminence to review the performance of the Appropriate Commissions or any of them and submit a report with recommendations of such committee to the Central Government;
- (2) The Committee appointed under sub section (1) shall be entitled to take the assistance of experts and consultants to be engaged with the approval of the Forum of Regulators;
- (3) The composition, functions and the terms of reference of the committee as mentioned above shall be prescribed by the central government

Changes related to Central Electricity Authority

- A sub- section 70(16) reading as follows to be added: - (16) The secretary and other officers and employees of the Authority shall be appointed by the Central Government from the Central Power Engineering Services in consultation with the chairperson and members of the Authority and the salary, remuneration, fees, allowance, , pension, leave and gratuity shall be fixed by the Authority in consultation with the Central Government
- Further, Section 72 of the Act to be deleted.

Changes Related to Electricity Inspectors

162(2)

In the absence of express provision to the contrary in this Act, or any rule made thereunder, an appeal shall lie from the decision of a Chief Electrical Inspector or an Electrical Inspector to the Appropriate Government or if the Appropriate Government, by General or special order so directs, to an appropriate commission

In the absence of express provision to the contrary in this Act, or any rule made thereunder, an appeal shall lie from the decision of a Chief Electrical Inspector or an Electrical Inspector to the Appropriate Commission.

Other major changes

- The Words “in accordance with the provisions of subsection (2)” to be deleted from Section 68.
- A new section 69A to be added reading as under:

Whenever any person is carrying out any activity within the area of license of any transmission or distribution licensee and such activity is or shall be affecting the transmission system or distributions system of such licensee, such entity shall obtain prior consent of such licensee as the case may be in the manner specified by the appropriate commission.

Other major changes

- Sub- Section 6 to be added in Section 166 providing :
(6) The decisions of the co-ordination committee constituted under sub- section (5) shall be placed before the appropriate commission within one week.
- Sub-section (ya) to be added in Section 176 reading as under:
(ya) conferment of powers of Department of the Central Government to the Chairperson, APTEL

Other major changes

- Ombudsman may be made the appellate authority in Section 127 instead of divisional commissioner.
- Provisions of Removal of Difficulty Orders may be incorporated in the Act itself.
- Distribution Network licensees and Transmission licensee of the state may be merged
- Consumers taking more than 1 MW in the state (even from supply licensees) are to be treated as open access consumers and the tariff applicable to them will not be regulated.

THANK YOU

Forum of Regulators Meeting

CERC Tariff Regulations 2014-19

Presentation by
Central Electricity Regulatory Commission
New Delhi, 110001

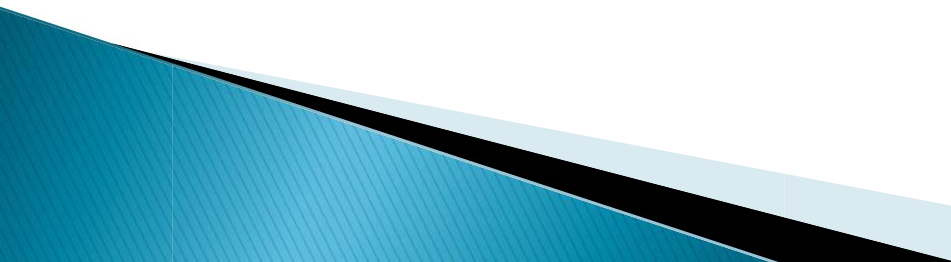
17th January, 2014



In this presentation

- **Prospects for Tariff Regulations 2014-19**
- **Salient Features of Draft Regulations**
 - a) **Tariff Determination and Truing Up**
 - b) **Financial Principles**
 - c) **Operational Parameters**

Prospects for Tariff Regulations, 2014-19

- Regulatory Certainty
 - Simplified Tariff Determination Process – Minimum complexity
 - Investment oriented– in view of capacity addition planned during 12th Plan.
 - Addressing stranded investment –Fuel Shortage
 - To discourage inefficient cost – Pre-specified normative parameters to be specified
- 

Salient Features of Draft Tariff Regulations

Salient Features of Draft Tariff Regulations

I. Capital Cost

- Continuation of determination of tariff based on projected capital expenditure with provisions to deal with variation in projected and actual expenditure
- Controllable and Uncontrollable Factors specified for time and cost over-run

II. Financial Principles

- Post Tax RoE @ 15.5% with Income Tax pass through corresponding to RoE instead of Grossing up
- Continuation of existing approach for financial parameters such as Debt: Equity Ratio, Interest on Loan and Depreciation provisions for regulatory certainty

III. Operational Norms

- Improvement in Norms based on actual performance
- Sharing of benefits on account of SHR, SFC and AEC in the ratio of 3:1 between Generating Companies and Beneficiaries

Salient Features of Draft Tariff Regulations

IV. O&M Expenses

- O&M Expenses based on actual trend and escalation factor for last five years

V. Recovery of Cost and Incentive

- Recovery of Annual Fixed Charges linked to Availability Factor
- Incentive linked to Plant Load Factor

VI. Truing Up

- Provisions for Truing up with Controllable and Uncontrollable Factors incorporated

VII. Provision for Fuel Shortage

Use of alternative source of fuel supply upto 30% of base fuel price. If fuel price exceeds the lower of 30% of base fuel price or 20% of fuel price of previous month, prior consultation with beneficiary

Tariff Determination

- **Application for determination of Tariff**
 - New Generating Station – 120 days of the anticipated date of commercial operation.
 - New Transmission Licensee - 180 days from the anticipated date to be commissioned.
 - Existing Generating Station or Transmission System - 120 days from the date of notification of these regulations.

- **If the COD is delayed beyond 180 days from the date of issue of tariff, the tariff granted shall be deemed to have been withdrawn and it is required to file a fresh application for determination of tariff after the COD.**

Financial Principles

Capital Cost

- Tariff Determination based on Projected Capital Cost/Additional Capital Expenditure
- Detailed Provisions related to Interest During Construction (IDC) and Incidental Expenditure During Construction (IEDC) including Controllable and Uncontrollable Factors

- Controllable & Uncontrollable Factors

- Controllable

- Variations in capital expenditure on account of time and/or cost overruns on account of land acquisition issues
 - Efficiency in the implementation of the project not involving approved change in scope of such project, change in statutory levies or force majeure events
 - Delay in execution of the project on account of contractor, supplier or agency of the generating company or transmission licensee.

- Un Controllable

- Force Majeure events, such as acts of war, fire, natural calamities, etc.;
 - Change in law

Capital Cost

- Capital Cost/Additional Capital Expenditure projected exceeds actual capital cost by more than 5%
 - Refund the excess tariff recovered corresponding to excess capital cost, as approved by the Commission along with interest at 1.20 times of the bank rate as prevalent on April 1 of respective year.
- Capital Cost/Additional Capital Expenditure projected falls short of the actual capital cost by more than 5 %
 - Recover the shortfall in tariff corresponding to reduction in capital cost, as approved by the Commission along with interest at 0.80 times of bank rate as prevalent on April 1 of respective year.
- Initial Spares linked to Plant & Machinery Cost instead of Capital Cost

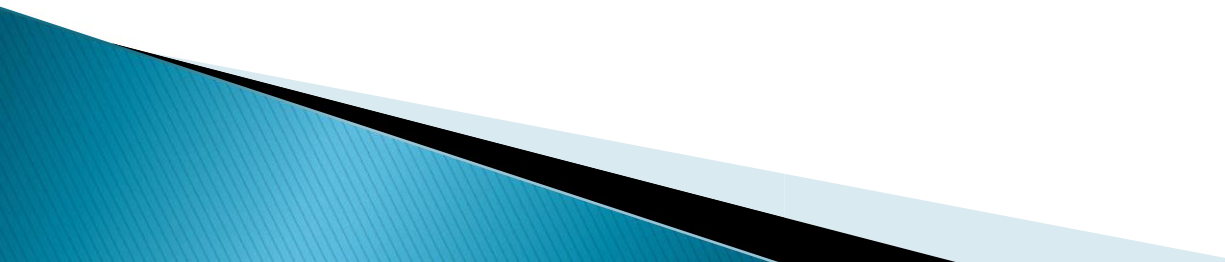
Renovation and Modernization

- Continuation of Special Allowance
- Treatment of Additions in Case of R&M

Depreciation

- No change in depreciation rate
- Useful Life
 - Coal/Lignite based thermal generating station - 25 years
 - Gas/Liquid fuel based thermal generating station - 25 years
 - AC and DC sub-station (including GIS) - 35 years
 - Hydro generating station including pumped Storage hydro generating stations - 35 years
 - Transmission line (including HVAC & HVDC) - 35 years
 - Communication system - 15 years
- Treatment for Asset Addition at the fag end of Useful Life

Return on Equity

- 15.5% for generating stations, transmission system and run of river generating stations
 - 16.5% for storage type generating stations incl. pumped storage hydro generating station and run of river with pondage
 - Additional 0.5% for projects completed in timeline
 - Reduction by 1% in case commissioning without RGMO/ FGMO, data telemetry, and communication system up to load dispatch centre and protection system.
- 

Tax on RoE

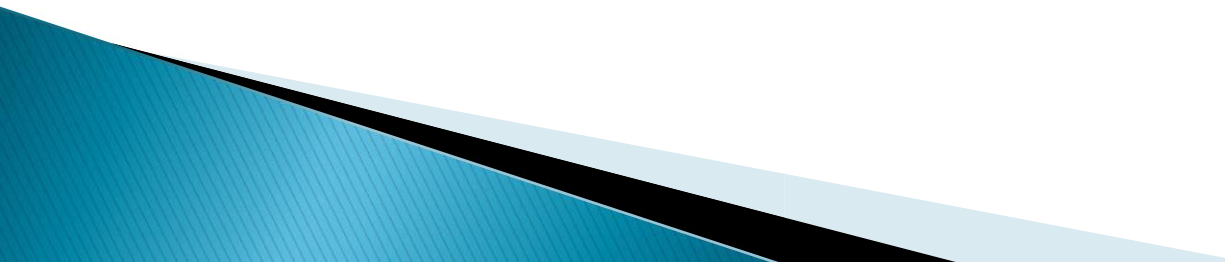
■ Tax on RoE

- Direct Recovery of Tax on income corresponding to permissible Return on Equity
- In case the profit before tax for a particular year is higher than the effective income tax on Return on Equity, it may be recovered on pro-rata basis as :
 “Income Tax to be recovered = Total Income Tax Paid x RoE approved by the Commission/Profit before Tax”
- Sample Illustration Based on Assumed Figures

S.No	Parameter	Case -1	Case -2
1	Return on Equity	100	100
2	PBT	120	80
3	Tax Rate	33.99%	33.99%
3	Actual Income Tax	40.8	27.2
4	Tax to be recovered from Beneficiaries	33.99	27.2

Operational Norms

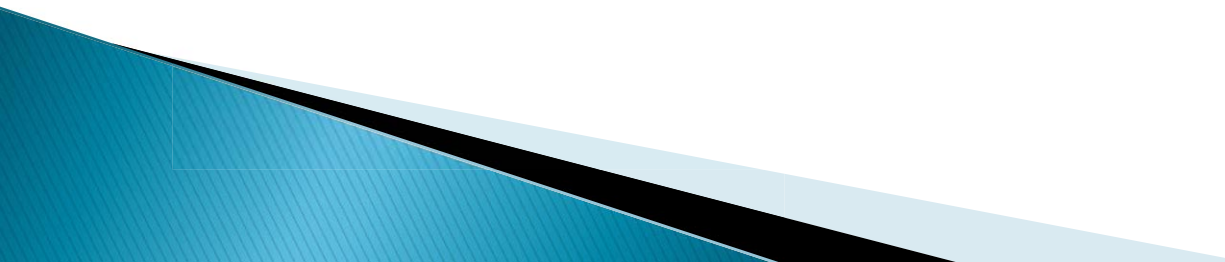
Operation and Maintenance expenses

- O&M Norms derived based on analysis of actual O&M Expenses during last five years and considering the WPI, CPI movement over last five years
 - Escalation Factor considered 6.35% for thermal,
 - Impact of wage revision if any, during the tariff to be allowed in due consideration of Government of India, Department of Public Enterprise guidelines and considering following percentage of O&M as employee cost:
- 

Operational Norms

- Sharing mechanism for gains due to operational parameters

Incentive

- Incentive linked to Normative Plant Load Factor instead of NAPAF for thermal stations
 - Target Availability for Incentive for Transmission System increased
- 

Plant Availability Factor

CEA Recommendation

- Present norms are considered adequate and may be retained.

Draft Regulations

- Present norms retained with some improvements for few thermal stations and some hydel stations

Station Heat Rate

CEA Recommendation

- Existing Stations - Considering the operating heat rate of stations, it is felt that the existing single value heat rate norms for 500 and 200/210/250 MW units may be reduced by 50 kcal/kWh.

Draft Regulations

- Reduction in the range of 50 – 75 kCal/kWh
- New Stations - Gross Operating heat rate (OHR) allowed for coal and lignite based units installed after 2009, may be kept as 3 % (three percentage points) higher than Design Heat rate (DHR) instead of the prevailing norm of 6.5 % higher than Design Heat rate.
- Minimum boiler efficiency for Sub -bituminous Indian coals may be taken as 87 % and lower figures may be allowed only after proper justification.

Draft Regulations

- 4.5% Margin over Design Heat Rate and Boiler Efficiency-87%

Auxiliary Consumption

CEA Recommendation

- For coal and lignited fired units existing norms are considered adequate and may continue.
- For 500 MW and higher size units installed after 1-4-2009:
 - Auxiliary Consumption norms may be reduced by 0.75 %.
500MW Turbine driven BFPs - 5.25 %
500MW Motor driven BFPs - 7.75 %
- For induced draught cooling towers - Additional auxiliary consumption of 0.5 %
- Prevailing auxiliary consumption norm for Gas based stations in open cycle (i.e. 1%) is considered adequate and may continue. For Gas based stations in combined cycle the norm may be reduced to 2.5% from 3%.

