

**TARIFF FRAMEWORK FOR PROCUREMENT OF
POWER BY DISTRIBUTION LICENSEES AND
OTHERS FROM SOLAR ENERGY PROJECTS AND
OTHER COMMERCIAL ISSUES FOR THE STATE
OF GUJARAT**

DISCUSSION PAPER

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GUJARAT ELECTRICITY REGULATORY COMMISSION

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INTRODUCTION

The Gujarat Electricity Regulatory Commission (GERC or Commission) vide Order No. 1 of 2012 dated January 27, 2012 had issued generic Tariff Order for procurement of power by Distribution Licensees and others from Solar power projects applicable up to March 31, 2015. Thereafter, the Commission vide Order no. 3 of 2015 dated August 17, 2015 had issued generic Tariff Order for procurement of power by Distribution Licensees and others, from Solar power projects in Gujarat applicable for the Control Period up to 31st March 2018.

The Commission intends to provide clarity on the tariff framework for the prospective period, for procurement of power generated by the Solar Power Projects in the State of Gujarat by Distribution Licensees, under the powers conferred to it under Sections 61(h), 62(1)(a), and 86(1)(b)&(e) of the Electricity Act, 2003, and National Electricity Policy, 2005, and Tariff Policy, 2016.



Executive Summary

In exercise of the powers conferred under Sections 3 (1), 61 (h), 62 (1) (a), and 86 (1)(b)&(e) of The Electricity Act, 2003 and guidelines of the National Electricity Policy, 2005 and Tariff Policy, 2006 and all other powers enabling it on this account, the Gujarat Electricity Regulatory Commission (GERC) presents this Discussion Paper (“Discussion Paper”) for the determination of tariff for procurement of power by Distribution Licensees and others from solar energy projects. The National Action Plan on Climate Change (NAPCC) launched by the Government of India in June 2008 is a comprehensive plan with eight missions that target specific issues and address the urgent and critical concerns of the country through a directional shift in the development pathway; further, the NAPCC targets an increase in renewable energy purchase by 1% a year with a target to achieve 15% renewable in India’s energy mix by 2020. Gujarat’s Solar Power Policy-2009 was launched in January 2009 with a target of installing 500 MW of solar photovoltaic and solar thermal generating plants by 2014, while the Jawaharlal Nehru National Solar Mission (JNNSM) launched in January 2010 targets 20,000 MW of net installed solar generating capacity throughout India by 2022. Subsequently the Government of India has revised the goals of JNNSM to 100,000 MW by 2022. Since then, the Ministry of Power vide order no. 23/03/2016-R&R dated 14th June 2018 updated the renewable purchase obligations (RPO) from the earlier 16% to 21% by 2022, in line with the national targets from both solar and non-solar renewable technology¹.

Since the Gujarat Solar Power Policy-2009 and subsequently the new Gujarat Solar Power Policy 2015, several national and international companies have signed Power Purchase Agreements (PPA) totaling a sizable net capacity of more than 1,919 MW of ground mounted installations and 281 MW of rooftop PV installations². The Government of Gujarat has completed projects such as the 500 MW Solar Park near Charanka, and developing new solar parks in Radhanesda (700 MW), Harshad (500 MW) and Dholera (5,000 MW). The Government has also promoted rooftops solar PV through the innovative pilot of 5 MW Gandhinagar Photovoltaic Rooftop Program. Subsequently this has been scaled to other cities across Gujarat. In addition, the Government of Gujarat under the Gujarat Energy Development Agency (GEDA) has subsequently launched the residential rooftop solar PV program to support and promote the installation of rooftop solar PV systems on the rooftop of residential consumers. So far a total of 326.67 MW has been supported under two successive schemes³.

