MINUTES OF TWENTY SECOND MEETING OF "TECHNICAL COMMITTEE FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL"

Venue	:	Upper Ground Floor CERC, New Delhi
Date	:	01-11-2018
List of Participants	:	At Annexure –1**(Enclosed)**

1. The Twenty Second meeting of Technical Committee on Implementation of Framework for Renewables at the State level was held on 1st November2018. Dr. M.K Iyer, Member, CERC welcomed all the participants of the meeting and special invitees. Former Chairperson of the Committee, Shri A.S Bakshi former Member of CERC also attended the meeting as special invitee.

2. Joint Chief (RA), CERC welcomed all the members, special invitees and other participants of the Standing Technical Committee. He highlighted that this will be last meeting of Shri R. N. Sen, Chairperson WBERC as he will be retiring this week and recounted the contribution made by Shri Sen in the technical committee. He mentioned that the deep appreciation for Shri Sen be put on record.

3. Thereafter the agenda items were taken up for discussion:-

4. <u>Discussions on the Agenda items</u>

Agenda Item No. 1: Draft Report on Gap Assessment for Comprehensive Metering and Accounting Framework for Grid Connected Solar Rooftop PV in India

a. Joint Chief (RA), CERC gave the background and the issues highlighted in the last meeting regarding the contracted capacity, formula of net billing and RPO obligation. He mentioned that in the 2013 Model Regulation certain restrictions were put on the solar rooftop and this model regulation was followed by most of the States. He explained the rationale behind the provisions in the model regulation of 2013. During 2012-13 the consumer tariff was low and the solar benchmark tariff was high. However, now the situation has changed, solar tariff has come down substantially while the consumer tariff has been increased over a period. He highlighted the modification in the Model Regulations to align with the changed reality and emphasized that Net Billing (as against the net metering) concept will encourage the development of solar rooftop projects and be beneficial for the utilities as well as the consumers. (Annexure –II)

Deliberations

b. The Committee noted the advantages of Net Billing and Technical feasibility of Rooftop solar Projects up to contracted demand.

c. The second issue raised was related to the ground mounted solar project installed in the consumer. The report suggested that if the roof doesn't have adequate space and extra space is available in the consumer premises, then, the ground mounted solar project shall be allowed as rooftop with restriction of contracted capacity and service line condition.

d. Some members raised concerns over recommendations in the report to allow ground mounted Solar Projects within premises. It was suggested that the framework should cover only those projects which are installed on the roof, treating all ground mounted small solar projects as IPP.

e. Some members advocated that the solar project installed in the premises of the building must be also covered in the definition as it will utilize the extra land available with the consumer. The limitation of getting open access below 1 MW capacity was also highlighted by some members.

f. However, all member agreed that the rooftop project for domestic consumers will cover the roof mounted projects as well as ground mounted solar project in its premises only. This will also applicable to housing societies too. However, for commercial and industrial consumers, solar rooftop project will be installed on the rooftop only subject to maximum contracted capacity and service line condition. On the issue of Aggregator, Members agreed that aggregation will be allowed only for domestic consumers.

g. As regards the second issue regarding settlement of excess generation, the report highlighted that the excess generation will be accounted at the end of the financial year and 10% of the excess generation will be settled through the reference price determined by the respective SERCs. It was suggested that the entire excess generation at the end of year will be settled through reference price and each SERCs can determined the reference price as per requirement of their states. Few members opined that the reference price will be last year's SECI bid price.

Action points/ Decisions

•*It was suggested that only "residential" consumers be allowed to interconnect ground-mounted solar systems under net-metering / net-billing subject to further discussions at the Forum of Regulators.*

•*The Model Regulations should provide for demand aggregation by distribution utility only and such aggregation be restricted to "residential" consumers only. Final view may be taken by the Forum of Regulators.*

•*It was decided that Model Regulations will provide different options to decide rate of procurement from solar rooftop projects. It was proposed that each State may decide to choose appropriate option.*

(C) Agenda Item No. 2: Report of Sub-Group on Challenges of Biomass and WTE Projects

- **Discussion and consideration for Approval**

a. The Consultant for Technical Committee gave a brief background of the sub group and informed that during 20th meeting of FOR Technical Committee held on 17th July, 2018 at CERC, New Delhi, representatives from Biomass as well as Waste-to-Energy (WtE) sectors made presentations and highlighted the various issues impacting the sector. Accordingly, the Technical Committee constituted a Sub-group headed by Shri R.N Sen, Chairperson WBERC to analyse the challenges before Biomass and Waste-to-Energy Projects and the following issues emerged.

   - Issue-1: Allowance for use of limited quantity of RDF/MSW in Biomass Power plant and treatment thereof
   - Issue-2: Allowance for use of limited quantity of Biomass in Waste to Energy (MSW/RDF) Projects and treatment thereof
   - Issue-3: Mandate for procurement of biomass power and mode of procurement

b. As regards usage of RDF in biomass project, the Sub Group agreed that as this is a voluntary measure and no additional cost/benefit or revision in the existing tariff shall be permitted for such usage. Thus, biomass power projects shall have the flexibility of using RDF upto 15% and will continue to have the same tariff as approved for such biomass-based power projects. The importance of adherence to environmental norms along with monitoring/reporting mechanism for fuel usage was also discussed.

c. A few Members also suggested that recommendations for new project must also come in this report.

d. As regards the second issue usage of Biomass in MSW plant, the Sub-Group recommended allowing usages of Biomass in RDF based WtE plants to the extent of 15% in terms of annual quantity MT of total fuel consumption. However, strict adherence to environmental norms as per SWM Rules, 2016 or any relevant norms would be required while allowing such flexibility. It was recommended to devise appropriate monitoring/reporting mechanism for the same. Further, it was also reiterated that no revision in tariff on this account shall be permitted.

e. During the discussion on third issue regarding mandatory purchase of Biomass, the Sub–Group recommended that mandatory procurement from biomass/biogas power can be made only by way of stipulating technology specific RPO target at state level. At present, many states have stipulated solar RPO and Non-Solar RPO targets. It is not desirable to make further distinction amongst Non-Solar by specifying separate target or mandate for biomass/biogas power procurement. The Sub-Group recommended mandatory procurement of biomass/biogas-based power projects by the Discoms within the States, upon considering state specific factors. (Annexure-III)

Action points/ Decisions

After detailed deliberation, Committee endorsed the report and recommendations of the Sub group.

Agenda Item No. 3: Status of implementation of SAMAST and Regulations on Forecasting, Scheduling & Deviation Settlement

- **Update by Consultant November**
- **Update in respect of other States by respective Members**

a. The Consultant (Idam Infra) made a presentation (Annexure-IV) on the SAMAST implementation and Forecasting & Scheduling and DSM Regulations at State level for various States. The Consultant is providing support to 13 State through Technical Committee.

b. The Consultant highlighted that 18 States have come up with either Draft or Final Forecasting & Scheduling Regulations (7 Draft and 11 Final).

c. **Himachal Pradesh: -** HPERC has notified the DSM regulation on 16th October 2018 and effective date is from 3rd December 2018. For SAMAST, DPR is prepared and submitted to the PSDF secretariat on 29th Sept 2018.

d. **Tamil Nadu**: TNERC is in process of finalizing F&S Regulations and DSM Regulations.

e. **Telangana:** Forecasting & Scheduling Regulations notified. Draft DSM regulations are ready. TSERC is in a process of publishing the same for public consultation.

f. **Haryana:** HERC has published the draft F&S Regulations for 2nd public consultation on 9th Aug-18 and the public hearing will be scheduled soon. The Consultant prepared the draft DSM Regulations in line with Model DSM Regulations and submitted to HERC in Aug. 2018.

g. **Punjab:-** PSERC has recently directed SLDC to submit the DPR to PSDF Committee. For F&S Regulation Public hearing was held on 20th Sept. 2018. Additional comments received on 1st Oct 2018 were also addressed and SOR was submitted to PSERC 20th Oct 2018.Upon reviewing the comments/suggestions of stake holders, PSERC shall finalize the F&S Regulations.

h. **Assam:** Forecasting and Scheduling Regulations have been notified and the Draft DSM Regulations is prepared AERC is in process of publishing the draft for public comments.

i. **Meghalaya:** SERC published the draft DSM Regulations &draft F&S Regulations for public consultation in the month of August 2018.The consultants reviewed the comments received and prepared the SOR and submitted to the MSERC with revised draft DSM Regulations on 5th Oct. 2018 and revised draft F&S Regulations on 1st Oct. 2018.

j. **West Bengal: -** DPR for SAMAST implementation in West Bengal was prepared in Oct-2017 and submitted to PSDF secretariat in Dec-2017. SLDC submitted the comments to PSDF on 17th May, 2018. DPR submitted by WBSLDC has been approved by PSDF Appraisal Committee in the month of August, 2018

Update in respect of other States by respective Members

k. **Andhra Pradesh:** Shri Pendyala Rama Mohan, Member APERC, provided updated information on the Forecasting and Scheduling framework in the State and highlighted further improvement in the forecasting of inform Power in the State. He also informed receipt of sanction of 21.48 Cr from PSDF Funds Committee for SAMAST implementation.

l. Sri. Bakshi, suggested to update of SAMAST and PSDF fund status in tabulation form, so that progress can easily monitored.

m. Shri S.K Soonee, Advisor POSOCO underscored the progress on F&S and SAMSAT is in good pace in all State. Shri Soonee suggested Pilot project on Reserve and

Ancillary is required in the State. As Gujarat and Madhya Pradesh is in leading in SAMAST. The Pilot can start in those States.

n. The Committee decided to have a sub group under Shri. Soonee with the chiefs of SLDCs representatives of SERCs of States of Gujarat, Madhya Pradesh, Andhra Pradesh & West Bengal as Members for pilot on Reserves and Ancillary Services at the state level. Other interested states could also be included/co-opted. It was also decided that the pilot project could be initiated without waiting for State Regulations on the Reserves and Ancillary. CERC Model regulation can be adopted for Pilot Project.

o. Joint Chief (RA), CERC informed that power quality report has also been approved by FOR and it has been decided that the implementation of the recommendations of the report can be monitored by the Technical Committee. Similarly, the report on Capacity building of LDCs and Model Regulation of Fee and Charges, also be monitored through the Technical Committee.

Action points/ Decisions

i. The Committee decided to constitute a sub Group under Shri. Soonee for pilot project for Reserves and Ancillary Services for the State and on Model Regulation on Ancillary. The Committee to consist of heads of SLDCs and representatives of SERCs of Gujarat, Madhya Pradesh, Andhra Pradesh and West Bengal. Other interested States could also be included/co-opted.

ii. POSOCO will give status of release of funds to States under PSDF scheme.

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Annexure-1

LIST OF PARTICIPANTS AT THE TWENTY FIRST MEETING OF TECHNICAL COMMITTEE FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL HELD ON 8TH OCTOBER 2018 AT CERC, NEW DELHI

1	Dr. M.K Iyer, Member	CERC
2	Shri S. Akshayakumar, Chairperson	TNERC
3	Shri Dev Raj Birdi, Chairperson	MPERC
4	Shri R N Sen, Chairperson	WBERC
5	Shri A.S. Bakshi, Ex-Member	CERC
6	Shri Pendyala Rama Mohan, Member	APERC
7	Shri S.C. Srivastava, Chief (Engg.)	CERC
8	Dr. S.K. Chatterjee, JC(RA)	CERC
9	Smt. Shilpa Agarwal, Joint Chief (Engg.)	CERC
10	Shri S.K. Soonee, Advisor	POSOCO
11	Ms. Rashmi S. Nair, DC(RA)	CERC
12	Shri AjitPandit	Idam
13	Shri Balwant Joshi	Idam
14	Shri Abhishek Dixit	Idam
15	Shri Ravindra Kadam, Advisor(RE)	CERC
16	Representatives of E&Y	E&Y
17	Shri Ankit Gupta, RA	CERC
18	Shri Neeraj Singh Gautam, RO	CERC

Developing Comprehensive Metering Regulations & Accounting Framework for Grid Connected Rooftop Solar Deployment in India

Presentation to FOR Technical Committee meeting

1st November, 2018

The World Bank – SBI Grid Connected Rooftop Solar Photo Voltaic Technical Assistance Program

SUPRABHA

SUSTAINABLE PARTNERSHIP FOR
ROOFTOP SOLAR ACCELERATION IN BHARAT

SUPRABHA Rooftop Solar TA Program

Funding Body	Implementing Agency	Installation target
WORLD BANK GROUP	SBI	600 MW GRPV

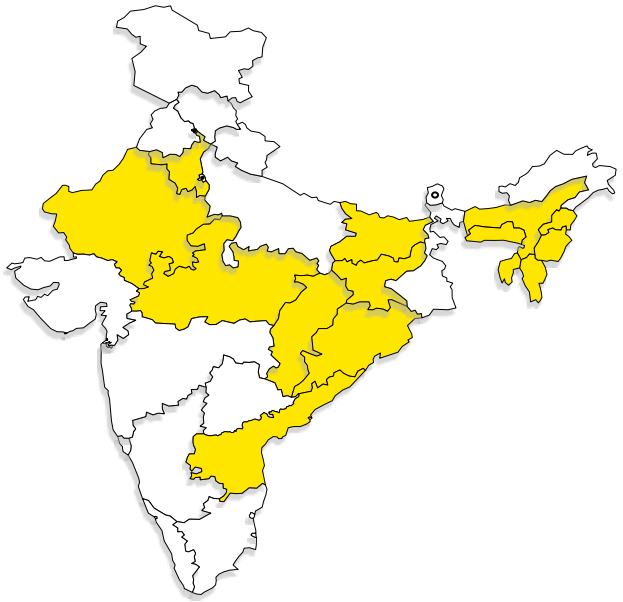
Long Term Concessional Loan: USD 625 Million
https://www.sbi.co.in/webfiles/uploads/files/SBI_WORLD_BANK.pdf

Technical Assistance : USD 13 Million
www.suprabha.org

Stakeholders

- Residential Consumers
- Regulators & Distribution Companies
- Urban Local Bodies
- C&I Consumers
- Financial Institutions
- Entrepreneurs

Coverage : 17 Indian states



- Jharkhand
- Bihar
- Orissa
- Chhattisgarh
- Rajasthan
- Haryana
- Madhya Pradesh
- Delhi
- Chandigarh
- Assam
- Nagaland
- Manipur
- Mizoram
- Tripura
- Meghalaya
- Sikkim
- Andhra Pradesh

Interventions:

1. Policy & Regulatory
2. Capacity Building
3. SSN Knowledge Exchange
4. Media & Outreach
5. Process Streamlining
6. Demand Aggregation

Net Metering Regulation, 2013 - Highlights

Interconnection arrangements	▶Respective Commissions to decide the target capacity ▶No limit on individual capacity installed based on sanctioned load ▶Interconnection limit : up to **15% of the peak capacity** of the distribution transformer (DT) ▶Maximum installed capacity possible**: 1 MW**
Energy accounting & commercial arrangements	▶Promotes self consumption ▶**No payment/credit Carry forward to consumer** for the excess electricity generated ▶Settlement period : Financial Year ▶ToD consumers: Excess generation treated as if occurred during off-peak hours

