

F. No. 283/48/2019-GRID SOLAR
नवीन और नवीकरणीय ऊर्जा मंत्रालय/ Ministry of New & Renewable Energy
ग्रिड सौर ऊर्जा प्रभाग / Grid Solar Power Division


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Dated: 2nd January, 2020

OFFICE MEMORANDUM

Sub: Draft Scheme for Supply of Round-The-Clock (RTC) Power from RE Power Projects, complemented with Power from Thermal Power Projects.

Ministry of New and Renewable Energy (MNRE) has prepared a *"Draft Scheme for Supply of Round-The-Clock (RTC) Power from Renewable Energy (RE) based (solar, wind or small hydro) Power Projects, complemented with Power from Thermal (coal) Power Projects."*

2. The Draft Scheme is enclosed herewith.
3. MNRE has already requested stakeholders like Ministry of Power, SECI, NTPC, CEA, CERC, PGCIL, POSOCO, RE Associations and State Governments & their DISCOMs to provide comments / feedback on the subject Draft Scheme.
4. The undersigned is directed to request all other stakeholders to provide their comments/ feedback on the subject Draft Scheme, to this Ministry, at the email of the undersigned (email: karndhar.sg@nic.in), latest by 16th January, 2020. A soft copy of the comments may also be provided at the aforesaid email address.


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To: All the Stakeholders concerned

Copy to: NIC, MNRE, for uploading on MNRE Website

Copy for internal circulation to: Sr. PPS to Secretary/ Sr. PPS to JS (AKS)/ Dir (RG)

Draft Scheme for Supply of Round-The-Clock (RTC) Power from RE Power Projects, complemented with Power from Thermal Power Projects.

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1. Background

- 1.1. In order to facilitate development and deployment of grid connected solar power, the first phase of JNNSM provided for a scheme of “bundling” wherein, then relatively expensive solar power was bundled with cheaper thermal power from the unallocated quota of the Government of India (Ministry of Power), generated at NTPC coal based stations.
- 1.2. With the intervention of Government of India, through the Ministry of New & Renewable Energy, the risks associated with solar and wind power sector have been brought down by way of advanced arrangement of land and evacuation through solar parks, green energy corridors, a secure and standardized PPA for 25 years with elaborate mechanism for risk apportionment and compensations, payment security, etc.
- 1.3. Such de-risking of renewable energy sector, coupled with advancement of technologies and economies of scale have resulted in bringing down the tariffs of solar and wind power to below Rs 3.00/unit levels, lower than the cost of power from the contemporary thermal power plants, thereby aiding in rapid deployment of solar and wind capacity in the country.
- 1.4. However, the renewable energy sector has its own share of issues in terms of intermittent and unpredictable nature of renewable energy and also low capacity utilization of transmission system. The problem gets pronounced with the addition of large scale renewable capacity. In order to manage the infirm nature of power, DISCOMs are procuring balancing power to provide grid stability and to meet its requirements in non-RE hours.

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2. Round the Clock (RTC) Power

- 2.1. The developments in renewable energy sector and the necessity to address the issues of intermittency, limited hours of supply and low capacity utilization of transmission infrastructure make case for “reverse bundling”, wherein high cost thermal power is allowed to be bundled with cheaper renewable energy, and is provided round-the-clock to the DISCOM.
- 2.2. Such bundling of RE power with thermal power can help in:
- a) bringing down the overall cost of power supplied to buying utilities;
 - b) further penetration of renewable energy;
 - c) overcome the intermittency issues of RE power
 - d) Meet the round-the-clock requirement of DISCOMS

3. Objective

The main objectives of the scheme are as follows:

- 3.1. To provide RTC power to the DISCOMs through bundling of RE power with thermal power
- 3.2. To scale up renewable capacity additions and achieve economies of scale.
- 3.3. To facilitate fulfilment of RPO requirement of the obligated entities.