GERC presented a solar tariff discussion paper dated June 02, 2015, “Discussion Paper On The Determination Of Tariff For Procurement Of Power By Distribution Licensees And Others From Solar Energy Projects For The State Of Gujarat” followed by its solar tariff order No. 3 of 2015 titled “Determination of tariff for Procurement by the Distribution Licensees and others from Solar Energy Projects” dated August 17, 2015. The levelized tariff for solar photovoltaic projects of large rooftop and megawatt scale power plant were determined as INR 6.77 per kWh (July 1,

¹ Ministry of Power. <http://bit.ly/30ueBqO>

² GEDA. <http://bit.ly/2WeEsRY>

³ MNRE. <https://bit.ly/2NbksgN>

2015 to March 31, 2016), INR 6.30 per kWh (April 1, 2016 to March 31, 2017) and INR 5.86 per kWh (April 1, 2017 to March 31, 2018). And for kilowatt scale projects were determined as INR 8.42, INR 7.83 and INR 7.28 for the period of next three years. The levelized tariff for solar thermal power plants commissioned between July 1, 2015 and March 31, 2018 remained INR 11.22 per kWh.

After issuing the Competitive Bidding Guidelines (CBG), the Ministry of New and Renewable Energy (MNRE) informed all the SERCs that since the CBG issued are for plants having size of 5 MW and above, the Commission can determine the Feed in Tariff for Solar Plant with capacity below 5 MW.

In April 2017, the CERC passed a suo-motu petition no. 05/SM/2017 declaring that for solar thermal technologies, the tariff shall be determined project specific and no generic tariff shall be determined for such technologies.

In view of the recent rapid price reductions in the cost of solar PV technology, there is a need to rethink the relevance of determining Feed in Tariff for solar PV technology. Feed in Tariff have helped give a certain direction and certainty to the market when the prices of Feed in Tariff for solar energy was more expensive compared to tariffs of conventional generation. However, as indicated by recent competitively bid auctions, both at the State level and auctions carried out by central government agencies like the Solar Energy Corporation of India (SECI), solar energy is now cost competitive, and also lower compared to average power purchase prices. Most new capacity additions are being conducted under section 63 of the electricity act, especially for large projects. This precludes the need for a Feed in tariff. Therefore, the Commission is of the view that there is no further need to come up with Feed in Tariff for large scale solar energy projects.

In the case of solar thermal technology, the Commission is of the view that the technology has not seen similar effects of scale as compared to solar PV technology. Consequently, the solar thermal sector for power generation has not seen similar price reductions as witnessed by the solar PV sector. Additionally, existing solar thermal plants commissioned under phase 1 of the JNNSM have all experienced technical challenges and several of them are now shut down. Due to these factors, the Commission has decided to determine tariffs for solar thermal technology on a case to case basis.

The Key Findings of this Discussion Paper are:

The Commission proposes to determine the tariff for all prospective Solar power projects, based on the rates discovered through competitive bidding, and discontinue the practice of determining the generic tariff for Solar power projects.

In order to ensure regulatory certainty for such projects set up in the intervening period, it is clarified that the Control Period shall be deemed to be extended till the date of effectiveness of the tariff framework proposed in this Discussion Paper.

The Commission decides that the small projects which will be installed in the State, the procurement of energy from such projects be purchased by the distribution licensee having linkage with the tariff rate discovered under the competitive bidding process.

The power generated from the small scale solar projects having size below 5 MW, the procurement price of energy is at the rate of tariff discovered under the competitive bidding process in different time period of 6 months of the year plus additional 20 paise per kWh thereon for the projects located outside the solar park.

The average tariff, available as on 1st April (as discovered in the competitive bidding by GUVNL during previous six months October-March and adopted by the Commission) applicable for the project commissioned during April-September. Similarly, the average tariff, available as on 1st October (as discovered in the competitive bidding by GUVNL during previous six months April-September and adopted by the Commission) applicable for the project commissioned during October-March.

Incase average tariff is not available for particular 6 months period then latest average tariff available for 6 months period as discussed above shall be considered.