Net Metering Regulation, 2013 - Highlights

Metering	▶ MRI type meters ▶ Accuracy class – Net meter (1.0 or better), Solar meter (0.2) ▶ Check meter mandatory for above 20 KW GRPV systems
Other regulatory provisions	▶ RPO: Benefit to DISCOM in case of non-obligated consumer ▶ Promotes CAPEX/ RESCO Model only; No scope for Utility Centric model ▶ Provision for setting higher capacity through alternative mechanisms

Need for review:

- ▶ **Changing landscape** as higher capacities coming-up in India, available advanced metering and communication capabilities
- ▶ **Enabling regulatory framework** to support ambitious government targets and support relevant policies
- ▶ **Introducing new business models** to Improve GRPV penetration; based on international experience
- ▶ **Need of remunerative commercial arrangement** to increase consumer participation

Identification of key issues in the existing regulation

Sr. No.	Issues identified	Type
T-1	Need for relaxing the maximum individual capacity that can be deployed based on sanctioned load	Technical
T-2	Need for clarifying the interconnection limits on GRPV capacities connected to DT	Technical
T-3	Need for provisioning for real time monitoring of solar generation and participation in system operations; required in case of large penetration of GRPV systems	Technical, grid stability & safety
C-1	Need for accommodating newer business models available to consumer and developers, limited scope to DISCOMs in present scenario	Commercial
C-2	Present PPA or connection agreement need additional aspects related to change in ownership and flexibility in existing PPA/connection agreement	Commercial
C-3	Need for compensating for excess generation in present energy accounting and commercial settlement principles	Commercial
O-1	Definition of premises and Solar roof-top PV systems needs review owning to future possibility of different scenarios	General definition & others
O-2	Metering and communication requirements needs review to provide greater visibility on solar generation to DISCOMs and system operations	Communication, metering & safety

Clarification followed

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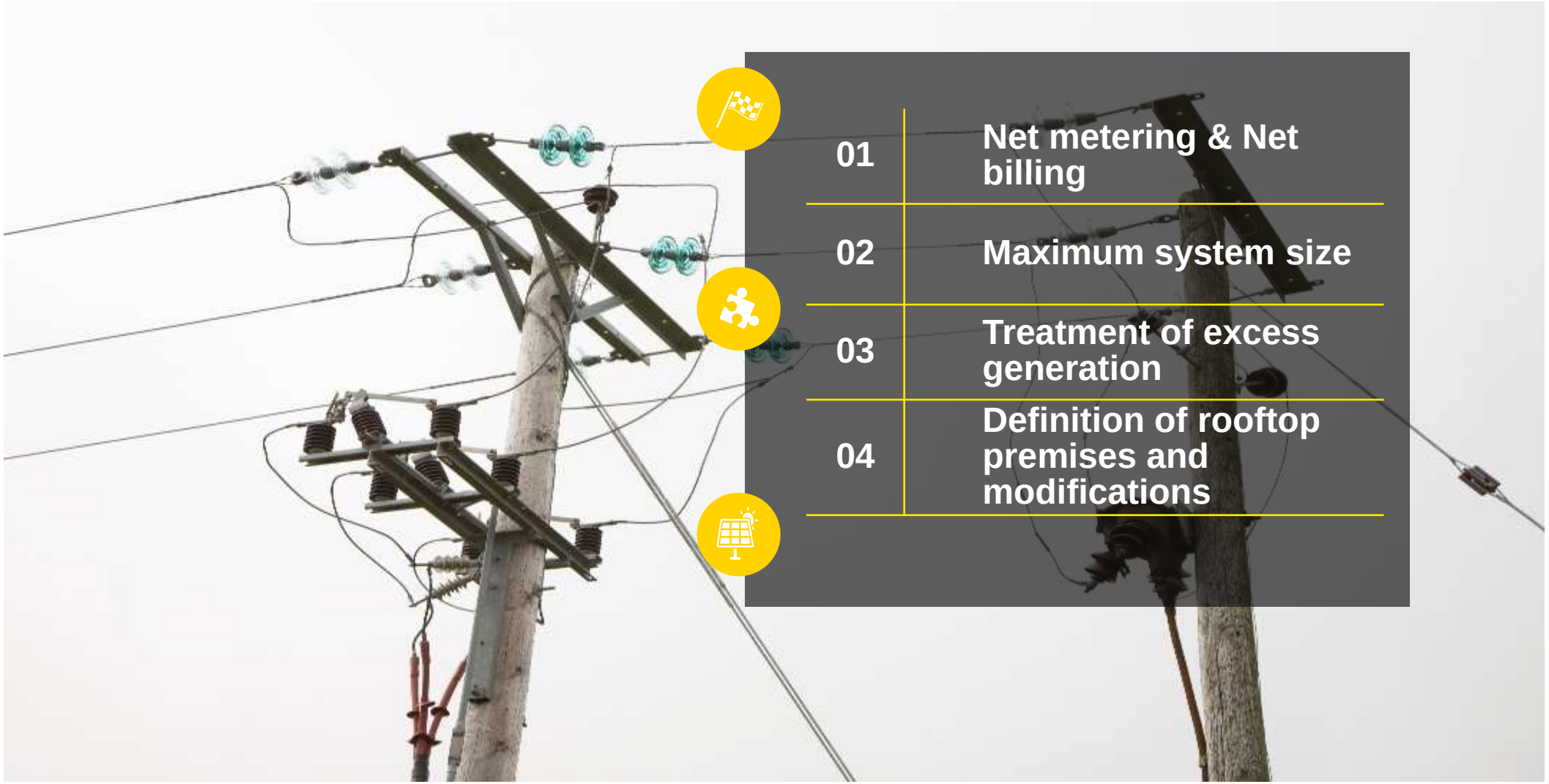

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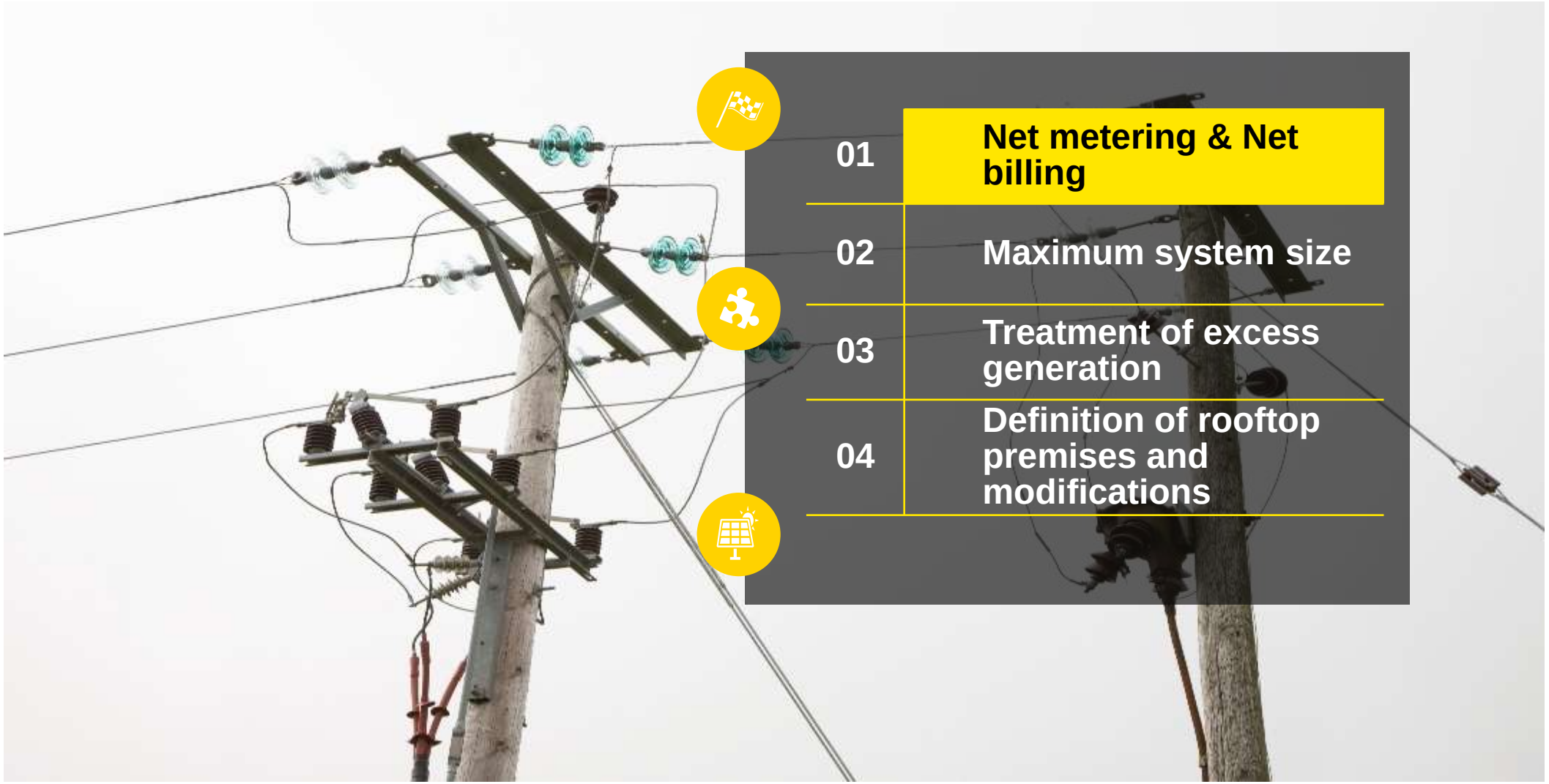


Assumptions for net metering & net billing comparison

Business As Usual (hereinafter referred to as BAU)

- No rooftop solar installation
- Total consumption in the billing period – 200 kWh
- Monthly consumer electricity bill – 200 kWh x 10 INR / kWh = INR 2000

Rooftop solar system installed

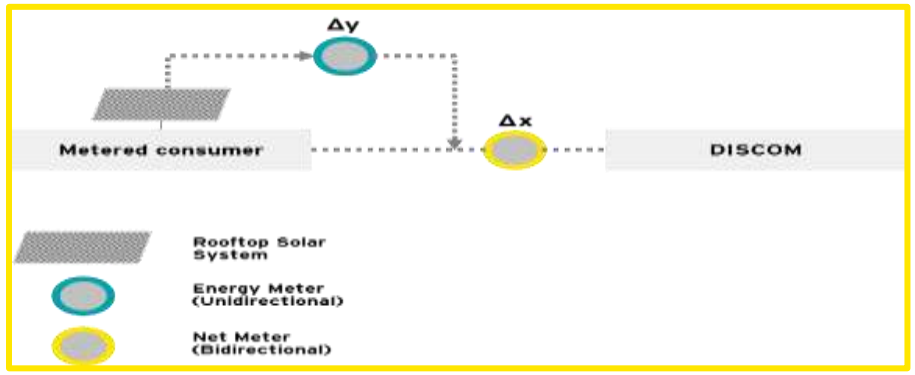
- System Capacity – 1 kW
- Number of units generated per day – 5 kWh
- Settlement period – 30 days
- Total consumption in the settlement period – 200 kWh
- Total generation by the rooftop solar plant in the settlement period – 150 kWh (5X30)
- Grid tariff – 10 INR / kWh
- Net billing tariff – 4 INR / kWh

	Net Metering	Net Billing
No. of units consumed from grid	50	200*
No. of units generated by rooftop plant	150	150

* Recorded by the consumer meter for the billing period

A sample case for net metering

Net Metering Arrangement



Assuming that

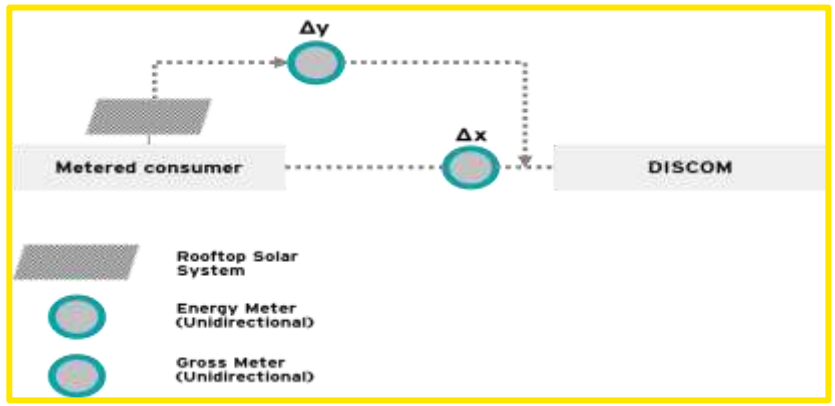
- xn – Net meter reading for month “n”
- yn – Energy meter reading for month “n”
- ∆x – Number of units (kWh) consumed from the grid i.e. xn – xn-1
- ∆y – Number of units (kWh) generated by the rooftop solar plant
- T – Grid tariff

Electricity bill = Fixed charges + ∆x*T

	Case 1 (BAU)		Case - Net Metering	
	Cash inflow	Cash outflow	Cash inflow	Cash outflow
Utility	200 kWh X 10 INR / kWh = 2000 INR		50 kWh x 10 INR / kWh = 500 INR	
Consumer		200 kWh X 10 INR / kWh = 2000 INR	-	50 kWh x 10 INR / kWh = 500 INR & Operation & maintenance expenditure (OME)

A sample case for net billing

Net Billing Arrangement



Assuming that

- xn – Gross meter reading for month “n”
- yn – Energy meter reading for month “n”
- Δx – Total number of units (kWh) consumed i.e. xn – xn-1
- Δy – Number of units (kWh) generated by the rooftop solar plant
- T – Grid tariff
- T’ – Net Billing tariff

Electricity bill = Fixed charges + Δx*T - Δy*T’

	Case 1 (BAU)		Case - Net Billing	
	Cash inflow	Cash outflow	Cash inflow	Cash outflow
Utility	200 kWh x 10 INR / kWh = 2000 INR		200 kWh x 10 INR / kWh = 2000 INR	150 kWh x 4 INR / kWh = 600 INR
Consumer		200 kWh x 10 INR / kWh = 2000 INR	150 kWh x 4 INR / kWh = 600 INR	200 kWh x 10 INR / kWh = 2000 INR & Operation & maintenance expenditure (OME)

Salient Features of Net Metering ….. (1/2)

- The prosumer may **set up distributed renewable energy system** to **offset the prosumer's electricity consumption from the distribution licensee**.
- The **distribution licensee shall** procure **any excess energy generated by PDRES at Average Power Purchase Cost for the year** in which such excess energy is procured by the distribution licensee.
- In case, the **electricity injected by the renewable energy system exceeds the electricity consumed** during the billing period, such **excess injected electricity shall be carried forward to the next billing period** as excess electricity and may be utilized in the following billing periods but within the same settlement period;
- In case, the **electricity supplied by the distribution licensee** during any billing period **exceeds the electricity injected in the grid by the PDRES,** the **distribution licensee shall raise bill for the net electricity** consumption after taking into account any excess electricity carried forward from the previous billing period;

PDRES: Prosumer Distributed Renewable Energy System

Salient Features of Net Metering ….. (2/2)

- In case the prosumer is under the **ambit of Time of Day Tariff**, following process shall be followed:
  - **Electricity consumption in any time block** (e.g., peak hours, off-peak hours, etc.) shall be **first compensated with the electricity generation** in the **same time block**.
  - Any **excess generation over consumption** in any time block in a billing cycle shall be accounted as if the excess generation occurred during immediately lower tariff time block. This process will continue till all consumption in lower tariff blocks is set off against PDRES generation.
  - Any excess generation after setting off consumption in lower tariff time blocks would be carried forward to the next billing cycle.
- Regardless of availability of excess electricity with the prosumer during any billing period, the consumer will continue to pay all other charges such as fixed/demand charges, Government levy, etc.
- The PDRES shall be exempted from all wheeling, cross subsidy, transmission and distribution, and banking charges and surcharges.