4. Benefits of the Scheme

- 4.1. DISCOMs will be able to meet their RPO obligations.
- 4.2. DISCOMs will be able to purchase firm power at competitive rates to meet their deficits or replace costly power.

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- 4.3. DISCOMS will not have to undertake operations to integrate RE power into the grid since the responsibility of giving firm power will be with the Generator.
- 4.4. DISCOMs may further save due to optimum scheduling of power among the sources.

5. Energy Mix

- 5.1. The Generator shall supply RE Power complemented with Thermal Power, in Round-The-Clock manner, keeping at least 80% availability on annual basis.
- 5.2. The Generator has to supply power such that at least 51%, of the annual energy supplied, corresponds to RE Power and the balance is drawn from thermal sources.
- 5.3. The Generator can combine storage for ensuring that it achieves the required minimum annual availability of 80%. However, minimum of 51% of energy shall be dispatched from renewable energy sources. This 51% shall also include dispatch from the storage system, provided RE sources were used to store energy in the storage system.

6. RE Power

- 6.1. RE power may include solar, wind, small hydro, or a combination thereof, with or without any Energy Storage System(ESS). The option of selecting the type and mix of RE sources and the usage of ESS shall be with the Generator.

7. Non-RE Power

- 7.1. The "**Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees**" issued by Ministry of

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Power, Government of India, has estimated the expected life of projects to be 15 years for gas/liquid fuel based projects, 25 years for coal based projects and 35 years for hydro projects. Since Solar/Wind plants are expected to have an estimated life of 25 years, and the PPAs are signed accordingly, the power from coal-based thermal power plants meets the requirement of bundling with RE power.

- 7.2.** Further, unlike RE power tariffs, which are fixed for the PPA period, the tariffs for thermal power are indexed with the prices of coal and gas, as the case may be. As such, even in cases where the offered first year tariff is same for both coal based thermal power and gas based thermal power, the levellised tariff over the 25 years PPA period may differ due to variations in indexation.
- 7.3.** Since the Scheme would involve quoting a combined first year tariff for the offered energy mix and the bid evaluation would be based on this first year tariff, it is important that only single thermal source, i.e. coal or gas, is chosen to supply the bundled power and this thermal source needs to be chosen and made explicitly the part of RFS documents by the Procurer.
- 7.4.** In view of matching PPA periods and the requirement of single indexation, it is appropriate that the complemented power from non-RE sources is coal based thermal power.
- 7.5.** Already commissioned or under construction thermal projects can be considered under this scheme, provided they have spare generation capacity that can be made available for long-term supply of Power.

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8. TARIFF

- 8.1. A composite single tariff for renewable energy, complemented with thermal energy shall be quoted by the bidders.
- 8.2. Tariff shall be quoted at the Delivery Point which shall be at the CTU interconnection point. Different components of RTC power i.e. solar, wind, small hydro, and thermal can be connected with CTU at different CTU sub-stations, but within the same RLDC area.
- 8.3. All Transmission related charges and losses from the Delivery Point onward shall be borne by the DISCOMs.
- 8.4. Generator(s) shall obtain Open Access for supply of power up to CTU-STU interconnection point of the Procuring state and entire cost shall be borne by the Generator(s) only.
- 8.5. The solar, wind and small hydro power generation does not involve any variable cost in terms of recurring fuel cost, except for the annual operation & maintenance cost. Accordingly, the tariffs for solar, wind or small hydro power are not indexed with any prices and are fixed for the PPA period unless there is a pre-defined escalation or de-escalation in such tariffs. However, unlike RE power tariffs, the tariffs for thermal power are indexed with the prices of coal, to adjust with the change in prices of fuel.
- 8.6. Since the Generator will be required to supply power at a composite tariff, the tariff shall be adjusted to cover the possible increase/decrease in coal prices as per index to be notified by the Regulatory Commission.
- 8.7. **Composite Fixed Charges(CFC) and Composite Variable Charges(CVC):**
The bidders shall specify the break-up of composite tariff, into “**Composite**

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Fixed Charges” and **“Composite Variable Charges”**. In the composite tariff, the “Composite Fixed Charges” shall be reflective of RE charges, capacity charges of thermal power and the non-variable component of energy charges for thermal power. The “Composite Variable Charges”, on the other hand, shall be reflective of variable component of energy charges for thermal power. The “Composite Variable Charges” shall be payable in accordance with fuel price index used for evaluation of the bid.