Other Considerations:

- Solar Power Projects established with only new plants and machinery would be eligible for the benefit of tariff determined within the scope of this Discussion Paper.
- Electricity consumed prior to commissioning of the project for construction purposes, would qualify as construction power. This electricity shall be procured by the project developer from the respective distribution licensee in the area the project is situated. The tariff payable by the project developer would be as per the tariff schedule approved by the Commission in its tariff order from time to time.
- The Reactive Power Charges as approved by the Commission in tariff orders for the Gujarat Energy Transmission Corporation Ltd. (GETCO) from time to time shall be applicable to such projects.
- Switchyard equipment, metering and protection arrangement and RTUs at generator end shall be provided by the owners of solar generators at their cost. The evacuation line from the switchyard of generator to the GETCO substation shall be laid by solar power developers at his own cost.

Energy Accounting and RPO

i. Solar projects not registered under REC Mechanism and the consumer does not take benefit of the renewable attribute

For such projects, the adjustment of the solar energy generation shall be allowed within the consumer's billing cycle. The entire Solar energy generation of such consumer shall be utilized for meeting the RPO of that Distribution Licensee.

Banking of energy shall be allowed within one billing cycle of the consumer, wherein set off may be given against energy consumed at any time of the billing cycle. However, peak charges shall be applicable for consumption during peak hours.

In the event of any surplus solar energy not consumed as per energy accounting, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate

Rs. 1.75 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

For the Solar power projects set up by MSME (Manufacturing) Enterprise above 50% of its contracted demand, energy account settlement shall be carried out on 15 minute time block basis.

ii. Solar projects not registered under REC Mechanism and the consumer takes the benefit of the renewable attribute to meet their own RPO.

The energy accounting shall be carried out on 15 minutes time block basis.

In the event of any surplus solar energy not consumed as per energy accounting based on 15-minute time block, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate Rs.1.75 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

Such surplus energy compensated by the Distribution Licensee shall be utilized for meeting the RPO of that Distribution Licensee.

iii. Solar projects registered under REC Mechanism and the Solar projects not registered under REC Mechanism but benefit of the renewable attribute is not given to distribution licensee.

The energy accounting shall be carried out on 15 minutes time block basis.

In the event of any surplus solar energy not consumed as per energy accounting based on 15-minute time block, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate Rs.1.50 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

Transmission/ Wheeling Charge and Losses

i. General

Whenever the entire Solar generation is sold to distribution licensee, the generator will supply the power at the interconnection point. Thereafter, the transmission/ wheeling charges will be borne by the distribution licensee.

ii. Transmission Charges and Losses

Solar power project setup for captive use /Third party sale/Registered under REC, transmission charges and losses as applicable to normal Open-Access Consumers shall be applicable.

iii. Wheeling Charges and Losses

- i. Solar power projects for captive consumption and not registered under REC Mechanism,



50% of Wheeling charges and losses as applicable to normal Open-Access Consumers shall be applicable.

- ii. For Solar Projects set up for third-party sale/National Solar Mission and registered under REC Mechanism, 100% of the Wheeling Charges & Losses as applicable to normal Open-Access Consumers shall be applicable.

iv. *Wheeling at Two or More Locations*

If a Solar Power Generator owner desires to wheel electricity to more than two locations, he shall pay INR 0.05 per unit on energy fed into the grid to distribution licensee in whose area power is consumed in addition to the abovementioned transmission charges and losses, as applicable.

Cross-Subsidy Surcharge & Additional Surcharge

- i. For the Solar project registered under REC Mechanism with sale of power to third party (including sale of power under NSM) within the State, 100% of Cross-Subsidy Surcharge and Additional Surcharge as applicable to normal Open-Access Consumers shall be applicable.
- ii. For the Solar power projects set up by MSME (Manufacturing) Enterprise above 50% of its contracted demand, 100% of Cross-Subsidy Surcharge and Additional Surcharge as applicable to normal Open-Access Consumers shall be applicable.
- iii. For the Solar project not registered under REC Mechanism with sale of power to third party (including sale of power under NSM) within the State, 50% of Cross-Subsidy Surcharge and Additional Surcharge as applicable to normal Open-Access Consumer shall be applicable.
- iv. For the solar projects set up for captive consumption, for sale to distribution licensee and for sale outside the State, Cross-Subsidy Surcharge and Additional Surcharge shall not be applicable.
 - 100% of the gross proceeds on account of CDM benefit to be retained by the project Developer in the first year after the date of commercial operation of the generating station. In the second year, the share of the beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the generating company and the beneficiaries.
 - The control period proposed for the solar energy tariff order is from issuance of order under this discussion paper till further Order in this regard.