PDRES: Prosumer Distributed Renewable Energy System

Salient Features of Net Billing Arrangement ….. (1/2)

- The prosumer may **set up distributed renewable energy system to offset the prosumer's electricity purchase** bill from the distribution licensee.
- Net billing is the arrangement where DRE Plant is:
  - Installed to serve a specific consumer,
  - Connected on utility side on the consumer meter,
  - Selling power to distribution licensee under Power Purchase Agreement,
  - Entire power is consumed by the consumer
- The distribution licensee **shall enter into Power Purchase Agreement** at **tariff to be determined by the Commission.**
- **Entire quantum of electricity** generated by the DRE plant shall be procured by the distribution licensee.
- The distribution licensee shall enter into **Power Sale Agreement with the consumer** for sale of entire quantum of power generated by the relevant DRE plant.

PDRES: Prosumer Distributed Renewable Energy System

Salient Features of Net Billing Arrangement ….. (2/2)

$$\textit{Energy Bill of Consumer} = \textit{Fixed charges + other applicable charges and levies} + (E_{DL} * EC_{RST}) - (E_{RE} * T_{PSA}) - Billing_{Credit}$$

Where:

- E_{RE} means the energy units recorded for the billing period by the DRE Plant's generation meter;
- T_{PSA} means the energy charges as per the energy sale agreement signed between the consumer and distribution licensee;
- E_{DL} means the energy units supplied(i.e. Gross Electricity Consumption) by the distribution licensee as recorded by the consumer meter for the billing period;
- EC_{RST} means the Energy Charge (EC) component of retail supply tariff including Fuel Cost Adjustment Charge (FAC) as applicable for the concerned consumer category as per the retail supply Tariff Order of the Commission;
- Billing credit is the amount by which value of DRE generation in the previous month was more than value of all other components of consumer bill

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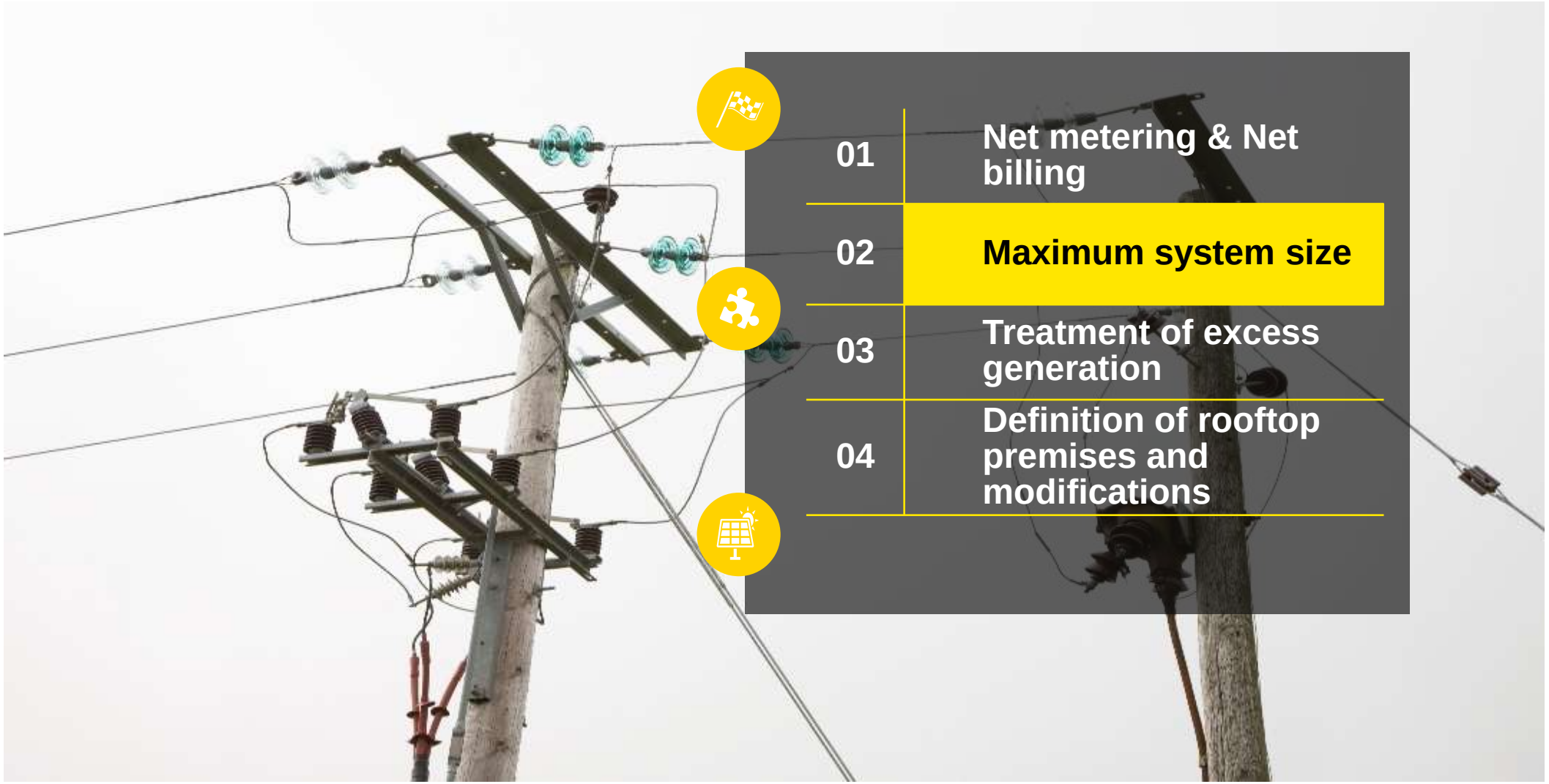
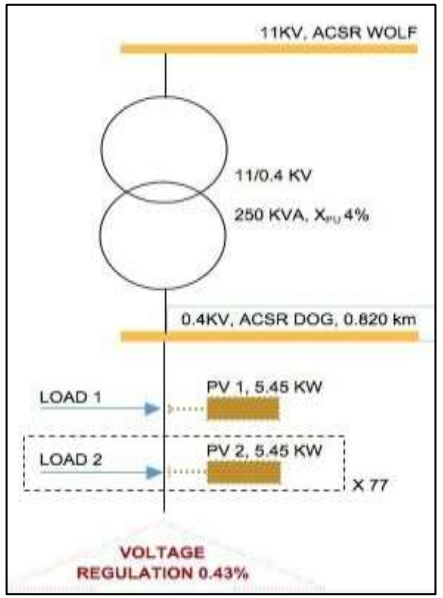


Analysis to address technical issues

- A simulation analysis has been conducted to assess maximum aggregated capacity of solar PV rooftop plants that can be connected to grid without impacting system operation within existing control and infrastructure configuration
- Impact assessment considering two key limiting parameters
  - Feeder/Grid asset thermal capacity
  - Over-voltage at point of interconnection
- Simulation model to conduct maximum capacity under different scenarios:
  - Different voltage level (0.4KV, 11 KV and 33KV)
  - Different DT capacity
  - Different loading conditions (rural, urban)



- If the installed PV capacity is limited to 100% of the sanctioned load, no limiting factors apply to the distribution element for 0 – 100 % DT loading.
- If the installed PV capacity exceeds the sanctioned load, the following will act as limiting factors
  - Thermal capacity of the feeder (in case the loads are equally distributed across the feeder)
  - Voltage rise (in case the PV are concentrated at farther end of the of the feeder)
  - Technically feasible to set up GRPV systems beyond 1 MW

Clarifications on relaxing the maximum individual capacity that can be deployed based on sanctioned load

PDRES Prosumer Distributed Renewable Energy System

- A distributed renewable energy system set up by prosumer under net metering or net billing, connected on the prosumer side of the meter or on service line to the prosumer.

IDRES Independent Distributed Renewable Energy System

- A distributed renewable energy system set up by any person and is connected to the distribution licensee network and sells electricity to distribution licensee under Power Purchase Agreement;

Proposed changes in the regulation

Serial No.	Type of system	Limit on Maximum Capacity	Commercial settlement
1	Prosumer owned DRE system (PDRES)	Individual project capacity not to exceed the sanctioned load/contract demand of the Prosumer	Net metering/ Net billing
2	Independent DRE system(IDRES)	Individual project capacity will be evaluated based on technical constraints	Power Purchase Agreement

Clarifications on relaxing the interconnection limits on GRPV capacities connected to DT

Proposed change in the model regulation:

- The cumulative capacity of distribution renewable energy systems allowed to be interconnected with the distribution network (feeder/ distribution transformer, owned by distribution licensee) shall not exceed 100% of the feeder and / or distribution transformer capacity, as applicable.

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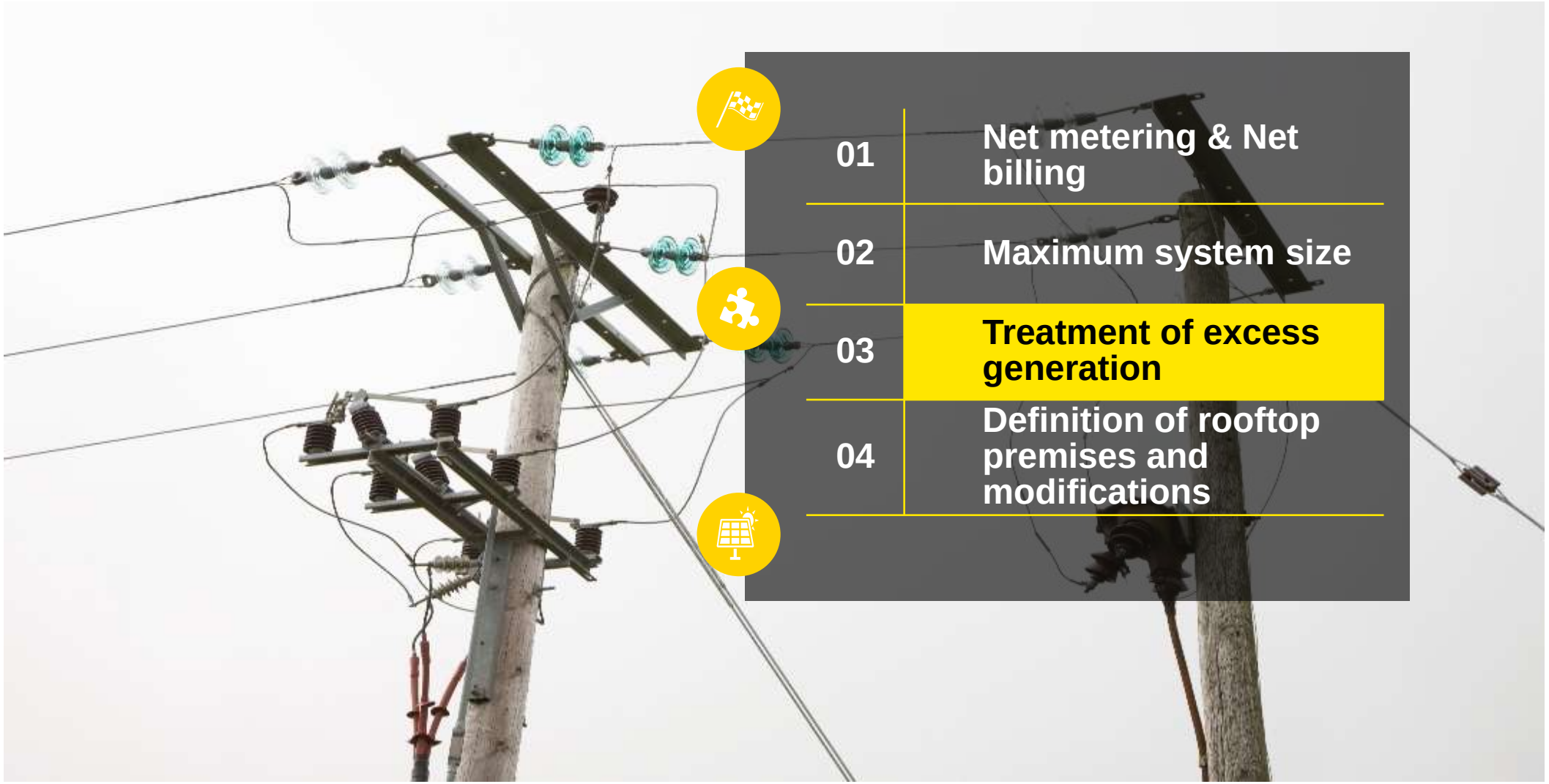

Clarifications on compensating for excess generation in present energy accounting and commercial settlement principles

- Few states allowed compensation, though, at different rates

State	Andhra Pradesh	Assam, Gujarat, Karnataka, Kerala, Madhya Pradesh, New Delhi, Telangana	Bihar, Tamil Nadu	Jharkhand, Uttar Pradesh
Treatment of excess energy in Net Metering	@ACoS	@APPC	@Tariff in force for that particular consumer	@INR 0.50/kWh

Proposed changes in the regulation

Serial No.	Type of system	Settlement mechanisms
1	Prosumer owned DRE system (PDRES)	Excess energy generated by PDRES to be settled at Average Power Purchase Cost for the year in which such excess energy is procured by the distribution licensee.