- 8.8.** The bids shall be evaluated for the composite levellised tariffs. The index to be adopted for decreasing / increasing the variable charges shall be specified in the RFS. The variation rate, as notified by the CERC from time to time on the basis of historical data, of the relevant fuel index (as identified in the RFS) in the international market or domestic market as the case may be, shall be used for increasing / decreasing the variable charges.
- 8.9.** Since it is for the bidder to choose the type of thermal power, to be supplied with RE, the procurer may specify the de-escalation /escalation indices for both international and domestic fuel in the RFS. Based on the variable charges quoted, and the type of fuel, the levellised composite tariff may be worked out.
- 8.10.** In cases where the bidder quotes the “composite variable charges” as firm, for each of the years of proposed supply, the variable charges proposed by the bidder, and the composite tariff thereof, shall be adopted for bid evaluation.
- 8.11.** The rate for discounting the combination of fixed and variable charges, for computing the levellised tariff, shall be as notified by CERC keeping in view prevailing rate for 10 year Government of India securities. This rate is to be specified in the RFS. The bids shall be evaluated for the composite levellised

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tariffs combining the capacity and energy components of the tariff quoted by the bidder.

- 8.12. Alternative Tariff Mechanism:** As an alternative to what is proposed in para 8.7 above, the Procurer may choose to adopt Normative Composite Fixed Charges and Composite Variable Charges. As the Generator is required to supply at least 51% of annual energy from RE sources, including BESS if any, for the purpose of this Scheme, it is presumed that 51% of the Tariff is represented by RE component and the balance 49% as thermal component. Further, in the new coal based thermal tariffs, the average variable cost to fixed cost ratio is in the range of 70:30 to 60:40. Thus, for the purpose of normative approach under this Scheme, the total composite tariff shall be considered to be consisting of 51% RE Tariff, 30% variable thermal tariff and 19% fixed thermal tariff. Thus, 70% of the composite tariff shall be the normative “Composite Fixed Charges” and the remaining “30%” shall be the normative “Composite Variable Charges”
- 8.13.** The procurer shall specify clearly in RFS the index proposed for increasing or decreasing variable charges.

9. Shortfall in Generation

- 9.1.** Total generation from the combine sources should be given priority for dispatch and scheduling by the concerned SLDC/RLDC. Plant shall have the “must-run” status, or the merit order dispatch based on composite variable charges.
- 9.2.** For deviations from schedule, the DSM (Deviation Settlement Mechanism) can be made applicable as per applicable RE/Thermal regulations in force. The

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DSM shall be settled by the Generator and States as per the applicable regulations.

- 9.3. For any shortfall below the 80% availability on an annual basis, a penalty may be charged, corresponding to this shortfall in energy, at 25% of PPA tariff.
- 9.4. Further, penalty shall also be charged for any shortfall in supply of RE power below the mandatory 51% of the total power supplied in a contract year. The penalty corresponding to this shortfall in RE shall be at 25% of PPA tariff.
- 9.5. In cases having both shortfall in availability below 80% and shortfall in supply of RE below 51% of the total power, the maximum of two penalties shall be applicable.