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Abbreviations

ABT	:	Availability-Based Tariff
AC	:	Alternating Current
CdS	:	Cadmium Sulphide
CdTe	:	Cadmium Telluride
CEA	:	Central Electricity Authority
CERC	:	Central Electricity Regulatory Commission
CUF	:	Capacity Utilization Factor
DC	:	Direct Current
EPC	:	Engineering, Procurement & Commission
EPD	:	Energy and Petrochemicals Department
GEDA	:	Gujarat Energy Development Agency
GERC	:	Gujarat Electricity Regulatory Commission
GETCO	:	Gujarat Energy Transmission Corporation Ltd.
GHI	:	Global Horizontal Insolation
GoG	:	Government of Gujarat
GoI	:	Government of India
GTI	:	Global Tilt Insolation
h	:	Hour
Hz	:	Hertz
IEC	:	International Electrotechnical Commission
IMD	:	India Meteorological Department
INR	:	Indian Rupees
JNNSM	:	Jawaharlal Nehru National Solar Mission
kWh	:	Kilowatt-hour (also known as a 'Unit')
L	:	Litre
Lac(s)	:	A unit in the Indian numbering system, which equals to 100,000. Also known as 'Lakh.'
LCOE	:	Levelized Cost of Electricity
MAT	:	Minimum Alternate Tax
MNRE	:	Ministry of New and Renewable Energy



MSME	:	Micro, Small and Medium Enterprise
MPPT	:	Maximum Power Point Tracking
MW	:	Megawatt
NASA	:	National Aeronautics and Space Administration
NSM	:	National Solar Mission
NTPC	:	National Thermal Power Corporation Ltd.
NVVN	:	NTPC Vidyut Vyapar Nigam Ltd.
O&M	:	Operation and Maintenance
ph	:	Phase
PPA	:	Power Purchase Agreement
PR	:	Performance Ratio
PV	:	Photovoltaic(s)
RBI	:	Reserve Bank of India
REC	:	Renewable Energy Certificate
RPO	:	Renewable Purchase Obligation
SBI	:	State Bank of India
SECI	:	Solar Energy Corporation of India
SERC	:	State Electricity Regulatory Commission
SEZ	:	Special Economic Zone
SPP	:	Solar Power Policy
sq.	:	Square
STC	:	Standard Testing Conditions
STU	:	State Transmission Utility
V	:	Voltage
W	:	Watt

1. Introduction

1.2 Background

In exercise of the powers conferred under Sections 3 (1), 61 (h), 62 (1) (a), and 86 (1)(b) & (e) of the Electricity Act, 2003, National Electricity Policy, 2005, and Tariff Policy, 2016 and all other powers enabling it in this behalf, the Gujarat Electricity Regulatory Commission (GERC or Commission) presents this Discussion Paper on the tariff framework for procurement of power by Distribution Licensees and others from Solar power projects to be commissioned prospectively.

The Gujarat Solar Power Policy-2015 as well as the amendments notified by the Government of Gujarat, have been considered while preparing this Discussion Paper. The Commission had issued the previous generic Tariff Order on 17th August, 2015, for procurement of power by Distribution Licensees from Solar power projects in Gujarat. The Control Period of GERC Solar power Tariff Order 2015 expired on 31 March, 2018. This Discussion Paper details the tariff framework for the prospective period as well as the intervening period.

1.3 The Electricity Act, 2003

The following provisions of the Act provide the enabling legal framework for promotion of Renewable Sources of energy by the State Electricity Regulatory Commissions (SERCs):

1.2.1 Section 61 (h) of the Act provides that, while specifying the terms and conditions of determination of tariff, the Commission shall be guided by the objective of promotion of cogeneration and generation of electricity from renewable sources of energy.

“The promotion of cogeneration and generation of electricity from renewable sources of energy.”