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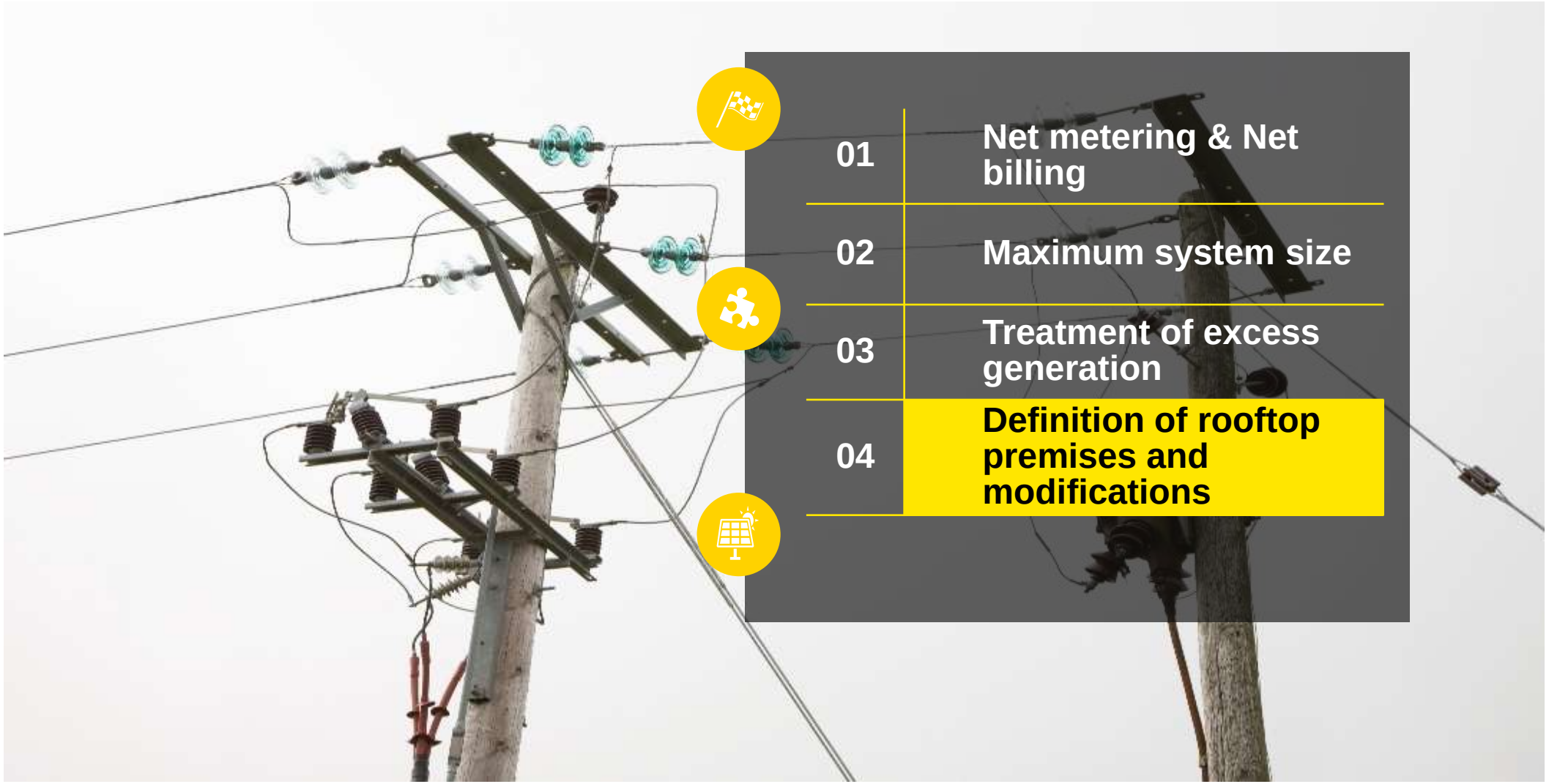


Clarification on definition of premises of Solar roof-top PV systems

Proposed changes in the regulation:

- Definition of premises is retained as per the EA 2003
- New definitions of PDRES and IDRES
- Individual capacity restricted based on sanctioned load for PDRES system
- Individual project capacity to be evaluated based on technical constraints for IDRES system
- It may be recommended that any ground mounted plant installed at the same premise of a rooftop system and connected to the same feeder to be considered rooftop PV if the capacity of the plant is within the sanctioned load of the Prosumer.

WORLD BANK GROUP

SBI

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

SUPRABHA
SUSTAINABLE PARTNERSHIP FOR ROOFTOP SOLAR ACCELERATION IN BHARAT

Thank you

Mr. Nithyanandam Yuvaraj Dinesh Babu
Team Leader, EY Consortium / Senior Advisor
Email: Yuvaraj.Dinesh@in.ey.com
Contact:9560719349

EY

GSES

SCGJ SKILL COUNCIL FOR GREEN JOBS

EVI

Idam

Edelman

Case studies

Commercial impact of rooftop solar on two DISCOMs has been assessed – JBVNL (Jharkhand Bijli Vitran Nigam Limited) and BYPL (BSES Yamuna Power Limited, New Delhi) using the model. The two case studies are as follows

Case Study 1 – Jharkhand - Jharkhand Bijli Vitran Nigam Limited

- In case of JBVNL, an **overall benefit of INR 1.3 Cr.** (**0.017% of the approved ARR**) for 2019 is observed. The overall benefit in case of JBVNL is due to the small difference between the APPC and the tariff charged. The overall benefit / loss has been computed by considering the revenue loss, RPO benefits, benefits due to reduced procurement and benefits due to reduced AT&C losses.

- Business Model 6 i.e. utility aggregates and acts as a RESCO; is the most commercially feasible model for the utility. Under Business Model 6, the PPA cost which leads to no commercial impact on the utility assessed. For JBVNL, it lies between **3.5-3.6 INR/kWh**

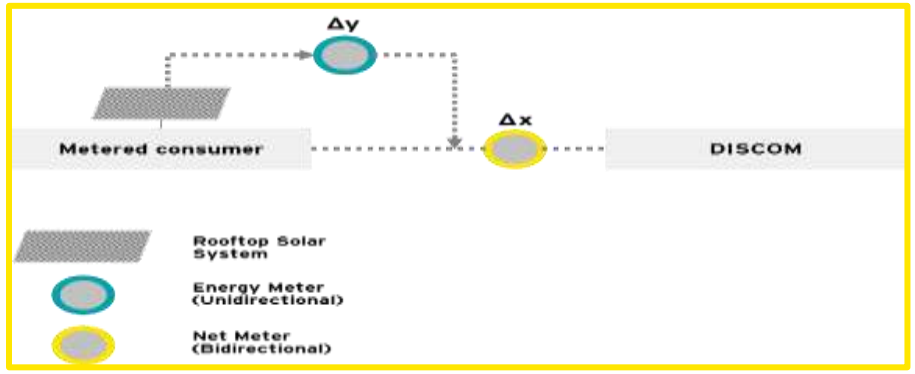
Case Study 2 – New Delhi - BSES Yamuna Power Limited

- For BYPL, the overall loss due to rooftop solar is limited to INR 9.93 Cr. (**0.25% of the approved ARR**) for 2019. The overall benefit / loss has been computed by considering the revenue loss, RPO benefits, benefits due to reduced procurement and benefits due to reduced AT&C losses.

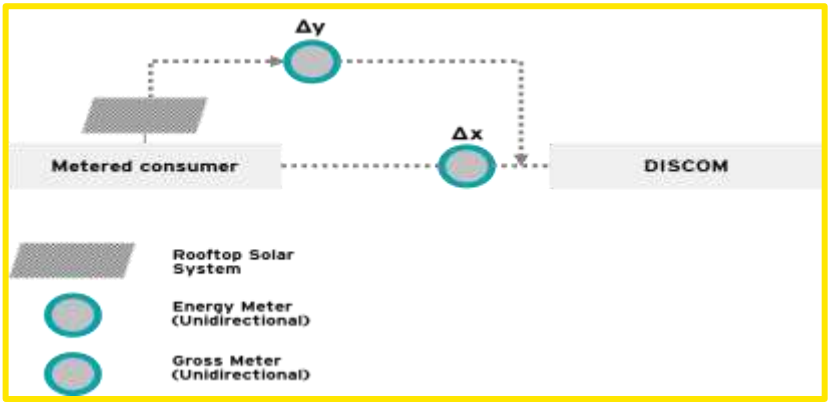
- The commercial impact of the abovementioned business models was also assessed. Business Model 6 i.e. utility aggregates and acts as a RESCO; is the most commercially feasible model for the utility. Under Business Model 6, the PPA cost which leads to no commercial impact on the utility assessed. For BYPL, the PPA cost lies between **5.8-5.9 INR/kWh**.

A sample case for Net Metering / Net Billing

Net Metering Arrangement



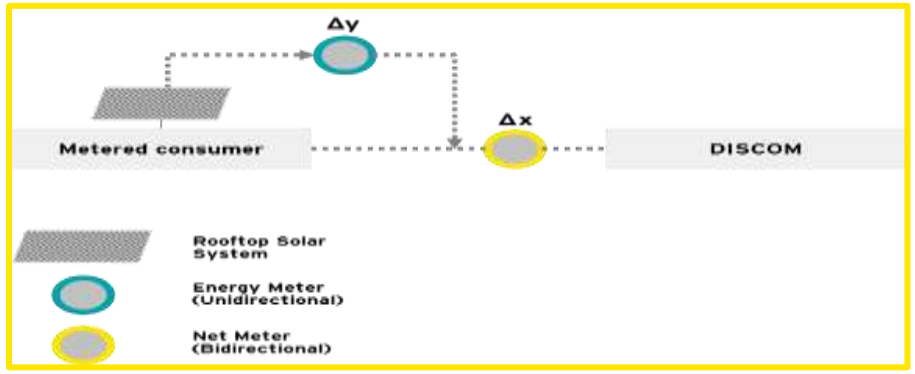
Net Billing Arrangement



	Case 1 (BAU)	Case - Net Metering	Case - Net Billing
Consumer to pay	200 kWh X 10 INR / kWh = 2000 INR	50 kWh x 10 INR / kWh = 500 INR	200 kWh x 10 INR / kWh = 2000 INR Minus 150 kWh x 4 INR / kWh = 600 INR = 1400 INR

A sample case for net metering

Net Metering Arrangement



Assuming that

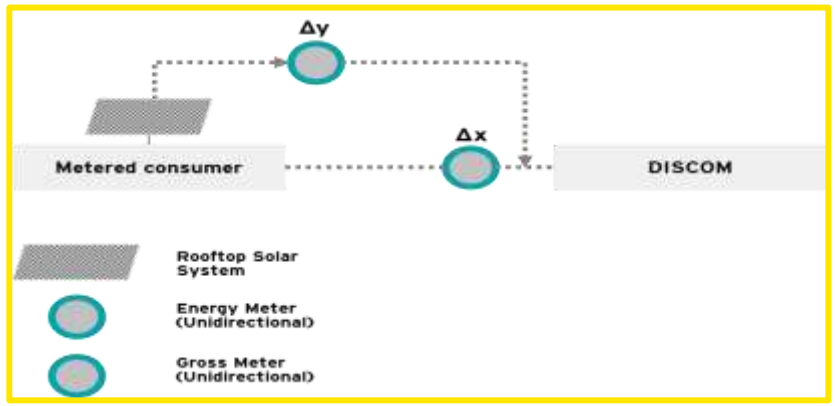
- xn – Net meter reading for month “n”
- yn – Energy meter reading for month “n”
- ∆x – Number of units (kWh) consumed from the grid i.e. xn – xn-1
- ∆y – Number of units (kWh) generated by the rooftop solar plant
- T – Grid tariff

Electricity bill = Fixed charges + ∆x*T

	Case 1 (BAU)	Case - Net Metering
Consumer to pay	200 kWh X 10 INR / kWh = 2000 INR	50 kWh x 10 INR / kWh = 500 INR & Operation & maintenance expenditure (OME)

A sample case for net billing

Net Billing Arrangement



Assuming that

- xn – Gross meter reading for month “n”
- yn – Energy meter reading for month “n”
- Δx – Total number of units (kWh) consumed i.e. xn – xn-1
- Δy – Number of units (kWh) generated by the rooftop solar plant
- T – Grid tariff
- T’ – Net Billing tariff

Electricity bill = Fixed charges + Δx*T - Δy*T’

	Case 1 (BAU)	Case - Net Billing
Consumer to pay	200 kWh x 10 INR / kWh = 2000 INR	200 kWh x 10 INR / kWh = 2000 INR Minus 150 kWh x 4 INR / kWh = 600 INR = 1400 INR & Operation & maintenance expenditure (OME)

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Report of Sub-Group on Challenges of Biomass and Waste-to-Energy projects

Agenda Item-2

22nd Meeting of FOR Technical Committee

November 1, 2018, New Delhi

Greening the Grid (GTG) Program

A Partnership between USAID/India and Government of India

The engagement of Consultant for support to FOR and its Technical Committee is supported under USAID/GTG-RISE initiative through Deloitte.

Background

- Representatives from Biomass as well as Waste-to-Energy (WtE) sectors made presentations during 20th meeting of FOR Technical Committee highlighting the various issues impacting the sector
- FOR Technical Committee constituted a Sub-group headed by Shri R.N Sen, Chairperson WBERC in its 20th Meeting held on 17th July, 2018 at CERC, New Delhi to understand the challenges before Biomass and Waste-to-Energy Projects
- Two meetings of Sub-Group held on 17th Aug. 2018 at CERC, New Delhi and on 24th Sept. 2018 at Kolkata to examine the issue faced by Biomass and WTE power projects in detail
- **Following issues were emerged and deliberated.**
  - **Issue-1**: Allowance for use of limited quantity of RDF/MSW in Biomass Power plant and treatment thereof
  - **Issue-2**: Allowance for use of limited quantity of Biomass in Waste to Energy (MSW/RDF) Projects and treatment thereof
  - **Issue-3**: Mandate for procurement of biomass power and mode of procurement

Issue-1 : Allowance for Use of RDF in Biomass Power Plants and treatment thereof

1. Allowance for use of RDF/MSW in Biomass Power Plant – (1/6)

Request for modification

- Allow existing/new biomass plants **to use up to 30% RDF** (respecting all environmental norms within limits)
- All biomass/MSW/RDF plants **to be classified as waste to energy**
- DISCOMS to be **obligated to buy 100% electricity** from the Bio-MSW plants at tariff determined by SERC
- Gross calorific value may determine in range of 3100kCal/kg - 3300kCal/kg by all state regulators
- Station Heat Rate may be standardized to 4400kCal/kWh for Biomass power plants
- The PLF may be revised to 75% from second year onwards

Justification

- It is argued that there exists synergy between Biomass power and WTE projects, particularly in case of power plants based on rankine cycle/incineration based technology.
- It is recommended to blend RDF from WTE projects with biomass projects to take care of the seasonality of fuel associated with biomass.
- Further, it is proposed that Tier-2 and Tier-3 Cities can set up RDF based WTE projects which can have fuel supply agreement with biomass power plants in nearby areas.

1. Allowance for use of RDF/MSW in Biomass Power Plant – (2/6)

Definitions

- **'Biomass'** means wastes produced during agricultural and forestry operations (for example straws and stalks) or produced as a by-product of processing operations of agricultural produce (e.g., husks, shells, deoiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial operations *(Ref. Cl. 2(1)(c) of CERC RE Tariff Regulations, 2017)*
- **Types of Biomass Resources** : Biomass will include Agro-based Industrial Residue, wood produced in Energy Plantations or recovered from wild bushes / weeds, wood waste produced in industrial operations; Crop / Agro Residues.
- Maximum of upto 15% use of fossil fuel of total energy consumption in kcals or as per DPR, whichever is less. Concerned SNA to monitor the project and ensure that the said power plant does not utilize more than 15% of fossil fuel of total energy consumption in killo calories. *(Ref. MNRE Circular dt 20-Jun-2014)*
- *'**Refused derived fuel"(RDF)** means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste; (Ref. Cl. 2(1)(u) of CERC RE Tariff Regulations, 2017)*

Conditions for Fuel Usage

- **Use of fossil fuels shall not be allowed,** except for the biomass power projects commissioned on or before 31.03.2017, the use of fossil fuels to the extent of 15% in terms of calorific value on annual basis shall be allowed for the tariff period from the date of commissioning. *(Ref. Cl. 39 of CERC RE Tariff Regulations, 2017)*

Key considerations:

1. ***Necessary amendments to policy/ regulatory provisions are required for allowing use of RDF in biomass power.***
2. ***Appropriate clauses for restriction on such RDF usage alongwith monitoring mechanism should be formulated.***

1. Allowance for use of RDF/MSW in Biomass Power Plant – (3/6)

Effect on performance

- Approved Station Heat Rate ranges from 3800-4200 kCal/kWh depending on vintage, boiler type (travelling grate or AFBC)
- Calorific value and fuel price varies for biomass fuel type across states (designed to use range/type of non-fossil fuel usage)
- Aux. power consumption varies, 10% (water-cooled condenser) or 12% (air-cooled condenser).
- Continued use of RDF in biomass power is likely to affect performance in terms of SHR, Auxiliary consumption and deration thereof, over longer period.
- Additional capex and opex required for emission control, pre-processing and fuel blending. However, extent of such incremental costs would depend on project case specific parameters.