Draft Regulations

- Retained existing norms with marginal improvement in some cases for thermal stations
- Reduced hydro generating stations for static excitation system

Secondary Fuel Oil Consumption

CEA Recommendation

- Normative SFC of (except for select high consumption stations) may be taken as 0.25 ml/kWh inclusive of 7 startups per unit.
- Additional start-ups may be allowed additional oil consumption as follows:-

Unit Size (MW)	Oil Consumption per startup (KI)		
200/210/250	20	30	50
500	30	50	90
660	40	60	110

Draft Regulations

- Part of Energy Charge instead of Annual Fixed Charges
- Norms
 - Pit Head – 0.5 ml/kWh
 - Non Pit Head – 1 ml/kwh
- Sharing of Gains between Generating Company and Beneficiaries on monthly basis in the ratio of 3:1

Other Aspects

Truing Up

■ Truing Up

- Truing up exercise along with the tariff petition filed for the next tariff period, with respect to the capital expenditure including additional capital expenditure incurred up to March 31, 2019.
- Where the tariff of a new project approved based on anticipated COD, the generating Company or the transmission licensee to file an application for interim true up of capital expenditure within 180 days of the commercial operation of the new project

■ Parameters for Generating Stations

Controllable Parameters

- Station Heat Rate
- Secondary Fuel Oil Consumption
- Auxiliary Energy Consumption

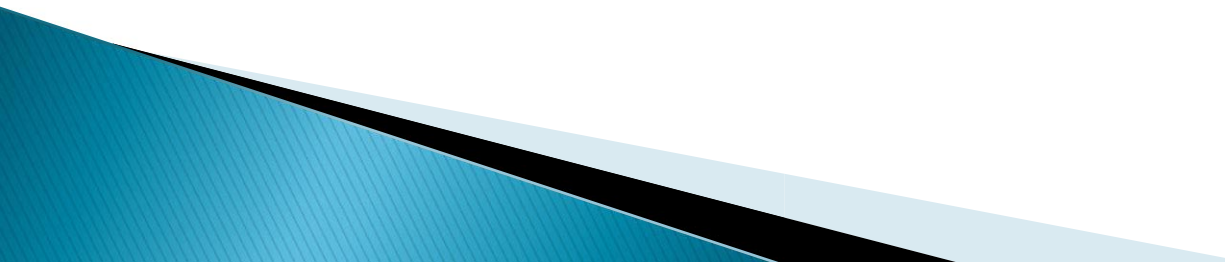
Uncontrollable Parameters

- Force Majeure
- Change in Law
- Primary Fuel Cost

Shortage of Fuel

- **Use of alternative source of fuel supply permitted on account of shortage of fuel or optimization of economical operation through blending. However the same should not exceed 30% of base fuel price. If it exceeds the lower of 30% of base fuel price or 20% of fuel price of previous month, prior consultation from beneficiary to be made not later than 3 days in advance.**

Key Issues for Discussion

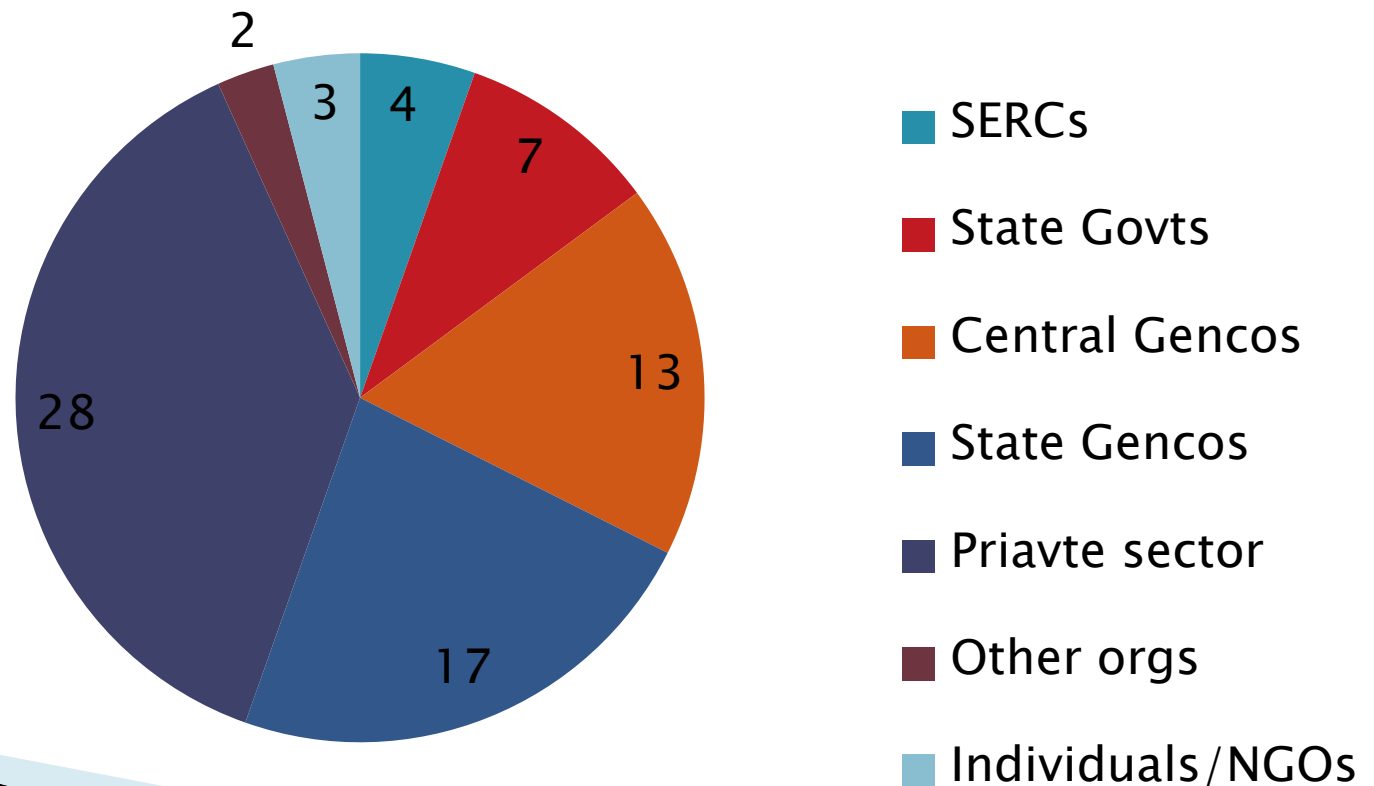
- **Capital Cost – Controllable and Uncontrollable Factors**
 - **Return on Equity and Treatment of Tax**
 - **Operational Norms – NAPAF, SHR, SFC, AEC**
 - **O&M Expenses**
 - **Incentive Mechanism**
 - **Truing Up – At the end of Control Period**
 - **Fuel Shortage**
- 

Thankyou

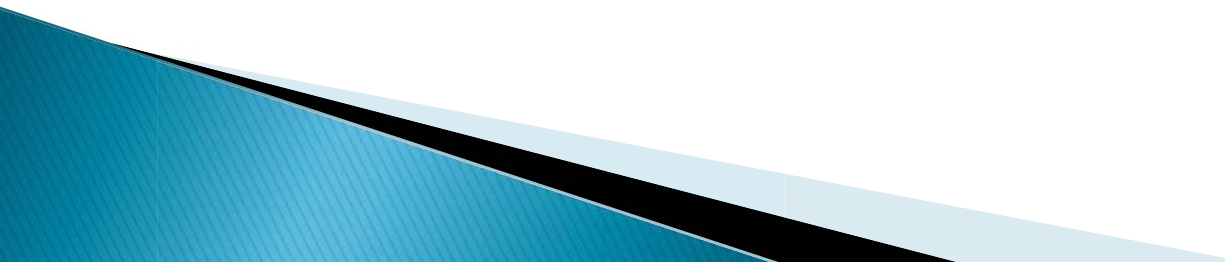
Present Status of Tariff Regulations, 2014-19

- Approach Paper issued by the Commission on 25.6.2013.
- Responses received from 74 stakeholders.

Stakeholder's Response



Present Status of Tariff Regulations, 2014-19

- Draft Regulations and Explanatory Memorandum published on December 6, 2013 for inviting comments
 - Comments/Suggestions received from around 22 stakeholders till date
 - Public Hearings held on January 15 and 16, 2014
 - Last date for submission of comments extended upto January 22, 2014
- 

Commercial Operation Date

- *Thermal Generating station*
 - Date declared by the generating company after demonstrating the maximum continuous rating (MCR) or the installed capacity (IC) through a successful trial run,
- *Hydro Generating Station*
 - Date declared by the generating company from 0000 hour after the scheduling process in accordance with the Grid code is fully implemented, and in relation to the generating station as a whole, the date declared by the generating company after demonstrating peaking capability corresponding to installed capacity of the generating station through a successful trial run
- **Certificate from CEA or any agency designated by Authority** to the effect that the generating station meets all the technical standards of CEA (Technical Standards for Construction of Electrical plants and electric lines) Regulations, 2010 and Grid Code.
- **Demonstration of Plant Availability of not less than Normative Availability in the month following the date of declaration of commercial operation.**

Commercial Operation Date

- *Transmission System*
 - Date Declared by the transmission licensee from 0000 hour of which an element of the transmission system is in regular service after successful charging and trial operation for transmitting electricity and communication signal from sending end to receiving end
- *Communication system or element*
 - Date declared by the transmission licensee from 0000 hour of which a communication system or element is put in service after completion of site acceptance test including transfer of voice and data to respective control centre as certified by the respective Regional Load Dispatch Centre.

Trial Run and Trial Operation

- Generating Station/Unit - Successful running of the generating station or unit thereof at maximum continuous rating or installed capacity for continuous period of 72 hours .
- Transmission system /element - Successful charging of the transmission system /element thereof for 24 hours at continuous flow of active power, and communication signal from sending end to receiving end and with requisite metering system, telemetry and protection system in service enclosing certificate to that effect from concerned Regional Load Dispatch Centre.

Initial Spares

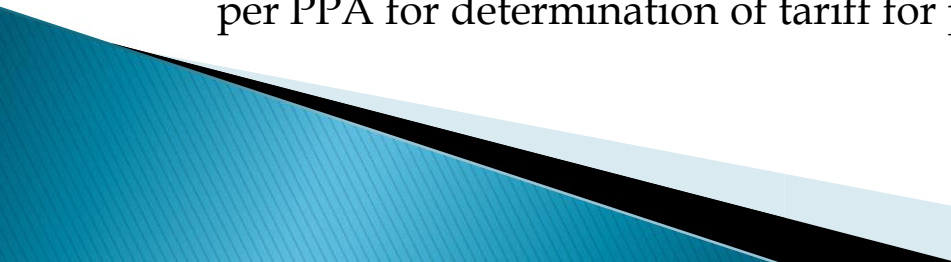
- **Initial Spares as % of Plant and Machinery Cost**
 - Coal-based/lignite-fired thermal generating stations- 3%
 - Gas Turbine/Combined Cycle thermal generating stations – 3%
 - Hydro generating stations including pumped storage hydro generating station – 4%
 - Transmission system
 - **Transmission line – 1%**
 - **Transmission Sub-station – 3%**
 - **Series Compensation devices and HVDC Station – 4.50%**
 - **Gas insulated sub-station (GIS) – 4%**
 - **Communication system – 3.5%**

Capital Cost

- **Capital Cost of new project shall include:**
 - The expenditure incurred or projected to be incurred up to COD of project.
 - Interest during construction, financing charges and any gain or loss on account of foreign exchange risk variation during construction period, on the loans (i) being equal to 70% of the funds deployed, in the event of the actual equity in excess of 30% of the funds deployed, by treating the excess equity as normative loan, or (ii) being equal to the actual amount of loan in the event of the actual equity less than 30% of the funds deployed.
 - Interest during construction and incidental expenditure during construction
 - Capitalised Initial spares subject to the ceiling rates
 - Expenditure on account of additional capitalization and de-capitalisation
 - Adjustment of revenue due to sale of infirm power prior to the schedule commissioning

Capital Cost

- **Prudence Check of Capital Expenditure:**

- For thermal generating station and the transmission system - consideration of the benchmark norms specified/to be specified
 - Where benchmark norms have not been specified - scrutiny of the reasonableness of the capital expenditure, financing plan, interest during construction, incidental expenditure during construction, use of efficient technology, cost over-run and time over-run, competitive bidding for procurement and such other matters.
 - In case of variation of capital cost from benchmark norms - submit the reason for exceeding the capital cost from benchmark norms.
 - The Commission may issue new guidelines or revise the existing guidelines for vetting of capital cost of hydro-electric projects by an independent agency or an expert and in that event the capital cost as vetted by such agency or expert may be considered by the Commission. The Commission may issue new guidelines or revise the existing guidelines for scrutiny and commissioning schedule of the hydro-electric projects.
 - The Commission shall take into consideration the ceiling of actual capital expenditure as per PPA for determination of tariff for prudence check of capital cost
- 

Capital Cost

- **Interest during Construction:**
 - Computed corresponding to the loan **from the date of infusion of fund or date of financial closure, whichever is later**, and after taking into account the prudent phasing of funds upto SCOD
 - In case of additional costs on account of IDC due to delays in achieving the date of commercial operation on SCOD, the generating company or the transmission licensee as the case may be, shall be required to furnish detailed justifications with supporting documents for such delay including prudent phasing of funds.
 - If the delay is due to uncontrollable factors IDC may be allowed after due prudence check
 - Only IDC on actual loan may be allowed beyond the SCOD to the extent found beyond the control of petitioner after due prudence and taking into account prudent phasing of funds.

Capital Cost

- **Incidental Expenditure during Construction**

- Computed from the zero date and after taking into account pre-operative expenses upto SCOD.
- Any revenue earned during construction period up to SCOD on account of interest on deposits or advances, or any other receipts may be taken into account for reduction in incidental expenditure during construction.
- In case of additional costs on account of IEDC due to delay in achieving the date of commercial operation on SCOD, the generating company or the transmission licensee as the case may be, shall be required to furnish detailed justification with supporting documents for such delay including the details of incidental expenditure during delay period and liquidated damages recovered or recoverable corresponding to the delay.
- If the delay is due to uncontrollable factors IEDC may be allowed after due prudence check.
- In case of delay on account of any agency or contractor or supplier of generating company or transmission licensee, the generating company/transmission licensee shall take into account the liquidated damages to the extent of the damages on account of the delay.

Capital Cost

- No additional impact of time overrun or cost overrun shall be allowed on account of non-commissioning of the generating station or associated transmission system by SCOD as the same should be recovered through Indemnification Agreement
- If the generating station is not commissioned on the SCOD of the associated transmission system, the generating company shall bear the IDC or transmission charges if the transmission system is declared under commercial operation by the Commission.
- If the transmission system is not commissioned on SCOD of the generating station, the transmission licensee shall arrange the evacuation from the generating station at its own arrangement and cost till the associated transmission system is commissioned

Additional Capitalisation and De-capitalisation

- **Additional Capitalisation**

- For a new project or an existing project :
 - Undischarged Liabilities recognized to be payable at a future date
 - Works deferred for execution
 - Procurement of initial capital spares within the original scope of work
 - Liabilities to meet award of arbitration or for compliance of the order or decree of a court of law
 - Change in law or compliance of any existing law

- **De-Capitalisation**

- Deduction of original cost of such asset as on the date of de-capitalisation from the value of gross fixed asset and corresponding loan as well as equity from outstanding loan and the equity respectively in the year

Special Allowance and Compensation Allowance

- **Renovation and Modernisation –**

- For coal-based/lignite fired thermal station, an additional expenses for R & M through **special allowance** in lieu of extended life beyond 25yrs from CoD @ 7.5 lakh/MW/Year, thereafter escalated @ 6.35 % every year from 2014-19.

- **Compensation Allowance**

- To meet expenses on new assets of capital nature
- In such an event, revision of the capital cost shall not be allowed on account of compensation allowance but the compensation allowance shall be included in the annual fixed cost.