1.2.2 Section 62 (1) (a) of the Act provides for determination of tariff for supply of electricity by a generating company to a distribution licensee.

“Supply of electricity by a generating company to a distribution licensee: Provided that the Appropriate Commission may, in case of shortage of supply of electricity, fix the minimum and maximum ceiling of tariff for sale or purchase of electricity in pursuance of an agreement, entered into between a generating company and a licensee or between licensees, for a period not exceeding one year to ensure reasonable prices of electricity.”

1.2.3 Section 86.1 (b) of the Act regulates the procurement process of electricity by the distribution licensees as under:

“regulate electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements for purchase of power for distribution and supply within the State;”

1.2.4 Section 86.1 (e) of the Electricity Act 2003 mandates promotion of cogeneration and generation of electricity from renewable sources of energy:

“Promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution license.”

1.2.5 Section 3 (1) of the Electricity Act 2003 requires the Central Government to formulate, inter alia, the National Electricity Policy in consultation with the Central Electricity Authority (CEA) and State Governments. The provision is quoted below:

“The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.”

1.4 National Electricity Policy, 2005

The National Electricity Policy, 2005 formulated in compliance with the above-stated Section 3 of the Electricity Act envisages:

Clause 5.6.1 stipulates about the need for Technology Development and R&D on non-conventional energy systems, as reproduced below:

“Special efforts would be made for research, development demonstration and commercialisation of non-conventional energy systems. Such systems would need to meet international standards, specifications and performance parameters.”

Clause 5.12 stipulates several conditions for promotion and harnessing of renewable energy sources. The salient features of the said provisions of NEP are reproduced below.

5.12.1: Non-conventional sources of energy being the most environment-friendly, there is an urgent need to promote generation of electricity based on such sources of energy. For this purpose, efforts need to be made to reduce the capital cost of projects based on non-conventional and renewable sources of energy. Cost of energy can also be reduced by promoting competition within such projects. At the same time, adequate promotional measures would also have to be taken for development of technologies and a sustained growth of these sources.

5.12.2: The Electricity Act, 2003, provides that co-generation and generation of electricity from non-conventional sources would be promoted by the SERCs by providing suitable measures for connectivity with the grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively, the share of electricity from

non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies.

1.5 Tariff Policy, 2006

The Tariff Policy, 2006 issued by the Ministry of Power, Government of India, also emphasizes on the importance of non-conventional sources of energy generation and states:

“Pursuant to provisions of section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.”

1.6 Tariff Policy, 2016

In compliance with the Section (3) of the Act, the Central Government has notified the revised Tariff Policy on 28th January, 2016. The Tariff Policy elaborates the role of Regulatory Commissions, the mechanism for promoting renewable energy, the time-frame for implementation, etc. Clause 5.2 of the Tariff Policy provides as under:

“Provided also that the State Government can notify a policy to encourage investment in the State by allowing setting up of generating plants, including from renewable energy sources out of which a maximum of 35% of the installed capacity can be procured by the Distribution Licensees of that State for which the tariff may be determined under Section 62 of the Electricity Act, 2003.”

Clause 6.4 of the Tariff Policy addresses various aspects associated with promoting and harnessing renewable sources of energy generation including co-generation from renewable energy sources, as reproduced below:

- 1) *“Pursuant to provisions of Section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from renewable energy sources, taking into account availability of such resources and its impact on retail tariffs. Cost of purchase of renewable energy shall be taken into account while determining tariff by SERCs. Long term growth trajectory of Renewable Purchase Obligations (RPOs) will be prescribed by the Ministry of Power in consultation with MNRE.*

Provided that cogeneration from sources other than renewable sources shall not be excluded from the applicability of RPOs.