Applicable Tariff

- **Generic tariff** has been determined for biomass power projects, as **per norms specified under RE Tariff Regulations**.
- **Use of RDF** (GCV ~2500 kCal/kg @ Rs 1800/MT) as against Biomass (GCV~ 3100 kCal/kg @ Rs 2800-3300/MT) would provide **savings in VC by ~ Rs 1.00 pu**; but same would be **partly offset due to incremental** capex cost and operational performance.

Other Conditions

- Compliance to Environmental Norms would be necessary.
- It needs to be verified & ascertained for **revision in conditions (if necessary**) as outlined under original **NoC from State Pollution Control Board** for air/water pollution control or **modifications required** to conditions in **Consent to Establish**.

1. Issue 1 - Allowance for use of RDF/MSW in Biomass Power Plant – (4/6) Recommendations

Recommendations of Sub-Group

- Allowing flexibility for use of limited quantity of RDF in Biomass power plant in Fuel consumption mix would provide some **savings on variable cost for biomass power projects** (ranging upto Rs 1 per Unit) but these **savings would be partly offset due to incremental capex and opex cost associated with this modifications.**

- However, **any incremental cost (capex and opex) incurred in the Biomass Power Plant** to accommodate above changes **will have to be borne by the developer itself** as allowing **flexibility is choice of such biomass power plant developer** and **not mandatory requirement** as such.

- **Use of RDF/MSW fuels to the extent of 15% quantity on annual basis** in the Biomass Power Plant could be allowed with **strict adherence and compliance of environmental norms** and **subject to monitoring mechanism** for use of such fuel in biomass power plants.

- This is a **voluntary measure** and **no additional cost/benefit or revision in the existing tariff shall be permitted** for such usage.

Recommendation on M&V and Reporting framework

- The Biomass power plant developer shall furnish **monthly fuel usage statement and monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.

1. Issue 1 - Allowance for use of RDF/MSW in Biomass Power Plant – (5/6) M&V framework

GOVERNMENT OF INDIA
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Monthly Fuel Procurement Statement -1/2

Format of Monthly Statements to be submitted by Biomass and Co-Generation Project Entities to State Nodal Agency

Template 1.1: Monthly Fuel Usage Statement

Name of the Project
(Location, District)
SNA / Utility Ref.No.
Installed Capacity (MW)
Date of Commissioning

For FY :
Statement Date:
Project Code:

RDF Consumption

Sr. No.	Month	Biomass Fuel-1 consumption (in Tonnes)			Biomass Fuel-2 consumption (in Tonnes)			Biomass Fuel-3 consumption (in Tonnes)			Fossil Fuel (Coal) consumption (in Tonnes)			% Fossil Fuel Consumption of Total Fuel Consumption	
		Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Grade of coal used	During current month	Cumulative last 12 month	During current month	Cumulative last 12 month
														(13)/(4+7+10+13)	(14)/(5+8+11+14)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	April														
2	May														
3	June														
4	July														
5	August														
6	September														
7	October														
8	November														
9	December														
10	January														
11	February														
12	March														

Project Developer to furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary

1. Issue 1 - Allowance for use of RDF/MSW in Biomass Power Plant – (6/6)
M&V framework

GOVERNMENT OF INDIA
MINISTRY OF POWER

Monthly Fuel Consumption Statement -2/2

Format of Monthly Statements to be submitted by Biomass and Co-Generation Project Entities to State Nodal Agency

Template 1.2: Monthly Fuel Usage Statement

Name of the Project
(Location, District)
SNA / Utility Ref. No.
Installed Capacity (MW)
Date of Commissioning

For FY :
Statement Date:
Project Code:

RDF Consumption

Sr. No.	Month	Energy Generation (kWh) during month		Cummulative Energy Generation (kWh) during FY till end of the month		Biomass Fuel-1 consumption (in Tonnes)			Biomass Fuel-2 consumption (in Tonnes)			Biomass Fuel-3 consumption (in Tonnes)			Fossil Fuel (Coal) consumption (in Tonnes)			% Fossil Fuel Consumption of Total Fuel Consumption	
						Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Grade of coal used	During current month	Cumulative last 12 month	During current month	Cumulative last 12 month
		Gross	Net	Gross	Net													(13)/(4+7+10+13)	(14)/(5+8+11+14)
1	2					3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Project Developer to furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary

Issue-2 : Allowance for Use of Biomass in Waste to Energy Plants and treatment thereof

2. Allowance for use of Biomass in Waste to Energy Plant – (1/6)

Request for modification

- Allow existing/new WtE plants **to use up to 30% biomass** (complying environmental norms within limits)
- All biomass/MSW/RDF plants **to be classified as waste to energy**
- DISCOMS to be **obligated to buy 100% electricity** from the Bio-MSW plants at tariff determined by SERC
- Gross calorific value may determine in range of 3100kCal/kg - 3300kCal/kg by all state regulators
- Station Heat Rate may be standardized to **4800 kCal/kWh** for MSW based WtE plants
- The PLF may be revised to 75% from second year onwards

Justification

- It is argued that there exists synergy between Biomass power and WTE projects, particularly in case of power plants based on rankine cycle/incineration based technology.
- It is recommended to blend biomass with RDF based WtE projects **to take care of varying quality and daily/seasonal variation** in available quantity of RDF.
- Further, it is proposed that Tier-2 and Tier-3 Cities can set up RDF based WTE projects which can have fuel supply agreement with biomass power plants in nearby areas.

2. Allowance for use of Biomass in Waste to Energy Plant – (2/6)

Definitions

- ***"solid waste"*** *means and includes solid or semi-solid* ***domestic*** *waste,* ***sanitary*** *waste,* ***commercial*** *waste,* ***institutional*** *waste,* ***catering and market*** *waste and other* ***non residential*** *wastes, street sweepings, silt removed or collected from the* ***surface drains****,* ***horticulture*** *waste,* ***agriculture and dairy*** *waste,* ***treated bio-medical*** *waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in rule 2; (Ref. SWM Rules, 2016)*
- ***'Municipal solid waste' or 'MSW'*** *means and includes* ***commercial and residential*** *wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes (Ref. Cl. 2(1)(p) of CERC RE Tariff Regulations, 2017)*
- *'****Refused derived fuel"(RDF)*** *means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste; (Ref. Cl. 2(1)(u) of CERC RE Tariff Regulations, 2017 and SMW Rules, 2016)*

Eligibility Criteria for Fuel Usage

- The project shall qualify to be termed as a **Municipal solid waste (MSW)** or **Refuse Derived Fuel (RDF)** based power project if it is using new plant and machinery based on Rankine cycle technology and using Municipal solid waste (MSW) or Refuse Derived Fuel (RDF) as fuel sources, as the case may be. *(Ref. Cl. 4 (h) and Cl. 4(l) of CERC RE Tariff Regulations, 2017)*

Key Considerations:

1. ***Necessary amendments to policy/ regulatory provisions are required for allowing use of biomass in MSW/RDF based WtE power projects.***
2. ***Appropriate clauses for restriction on such biomass usage alongwith monitoring mechanism should be formulated.***

2. Allowance for use of Biomass in Waste to Energy Plant – (3/6)

Effect on performance

- Approved Station Heat Rate ranges from 4100-4200 kCal/kWh and sought to be revised to 4800 kCal/kWh. Auxiliary Consumption factors for MSW/RDF based projects are very high (around 15%)
- Calorific value of MSW varies 1100-1800 kCal/kg but for RDF GCV of 2500 kCal/kg is assumed. Composition and physical/bio-chemical characteristic of RDF would vary across seasons and across regions depending on local factors.
- Use of biomass would improve homogeneity in fuel mix and facilitate combustion. But, effect of continued use of biomass in WtE plant and its influence on performance parameters /O&M over longer period is unknown.
- No significant additional capex and opex is envisaged; except for fuel supply management and optimisation in controlling fuel feed-stock.

Applicable Tariff

- **Generic tariff** was determined for MSW/RDF based WtE projects in 2015-16. However, **CERC RE Tariff Regulations, 2017 and SERCs have preferred Project Specific Tariff determination for MSW/RDF power plants**.
- **Use of Biomass** (GCV~ 3100 kCal/kg @ Rs 2800-3300/MT) as against **RDF** (GCV ~2500 kCal/kg @ Rs 1800/MT) would in fact **increase VC by ~ Rs 0.70-0.80 pu**; but same would improve operational performance/PLF of WtE.

Other Conditions

- Compliance to Environmental Norms **as per SWM Rules, 2016** would be necessary.
- It needs to be verified & ascertained for **revision in conditions (if necessary)** as outlined under original **NoC from State Pollution Control Board** for air/water pollution control or **modifications required** to conditions in **Consent to Establish**.

2. Issue 2 - Allowance for use of Biomass in Waste to Energy Plant – (4/6) Recommendations

Recommendations of Sub-Group

- Use of Biomass in RDF based WtE plants to the extent of 15% in terms of annual quantity MT of total fuel consumption.
- However, **strict adherence to environmental norms** as per SWM Rules, 2016 or any relevant norms would be required
- Hence, it was recommended to devise appropriate monitoring/reporting mechanism for the same.
- As this is **voluntary measure** and no mandatory **usage of such biomass in RDF based WtE** is contemplated hence, **no revision in tariff** on this account shall be permitted.

Recommendation on M&V and Reporting framework

- The Project developer shall furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.
- No revision in tariff on this account shall be permitted.

2. Issue 2 - Allowance for use of Biomass in Waste to Energy Plant – (5/6) M&V framework

Monthly Fuel Procurement Statement -1/2

Format of Monthly Statements to be submitted by Biomass and Co-Generation Project Entities to State Nodal Agency

Template 1.1: Monthly Fuel Usage Statement

Name of the Project
(Location, District)
SNA / Utility Ref.No.
Installed Capacity (MW)
Date of Commissioning

For FY :
Statement Date:
Project Code:

RDF Consumption

Sr. No.	Month	Biomass Fuel-1 consumption (in Tonnes)			Biomass Fuel-2 consumption (in Tonnes)			Biomass Fuel-3 consumption (in Tonnes)			Fossil Fuel (Coal) consumption (in Tonnes)			% Fossil Fuel Consumption of Total Fuel Consumption	
		Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Grade of coal used	During current month	Cumulative last 12 month	During current month	Cumulative last 12 month
														(13)/(4+7+10+13)	(14)/(5+8+11+14)
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7	October														
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9	December														
10	January														
11	February														
12	March														

Project Developer to furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary

2. Issue 2 - Allowance for use of Biomass in Waste to Energy Plant – (6/6)
M&V framework

Monthly Fuel Consumption Statement -2/2

Format of Monthly Statements to be submitted by Biomass and Co-Generation Project Entities to State Nodal Agency

Template 1.2: Monthly Fuel Usage Statement

Name of the Project
(Location, District)
SNA / Utility Ref. No.
Installed Capacity (MW)
Date of Commissioning

For FY :
Statement Date:
Project Code:

RDF Consumption

Sr. No.	Month	Energy Generation (kWh) during month		Cummulative Energy Generation (kWh) during FY till end of the month		Biomass Fuel-1 consumption (in Tonnes)			Biomass Fuel-2 consumption (in Tonnes)			Biomass Fuel-3 consumption (in Tonnes)			Fossil Fuel (Coal) consumption (in Tonnes)			% Fossil Fuel Consumption of Total Fuel Consumption	
						Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Type of fuel	During current month	Cumulative last 12 month	Grade of coal used	During current month	Cumulative last 12 month	During current month	Cumulative last 12 month
		Gross	Net	Gross	Net													(13)/(4+7+10+13)	(14)/(5+8+11+14)
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8	November																		
9	December																		
10	January																		
11	February																		
12	March																		

Project Developer to furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary

Issue-3 : Mandate for procurement of biomass power and mode of procurement

3. Mandate for Procurement of Biomass Power and Mode of procurement – (1/4)

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Request for modification

- Centralised procurement of biomass power may be permitted.
- Bundling of biomass power with NTPC power for sale to DISCOM may be considered.
- All biomass/MSW/RDF plants to be classified as waste to energy.
- DISCOMS to be obligated to buy 100% electricity from the Bio-MSW plants at tariff determined by SERC.

Justification

- With decrease in prices of power of wind and solar projects, discoms are not willingly procuring power from other RE projects such as biomass and delaying payments by 3-4 month which is pushing biomass projects to shut down.

- As most of the biomass projects are old and would complete their PPA in next two or three years, PPA for such projects should be extended further along with some financial assistance.

Question: Whether Biomass Power and Bio-WtE plants to be treated as (or on par with) 'Waste to Energy (WtE) Plants using MSW/RDF as main fuel source?

3. Mandate for Procurement of Biomass Power and Mode of procurement – (2/4)

Tariff Policy 2016 – Mandate for WtE

"6.4 Renewable sources of energy generation including Co-generation from renewable energy sources:

1 (ii) Distribution Licensee(s) shall compulsorily procure 100% power produced from all the Waste-to-Energy plants in the State, in the ratio of their procurement of power from all sources including their own, at the tariff determined by the Appropriate Commission under Section 62 of the Act."

"6.4 (2) States shall endeavor to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the waste to energy plants"

SMW Rules 2016 – Mandate for WtE

***9. Duties of the Ministry of Power**.-The Ministry of Power through appropriate mechanisms shall,-*

(a) decide tariff or charges for the power generated from the waste to energy plants based on solid waste.

(b) compulsory purchase power generated from such waste to energy plants by distribution company.

***10. Duties of Ministry of New and Renewable Energy Sources**- The Ministry of New and Renewable Energy Sources through appropriate mechanisms shall,-*

(a) facilitate infrastructure creation for waste to energy plants; and

(b) provide appropriate subsidy or incentives for such waste to energy plants.

3. Mandate for Procurement of Biomass Power and Mode of procurement – (3/4)

Issues to be addressed

- **Whether the Commission should mandate procurement model for specific RE source for DISCOMs?**
  - Competitive Bidding guidelines for RE do not mandate centralised procurement or bundled procurement as mandatory route.
  - Appointment of Authorised Representative or selection of Procurement Agency is choice to be exercised by DISCOMs.
  - Bundling of power is prerogative of concerned PSU or to be formulated as part of Scheme by Central Govt
- **Mandate for RE procurement can be stipulated in terms of RPO target.**
  - Separate RPO target (Solar and Non-Solar) has been specified in the past.
  - However, no further distinction is made amongst all other Non-Solar RE sources *except* mini/micro hydel in some.
  - Besides, with falling solar prices, need for separate Solar/Non-Solar RPO targets is under question/review.
- **Tariff policy has stipulated mandate for procurement, only for WtE plant at Tariff determined by SERC.**
  - Allowance for use of multiple fuels (RDF in Biomass and Biomass in WtE in limited quantity) does not change inherent character or classification of Waste to Energy (WtE) plant.
  - Flexibility in fuel usage/mix (in limited quantity) may be allowed only to provide operational flexibility without any impact on tariff and subject to other conditions, adherence to environmental norms etc.
- **Treatment for Existing Biomass Power plants for Extension of PPA beyond initial term**
  - Extension to be evaluated in terms of balance Useful Life. MERC has recently allowed (Case 84 of 2015) such extension subject to competitive bidding with ceiling rate for operating cost recovery and VC at annually determined Tariff Rate.