Years of Operation	Compensation Allowance (Rs lakh/MW/year)
0-10	Nil
11-15	0.20
16-20	0.50
21-25	1.00

O&M Expenses (Rs Lakh/MW)

Coal/Lignite TPS

Year	200/210/250 MW Sets	300/330/350 MW Sets	500 MW Sets	600 MW Sets and above
FY 2013-14 (Existing. Regn)	22.74	19.99	16.24	14.62
FY 2014-15	24.07	20.19	16.32	14.68
FY 2015-16	25.60	21.47	17.35	15.61
FY 2016-17	27.22	22.84	18.45	16.60
FY 2017-18	28.95	24.29	19.63	17.66
FY 2018-19	30.79	25.83	20.87	18.78

Multiplying Factor for Additional Units

Size	Unit	Rs. Lakh/MW
200/210/250 MW	Additional 5th& 6th units	0.90
	Additional 7th& more units	0.85
300/330/350 MW	Additional 4th& 5th units	0.90
	Additional 6th& more units	0.85
500 MW and above	Additional 3rd& 4th units	0.90
	Additional 5th& above units	0.85

O&M Expenses (Rs Lakh/MW)

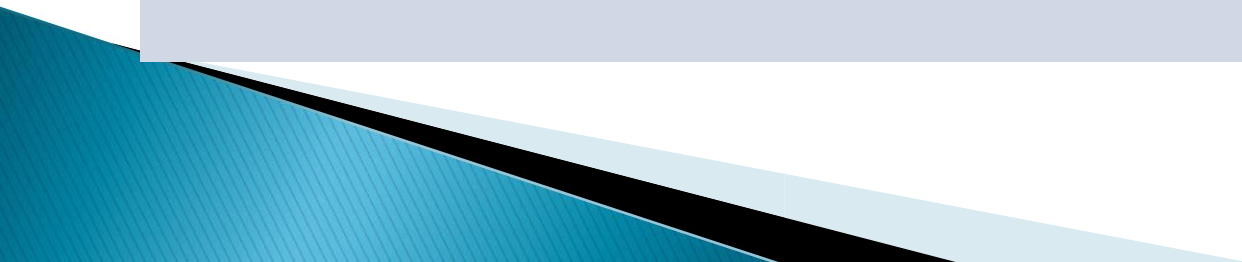
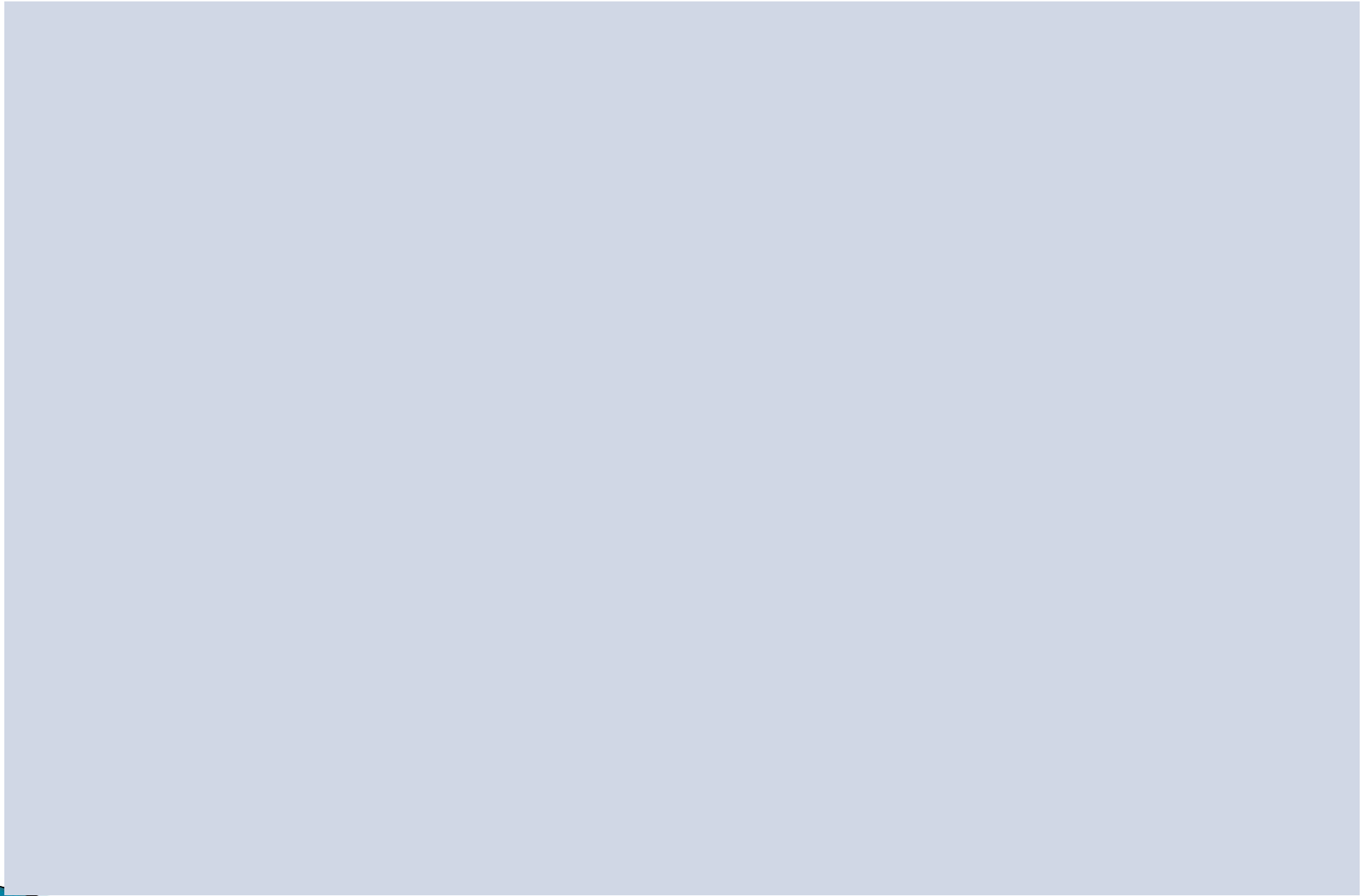
Gas based TPS

Year	Gas Turbine/ Combined Cycle generating stations other than small gas turbine power generating stations	Small gas turbine power generating stations	Agartala GPS	Advance F Class Machines
FY 2013-14	18.49	28.61	39.66	
FY 2014-15	16.77	33.33	41.20	25.72
FY 2015-16	17.83	35.44	43.82	27.36
FY 2016-17	18.97	37.69	46.60	29.09
FY 2017-18	20.17	40.09	49.56	30.94
FY 2018-19	21.45	42.63	52.70	32.91

Lignite based TPS

Year	125 MW
FY 2014-15	29.12
FY 2015-16	30.97
FY 2016-17	32.94
FY 2017-18	35.03
FY 2018-19	37.25

O&M Expenses - Transmission



O&M Expenses – Generation (Rs Lakh/MW)

	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2012-13	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018- 19
Generating Stations	Actual					Derived	Projected				
Unchachar TPP	17.98	18.71	22.42	22.6	24.44	23.59	26.53	28.21	30	31.91	33.93
NLC TPS I Exp	13.49	16.47	15.59	19.94	23.23	19.61	22.05	23.45	24.94	26.52	28.2
NLC TPS II	17.46	20.2	20.39	21.56	23.95	23.04	25.91	27.55	29.3	31.16	33.14
Bokaro TPS	17.82	20.43	22.75	26.5	NA	24.96	28.07	29.85	31.74	33.76	35.9
NSPCL Bhilai Ext			14.44	13.06	17.25	15.73	17.79	18.92	20.12	21.4	22.76
Average (200/210/250 MW)	16.69	18.95	19.12	20.73	22.22	21.39	24.07	25.6	27.22	28.95	30.79

	FY 2008-09	FY 2009- 10	FY 2010-11	FY 2011-12	FY 2012- 13	FY 2012-13	FY 2014-15	FY 2015- 16	FY 2016-17	FY 2017- 18	FY 2018-19
Generating Stations	Actual					Derived	Projected				
Simhadri TPS	13.76	12.09	14.42	11.04	13.43	14.54	16.35	17.38	18.49	19.66	20.91
Tal Kaniha TPS	9.25	9.83	12.86	14.99	13.07	13.3	14.95	15.9	16.91	17.98	19.12
Rihand TPS	12.79	13.03	15.42	14.47	14.59	15.7	17.65	18.77	19.97	21.23	22.58
Average (500 MW Sets)	11.94	11.65	14.23	13.5	13.7	14.51	16.32	17.35	18.45	19.63	20.87

O&M Expenses – Generation (Rs Lakh/MW)

	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2012-13	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
Generating Stations	Actual					Derived	Projected				
Anta GPS	14.63	12.72	16.45	13.79	18.72	17.15	19.37	20.6	21.91	23.3	24.78
Auraiya	10.06	13.71	13.34	12.72	16.65	14.88	16.81	17.88	19.01	20.22	21.5
Kawas	12.28	13.36	14.49	13.44	16.27	15.7	17.73	18.86	20.05	21.33	22.68
Gandhar	11.2	11.86	13.3	15.41	12.33	14.43	16.29	17.33	18.43	19.6	20.84
Faridabad	11.82	10.39	20.35	22.72	14.63	17.83	20.14	21.42	22.78	24.22	25.76
Dadri GPS	9.23	10.41	9.97	10.82	10.06	11.4	12.87	13.69	14.56	15.49	16.47
Kayamkulam	22.52	14.48	26.08	19.45	18.36	22.88	25.84	27.48	29.22	31.08	33.05

O&M Expenses – Generation (Rs Lakh/MW)

Generating Stations	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2012-13	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
	Actual					Derived	Projected				
NHPC Stations											
Bairasul	35.01	34.13	40.32	43.77	40.84	43.51	48.97	52.08	55.39	58.9	62.64
Loktak	64.36	69.76	85.25	89.5	68.87	82.83	93.25	99.17	105.47	112.17	119.29
Salal	14.31	14.72	17.14	18.12	19.48	18.72	21.08	22.41	23.84	25.35	26.96
Tanakpur	39.76	41.83	51.76	56.07	59.12	55.38	62.35	66.31	70.52	75	79.76
Chamera - I	14.85	14.39	15.4	19.86	18.24	18.51	20.83	22.16	23.56	25.06	26.65
Uri	9.91	11.16	13.33	16.14	17.25	15.04	16.93	18.01	19.15	20.37	21.66
Rangit	58.6	55.13	68.37	59.06	66.21	69.11	77.77	82.71	87.97	93.55	99.49
Chamera - II	14.52	17.31	23.35	28.49	26.51	24.39	27.47	29.22	31.07	33.05	35.15
Dhauliganga	16.91	19.13	21.94	22.31	22.31	22.97	25.86	27.5	29.24	31.1	33.08
Dulhasti	15.99	28.24	30.1	35.52	36.38	31.29	35.26	37.5	39.88	42.41	45.11
Teesta- V	11.42	11.24	13.05	13.75	15.93	14.6	16.44	17.48	18.59	19.77	21.03
Sewa-II	-	-	35.71	54.84	49.19	49.17	55.43	58.95	62.69	66.67	70.91
KHEP	18.6	23.27	21.21	26.75	28.16	26.33	29.69	31.58	33.58	35.71	37.65
RHEP	10.34	10.92	13.22	14.21	17.47	14.7	16.58	17.63	18.75	19.94	21.03
DHEP	33.97	36.75	42.26	51.77	57.89	49.41	55.72	59.26	63.03	67.03	71.28
NHDC Stations											
Omkareshwar	5.52	5.69	8.99	9.62	10.71	8.96	10.1	10.74	11.42	12.15	12.92
Indira Sagar	5.46	6.73	7.72	6.66	7.38	13.13	14.81	15.75	16.75	17.82	18.95
SJVNL	11.88	11.87	13.44	15.67	14.81	15.14	17.08	18.16	19.32	20.54	21.85
Tehri	13.47	12.87	20.61	17.56	19.45	18.73	21.12	22.46	23.88	25.4	27.01

Thermal Stations - PAF (%)

S. No.	Stations	Plant Availability Factor (%)					
		2008-09	2009-10	2010-11	2011-12	2012-13	Five year Average
	NTPC Stations						
1	Singrauli	90.91	92.44	97.3	89.55	94.05	92.85
2	Rihand	95.17	100.94	91.05	97.17	82.05	93.28
3	Rihand II	101.95	91.79	100.45	92.2	100.08	97.29
4	Rihand III	NA	NA	NA	NA	62.65	62.65
5	Tanda	89.55	92.61	93.52	89.16	84.46	89.86
6	Unchahar	91.77	98.8	99.77	94.44	98.78	96.71
7	Unchahar II	98.41	95.81	100.38	92.96	100.07	97.53
8	Unchahar III	93.09	104.83	95.62	101.66	100.06	99.05
9	Korba	97.48	97.96	93.24	79.76	90.96	91.88
10	Korba III	NA	NA	81.38	76.76	94.76	84.3
11	Vindhyachal I	93.33	96.48	96.2	91.27	93.97	94.25
12	Vindhyachal II	95	97.06	97.02	89.65	94.17	94.58
13	Vindhyachal III	96.93	99.7	99.39	97.19	98.96	98.43
15	Ramagundam Stage I and II				94.34	93.4	93.48
16	Ramagundam Stage III	93.52	93.65	92.48	94.84	87.03	90.94
17	Sipat	96.72	94.39	96.95	98.78	85.69	94.51

Thermal Stations - PAF (%)

S. No.	Stations	Plant Availability Factor (%)					Five year Average
		2008-09	2009-10	2010-11	2011-12	2012-13	
	NTPC Stations						
18	Sipat I	NA	NA	NA	70.99	80.54	75.77
19	Simhadri Stage II	94.54	94.38	94.09	89.79	75.41	89.64
20	Farakka	76.81	73.36	87.24	82.56	74.22	78.84
21	Farakka Stage III	NA	NA	NA	NA	70.65	70.65
22	Kahalgaon I	80.11	68.74	75.09	80.19	85.61	77.95
23	Kahalgaon II	72.86	65.08	68.73	64.77	75.05	69.3
24	Badarpur	94.48	86.46	90.17	76.7	90.23	87.61
25	Tal kaniha	85.54	90.49	87.79	85.52	82.12	86.29
26	Talcher Stage I	88.5	86.68	84.77	80.83	81.93	84.54
27	Talcher Stage II	91.67	97.4	92.5	88.55	82.87	90.6
28	Dadri Thermal	101.22	101.37	98.67	96.6	98.24	99.22
37	Jhajjar STPS	NA	NA	38.02	65.18	84.77	62.66
38	NSPCL – Bhilai Ext.	NA	45.88	74.97	73.5	76.13	67.62
	DVC Stations*						
1	Bokaro TPS	62.54	63.75	62.26	60.82	56.3	61.13
2	Chandrapura	73.26	62.84	75.04	60.87	76.49	69.7
3	Durgapur	62.68	66.57	49.07	63.79	67.02	61.82
4	Mejia	51.54	58.06	74.62	70.85	66.11	64.24
	NLC Stations						
1	NLC TPS – I	60.76	70.78	66.32	68.01	68.93	66.96
2	NLC TPS II - Stg - I	66.41	77.26	82.16	84.91	86.35	79.42
3	NLC TPS II-Stg II	70.79	84.06	82.9	85.65	87.69	82.22
4	NLC TPS I Exp.	85.28	81.78	82.04	83.93	90.73	84.75

Thermal Stations - PAF (%)

S. No.	Stations	Plant Availability Factor (%)					Five Year Average
		2008-09	2009-10	2010-11	2011-12	2012-13	
1	Anta	83.17	89.38	89.7	94.09	93.61	89.99
2	Auraiya	86.19	91.33	96.05	92.47	91.55	91.52
3	Gandhar	84.24	89.74	92.41	94.05	93.58	90.8
4	Kawas	84.14	89.56	91.43	96.43	90.56	90.42
5	Faridabad	72.63	93.15	89.85	89.86	91.44	87.39
6	Dadri Gas	89.01	90.12	96.3	94.8	97.68	93.58
7	Kayamkulam	92.56	94.14	92.04	96.13	92.62	93.5
	NEEPCO						
1	Assam Gas	70.85	69.79	74.04	70.15	66.25	70.22
2	Agartala Gas	88.99	88.99	88.99	88.99	87.78	88.74

Thermal Stations - PAF (%)