- (i) *Within the percentage so made applicable, to start with, the SERCs shall also reserve a minimum percentage for purchase of solar energy from the date of notification of this policy which shall be such that it reaches 8% of total consumption of energy, excluding Hydro Power, by March 2022 or as notified by the Central Government from time to time.*
 - (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.*
 - (iii) *It is desirable that purchase of energy from renewable sources of energy takes place more or less in the same proportion in different States. To achieve this objective in the current scenario of large availability of such resources only in certain parts of the country, an appropriate mechanism such as Renewable Energy Certificate (REC) would need to be promoted. Through such a mechanism, the renewable energy based generation companies can sell the electricity to local distribution licensee at the rates for conventional power and can recover the balance cost by selling certificates to other distribution companies and obligated entities enabling the latter to meet their renewable power purchase obligations. The REC mechanism should also have a solar specific REC.*
 - (iv) *Appropriate Commission may also provide for a suitable regulatory framework for encouraging such other emerging renewable energy technologies by prescribing separate technology based REC multiplier (i.e. granting higher or lower number of RECs to such emerging technologies for the same level of generation). Similarly, considering the change in prices of renewable energy technologies with passage of time, the Appropriate Commission may prescribe vintage based REC multiplier (i.e. granting higher or lower number of RECs for the same level of generation based on year of commissioning of plant).*
- 2) *States shall endeavour to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the waste to energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to be notified by the Central Government.*
- However, till such notification, any such procurement of power from renewable energy sources projects, may be done under Section 62 of the Electricity Act, 2003. While determining the tariff from such sources, the Appropriate Commission shall take into account the solar radiation and wind intensity which may differ from area to area to ensure that the benefits are passed on to the consumers.*
- 3) *The Central Commission should lay down guidelines for pricing intermittent power, especially from renewable energy sources, where such procurement is not through competitive bidding. The tariff stipulated by CERC shall act as a ceiling for that category.*

- 4) *In order to incentivize the Distribution Companies to procure power from renewable sources of energy, the Central Government may notify, from time to time, an appropriate bid-based tariff framework for renewable energy, allowing the tariff to be increased progressively in a back-loaded or any other manner in the public interest during the period of PPA, over the life cycle of such a generating plant. Correspondingly, the procurer of such bid-based renewable energy shall comply with the obligations for payment of tariff so determined.*
- 5) *In order to promote renewable energy sources, any generating company proposing to establish a coal/lignite based thermal generating station after a specified date shall be required to establish such renewable energy generating capacity or procure and supply renewable energy equivalent to such capacity, as may be prescribed by the Central Government from time to time after due consultation with stakeholders. The renewable energy produced by each generator may be bundled with its thermal generation for the purpose of sale. In case an obligated entity procures this renewable power, then the SERCs will consider the obligated entity to have met the Renewable Purchase Obligation (RPO) to the extent of power bought from such renewable energy generating stations.*

Provided further that in case any existing coal and lignite based thermal power generating station, with the concurrence of power procurers under the existing Power Purchase Agreements, chooses to set up additional renewable energy generating capacity, the power from such plant shall be allowed to be bundled and tariff of such renewable energy shall be allowed to be pass through by the Appropriate Commission. The Obligated Entities who finally buy such power shall account towards their renewable purchase obligations.

Provided also that scheduling and despatch of such conventional and renewable generating plants shall be done separately.

- 6) *In order to further encourage renewable sources of energy, no inter-State transmission charges and losses may be levied till such period as may be notified by the Central Government on transmission of the electricity generated from solar and wind sources of energy through the inter-State transmission system for sale.*
- 7) *Appropriate Commission may provide regulatory framework to facilitate generation and sale of electricity from renewable energy sources particularly from roof-top solar system by any entity including local authority, Panchayat Institution, user institution, cooperative society, Non-Governmental Organization, franchisee or by Renewable Energy Service Company. The Appropriate Government may also provide complementary policy support for this purpose.”*

1.7 National Action Plan on Climate Change

The Prime Minister of India released the country's National Action Plan on Climate Change (NAPCC) on 30 June 2008. There are Eight National Missions which form the core of the

National Action Plan. The NAPCC consists of several targets on climate change issues and addresses the urgent and critical concerns of the country through a directional shift in the development pathway. It outlines measures on climate change related adaptation and mitigation while simultaneously advancing development. The Missions form the core of the Plan, representing multi-pronged, long-term and integrated strategies for achieving goals in the context of climate change. NAPCC set the target of 5% renewable energy purchase for FY 2009-10. Further, NAPCC envisages that such target will increase by 1% annually for the next 10 years. This would mean NAPCC envisages renewable energy to constitute approximately 15% of the energy mix of India.