3. Issue 3 - Procurement of Biomass Power and Mode of procurement – (4/4) Recommendations

Recommendations of Sub-Group

- Competitive Bidding guidelines for RE do not mandate centralized procurement or bundled procurement as mandatory route.
- Sub-Group agreed that biomass power projects also require policy support for off-take of its power.
- Proposed that FOR may consider recommending the mandatory procurement of biomass/biogas based power projects by the Discoms within the States.

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GOVERNMENT OF INDIA
MINISTRY OF POWER

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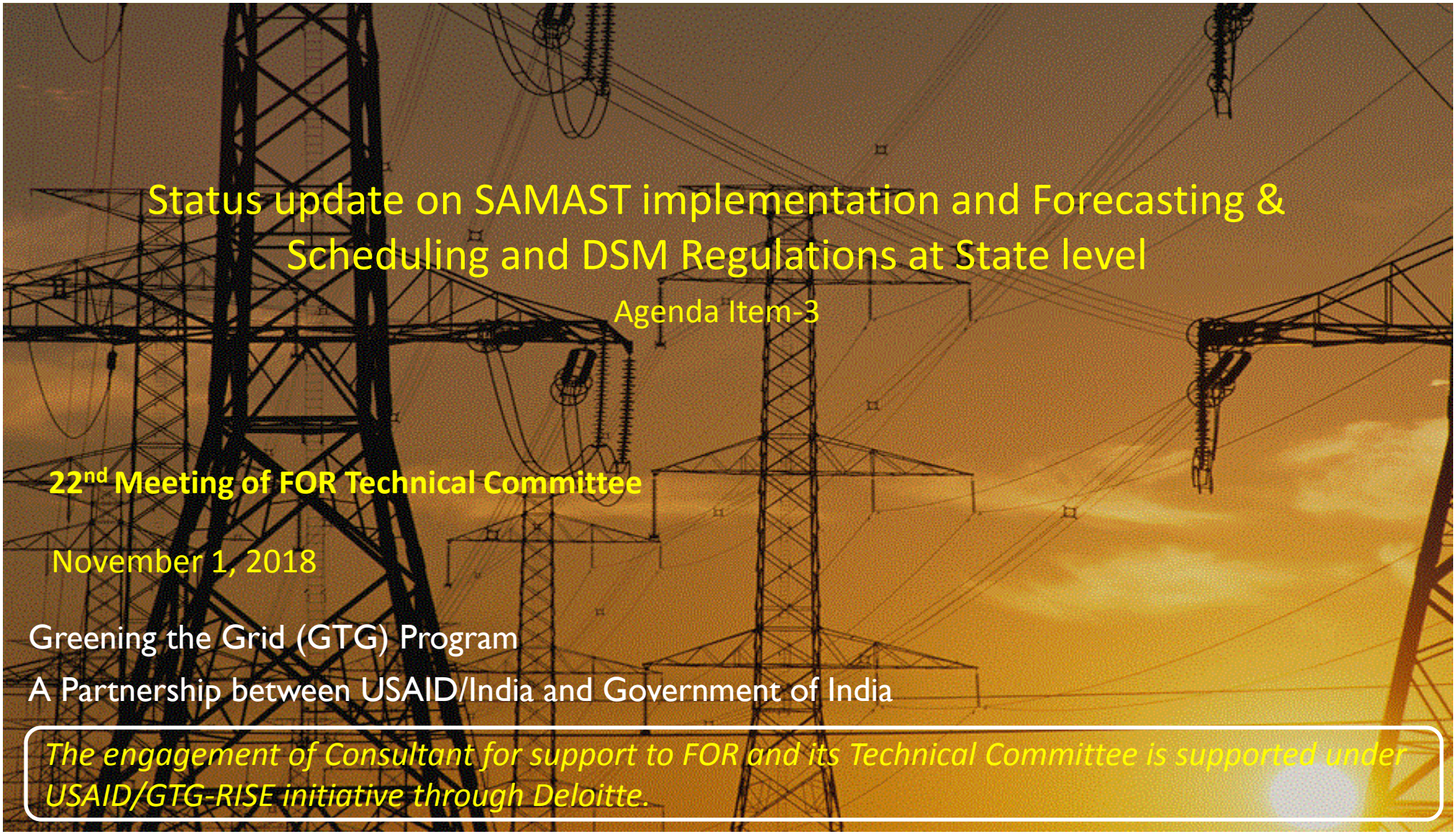
GOVERNMENT OF INDIA
MINISTRY OF POWER
सत्यमेव जयते



Status update on SAMAST implementation and Forecasting & Scheduling and DSM Regulations at State level

Agenda Item-3

22nd Meeting of FOR Technical Committee

November 1, 2018

Greening the Grid (GTG) Program

A Partnership between USAID/India and Government of India

The engagement of Consultant for support to FOR and its Technical Committee is supported under USAID/GTG-RISE initiative through Deloitte.

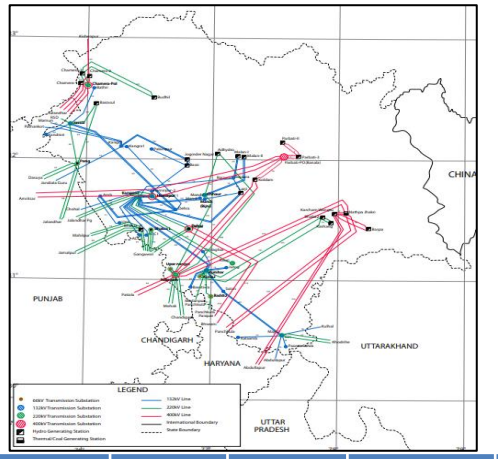
Status update of state specific activities

- Himachal Pradesh
- Haryana
- Punjab
- Telangana
- Tamil Nadu
- North Eastern states
  - Assam
  - Meghalaya
  - Arunachal Pradesh
  - Mizoram
  - Manipur
  - Nagaland
  - Tripura
- West Bengal

Status Update of State Specific Activities

- Himachal Pradesh
- Haryana
- Punjab
- Telangana
- Tamil Nadu
- North Eastern states
- West Bengal

Status of Himachal Pradesh



RE Gen. Sources	Wind	Small Hydro	Bio-Energy	Solar
Gen. Potential (MW)	64	2398	144	33840

Gen. sources	State	Central
Coal	0	183
Gas	0	62
Hydro	695	1224
RE	257	0
Total in MW	**951**	**1498**

Total Gen Cap. : 4047 MW
IPPs: 1597 MW
RE Total: 862 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 1594 MW (2017-18)
Supply: 1594 MW
No. of Sub-stations: 13 no. of Substations
(Ref.: LGBR report 2018-19 & HPPTCL website)

- Himachal Pradesh falls under **Category 'B'** of SAMAST report

SAMAST

- HPERC requested for assistance of consultant for preparation of SAMAST DPR
- Consultant visited HPSLDC during Sep-18 for data collections and discussions
- Draft DPR shared with HPSLDC and upon deliberations draft DPR was finalized and submitted to HPERC.
- Upon HPERC's approval, DPR is submitted to PSDF secretariat on 29th Sept 2018.

DSM Regulations

- HPERC had published the DSM Regulations for public consultation
- Consultant reviewed the draft and provided comments in line with model DSM Regulations during meeting dated 18th Sept. 2018
- HPERC reviewed the comments of stakeholders and notified the final DSM Regulation on 16th October 2018

No. of Distribution Licensees: 1 no. (HPSEBL)
No. of Transmission Licensees: 1 no. (HPPTCL)
No. of OA Consumers : 20 nos. (LTOA/MTOA/STOA)
(Ref.: FOR - SAMAST Report, 2016)

Implementation of SAMAST in Himachal Pradesh

- The existing boundary metering project is working partially and IT system is not commissioned
- Energy accounting and UI/ Deviation settlement for only OA Consumers is operational in Himachal Pradesh.
- Settlement of UI/ Deviation is being done by SLDC manually.
- No Reactive Energy Account is being prepared at present.
- Weekly and Monthly Deviation account are being prepared for Open Access only.
- Scheduling is being done manually for large IPPs and intra-State OA Consumers
- Load Forecasting is being carried out by HPSEBL, being a single DISCOM entity, in coordination with ALDC and HPSLDC.
- All payments related to regulatory pool account are being handled by HPSEBL in coordination with HPSLDC.

Cost Component	Cost (INR in lac)
Cost-Estimate - Hardware-Metering infrastructure	186.78
Cost-Estimate - Communication Component	182.61
Cost-Estimate - Software, Hardware-II, Infrastructure, Training & Capacity Building – SAMAST	940.10
Cost estimates without taxes	1309.49
COST ESTIMATE GRAND TOTAL (with GST @18%)	**1545.20**

State	Main Meters	Check Meters	Standby Meters	Total Interface meters	AMR
Himachal Pradesh	88	88	80	256	Y

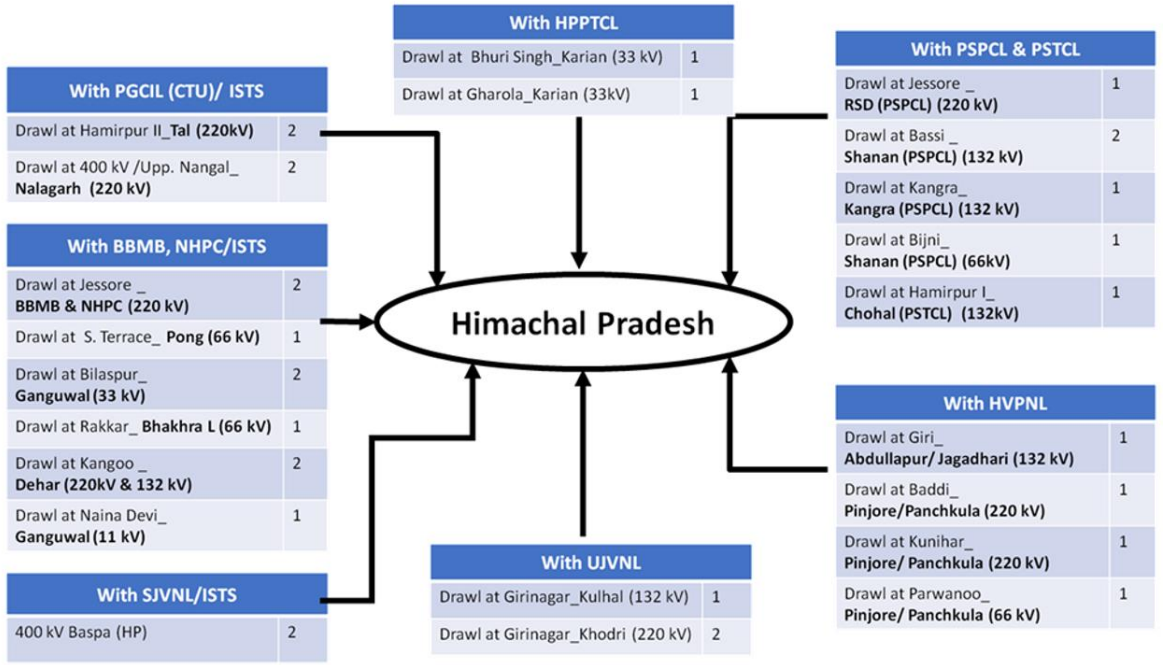
G-D (HPSEBL own Gen.)	IPPs (large HEP)	RES-D (SHP+ Solar)	ISTS-InSTS	D-T	G-D (OA Gen)	G-T (OA Gen)	HT-T	OA-D	Total
11	3	10	30	2*	8*	2*	0	20	**75**

Implementation of SAMAST in Himachal Pradesh

GOVERNMENT OF INDIA
MINISTRY OF POWER

Figure 1: Details of Boundary metering and energy exchange with ISTS

(As per Annexure – F)



-D +r)	ISTS-InSTS	D-T	G-D (OA Gen)	G-T (OA Gen)	HT-T	OA-D	Total
	30	2*	8*	2*	0	20	**75**

ost Component	Cost (INR in lac)
Cost-Estimate - Hardware-Metering infrastructure	186.78
Cost-Estimate - Communication Component	182.61
Cost-Estimate - Software, Hardware-II, Infrastructure, Training & Capacity Building – SAMAST	940.10
Cost estimates without taxes	1309.49
COST ESTIMATE GRAND TOTAL (with GST @18%)	**1545.20**

HPERC DSM Regulations,2018 – Salient features(1/3)

Sr. No.	Ref of Regulations	FOR Model DSM Regulations	Provision of HPERC DSM Regulations
1	Objective	To maintain grid discipline and grid security as envisaged under the Grid Code through the commercial mechanism of DSM through drawal and injection by the users of the grid	• To maintain grid discipline and grid security as envisaged under the Grid Code through the commercial mechanism for Deviation Settlement through drawal and injection of electricity by the users of the grid.
2	Scope	Seller(s) and Buyer(s) involved in the transactions facilitated through short-term open access or medium-term open access or long-term access in intra-state transmission or distribution of electricity (including inter-state wheeling of power), as the case may be.	• All buyers and Sellers i.e. the State Dist. Licensees, State Generating Stations and OA Customers connected to the State Grid. • For the purpose of DSM, State Generators and other IPPs if selling power to State Entities like, State Dist. Licensee shall not be treated as separate State Entities for such sale of power under regular arrangement. • However, in case of generator selling part of its total generation other than State Entity , it will be considered as separate State Entity for such balance portion. • Partial OA Generators and Consumers shall submit their schedule to SLDC for portion under OA.
3	Procurement of Un-Requisitioned Surplus (URS) in the interest of the State Grid	• No such provision in Model DSM Regulations	• In the event of sudden fall in availability of more than 20 MW for any individual State Entity, if the concerned the State Entity generator has not already initiated any steps, or is not entitled, to revise his schedule, the SLDC may, in the interest of grid security, procure, under intimation to such State Entity(ies), URS from the concerned generating stations for such time blocks as it may feel appropriate duly keeping in view the main objectives of Regulations

HPERC DSM Regulations,2018 – Salient features(2/3)

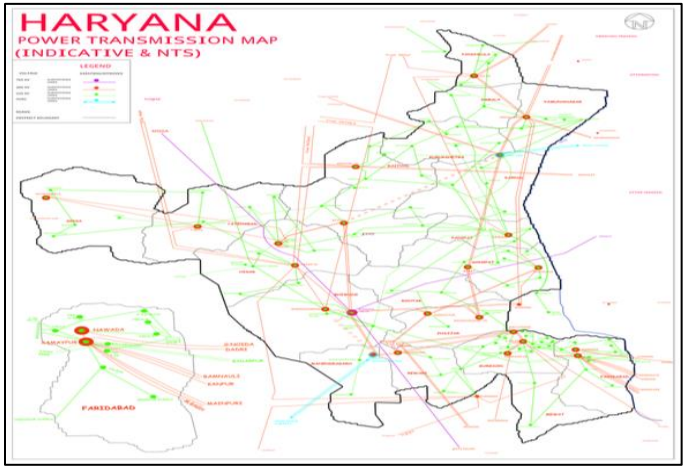
Sr. No.	Ref of Regulations	FOR Model DSM Regulations	Provision of HPERC DSM Regulations

3	Limits for Deviation	• No over-drawal/under-injection when Frequency below 49.8 Hz.
		• No under-drawal / over-injection when frequency is above 50.05 Hz
		• Volume Cap for Intra-state Entities proposed as under:
		  • For Generators /Sellers : 10 MW or 12% of Schedule, whichever lower
		  • For DISCOMs/Buyers: X Limit or 12% of Schedule, whichever lower
		  • In case of schedule is less than 40 MW, Volume cap of 5 MW or 12% of schedule, whichever higher.
		• Additional Charges at rate of 20%, 40%, 100% of Applicable Deviation Charges in steps of deviation 12%-15%, 15%-20%, > 20% or X+10 MW, X+ 20 MW, > X+ 20 MW
			• No over-drawal/under-injection when Frequency below 49.7 Hz
			• No under-drawal/over-injection when frequency is above 50.05 Hz
			• Volume Cap for Intra-state Entities is as under:
			  • For Generators /Sellers :12% of Schedule
			  • For DISCOMs/Buyers: 12% of Schedule
			• Additional Charges for overdrawal by buyer/for under injection by seller at rate of 20%, 40%, 100% of Applicable Deviation Charges in steps of deviation 12%-15%, 15%-20%, > 20%
			• In addition, additional charge for Deviation shall be payable for the over-injection and/or under drawal by a seller and/or buyer, when frequency **is "50.10 Hz** and above" at the rate of **178 paise** per kWh
			• In addition, additional charge for Deviation shall be payable for over-drawal and/or under-injection by a buyer and/or seller, when grid frequency is "below 49.70 Hz" and the rate of 100% of the charge for Deviation corresponding to the frequency of "below 49.70 Hz" i.e. 824.04 Paise/kWh.