S. No.	Stations	Plant Availability Factor (%)					Five Year Average
		2008-09	2009-10	2010-11	2011-12	2012-13	
1	Anta	83.17	89.38	89.7	94.09	93.61	89.99
2	Auraiya	86.19	91.33	96.05	92.47	91.55	91.52
3	Gandhar	84.24	89.74	92.41	94.05	93.58	90.8
4	Kawas	84.14	89.56	91.43	96.43	90.56	90.42
5	Faridabad	72.63	93.15	89.85	89.86	91.44	87.39
6	Dadri Gas	89.01	90.12	96.3	94.8	97.68	93.58
7	Kayamkulam	92.56	94.14	92.04	96.13	92.62	93.5
	NEEPCO						
1	Assam Gas	70.85	69.79	74.04	70.15	66.25	70.22
2	Agartala Gas	88.99	88.99	88.99	88.99	87.78	88.74

Overview of Smart Grid and Conceptual Framework of Smart Grid Regulations

N. S. SODHA

Executive Director, Power Grid

January 18, 2014

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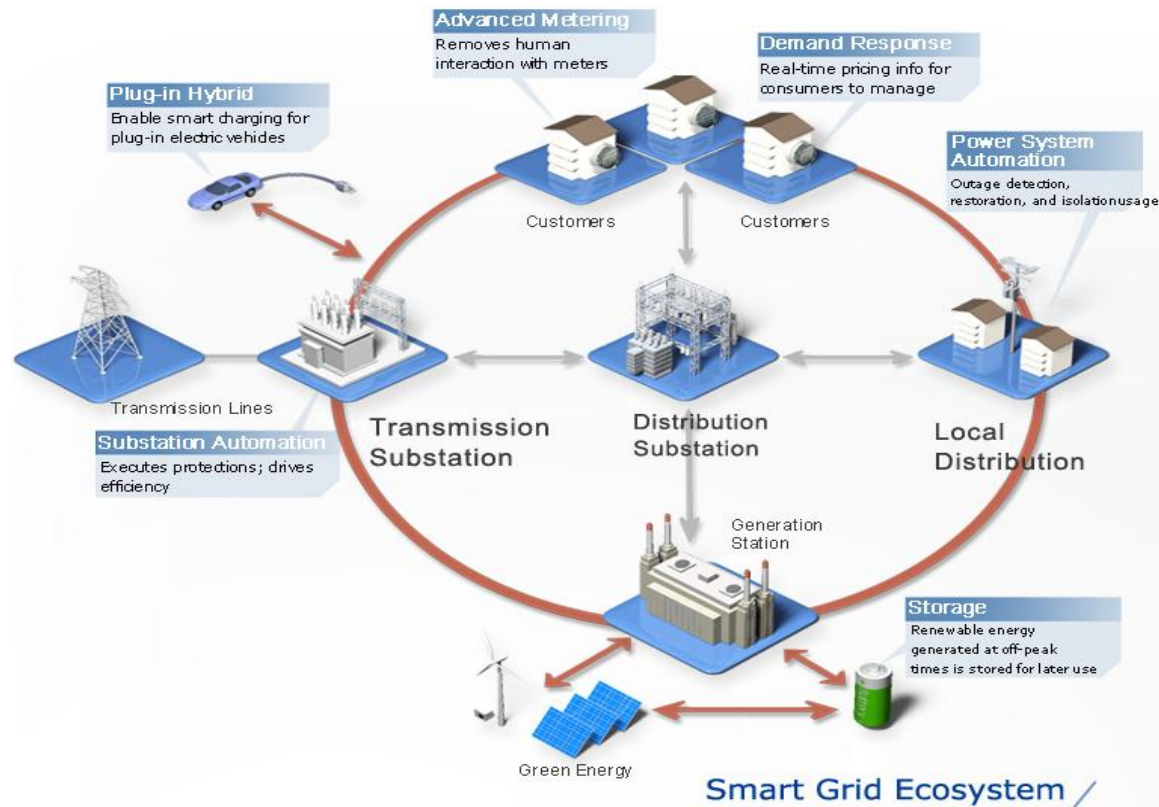
- **Smart Grid Ecosystem and Applications**
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Smart Grid Ecosystem and Applications

- A set of technology implementation that uses advanced metering, communication and control equipment to facilitate interaction b/w multiple entities
- Encompasses a variety of technologies that span the complete electrical system including the user end
- Several applications areas have emerged:
 - Peak Load Mgt. / Demand Response
 - RE Integration
 - Outage Management
 - Power Quality Management
 - Customer Management
 - Micro-Grids
 - Electric Vehicles and Storage (V2G/G2V)



Key Benefits of Smart Grid

Self Healing

Automatically detects & resolves/isolates problems in the network

Resilience

Resists attacks; Faster restoration capabilities

Asset Utilization

Better asset monitoring, visibility, measurement & control systems

Integration

Enables incorporation of multiple generation and storage options

Inclusive

Promotes two-way communication & enables customer participation

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Institutional Structure and Activities Underway

- **India Smart Grid Task Force (ISGTF)**

Inter-ministerial body created to provide policy direction to the Smart Grid initiatives in the country

- **India Smart Grid Forum (ISGF)**

A PPP initiative, responsible for helping the stakeholders in the deployment of smart grid technologies and undertaking research work for promotion of such technologies

- **Smart Grid Vision and Road Map For India**

The Government of India (GoI) has adopted a National Smart Grid Vision for India with key objective:
"Transform the Indian power sector into a secure, adaptive, sustainable and digitally enabled ecosystem that provides reliable and quality energy for all with active participation of stakeholders"

- **14 Utility Pilot Projects**

Covers several key applications of SG - At varied level of preparedness (Tender documents for some of them have already been announced)

In addition, there are several initiatives that respective entities have been undertaking working in their domains to support smart grid implementation in India- CEA, BIS, CPRI, BEE etc.

Functionalities of SG Utility Pilots

National Priorities

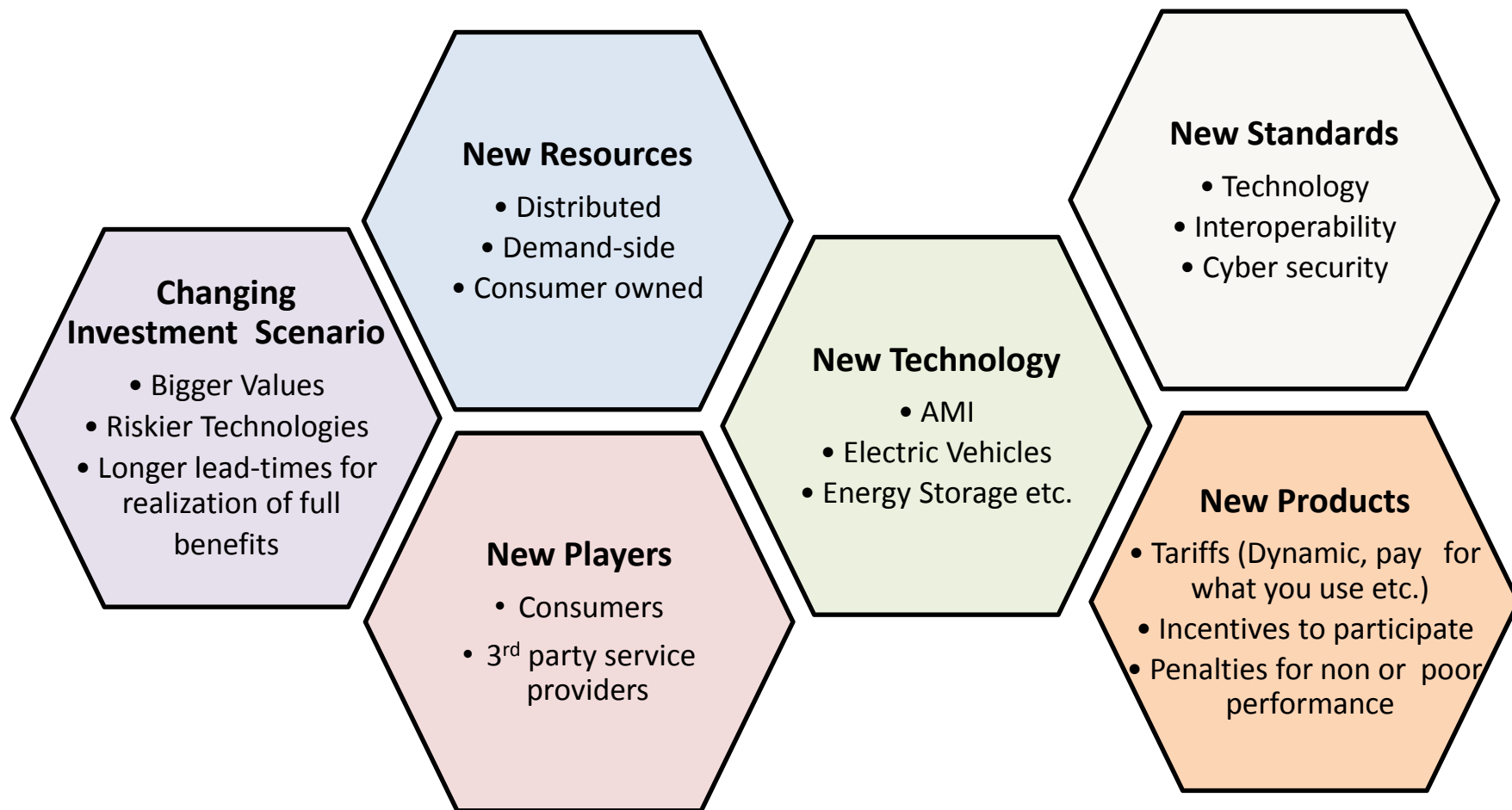
Smart Grid Interventions proposed under the 14 GOI Pilots

Power Demand Shortage	Demand Side Management		Demand Response	
	Peak Load Management			
Clean Energy	Renewable Energy Integration		Demand Response (<i>for balancing</i>)	
Loss Reduction/ Operational Efficiency Improvement	Theft Management & Tamper Detection		Asset Monitoring	Meter Data Management System
	Substation Automation		AMI	
Consumer Service Standards	Power Quality	Work Force/Crew Management		Outage Management
	Automatic Billing		Consumer portal	

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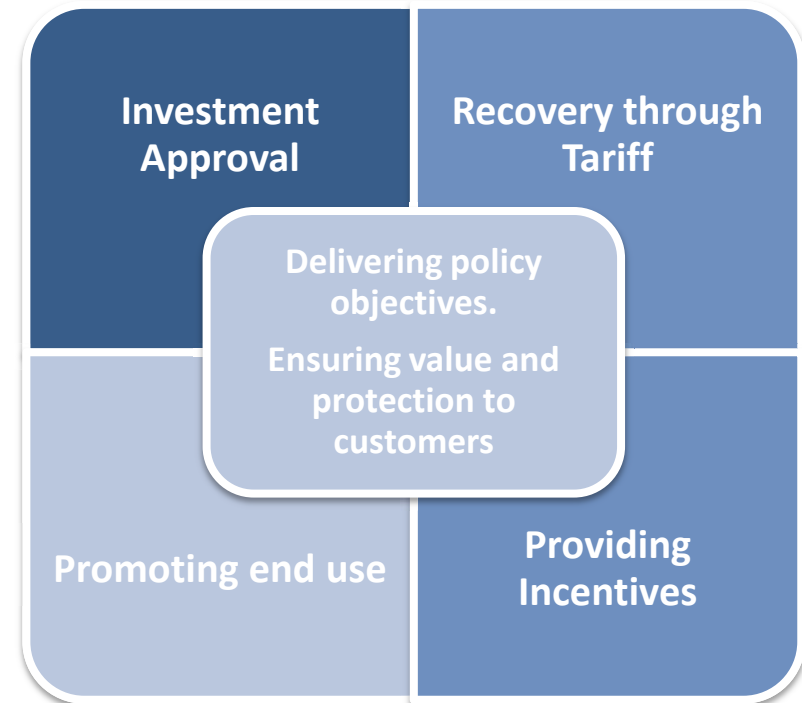
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Need for Smart Grid Regulations



Context of Smart Grid Regulations

- Smart Grids cannot evolve without dynamic, flexible regulation
- The regulator will be a facilitator to smart grids business
- Discoms need to demonstrate clear positive benefits to consumers
- Regulators more than ever need to protect the interests of the consumers



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Objective of Smart Grid Regulations

1

- Efficiency in generation and licensee operations
- Manage T&D network effectively
- Enhance network security
- Integrate renewable and clean energy into the grid
- Enhance network visibility and access
- Improve customer / prosumer service level

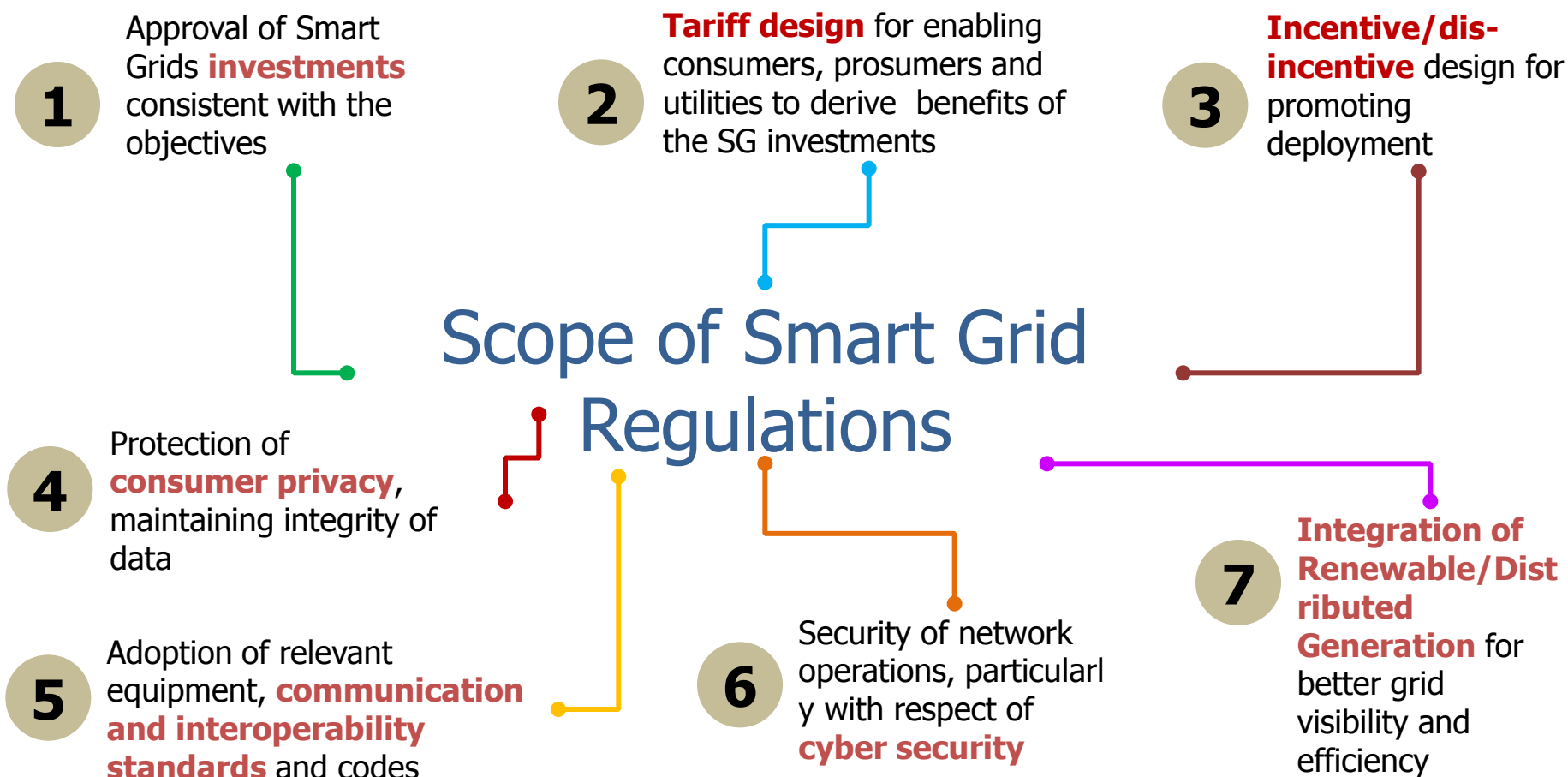
By greater technology adoption across the value chain in electricity sector (especially in T&D)