10. Shortfall in Generation and Curtailments

- 10.1. In case power is not scheduled, the procurer shall be liable to pay to Generator for deemed generation.
- 10.2. Under present regulations, the compensations provided for curtailment of RE Power are at 100% of PPA Tariff, and for Thermal Power, 'Capacity Charges' are paid.
- 10.3. Since the "Composite Fixed Charges" in the composite tariff are reflective of RE charges and capacity charges (*they also include non-variable component of energy charges, but for simplicity the same is not being considered*), the compensation for curtailment shall be calculated and paid at "Composite Fixed Charges".
- 10.4. Accordingly, the Minimum Generation Compensation from the Procurer shall be in the manner detailed below.

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Duration of Backdown or Grid Unavailability	Provision for Generation Compensation
Hours of Backdown, during a monthly billing cycle, or Grid unavailability in a contract year as defined in the PPA	Generation Compensation = <i>Generation Loss × Composite Fixed Charges</i> <i>Generation Loss = (Backed down capacity in MW × corresponding time of backdown in hours × 1000)</i>

10.5. Alternatively, when normative fixed and variable charges are considered, the compensation for such curtailment should be 51% (RE component) and 19% (Thermal Fixed Charges) i.e. compensation calculated at 70% of PPA Tariff.

10.6. Accordingly, the Minimum Generation Compensation from the Procurer, in such cases, shall be in the manner detailed below.

Duration of Backdown or Grid Unavailability	Provision for Generation Compensation
Hours of Backdown, during a monthly billing cycle, or Grid unavailability in a contract year as defined in the PPA	Generation Compensation = <i>Generation Loss × 70% × PPA Tariff</i> <i>Generation Loss = (Backed down capacity in MW × corresponding time of backdown in hours × 1000)</i>

10.7. The Generation Compensation is to be paid as part of the energy bill for the successive month after receipt of Regional Energy Accounts (REA). No Trading Margin shall be applicable on this Generation Compensation. Possible conditions for exclusion of Generation Compensation, on account of Backdown purposes, shall be clearly specified in the RfS and the PPA.

10.8. No back-down / curtailment to be ordered without giving formal/ written instruction for the same.

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10.9. The details of back-down / curtailment, including justifications for such curtailment, to be made public by the concerned Load Dispatch Centre.

11.RPO

11.1. The renewable energy component (including Energy Storage System (ESS) component charged with RE sources) bought under this Scheme shall be eligible for RPO compliance.

11.2. The apportionment of RPO between solar & non-solar can be on the lines of principle adopted in case of hybrid plants.

12.Methodology

12.1. The scheme bidding process would be carried out by SECI or NTPC or any other intermediary procurer authorised by the Government.

12.2. The basis of selection of the successful bidder for renewable and thermal energy shall be through a transparent bidding process. The bids shall be invited for RE power combined with one single thermal fuel source, i.e. coal Tariff shall be quoted by the bidders at a composite single tariff for bundled energy, and this quoted composite tariff shall be the bidding parameter.

12.3. The PPA term will be 25 years.

12.4. Thermal tariff shall be adjusted to cover the possible increase/decrease in coal price as per index to be notified by the Regulatory Commission.

12.5. SECI or NTPC or any other intermediary procurer authorized by the Government shall sign Power Purchase Agreements (PPAs) with Generator(s) at the discovered composite tariff, through transparent open competitive

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bidding process and shall also sign Power Supply / Sale Agreements (PSAs) with buying DISCOMs/State Utilities/Bulk Consumers.

12.6. SECI or NTPC or any other intermediary procurer authorized by the Government shall be allowed to charge a trading margin.

12.7. Tariff shall be quoted at the Delivery Point which shall be at the CTU interconnection point. All Transmission related charges and losses from the Delivery Point onward shall be borne by the DISCOMs.

12.8. Generator(s) shall obtain Open Access for supply of power up to CTU-STU interconnection point of the Procuring state and entire cost shall be borne by the Generator(s) only.

13. Enabling Provisions required for Scheme Implementation

13.1. MNRE shall issue general policy guidelines for implementation of the Scheme.

13.2. The tariff determined shall be adopted by the Appropriate Commission in pursuance of the provisions of section 63 of the Electricity Act, 2003.