HPERC DSM Regulations,2018 – Salient features(3/3)

Sr. No	Ref of Regulations	FOR Model DSM Regulations	Provision of HPERC DSM Regulations
4	Charges for Deviation	• Charges payable (over-drawal/under-injection) and receivable (under-drawal/over-injection) for each time-block with slope of 50 paise/unit per 0.01 Hz • Linked to avg. freq (15 min duration) in steps of 0.01 Hz over range from 49.9 Hz to 50.05 Hz • Change in sign of deviation once every 6 time blocks- violation attracts additional charges @10% of deviation charges applicable for the continuance of violation • Cap Rate of Paise 303.04/ unit (indicated- to be linked through imported coal power plant) • Charges for over injection / under drawal in excess of 12% of the schedule or 10 MW shall be zero.	• Charges shall be accordance to Price Vector specified in CERC (DSM Regulations), 2014 • Change in sign in case of over drawal/under injection by a State Entity during 12 such time blocks, immediately , in which the frequency remained less than 49.9 Hz; or • Change in Sign in case of Under drawal/over injection by a State Entity during 12 such time blocks, immediately, in which the frequency was more than 49.9 Hz • Cap Rate of Paise 178/ unit (sent out on case of hydro/wind/solar/MSW generation) • Charges for over injection/ under drawal in excess of 12% of the schedule shall be zero.
5	Institutional Arrangement	• State Power Committee to prepare Statement for Deviation Charges on Weekly basis • State Load Despatch Centres to operate & maintain 'State Deviation Pool Account Fund'	• HPSLDC to prepare Statement for Deviation Charges on Weekly basis and operate & maintain 'State Deviation Pool Account Fund • HPSLDC to prepare energy account bill on monthly basis • No SPC proposed

Status update for Haryana



No. of Distribution Licensees /SEZ: 3 no. (UHBVN, DHBVN & Railway)
No. of Transmission Licensees: 1 no. (HVPNL)

Gen. sources	State	Central
Nuclear		101
Coal	4790	1295
Gas	150	536
Hydro	1103	664
RE	412	5
Total in MW	**6432**	**2600**

Total Gen Cap. : 11260 MW
IPPs: 4628 MW
RE Total: 412 MW
CPPs: 352 MW

(Ref.: CEA Executive Summary August 2018 & HERC Annual Report 2014-15)

Peak Demand: 9671 MW (2017-18)
Supply: 9539 MW
No. of Transmission S/s: 422 no. of Substations
(Ref.: LGBR 2018-19 Report & HVPNL website)

Cost Component	Cost (in Rs lac)
Cost Estimate - Hardware-Metering infrastructure	1539.17
Cost Estimate - Communication Component	498.75
Cost Estimate - Software, Hardware-II, Infrastructure, Training & Capacity Building – SAMAST	1068.90
Project Management and consultancy	186.41
Grand Total	**3293.24**

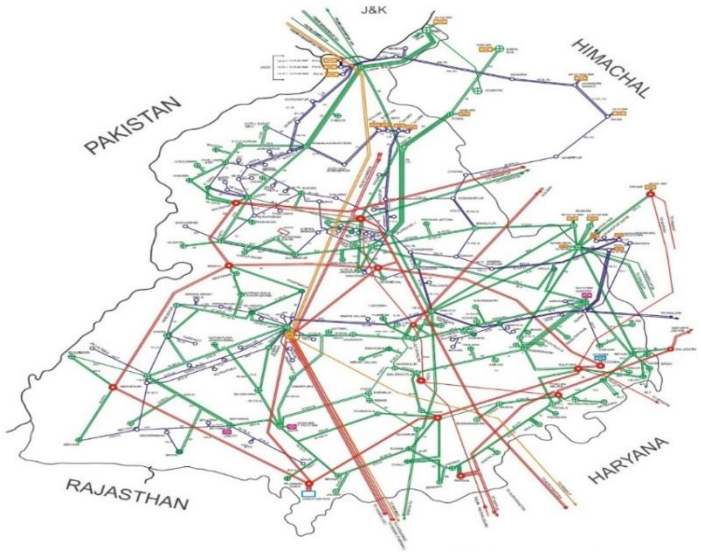
- Haryana Falls under **Category 'B'** of SAMAST report (DSM only for OA)

SAMAST
- Consultant assisted to HSLDC for preparation of SAMAST DPR
- Haryana SLDC submitted the DPR to PSDF secretariat in the month of June 2018.
- The consultant also assisted Haryana SLDC for compliance of the comments received from TSEG
- Haryana SLDC submitted the replies to the comments in the month of Sept.2018

DSM Regulations
- Consultant prepared the draft DSM Regulations in line with Model DSM Regulations and submitted to HERC in Aug. 2018
- HERC is reviewing the draft DSM Regulations.

F&S Regulations
- Consultant prepared the draft F&S Regulations and Submitted to HERC in Apr-18
- HERC published the draft F&S Regulations for public consultation in May-18
- Consultant reviewed the comments, discussed with the members and submitted the revised draft in June-18
- HERC has published the draft F&S Regulations for 2nd public consultation on 9th Aug-18 and public hearing will be scheduled soon.

Status update for Punjab



Gen. sources	State	Central
Nuclear		197
Coal	1760	855
Gas	150	264
Hydro	2598	923
RE	128	
Total in MW	**4635**	**2239**

Total Gen Cap. : 13432 MW
IPPs: 6558 MW
RE Total : 1282 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 11705 MW (2017-18)
Supply: 11705 MW
No. of Sub-stations: 280 no. of Substations
(Ref.: LGBR 2018-19 Report & PUNJABSLDC website)

Cost Component	Cost (in Rs lac)
Cost Estimate - Hardware-Metering infrastructure	953.66
Cost Estimate - Communication Component	298.00
Cost Estimate - Software, Hardware-II, Infrastructure, Training & Capacity Building – SAMAST	1522.22
Cost estimates without taxes	2773.88
Grand Total (with taxes)	**3273.18**

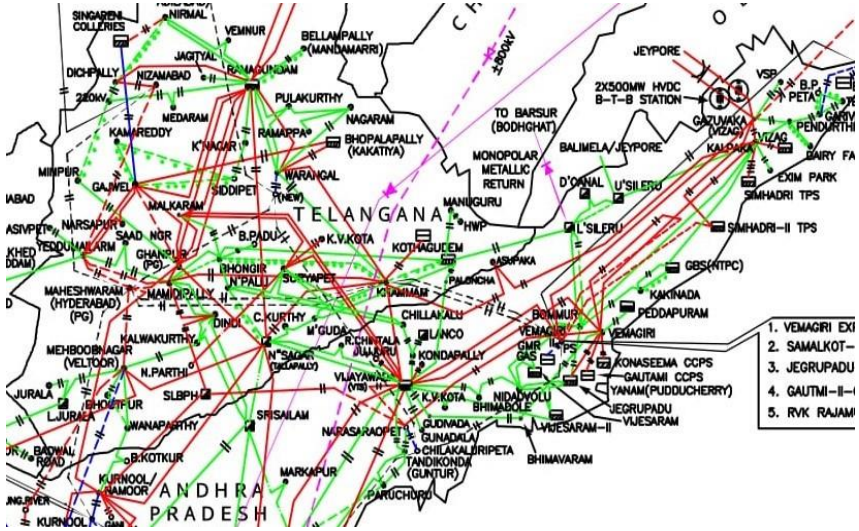
- Punjab Falls under **Category 'B'** of SAMAST report

SAMAST
- Consultant assisted Punjab SLDC for preparation of DPR for SAMAST implementation in Punjab.
- The DPR is approved by management committee of SLDC and submitted to PSERC for approval
- PSERC has recently directed SLDC to submit the DPR to PSDF Committee

F&S Regulations
- Consultant prepared the draft F&S Regulations and submitted to PSERC in May-18
- PSERC published the draft F&S Regulations for public consultation in June-18
- Consultant prepared the SOR and submitted to PSERC in July-18
- Public hearing was held on 20th Sept. 2018. Additional comments received on 1st Oct 2018 were also addressed and SOR was submitted to PSERC 20th Oct 2018
- Upon reviewing the comments/suggestions of stake holders and SOR submitted by consultant, PSERC shall finalize the F&S Regulations

No. of Distribution Licensees /SEZ: 1 no. (PSPCL)
No. of Transmission Licensees: 1 no. (PSTCL)
No. of OA Consumers : 6 no. (LTOA/MTOA/STOA)
(Ref.: As per info provided by SLDC)

Status update for Telangana



Gen. sources	State	Central
Nuclear		149
Coal	5082	1956
Gas		
Hydro	2450	
RE	3769	10
Total in MW	**11301**	**2115**

Total Gen Cap. : 15197 MW
IPPs: 5509 MW
RE Total: 3769 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 10298(mar18) MW (2017-18)
Supply: 10284 MW
No. of Transmission S/s: 214 no. of Substations
(Ref.: LGBR 2018-19 Report & 15th TC Meeting PPT by TSTRANSCO)

- Telangana falls under **Category 'B'** of SAMAST report

No. of Distribution Licensees /SEZ: 3 nos. (TSSPDCL, TSNPDCL & Rural Electric Co-operative Society, Sircilla (Sircilla, RESCO))
No. of Transmission Licensees: 1 no. (TSTRANSCO)

F&S Regulations

- TSERC has notified F&S Regulations on 31st May, 2018
- TSSLDC/TSERC requested for support for clarifications in implementation Procedure for F&S Regulations.
- The Consultant visited the SLDC and also had a meeting in the TSERC in August-September, 2018.
- Finalisation of implementation procedure currently underway.

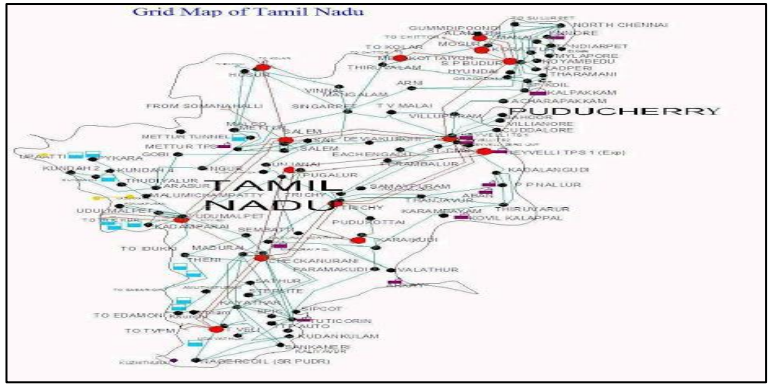
DSM Regulations

- Draft DSM Regulations are prepared and submitted to TSERC during Aug 2018 for review.
- Support in ongoing consultations and deliberations with TSERC
- TSERC is in a process of publishing the same for public consultation.

TSERC Grid Code and TSERC MYT Generation Regulations

- TSERC requested to review the draft grid code & MYT Generation Regulations prepared by TSERC
- Consultant reviewed the draft and offered the comments and submitted the revised draft grid code & MYT Generation Regulations for finalization

Status update for Tamil Nadu



RE Gen. Sources	Wind	Small Hydro	Bio-Energy	Solar	Total
Gen. Potential (MW)	14152	660	1671	17670	**34152**

Gen. sources	State	Central
Nuclear		1448
Coal	4320	4490
Gas	524	
Hydro	2203	
RE	123	182
Total in MW	**7170**	**6119**

Total Gen Cap. : 30254 MW
IPPs: 16965 MW
RE Total: 11213 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 15001 MW (2017-18)
Supply: 14975 MW
No. of Transmission S/s: 842 no. of Substations
(Ref.: LGBR 2018-19 Report & TANTRANSCO Website)

- Tamil Nadu reported under **Category 'C'** of SAMAST report

No. of Distribution Licensees /SEZ: 1 no. (TANGEDCO)
No. of Transmission Licensees: 1 no. (TANTRANSCO)
No. of OA Consumers : 440 no. (LTOA/MTOA/STOA)
(Ref.: FOR - SAMAST Report, 2016)

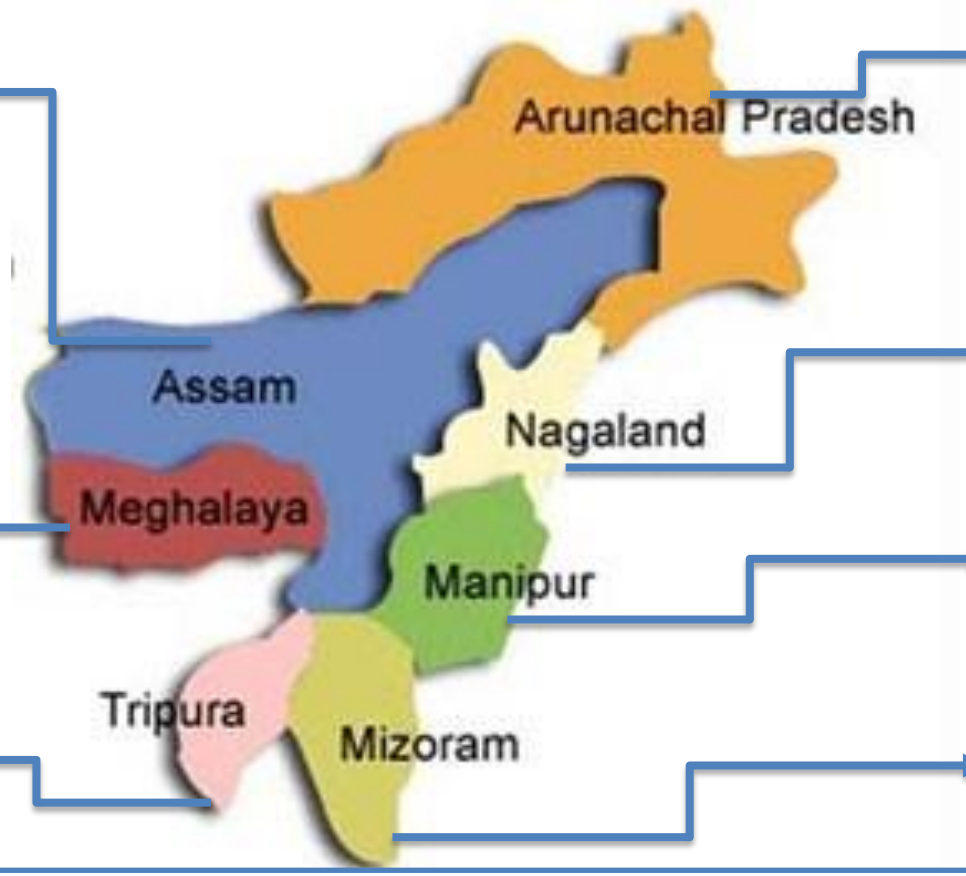
DSM Regulations

- Consultant prepared the draft DSM Regulations in line with Model DSM Regulations and submitted to TNERC in Nov-17
- Draft DSM Regulations were published for public comments in Dec, 2017
- Consultant prepared the summary of the comments, draft SOR and revise DSM Regulations and submitted in June-18