2

Takes into consonance the National & State Roadmaps, and aims to **propagate investments in SG and allied technologies in accordance with these roadmaps**

3

Considering early stages of development, provides **flexibility** to experiment with new technologies and applications while duly protecting the legitimate **interests of consumers and prosumers**



Entities may be required to demonstrate adherence to the requirements stipulated herein through appropriate reporting structures (preferred through automated means with minimum human intervention)

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Smart Grid Regulations Coverage

Investment

- Review and Approval of Smart Grid Investme
- Recovery of Costs
- Role of Smart Grid Consultation Committee (SG-CC)
- Evaluation, Measurement & Verification

Tariff Design

- Implement specific Tariff Structure to promote deployment
- Process of tariff setting

Safety and Standards

- Product Standards
- System Standards
- Performance Standards
- Network and Communication Standards
- Customer Data Protection Standards

Customer Engagement

- Awareness and Capacity Building
- Customer Participation and Incentives
- Consumer or Prosumer Dispute Redressal Process

Smart Grid Cell & Nodal Officer

- Constitution of Smart Grid Cell
- Appointment of Nodal Officer

While the regulations provides details of various themes, in certain cases it interfaces with the developments/standards and process already laid out in various documents

Investments

Tariff Design

Safety and Standards

Customer Engagement

Smart Grid Cell & Nodal Officer

Review and Approval of Smart Grid Investments

- Approval of SG projects above a specified value
- Investments plan may be aligned to the MYT cycle
- Aligned with the state and national SG roadmap
- CBA to be undertake for all stakeholders involved/affected
- Project plan to include training and customer engagement

Smart Grid Consultation Committee (SG-CC)

- To be appointed by the Commission
- Assist the SERC SG project/plan evaluation
- Undertake or direct research and analysis specific aspects
- Creation of SG-CC Fund through the licensee annual fees

Recovery of Cost

- ARR determination process (***Socialization***)
- Specific tariff schemes (***Recovery from specific consumer segment***)
- Surcharges
- Pricing of new services like reliability guarantees/slabs etc.

Evaluation, Measurement and Verification (EM&V)

- All utilities to be evaluated and guided by EM&V framework

Investments

Tariff Design

Safety and
Standards

Customer
Engagement

Smart Grid Cell
& Nodal Officer

Design of Tariff Structures for Smart Grids Programs

Implement specific tariff regimes for Smart grids projects:

Time of Use (TOU) Tariff

Customer pays a higher amount of money (**on-peak prices**) for the peak hours during the day and lower (**off-peak**) prices during the night

Critical Peak Pricing (CPP)

Customers pays **significantly high prices** under predetermined trigger conditions. This type of rate is an additive one and can be combined with any other (usually TOU) tariff.

Real-Time Pricing (RTP) Tariffs

Consumption is charged **on an hourly or half-hourly or fifteen minute basis and mirror wholesale prices/cost trends** to the customers.

Variant and Combination Tariff

Variant and combination of tariffs considering the purpose, the benefits envisaged, technology considerations and consumer protection needs

Investments

Tariff Design

Safety and
Standards

Customer
Engagement

Smart Grid Cell
& Nodal Officer

Guiding Principle in Design of Tariff Structures for Smart Grids Programs

Tariffs to be **simple, understandable, financially rewarding for consumer**, and ensure that the impact and benefits for the licensees and consumers/prosumers are apparent.

Notify **suitable Distributed Generation (DG) Tariffs for prosumers** selling electricity from the DG facilities to the grid.

Reflect **suitable incentives and dis-incentives for consumers participating in the tariff programs** based on the level of adherence *(for programs related to Demand response or those that involve consumer or prosumer participation)*

Provision for R&D activities in the field for Smart Grid projects, to be recovered through ARR- Transco, Discom and Load Despatch

Investments

Tariff Design

**Safety and
Standards**

Customer
Engagement

Smart Grid Cell
& Nodal Officer

Safety and Standards Related to Smart Grids

Product

Where available BIS standards to be complied with for all equipment and technology related to smart grids.

System

BIS/CEA standards to be complied with for all system and network operational matters. E.g. IEGC, Metering Standards, Technical Standards on Grid Connectivity

Network and Communication

If related to interoperability and cyber security are in place by either BIS or CEA then they shall be adopted else closest international standard norms shall be followed.

Where standards by relevant nodal entity are not available , those notified by IEC/IEEE/ANSI Standard may apply

Commission may require certificate of compliance from the designated nodal agency

Investments

Tariff Design

Safety and
Standards

Customer
Engagement

Smart Grid Cell
& Nodal Officer

Safety and Standards Related to Smart Grids

Performance Standards

- **SOP regulations to be applicable for assessing the performance** the SG projects and for incentivizing / penalizing performance of licensees
- May specify and **require implementation of additional SOPs** to maximize the benefits and ensure compliance
- All SoPs to be met shall be **measurable through measurement, visualization and analytics facilities**

Customer Data Protection

- **Ensure protection of consumer privacy** as the highest levels of priority. Specify **rules for customer privacy & data protection** to follow
- Commission may allow licensees to disclose consumption data to third parties,
- **No entity shall be permitted to sell/disseminate** consumer data to any party or use for other purposes
- **Consumers shall have access to all of their own consumption data**
- Disputes to be resolved through Consumer Grievance Redressal Forum & Electricity Ombudsman

Investments

Tariff Design

Safety and
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Customer Engagement and Smart Grids

1

Awareness and Capacity Building

- Earmark up to [XX%] of the project cost for each smart grids project towards consumer awareness & capacity building
- Define a clear internal & external communication strategy that identifies the communication needs linked to the key project components

2

Customer Participation & Incentives

- Consumers to be permitted to opt in or out of the programs
- May approve proposals for incentives/dis-incentives to participating consumers
- Full details of the program rebates, incentives and penalties to be available on the Licensee's website
- Review schemes on the basis consumer/prosumer and utility feedback

3

Consumer or Prosumer Dispute Redressal Process

- Disputes resolution through the CGRF & office of the Electricity Ombudsman, as relevant.
- Time to time review and modify relevant regulations on Consumer Grievance Redressal to ensure effective implementation of the Smart Grids program

Investments

Tariff Design

Safety and
Standards

Customer
Engagement

**Smart Grid Cell
& Nodal Officer**

Constitution of Smart Grid Cell and Appointment of Nodal Officer

- May require **Licensees to constitute a Smart grids Cell** responsible for coordinating activities related to defining and implementing approved SG roadmap and pilots
- Upon its constitution, Licensee to appoint a **nodal officer** for heading the operations of such cell

SG Cell functions:

- Development of the overall SG program and the identification of specific plans
- Develop quality DPRs in line with program requirement, roadmaps and other regulations and codes
- Record information on the progress & performance over time and report back to the Commission
- Report to the Commission on the SOPs achieved against the notified benchmarks

Licensee may combine activities related to energy efficiency, DSM and SG implementation within the same cell

Absence of a Smart Grids Cell shall not limit the implementation of the Smart Grids projects by the Licensee

Assessment of Performance of SG Projects & Programs

1

Performance Measurement through KPI

- Define **Key Performance Indicators (KPIs) and their measurement criteria** and the process for monitoring and reporting.
- For each KPI there shall also be a methodology for measuring and verifying the performance approved by all stakeholders.

2

Project Monitoring and Progress Reporting

- Monitoring to include **methods for identifying and resolving project issues and disputes**
- **Project progress reports** to be submitted to the Commission as per periods specified through orders
- After the completion of each project, a completion report to be submitted to the Commission within 3 months of project completion.

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Technical Committee for Development of SG Regulations

- **Constituted by the Ministry of Power**

- Mr. B N Sharma, Joint Secretary (Distribution), MoP (Chairman)
- Mr. Pravinbhai Patel, Member (Technical), GERC
- Mr. Alok Gupta, Member, MPERC
- Mr. Pankaj Batra, Chief Engineer, I/C, CEA
- Mr. S A Soman, Professor, IIT-Mumbai
- Mr. N. S. Sodha, Executive Director, PGCIL Ltd. (Convenor)

- **Role of Committee**

- To provide technical expertise and advice to the PACE-D TA program team during the development of regulations
- To review the draft documents and help in the formulation of the regulations which will be finally submitted to the Forum of Regulators (FOR) for its consideration

Way Forward

- Draft Smart Grid Model Regulations and EM shall be submitted shortly for consideration of the Forum of Regulators based on today's presentation and inputs received
- FoR may consider these Draft Smart Grid Model Regulations for adoption suitably and individual SERCs may be advised to build up their regulations based on these Model Regulations
- FoR may advise SERCs in the states where Smart Grid Pilot projects are being implemented to give regulatory approval for the projects expeditiously.

National Optical Fiber Network (NOFN) Project

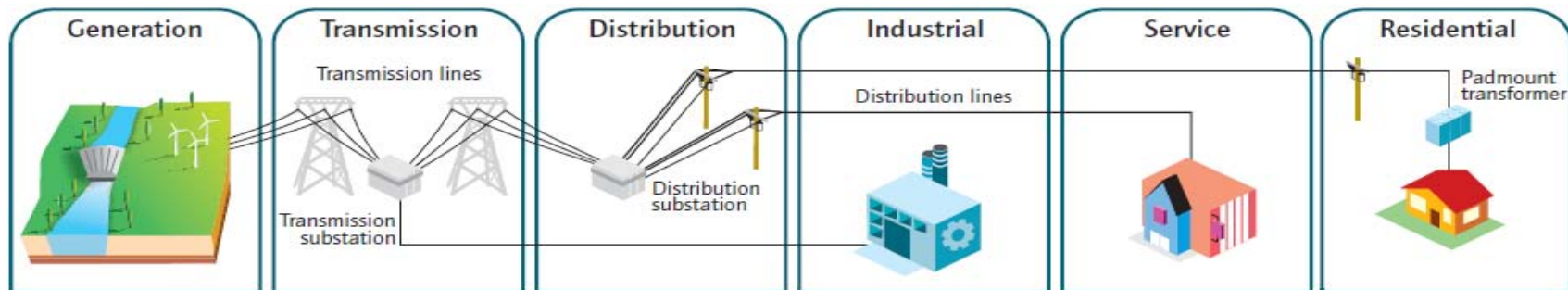
- NOFN project intends to provide broadband connectivity to approx. 2,50,000 Gram panchayats of India.
- Will leverage existing fiber networks of PSUs such as BSNL, RailTel, GAIL and PGCIL etc. to provide internet access, e-services and e-applications to the Gram panchayats.
- NOFN uses Gigabit passive optical network (GPON) technology indigenously developed by Centre for Development of Telematics (C-DOT)
- In first phase, connecting 1,00,000 panchayats and in second phase connecting 1,50,000 panchayats is proposed.
- Pilots are being tried at Ajmer in Rajasthan, Vishakhapatnam in Andhra Pradesh, Panisagar in Tripura, Thane & Jalka Shahpur in Maharashtra.

Need for Including 33kV Sub-stations in NOFN

- Proposal to include Substations up to 33kV within the NOFN project to provide the communication backbone for distribution automation and smart grid applications
- Increasing processing speeds and functionality of Intelligent Electronic Devices (IEDs) within substations, enhanced security requirements and elimination of interference from power lines has driven this investment.
- Fiber Optic Cables provides wide range of benefits including IP protocol for communicating critical information and for optimal performance.
- Creating an electricity distribution fiber network will enable multiple operations and applications like SCADA, load, asset & distributed generation management to co-exist on one system.
- It will save significant investment in communication network which would otherwise have to be borne by individual discoms.
- There is need to establish a regulatory and commercial mechanism for funding of the last mile connectivity up to 33 kV substations and for sharing of larger Network.

Thank You

Traditional Grid vs. Smart Grid



TRADITIONAL GRID

Centralized
electricity
generation
with majorly
thermal plants

Manual
restoration in
case of outage

Manual
monitoring of
hardware with
minimum use
of sensors

Blackouts and
power cuts
during grid
failure

One way
communicatio
n with electro -
mechanical
metering

Few customer
choices
available

SMART GRID

Distributed
electricity
generation
with integrated
renewable
sources

Self healing
during outage

Intelligent
equipment
with self
monitoring
with extensive
use of sensors

Adaptive
operation and
islanding in
case of grid
failure

Two way
communication
of information
with digital
metering

Customer
empowerment
with many
choices

POWER FINANCE CORPORATION LIMITED

Nodal Agency for R-APDRP

R-APDRP related regulatory issues

18 Jan 2014



RAPDRP : Background



- As per RAPDRP guidelines, urban towns having population >30,000 as per 2001 census (>10,000 in special category states i.e. NE states, Sikkim, J&K, HP & Uttarkhand) are covered for providing assistance.
- Under Part-A(IT and SCADA) projects, initially 100% cost of project sanctioned as GoI loan. 100 % loan are convertible into grant, subject to timely and successful completion of projects and verified by TPIEA(Third party independent evaluation Agency).
- Under Part-B projects, initially 25% of project cost (90% in sp cat states) is sanctioned as GoI loan. Balance 75% (10% for sp cat states) is to be availed from own source/ FIs such as PFC/REC etc. Up to 50% of project cost (up to 90% in sp cat states) is convertible into grant on achievement of AT&C loss reduction to 15% on sustained basis for 5 years (in 5 equal yearly instalments) after verification by TPIEA.

Regulatory treatment of grant



- MOP, Gol has sanctioned RAPDRP projects consisting of Part-A (IT & SCADA) and Part-B projects during Feb. 2009 till Sep.2013. Initially loan against project is sanctioned as per RAPDRP conditionality, which is convertible to grant on achievement of milestone/performance as per RAPDRP guidelines.
- As per guidelines, utilities are required to inform respective SERC about all RAPDRP schemes, for which loan has been availed.
- Total cost of sanctioned projects till date is Rs.37190 crores including Part-A and B, a snapshot of sanctioned cost and maximum possible grant from Gol is given below:

	Part-A (IT)	Part-A (SCADA)	Part-B	Total
Sanction Cost	5234	1575	30381	37190
Max. projected conversion into grant	5234	1575	16897	23705
			<u>State wise details</u>	

- Further, utility has to keep provision for giving incentive to employees under RAPDRP Incentive Scheme for towns where AT&C loss is reduced to 15% or below. Gol will provide 2% of fund (converted as grant from Part-B loan) as Gol grant. Utilities to provide matching fund (from their expenses) for distribution as incentive to its employees under RAPDRP Incentive Scheme. This matching fund (to be arranged out of enhanced revenue of town due to loss reduction) to be allowed as expense while computing ARR.

Uniform guideline on regulatory treatment of grant



- As per RAPDRP guidelines, benefits under R-APDRP are to be passed on to consumers. Accordingly, utility has to explicitly indicate in ARR filing, investment received under R-APDRP (Loan/ Grant) so that benefit, if any, is passed on to consumers through ARR / Tariff Orders by respective SERC.
- Treatment of Loan under RAPDRP and subsequent conversion of loan including interest on loan into grant by GoI need to be looked by FOR, so as to avoid any regulatory shock, which may arise due to non conversion of loan / interest on loan into grant

Proposal

- Since objective of RAPDRP is extension of benefits of efficiency improvement to consumers, CERC has suggested to MoP that for uniformity of approach, the Forum of Regulators (FOR) should evolve a guideline to make a clear provision in their respective Regulations for treatment of grant received by licenses (as loan conversion and incentive distribution to employees), which should be adopted by all State Commissions in their respective Tariff Regulations.

(CERC proposal)

Facilitating consumers for maximizing use of IT system created under RAPDRP



- A No. of e-Services has been launched under R-APDRP, e.g. a consumer can view his bills and pay it on online through a no of payment options (credit card, debit card, cash card, net banking, ECS etc.) or can view/pay bills through Any Time Payment (ATP) machines. A consumer can also make payment of his bill through his mobile having GPRS/3G/equiv. connectivity.
- Such initiatives under R-APDRP shall improve consumer convenience and help utility in early and faster realization of dues against uses of electricity.
- For facilitating online payment, third party agency levy convenience fee or payment gateway charges. Some of utilities pass it to consumers, whereas some absorbs themselves. Levy of these charges to consumers is deterrent to use of IT system by consumers and will discourage consumers to use IT system.

Proposal: In order to encourage consumers to use various e-Services, FOR to evolve a guideline and make provision in regulations for encouraging use of information technology (e.g. use of online payment, use of ATP machines etc.) by consumers in such a way that it motivates consumers for making maximum use of IT system.

Enabling provisions for implementation of pre-paid metering system for distribution of electricity



- Prepaid meter enhances utility revenue and reduces costs in multiple ways: accelerated cash-flow; theft avoidance; bad debt reduction; no cost towards meter reading & billing; lower administrative costs; advance demand planning; and disconnect/re-connect costs reduction.
- Concept of pre-paid meters is growing in housing societies in bigger towns, where utilities supply power in bulk at HV level and society collects uses charges from residents / consumers through pre-paid metering system, but practice of pre-paid metering system is yet to be implemented by dist. utility for their direct consumers.

Proposal: To encourage use of pre-paid meters by utility, FOR to evolve a guideline to make enabling provision in regulations for encouraging use of pre-paid metering system by distribution utility for supply of electricity to their direct consumers, which may include:

- ❖ Necessary enabling provisions with respect to charging of arrears to pre-paid consumers, in case of revision in tariff from back date. For this meters to have facility to record energy consumption for period between two recharges, so that amount of arrears can be calculated and passed on to consumer during next recharge.
- ❖ To encourage consumers for taking pre-paid connection, suitable incentive mechanism (e.g. discount in the electricity usage charges or fixed charges etc.) should be available.

Thanks

PROMOTION OF RENEWABLE ENERGY SOURCES : LATEST DEVELOPMENT, GOI INITIATIVES AND REGULATORY SUPPORT

**APTEL judgment
on the issue of
requiring obligated entities
to purchase power from
fossil fuel based co-gen units**

APTEL Judgment dated 2.12.2013

(Appeal No. 53 of 2012, M/s Lloyds Metal v/s MERC)

Background:

- ☐ Appeal has been filed by the Appellant against the impugned interim order passed by MERC
- ☐ for not determining the tariff for coal based co-generation plant of the Appellant and
- ☐ not fixing purchase obligation of the Distribution Licensees from the co-generation plant under Section 86(1)(e) of the Act.
- ☐ Matter referred to the Full Bench of the Tribunal vide order dated 23.9.2013 by the Division Bench of the Tribunal

APTEL Judgment dated 2nd December, 2013

“39. Upon conjoint reading of the provisions of the Electricity Act, the National Electricity Policy, Tariff Policy and the intent of the legislature while passing the Electricity Act as reflected in the Report of the Standing Committee on Energy presented to Lok Sabha on 19.12.2002, we have come to the conclusion that a distribution company cannot be fastened with the obligation to purchase a percentage of its consumption from fossil fuel based co-generation under Section 86(1)(e) of the Electricity Act, 2003. Such purchase obligation 86(1)(e) can be fastened only from electricity generated from renewable sources of energy. However, the State Commission can promote fossil fuel based co-generation by other measures such as facilitating sale of surplus electricity available at such co-generation plants in the interest of promoting energy efficiency and grid security, etc.”

APTEL Judgment dated 26.4.2010 (Appeal No. 57 of 2009, M/s Century Rayon v/s MERC)

- ☐ Cogeneration plants, who provide many number of benefits to environment as well as to the public at large, are to be entitled to be treated at par with the other renewable energy sources.
- ☐ Both these categories must be promoted and equally entitled to be promoted by the SERC.
- ☐ Fastening obligation on the co-generator irrespective of the nature of the fuel in preference to the other would defeat the object of Section 86 (1)(e) and totally contrary to the legislative interest.
- ☐ Appeal being generic in nature, APTEL conclusions in this Appeal will be equally applicable to all co-generation based captive consumers using any fuel.

APTEL Judgment dated 26.4.2010 (Appeal No. 57 of 2009, M/s Century Rayon v/s MERC)

- ❑ Accordingly, the OERC has specified separate purchase obligations for co-generation plants
- ❑ RERC has also treated the electricity generated from waste heat recovery based co-generation plants equivalent to the electricity generated from the renewable energy power plant.
- ❑ KERC also has not made any distinction between the renewable and waste heat recovery based co-generation power plants and included the co-generation technology eligible for meeting the Renewable Purchase Obligations.

Above stand taken by the SERCs need be reviewed in light of recent APTEL judgement.

**Review
of
Floor and Forbearance prices
For
Solar projects**

CERC REC Regulations, 2010

Denomination

- ❑ Each certificate represent 1 MW hour of electricity generated from renewable energy source and injected into the grid.

$$1 \text{ MWh} = 1 \text{ REC}$$

Category of Certificates

- ❑ Solar REC and Non Solar REC

Floor and Forbearance price

- ❑ Floor price means the minimum price at and above which the certificate can be dealt in the power exchange
- ❑ Forbearance price means the ceiling price within which only the ccertificates can be dealt in the power exchange

Floor and Forbearance price

❑ CERC Order dated 13.06.2011

	Non Solar REC (Rs./MWh)	Solar REC (Rs./MWh)
Forbearance Price	3,300	13,400
Floor Price	1,500	9,300

❑ Applicable for the control period:1.04.2012 to 31.03.2017

Significant mismatch between Solar Certificate Floor price and Solar PV tariff

- ❑ Floor price: Rs. 9.30/kWh v/s Solar Tariff : @ Rs. 7.00/kWh
- ❑ Developer may have windfall profit
- ❑ Obligated entity may not come forward to buy Solar REC

Issues for consideration

- ❑ Need for review of Solar REC Floor and Forbearance prices
- ❑ Need for introduction of technology based multiplier concept within solar REC to take care of tariff differential between Solar PV and Solar Thermal
- ❑ Need for introduction of vintage based multiplier concept to take care of Solar PV projects registered so far
- ❑ Need for merger of Solar REC and Non-Solar REC and introduction of multiplier concept to take care of emerging and high cost technologies

Determination of New Floor and Forbearance Price

- ❑ **Floor price:** Maximum difference between the minimum viability tariff for that technology and the APPC cost for various States
- ❑ **Forbearance Price:** Maximum difference between Solar PV Tariff and APPC of various States

Trend in CERC determined Solar Tariff

Particulars	09-10	10-11	11-12	12-13	13-14	14-15
Solar PV						
Capital Cost Rs. Cr/MW	17.00	16.90	14.42	10.00	8.00	6.12
Tariff Rs./kWh	18.44	17.91	15.39	10.39	8.75	7.00
Solar Thermal						
Capital Cost Rs. Cr/MW	13.00	15.30	15.00	13.00	12.00	12.00
Tariff Rs./kWh	13.45	15.31	15.04	12.46	11.90	11.89

- ❑ Solar PV Tariff discovered through recent competitive bidding @ Rs. 6.50/kWh.

Expected Solar Tariff in 2014-15

❑ Solar PV levellised Tariff :
Rs. 7.00/kWh

❑ Minimum viability Tariff :
Rs.4.51 /kWh

❑ O & M Cost:	1.18
❑ Interest on LT loan:	1.50
❑ Interest on WC:	0.19
❑ Loan Repayment:	1.64
Total	4.51

❑ Solar Thermal Tariff
Rs.11.89/kWh

❑ Minimum viability Tariff:
Rs.7.44 /kWh

❑ O & M Cost:	1.47
❑ Interest on LT loan:	2.70
❑ Interest on WC:	0.31
❑ Loan Repayment:	2.96
Total	7.44

Average Pooled Purchase Cost of States

States	APPC FY12-13	APPC FY13-14	APPC FY 14-15
Himachal Pradesh		2.17	2.28
Madhya Pradesh		2.53	2.65
Andhra Pradesh		2.69	2.82
Uttarakhand		2.72	2.86
Rajasthan	2.75		3.03
Gujarat		2.94	3.09
Karnataka		3.07	3.22
Tamil Nadu		3.11	3.27
Kerala		3.20	3.36
Punjab	3.11		3.43
Uttar Pradesh		3.74	3.93

❑ Assuming 5% escalation in APPC

Floor and Forbearance prices in 2014-15

☐ Solar PV

Floor Price

- ☐ Maximum difference between the minimum viability tariff for that technology and the APPC cost for various States
- ☐ $\text{Rs. } 4.50 - \text{Rs. } 2.65 = \text{Rs. } 1.85 / \text{kWh.}$
Floor price be **Rs. 1900/ MWh**

Forbearance price

- ☐ Maximum difference between Solar PV Tariff and APPC of various States
- ☐ $\text{Rs. } 7.00 - \text{Rs. } 2.65 = \text{Rs. } 4.35 / \text{kWh.}$
Floor price be **Rs. 4400/ MWh**

☐ Solar Thermal

Floor Price

- ☐ Maximum difference between the minimum viability tariff for that technology and the APPC cost for various States
- ☐ $\text{Rs. } 7.44 - \text{Rs. } 2.65 = \text{Rs. } 4.79 / \text{kWh.}$
Floor price be **Rs. 4800/ MWh**

Forbearance price

- ☐ Maximum difference between Solar PV Tariff and APPC of various States
- ☐ $\text{Rs. } 11.89 - \text{Rs. } 2.65 = \text{Rs. } 9.24 / \text{kWh.}$
Floor price be **Rs. 9300/ MWh**

Issues for consideration : Single Solar REC Market

- ❑ Till date, 130 Solar projects have been registered under solar REC of the capacity 262.72 MW. All projects belong to Solar PV technology. Only 1 Solar Thermal project of 3 MW got accreditation, which has yet to get registration
- ❑ Instead of determining floor and forbearance price separately for Solar Thermal projects, a common solar REC market could be continued
- ❑ New Solar REC Floor & Forbearance prices could be based on Solar PV
 - ❑ Solar PV projects registered from 1.4.2014, for 1 MWh injection of Solar PV power, 1 Solar REC could be issued and could be traded at Power Exchanges between **Floor price of Rs. 1900/ MWh and Forbearance price of Rs. 4400/ MWh**

Issues for consideration: Multiplier for Solar Thermal

- ❑ In order to promote Solar Thermal projects under REC Mechanism, more no of RECs could be issued as compared to Solar PV generation

$$\text{Multiplier for Solar Thermal Project} = \frac{\text{Floor Price for Solar Thermal}}{\text{Floor price for Solar PV}}$$

$$= \frac{4800}{1900}$$

$$= 2.53$$

Solar Thermal projects registered from 1.4.2014, for 1 MWh injection of Solar Thermal power, 2.53 Solar RECs could be issued

Issues for consideration: Need for introduction of vintage based multiplier (VBM) concept to take care of older projects (registered till 31.3.2014)

- ❑ Review of Floor and Forbearance price for registered Solar projects, prior ending of the current Control Period of FY 2012-17 may attract principle of promissory estoppels
- ❑ Revenue of old projects need to be protected
- ❑ Concept of VBM need can be introduced
 - ❑ Higher numbers of Certificates may be issued to the old projects till 31.03.2017
 - ❑ Equivalent to a multiplier based on the ratio of current Floor price and new floor price of Solar REC
$$= \text{Rs. } 9300 / \text{Rs. } 1900 = 4.89$$
 - ❑ Old Solar PV projects registered till 1.4.2014, for 1 MWh injection, 4.89 Solar RECs could be issued till 31.03.2017
 - ❑ Beyond 1.4.2017, for 1 MWh injection by such old projects, 1 Solar RECs could be issued

Issues for consideration: Need for merger of Solar and Non-Solar REC categorisation

- ❑ Instead of segmenting the market into two separate categories, emerging and high cost RE technologies can be encouraged by issuing higher RECs for same level of generation

Limiting Factors

- ❑ A separate Solar RPO target is carved-out by all States
- ❑ NTP mandate separate target for Solar RPO
- ❑ Moving to a single REC market would dilute the separate Solar RPO in States
- ❑ It would be impossible to determine source technology in the single RECs instrument

Suggested Way Forward for discussion

- ❑ Revision of solar floor and forbearance prices immediately based on current prices
- ❑ Technology based multiplier for Solar thermal projects till 2017
- ❑ Vintage based multiplier for Solar projects till 2017
- ❑ Merger of solar and non solar REC and introduction of Vintage and Technology based multiplier for all RE technologies beyond 2017
- ❑ Need for determination of multiplier on year on year basis

FOR Working Group meeting held on 09.12.2013

Following consensus was evolved:

Issue 1: Need for mid-course review of solar REC Floor and Forbearance price.

Consensus: *Members of the Working Group agreed on the proposal for review of solar REC floor and forbearance price in view of the significant change in the basis/reference for determination of such floor and forbearance price (viz. change in cost/tariff of solar projects).*

Issue 2: Need for introduction of technology based multiplier concept within solar to take care of cost differential between Solar PV and Solar Thermal projects.

Consensus: *Members of the Working Group agreed on the proposal. It was also suggested that while providing for the technology based multiplier for Solar Thermal within Solar REC, a proper justification needs to be given for promoting solar thermal technology having relatively high cost of generation.*

FOR Working Group meeting held on 09.12.2013

Following consensus was evolved:

Issue 3: Need for introduction of vintage based multiplier concept to take care of older projects within solar segment.