F&S Regulations

- Consultant prepared the draft F&S Regulations in line with Model F&S Regulations and Submitted to TNERC in Oct-17
- Draft F&S Regulations were published for public comments in Dec, 2017
- Consultant prepared the summary of the comments, draft SOR and revise F&S Regulations and submitted in May-18
- TNERC is in process to finalize F&S Regulations and DSM Regulations

North Eastern Region: Overview



1513 MW (APGCL, NTPC, NEEPCO; SLDC, Kahelipara, Guwahati)

568 MW (NEEPCO, MECL; SLDC, Shillong

736 MW (NEEPCO, OTPC, TSECL; SLDC, Agartala)

301 MW (NEEPCO; SLDC, Itanagar)

161 MW (NEEPCO; SLDC, Dimapur)

243 MW (NHPC, MPDC; SLDC, Imphal)

197 MW (NEEPCO; SLDC, Aizawl)

- Total installed capacity of North Eastern Region is @ 4000 MW, which includes 282 MW of Central – Unallocated share.
- Regional Peak Demand: 2629 MW; Peak met: 2520 MW

Consultation Support in North Eastern Region

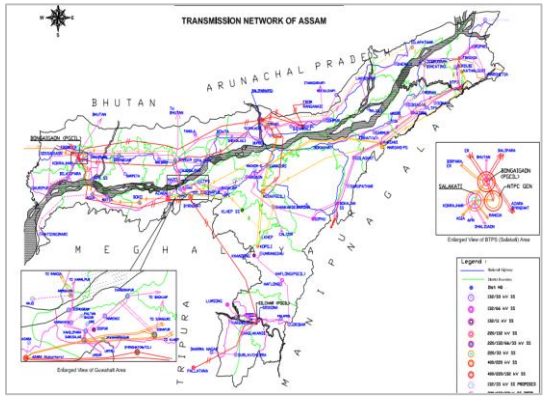
- Consultant participated in meetings at NERPC, and SLDC-Meghalaya on 14 May, 2018 at NERLDC, Shilong on SAMAST implementation in Meghalaya.
- Consultant also participated in meetings at NERPC, AERC and SLDC- Assam on 16 May, 2018 at AERC, Guwahati on SAMAST implementation in Assam.

State-wise Cost Estimates of DPRs for SAMAST Implementation

Sl. No.	States	No of Meters (No.)	Cost of Meter (INR L)	Cost of HW/SW (INR L)	Project Cost of SAMAST (INR L)	CT/PT replacement Cost (INR L)	GRAND Total (INR L)
1	Arunachal Pradesh	121	55.7	1287.6	**1343.3**	0.0	**1343.3**
2	Assam	700	322.5	1530.8	**1853.3**	157.6	**2010.9**
3	Manipur	589	284.9	1561.6	**1846.5**	1685.5	**3532.0**
4	Meghalaya	374	180.9	1467.0	**1647.9**	229.3	**1877.2**
5	Mizoram	413	190.3	1435.7	**1626.0**	200.0	**1825.9**
6	Nagaland	198	91.2	1335.9	**1427.1**	445.0	**1872.2**
7	Tripura	366	168.6	1343.1	**1511.7**	1339.3	**2851.0**
	TOTAL	**2761**	**1294.1**	**9961.7**	**11255.8**	**4056.7**	**15312.5**

*-including 18% GST #- inclusive PMC cost

Status update for Assam



Gen. sources	State	Central
Coal		279
Gas	258	436
Hydro	100	369
RE	30	
Total in MW	**388**	**1083**

Total Gen Cap. : 1513 MW
IPPs: 41 MW
RE Total: 47 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 1822 MW (2017-18)
Supply: 1745 MW
No. of Transmission S/s: 65 no. of Substations (July-18)
(Ref.: LGBR report 2018-19 & AEGCL website)

No. of Distribution Licensee: 1 no. (APDCL)
No. of Transmission Licensee: 1 no. (AEGCL)
No. of OA Consumers : 14 no. (LTOA/MTOA/STOA)
(Ref.: FOR - SAMAST Report, 2016)

Particulars	Cost (in Rs lac)
Cost of Meter	322.5
Cost of Hardware and Software	1530.8
Project Cost of SAMAST	1853.3
CT/PT replacement Cost	157.6
Grand Total	**2010.9**

- Assam falls under **Category 'D'** of SAMAST report

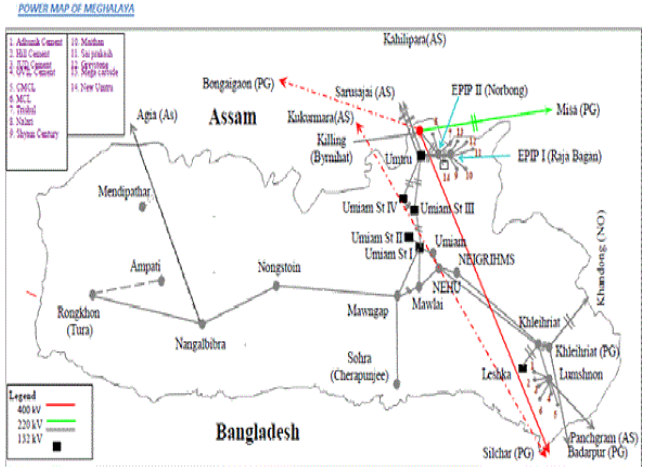
SAMAST
- Consultant assisted to all N-E states for preparation of SAMAST DPRs coordinated by NERLDC
- NERLDC submitted the DPRs for all N-E states to PSDF secretariat in the month of June 2018.

DSM Regulations
- Consultant reviewed the draft DSM Regulations prepared by AERC in line with Model DSM Regulations and Submitted the revised draft with comments to AERC in the 1st Aug. 2018
- AERC is in process of publishing the draft for public comments

F&S Regulations
- Consultant reviewed the draft F&S Regulations prepared by AERC in line with Model F&S Regulations and Submitted the revised draft with comments to AERC in the month of July, 2018.
- AERC published the draft for public comments and public hearing was held on 7th Aug. 2018
- The consultants reviewed the comments received and prepared the SOR and submitted to the AERC with revised draft Regulations on 22nd Aug. 2018
- AERC is in process of notification of F&S regulation

AERC Grid Code
- Consultant reviewed the draft grid code prepared by AERC and Submitted the revised draft grid code with comments to AERC in the month of August 2018.

Status update for Meghalaya



Gen. sources	State	Central
Coal		30
Gas		110
Hydro	322	75
RE	31	
Total in MW	**353**	**215**

Total Gen Cap. : 568 MW
IPPs: 0.06 MW
RE Total: 31 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 369 MW (2017-18)
Supply: 368 MW

No. of Distribution Licensee: 1 no. (MePDCL)
No. of Transmission Licensee: 1 no. (MePTCL)
No. of OA Consumers : 7 no. (LTOA/MTOA/STOA)
(Ref.: FOR - SAMAST Report, 2016)

Particulars	Cost
Cost of Meter	180.9
Cost of Hardware and Software	1467.0
Project Cost of SAMAST	1647.9
CT/PT replacement Cost	229.3
Grand Total	**1877.2**

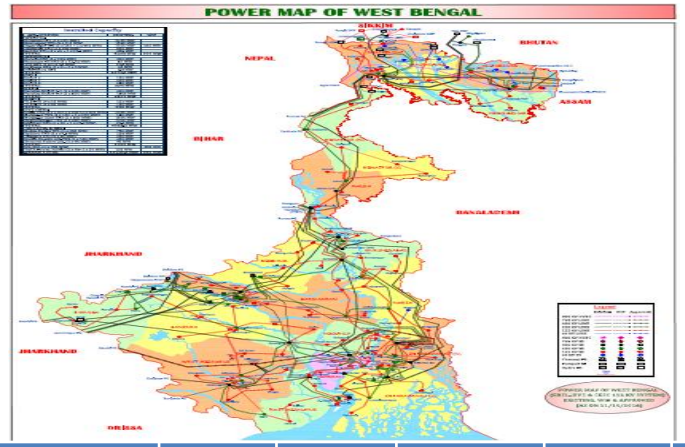
- Meghalaya falls under **Category 'B'** of SAMAST report

SAMAST
- Consultant assisted to all N-E states for preparation of SAMAST DPRs coordinated by NERLDC
- NERLDC submitted the DPRs for all N-E states to PSDF secretariat in the month of June 2018.

DSM Regulations
- Consultant prepared the draft DSM Regulations in line with Model DSM Regulations and Submitted to MSERC on 2nd Aug. 2018
- MeSERC published the draft DSM Regulations for public consultation in the month of August 2018
- The consultants reviewed the comments received and prepared the SOR and submitted to the MSERC with revised draft DSM Regulations on 5th Oct. 2018

F&S Regulations
- Consultant prepared the draft F&S Regulations in line with Model F&S Regulations and Submitted to MSERC on 15th Aug. 2018
- MeSERC published the draft F&S Regulations for public consultation in the month of August 2018
- The consultants reviewed the comments received and prepared the SOR and submitted to the MSERC with revised draft F&S Regulations on 1st Oct. 2018

Status update for West Bengal



Cost Component	Cost (INR in lac)
Cost-Estimate - Hardware-Metering infrastructure	1,290
Cost-Estimate - Communication Component	213
Cost-Estimate - Software, Hardware-II, Infrastructure, Training & Capacity Building – SAMAST	1,093
COST ESTIMATE GRAND TOTAL	**2,596**

RE Gen. Sources	Wind	Small Hydro	Bio-Energy	Solar	Total
Gen. Potential (MW)	22	396	544	6260	**7222**

Gen. sources	State	Central
Coal	5400	761
Gas	100	
Hydro	986	410
RE	92	
Total in MW	**6578**	**1171**

Total Gen Cap. : 10518 MW
IPPs: 2769 MW
RE Total: 436 MW

(Ref.: CEA Executive Summary August 2018)

Peak Demand: 8137 MW (2017-18)
Supply: 8114 MW
No. of Transmission S/s: no. of Substations
(Ref.: LGBR 2018-19 Report)

- West Bengal falls under **Category 'A'** of SAMAST report

SAMAST

- DPR for SAMAST implementation in West Bengal was prepared in Oct-2017 and submitted to PSDF secretariat in Dec-2017
- Consultant assisted SLDC for complying comments on DPR.
- SLDC submitted the comments to PSDF on 17th May, 2018.
- DPR submitted by WBSLDC has been approved by PSDF Appraisal Committee in the month of August, 2018
- Procurement process for implementation for hardware/software underway

No. of Distribution Licensees: 3 no. (WBSEDCL, CESC, IEPL)
No. of Transmission Licensee: 1 no. (WBSETCL)

Status of F & S Regulations at state level

- Overview of F&S Regulations of States

Status of F&S Regulations at State Level (as on Sept 2018)

SERCs	Status	Date of Notification
Andhra Pradesh ERC	**Final**	21 August, 2017
Chhattisgarh ERC	**Final (Under DSM)**	07 November 2016
Gujarat ERC	Draft	13 January 2017
Jharkhand ERC	**Final**	08 December 2016
Karnataka ERC	**Final**	31 May 2017
Madhya Pradesh ERC	**Final**	25 May 2017
Rajasthan ERC	**Final**	14 September, 2017
Tamil Nadu ERC	Draft	27 January 2018
Tripura ERC	**Final**	24 June 2017
Uttarakhand ERC	**Final (Under DSM)**	06 February 2017
Joint ERC (Manipur & Mizoram)	**Final**	09 August 2016
Haryana ERC	Draft	17 January, 2018
Punjab ERC	Draft	17 January, 2018
Telangana ERC	**Final**	30 May 2018
Maharashtra ERC	**Final**	20 July,2018
Orissa ERC	Draft	23 September 2015
Assam ERC	Draft	25 June, 2018
Meghalaya ERC	Draft	August, 2018

Notified: 11 states; Draft: 7 states

Summary of comparison of F&S Regulations of States

Parameters	Applicability	Error formula	Tolerance Band	Deviation Charges	Treatment for Shortfall in DSM Pool
FOR Model	All Wind and Solar	AvC in Denominator	+/- 10% New +/- 15% Old	Fixed rate as % of PPA (band-10%, 20%, 30%, >30%)	PSDF and NCEF
Telangana **(Final)**	All Wind and Solar>= 5 MW	AvC in Denominator	+/- 15% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-15%, 25%, 35%, >35%)	(D-R) Allocated to RE Generators and Pooling S/S in proportion to Deviation
Maharashtra **(Final)**	All Wind and Solar	AvC in Denominator	1. For AvC based error: +/-15%	Fixed rate of Rs./Unit (0.5, 1, 1.5) 1. For AvC based Error: (band -15%, 25%, 35%, >35%)	(D-R) Allocated to RE Generators and Pooling S/S in proportion to Deviation
Tamil Nadu **(Draft)**	All Wind and Solar	AvC in Denominator	+/- 10% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-10%, 20%, 30%, >30%)	treatment under state DSM Pool
Haryana **(Draft)**	All Wind and Solar for capacity > 1 MW	AvC in Denominator	+/- 10% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-10%, 20%, 30%, >30%)	(D-R) Allocated to RE Generators and Pooling S/S in proportion to Deviation
Punjab **(Draft)**	All Wind and Solar for capacity > 5 MW	AvC in Denominator	+/- 10% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-10%, 20%, 30%, >30%)	PSDF and NCEF
Assam (Draft)	All Wind and Solar	AvC in Denominator	+/- 10% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-10%, 20%, 30%, >30%)	Not specified
Meghalaya (Draft)	All Wind and Solar for capacity > 1 MW	AvC in Denominator	+/- 15% and in steps • wind & solar • New and existing	Fixed rate of Rs./Unit (0.5, 1, 1.5) (band-15%, 25%, 35%, >35%)	(D-R) Allocated to RE Generators and Pooling S/S in proportion to Deviation

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