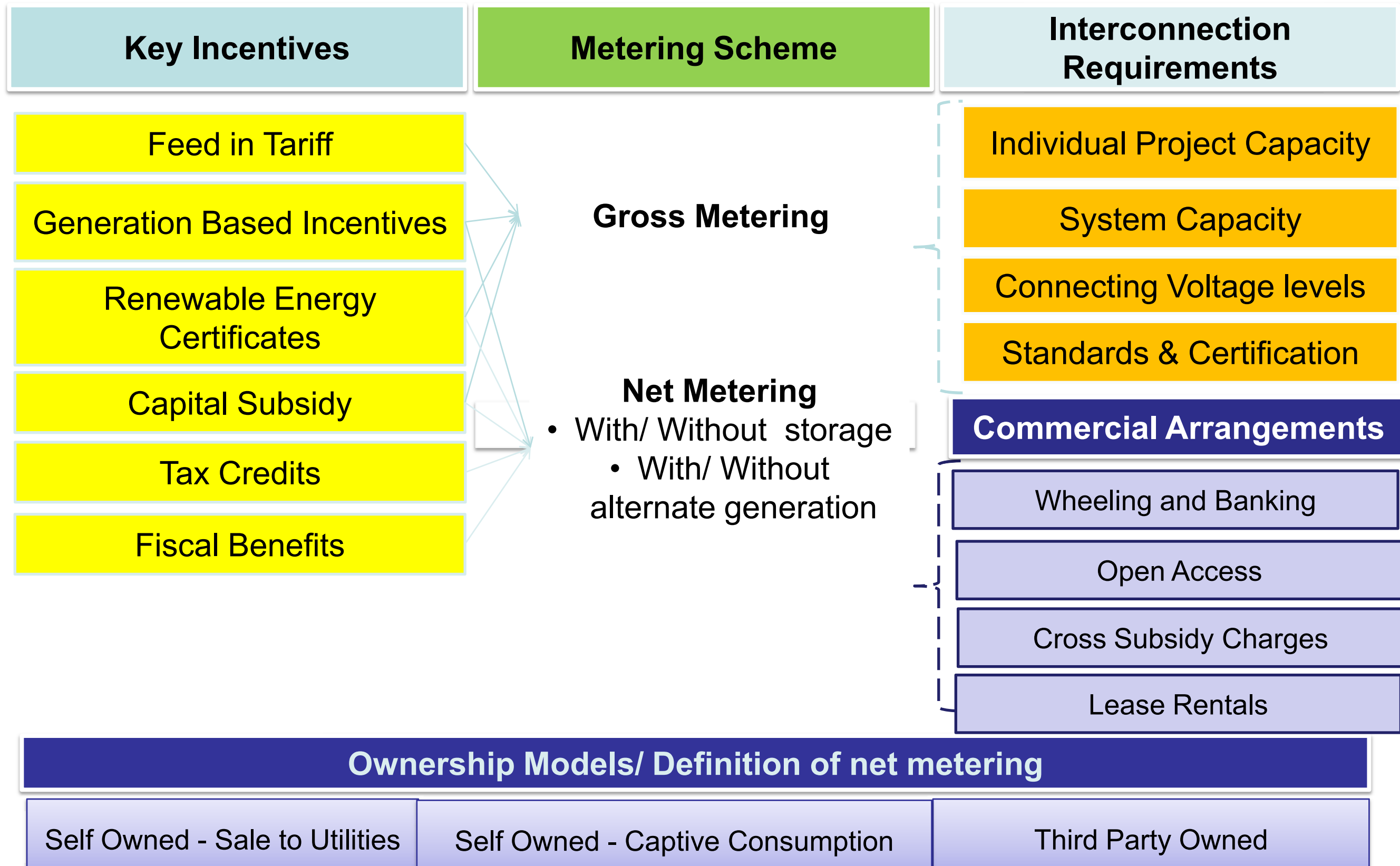
Consensus: *Members of the Working Group agreed on the proposal. It was also suggested that while determining the multiplier upon reduction in floor price, appropriate adjustment need to be done to factor in any increase in the average pooled purchase cost over the period.*

**Evolving Model Guidelines
on
Energy Accounting,
Commercial/Tariff Arrangement
for
Proliferation of Rooftop Solar PV
Projects**

Contents

- Solar Rooftop Business Models
- Commercial Arrangements
- Key Discussion Points and Recommendations
- Metering Arrangements

Business Model Design – Key Parameters



Enabling Net Metering concept in India:

Key Action Points

A. Net metering regulations – Permitting provisions:	
Definition of net-metering	<ul style="list-style-type: none">• Self owned/third party owned facilities
Define permitting capacity limits for Individual Projects	<ul style="list-style-type: none">• Individual capacity• Maximum capacity eligible for net-metering
Define Electricity generation limits	<ul style="list-style-type: none">• Sale to utility by net metered – charges to apply?
Level of overall/local grid penetration	<ul style="list-style-type: none">• Impact on utility's system
B. Tariff Guidelines	
Tariff settlement framework	<ul style="list-style-type: none">• Self consumption• Excess injection into the grid
Applicability of Other charges	<ul style="list-style-type: none">• Open Access charges, CSS, wheeling charge, banking etc.

Key Decision Points

C. Metering	
Meter Specifications and Standards	<ul style="list-style-type: none">• Availability of LT bi-directional meters• Adequacy of existing standards.• CEA defined standards
D. Energy Accounting	
Meter data compilation	<ul style="list-style-type: none">• Roles and responsibilities
Settlement Period	<ul style="list-style-type: none">• Define the accounting period• Carry forward energy• Sale of energy to Discoms
E. Commercial Arrangements	
TOD Settlement	<ul style="list-style-type: none">• Settlement to be in line with existing framework
REC framework	<ul style="list-style-type: none">• Changes in REC regulations for net metering

1. Net metering Definition

Discussion Point

Key Considerations

- Cover only small-scale, on-site renewable generation
- Permit third party ownership, waiving open-access or supply implications

Key Issues

- Qualification for open access (eligibility requirements) and payment of open access charges for third party
- However these consumers are liable to pay the wheeling charges, cross-subsidy surcharge and additional surcharge, in addition to wheeling charges and cross-subsidy surcharge
- Net Metering is a concept, which can cover other on-site renewable energy generation like micro-wind.

Recommended Action

- "Eligible consumer" means a consumer of electricity in the area of supply of the distribution licensee, who uses a **rooftop solar** system installed in the consumer premises, to offset part or all of the consumer's own electricity requirements, given that such facility can be **self owned or third party owned**;
- "Net energy metering" means an arrangement under which rooftop solar system installed at eligible consumer premises delivers surplus electricity, if any, to the distribution licensee after off-setting the electricity supplied by distribution licensee during the applicable billing period.

2. Defining permitting limits on individual project cap.

Discussion Point

Key Considerations

- Address boundary conditions/ constraints presented by service line capacities
- Individual project capacities linked to connected consumer load and connection voltage
- Cost implication of utility system augmentation

Key Issue

- Who bears the cost of infrastructure up-gradation, if required, at distribution level and who should bear the cost of such upgrade?
- Does it require changes in the Distribution Codes - address the connectivity voltage ranges for various capacities of the rooftop solar PV projects?

Recommended Action

Model Net-metering Guideline

- Individual solar rooftop permitting capacity limits (in kW) & the related connection voltage to be eligible for net metering
 - to be **aligned to corresponding State Supply code provision for permitting consumer connections**
- Define overall capacity limit (maximum) to qualify for net-metering arrangement
 - Maximum capacity upto **1 MW** to qualify under net-metering

Covered under State Regulation/ Codes

- Defined under Supply code
- **Developer to bear cost** if evacuation required at higher level than specified for net-metering based projects

3. Defining permitting limits on individual generation

Discussion Point

Key Considerations

- Commercial implications of the sale of excess energy – contract, pricing, accounting
- Assessment of subsidy/ incentive

Key Issue

- Increases the complexity of energy accounting, contracting arrangements and pricing
- Impact on the overall quantum of subsidy/ incentive – impact on Government
- Energy accounting and settlement mechanism to provision for surplus energy sale to utility
- Pricing of energy – charges to apply
- Procurement price of utility
- Settlement mechanism to be defined
- Does it lead to sub optimal utilization of rooftop?

Recommended Action

Model Net-metering Guideline

- Define limits on total generation as a % of total electricity consumption by the consumer in a particular accounting period
- **Proposed limit : Generation as 90%** of the total consumption in a defined period (say financial year)
- Any excess injection at the end of financial year to be taken as free energy
- PLF of the project to not exceed 22% on annual basis

4. Level of grid penetration

Discussion Point

Key Considerations

- Commercial implications; Limiting factors like DTR capacity, feeder loading

Key Issues

- *Overall Cap* : Utilities loss of revenue; Variability of generation & grid stability; Solar RPO accounting & cost of up-gradation

Local level issues

- Distribution system configuration not geared for reverse flow of power – can impact transformer performance, phase balance
- Diversity of consumers at feeder / DTR level can assist in accommodating generation up to a limit without reversal in the network
- HVDS may require separate considerations as diversity is low

Recommended Action

Model Net-metering Guideline

- Overall Cap : State Regulator to decide in capacity terms or % of demand of the Discom
- Local Level Cap : Define limits for connecting solar rooftop projects - LT feeder/DTR capacity ~ **say 5% - 10% of peak capacity**
 - Discoms to **update feeder level capacity available** regularly

Other Initiatives required

- Phase 2: CEA to define limits based on study
- Phase 3: In the long term, the distribution utilities may be directed to undertake network infrastructure upgrades : Ring / meshed architecture, auto-tap changing transformers, etc.

5. Solar Renewable Purchase Obligation (RPO)

Regulatory framework

- Electricity Act 2003 : Section 86 (1) (e) “The State Commission shall discharge the following functions, namely: - also specify, for **purchase of electricity** from such sources, a percentage of the total consumption of electricity in the area of a distribution license;”
- RPO targets fixed by State Regulators

Types of Captive Consumers

Category 1

- Defined as Obligated Entity under State RPO Regulation – generally for captive capacity of 1 MW and above (e.g. industrial consumers)
- May like to claim meeting Solar RPO through Self consumption from net-metered based rooftop solar project

Category 2

- Not defined as Obligated Entity under State RPO Regulation – generally for captive capacity less than 1 MW
- This form of captive consumption not covered under RPO framework currently
- **Discoms can be given benefit of deemed RPO under this category ?**

Solar RPO under net-metering

Key Issues

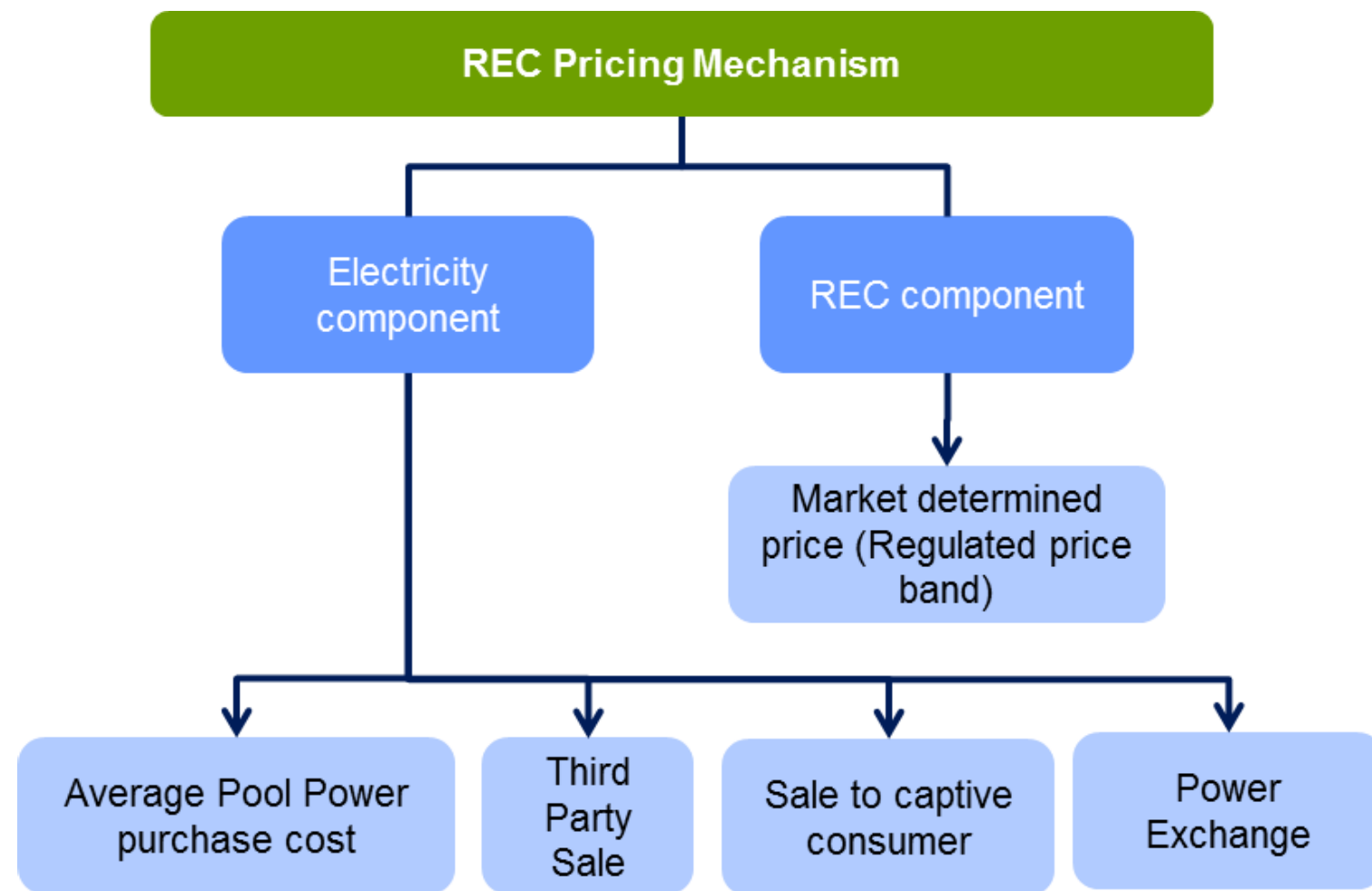
- **Solar net-metering to qualify as captive consumption and may not get accounted for utility solar RPO as there would be no power purchase**
 - Only in case of excess injection, purchase of electricity would happen by Utility
 - No defined target for rooftop solar – may not be a preferred option for utilities over ground mounted solar
- **Need to demarcate capacity under net-metering and sale to utility**
 - Utility may sign PPA for a defined capacity – clarity to meet Solar RPO target
 - Segregating capacity for sale to utility will be gross metering rather than any form of net-metering
- **If Deemed RPO allowed for net-metering systems, such consumers can not get benefit of RECs – as it may result in double accounting**
 - Generation is different from Consumption – **if deemed RPO allowed then such consumers may prefer to go under gross metering model & sell RECs rather than coming under self-consumption net-metering model with no REC benefit ???**

Recommended Option

- **Allow Deemed RPO for utilities – for captive consumers not defined as obligated entities**

6. Net Metered projects availing RECs

- RECs issued again generation of electricity
- **Captive Generating Plant** can avail RECs for electricity under self-consumption, given it has not availed or does not propose to avail any benefit in the form of concessional/promotional transmission or wheeling charges, banking facility benefit and waiver of electricity duty.



Key Considerations

- Level of REC that can be issued to small capacity projects (1 kW will be 1.5 RECs in a year)
- Infrastructure requirement for energy accounting & information flow upto NLDC
- Qualifying criteria for REC issuance;
- Ownership of REC

References

Net Metered projects availing RECs

Key Issues

- Small projects not under REC framework - not having adequate energy accounting system in place
- Net-metering projects would be more of captive consumption – will need wheeling exemption and hence will not qualify under current REC regulation eligibility criteria
- Accounting of excess injection to grid for REC – whether it will come under self-consumption or sale to utility ???
- For REC registration, capacity needs to be clearly demarcated on how much capacity is for captive generation and how much would be for sale to utility
 - In case excess injection is allowed without demarcation of capacity, REC registration may pose to be an issue & can have accounting problems also, how to undertake accreditation of project

Recommendation – REC Regulation

- Allowing small capacity size project to participate under REC mechanism
- No changes in REC eligibility Condition
- If project eligible can claim REC benefit - Given the fact that net-metered based projects need to be necessarily exempted from wheeling/open access charges – project will not qualify for REC benefit

7. Tariff settlement framework under Net-metering

Discussion Point

Key Considerations

- Commercial settlement of excess electricity injection into the grid
- Impact of change in consumer tariff slab due to net-metering – subsidy element

Key Issue

- What should be the accounting period for settlement
- Should excess injection into the grid be recognized for commercial settlement
- Should excess injection be allowed and if so what should be the settlement mechanism and price?
 - retail tariff, APPC, avoided cost?

Recommended Action

Model Net-metering Guideline

- Excess injection not allowed for commercial settlement – no carry forward allowed to next settlement period
- Settlement only in energy terms at the end of the Financial Year

Reference Case – Energy Accounting under Net-metering

Month	Generation (kWh)	Consumption (kWh)	Net Electricity (kWh)	Effective Bill (kWh)
April	150	160	10	10
May	150	180	30	30
June	150	20	-130	-130
July	150	260	110	-20
August	150	100	-50	-70
September	150	260	110	40
October	150	140	-10	-10
November	150	200	50	40
December	150	220	70	70
January	150	100	-50	-50
February	150	250	100	50
March	150	0	-150	-150
Yearly Total	1800	1890	90	
Generation as a % of Consumption		95%		

- Monthly accounting required, previous month credit (if any) to be accounted
- Generation as a % of consumption to be calculated at the end of Financial Year

8. TOD settlement

Discussion Point

Key Considerations

- Commercial settlement across periods & energy accounting
- Banking of electricity and its commercial settlement
- Availability of TOD meters across consumer categories

Key Issues

- Whether the excess energy generated by the solar installation and exported to the grid during a particular time period can be used to net energy imported in other time period in TOD regime
- TOD metering done in most of the States for HT/ commercial consumer levels - LT level consumers not covered under TOD metering in general

Recommended Action

Model Net-metering Guideline

- Commercial settlement mapped across periods : peak to peak, off-peak to off-peak etc as per the State Regulation
- Consumer to pay the differential tariff across periods (if applicable)
- Will safeguard commercial interest of utility & in line with existing regulatory framework

9. Applicability of other charges

Discussion Point

Key Considerations

- Applicability of open access framework on small projects based on net metering arrangements specifically third party sale
- Capacity limit for availing open access
- What charges would apply for net metering arrangement

Key Issues

- Whether net-metering arrangement amounts to wheeling of electricity through utility
- Whether open access is required for net metered rooftop projects – for third party owned systems
- Whether net-metering based third party sale can happen?
 - Can capacity segregated for self consumption or third party sale

Recommended Action

Model Net-metering Guideline

- Exemption for rooftop solar net-metering based projects, whether self-owned by consumer or third party owned facility on consumer premises, from banking, wheeling & cross-subsidy charges
- Definition of banking to be in line with State Regulations

10. Metering requirements

Discussion Point

Key Considerations

- Process of meter reading for generation & consumption
- Metering standards; Requirement for Backup stand by, check meters
- Bi-directional meters for LT level

Key Issues

- Whether Joint meter reading is required for Net metered systems?
- Whether utility will recognize all the meters (in case of 2/3 meter systems) for commercial settlement
- Minimum features required for net metering?
- Bi-directional meters for LT Level are currently not available in India
- Do all meters need to be at utility voltage level? Case of solar generation and consumption at auxiliary voltage

Recommended Action

Model Net-metering Guideline

- Meter reading to be taken by utility only & accepted for commercial settlement

Modification in Distribution Code

- Position & sealing of Solar Meter will be guided by the same provisions as applicable to consumer meter in Supply Code.
- Acceptance of net-meters for commercial settlement

Metering requirements

Modifications in Metering Standards - CEA

- ☐ Meter should be downloadable (i.e. Meter Reading instrument (MRI) compliant or wireless equipment for recording meter readings)
- ☐ Installation of bi-directional meters at LT level
- ☐ Requirement for Check meters to be defined
 - ☐ Only for projects having capacity more than 20 kW (Gujarat Rooftop experience)
 - ☐ Solar Check meter can be Optional & owned by the licensee
- ☐ Requirement of Standby meters to be defined : Only for projects connected at 11 kV and above
 - ☐ For HT Consumers connected at 11 kV and above - Solar Power metering and auxiliary consumption (415 V) be allowed

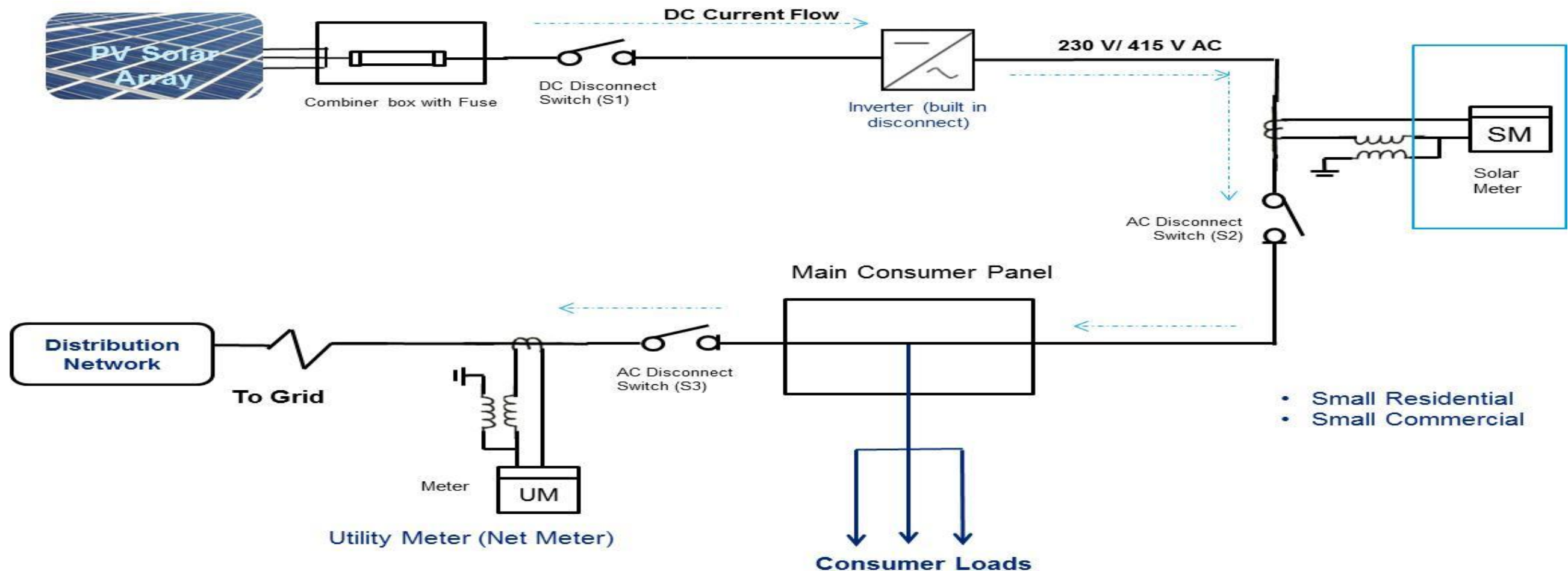
Metering Configurations

Proposed Metering Arrangement - Net-metering

- ❑ Net Metering Options
 - ❑ 2 Meter Configuration
 - ❑ without Storage
 - ❑ with full Storage

Net metering w/o storage backup:

2 Meter Configuration : 230 V Single Phase/ 415 V Three Phase Connection



• Key observations

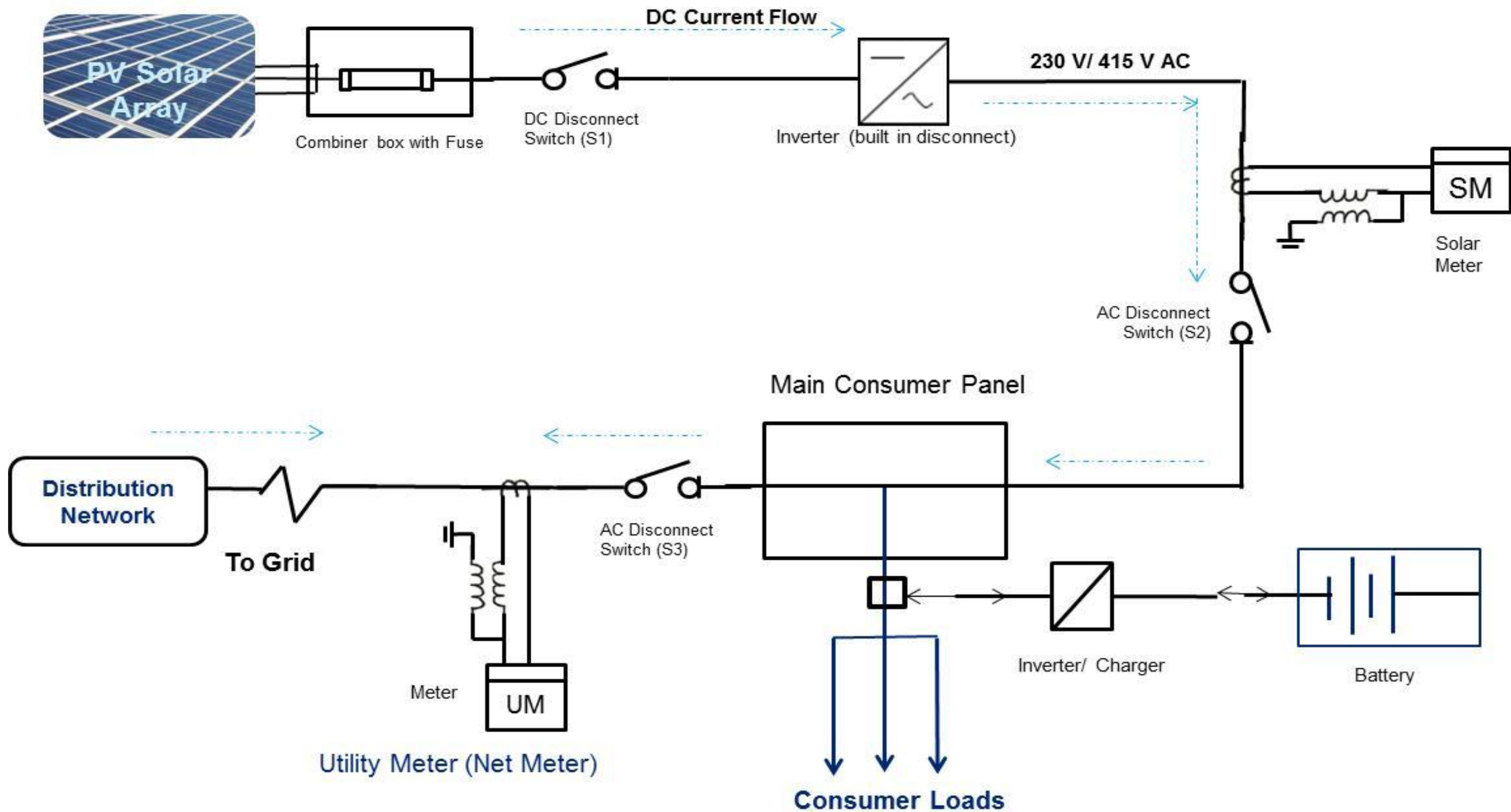
- The two meter configuration is the most optimal configuration – allows discrete & separate measurement of both solar and utility power
- The presence of the solar meter allows use of generation based incentives like REC/ GBI etc.

Key issues

- 1) Acceptability of solar meter as a commercial meter;
- 2) placement of the solar meter – should it be next to the main utility meter or next to the solar inverter;
- 3) safety and sanctity of the solar meter as well as wire from inverter to solar meter;
- 4) need for a solar check meter;
- 5) Need for an easily accessible external AC disconnect switch

Net metering with storage backup

2 Meter Configuration : 230 V Single Phase/ 415 V Three Phase Connection



RPO/REC Status

Status of RPO obligations :

States	RPO Obligation (2013-14)	
	Non Solar RPO	Solar RPO
	%	%
Andhra Pradesh	4.75	0.25
Assam	5.40	0.20
Arunachal Pradesh	5.45	0.15
Bihar	3.50	1.00
Chhattisgarh	5.75 ^	0.50 ^
Delhi	4.6	0.2
Gujarat	6.00**	1.00**
Haryana	2.90	0.10
Himachal Pradesh	10.00	0.25
J&K	4.75	0.25
Jharkhand	3.00	1.00
Karnataka	10*	0.25*
Kerala	3.65	0.25
Madhya Pradesh	4.70	0.80
Maharashtra	8.50	0.50
Meghalaya	0.60	0.40
Odisha	5.80	0.20
Punjab	3.37	0.13
Rajasthan	7.20	1.00
Tamil Nadu	8.95**	0.05**
Tripura	0.90	0.10
Uttarakhand	5**	0.05**
Uttar Pradesh	5**	1.00**
West Bengal	3.90	0.00
Goa & UT	2.60	0.40
Manipur	4.75	0.25
Mizoram	6.75	0.25
Nagaland	7.75	0.25

- All the States (except Sikkim) have notified RPO/REC Regulations.
- Some of the States are yet to specify long term trajectory beyond FY 2013-14.

** RPO targets are not determined for FY14 and are assumed to continue FY13 target levels.

- 10% + 0.25% (BESCOM, MESCOM, CESC), 7% + 0.25% (for others).

^ data as per CSERC Draft RPO regulation.

Status of Non-Solar REC inventory as on 1.1.2014

Month, Year	Opening Balance	REC Issued	REC Redeemed	Closing Balance
January,2013	1,662,978	304,238	193,337	1,773,879
February,2013	1,773,879	314,917	152,952	1,935,844
March,2013	1,935,844	268,323	427,871	1,776,296
April,2013	1,776,296	259,299	44,459	1,991,136
May,2013	1,991,136	249,221	52,968	2,187,389
June,2013	2,187,389	292,928	72,486	2,407,831
July,2013	2,407,831	462,962	161,402	2,709,391
August,2013	2,709,391	488,824	40,889	3,157,326
September,2013	3,157,326	611,572	49,831	3,719,067
October,2013	3,719,067	490,425	150,640	4,058,852
November,2013	4,058,852	401,096	308,928	4,151,020
December,2013	4,151,020	409,340	403,862	4,156,498
January,2014	4,156,498	65,349	0	4,221,847
Total :		9,098,811	4,876,964	

Status of Solar REC inventory as on 1.1.2014 :

Month, Year	Opening Balance	REC Issued	REC Redeemed	Closing Balance
May,2012	0	249	10	239
June,2012	239	324	342	221
July,2012	221	328	179	370
August,2012	370	190	379	181
September,2012	181	1,443	1,160	464
October,2012	464	1,412	1,791	85
November,2012	85	1,603	1,219	469
December,2012	469	992	1,208	253
January,2013	253	3,306	2,308	1,251
February,2013	1,251	1,882	2,234	899
March,2013	899	2,917	3,183	633
April,2013	633	2,444	2,217	860
May,2013	860	3,973	1,703	3,130
June,2013	3,130	2,802	1,479	4,453
July,2013	4,453	17,227	2,029	19,651
August,2013	19,651	12,890	2,359	30,182
September,2013	30,182	23,928	6,712	47,398
October,2013	47,398	20,783	9,257	58,924
November,2013	58,924	2,936	7,354	54,506
December,2013	54,506	36,623	7,882	83,247
January,2014	83,247	1,231	0	84,478
Total :		139,483	55,005	



Thank You