The National Action Plan on Climate Change is the national strategy of India to achieve a sustainable development path that simultaneously advances economic and environmental objectives. The National Action Plan hinges on the development and use of new technologies. The National Solar Mission is one of the eight national missions which form the core of the National Action Plan. Based on this vision a National Solar Mission was launched.

1.8 Gujarat Solar Power Policy, 2009

The Gujarat Solar Power Policy was announced on January 6, 2009, by the Energy and Petrochemicals Dept. (EPD), Government of Gujarat, with the following objectives:

- Promoting generation of green and clean power in the State using solar energy.
- To put in place an appropriate investment climate, that could leverage the Clean Development Mechanism (CDM).
- Productive use of the wastelands, thereby engendering a socio-economic transformation.
- Employment generation and skill enhancement of local youth.
- Promotion of R&D and facilitation of technology transfer.
- Establish core technical competence in professionals in the State to initiate and sustain use and effective management of newer applications.
- Promotion of local manufacturing facilities.
- Creation of environmental consciousness among citizens.

This Policy was effective up to 31 March, 2014, and targets a net installed solar generation capacity of 500 MW.

1.9 Jawaharlal Nehru National Solar Mission

The Jawaharlal Nehru National Solar Mission (JNNSM) was announced in 2009. JNNSM aims to promote the development of solar energy for grid connected and off-grid power generation. The ultimate objective is to make solar power competitive with fossil based applications by 2020-2022. The mission aims to achieve 22 GW of both off-grid and on-grid solar power by 2022, which was subsequently revised to 100 GW by 2022.

In order to encourage rapid scale-up, a scheme is introduced in cooperation with the Ministry of Power, National Thermal Power Corporation Ltd. (NTPC) and Central Electricity Authority

(CEA) to offtake solar power and reduces the financial burden on the government. NTPC Vidyut Vyapar Nigam Ltd. (NVVN), a wholly owned subsidiary of NTPC, was chosen as the nodal agency for entering into Power Purchase Agreement (PPA) with solar power Developers during Phase 1 (Batch 1&2). In the Phase 2 (Batch 1) of the NSM, the Solar Energy Corporation of India (SECI) signed the PPA on behalf of the government due to absence of unallocated power for bundling purposes.

State Governments are also encouraged to promote and establish solar generation parks with dedicated infrastructure for setting up utility scale plants to ensure ease of capacity creation.

1.10 GERC Solar Tariff Order, 2012

Gujarat Electricity Regulatory Commission (GERC), in its Order No. 1 of 2012 dated January 27th 2012 determined the tariff for procurement of power by Distribution Licensees and others from solar energy projects for the State of Gujarat. In fact, GERC was the first State Electricity Regulatory Commission (SERC) in the country to issue a comprehensive Tariff Order on solar energy.

The said order was challenged by solar energy society of India by filling appeal no. 75 of 2012 before Hon'ble APTEL. Hon'ble APTEL passed an order dated April 17, 2013 in the said appeal and remanded the matter to the Commission directing to pass the consequential order in terms of the observation and directions given in the said Judgment. Based on the above Judgment the Commission passed an order dated July 7, 2014 and also issue corrigendum to it by order dated July 11, 2014.

1.10 Gujarat Solar Policy, 2015

Government of Gujarat, Energy and Petrochemical department declared the solar power policy of Gujarat, vide G.R. No. SLR-11-2015-2442-B dated 13th August 2015, which would be operative till March 31, 2020. This policy intends to facilitate and promote large scale promotion of the solar power generation capacities in the State and the interests of all the investors, developers, consumers and various other stakeholders.

The main features of the Policy are as follows:

- The minimum size of a MW scale project shall be 1 MW and 1 Kw for KW scale projects.
- Any company or group of individuals shall be eligible for setting up a solar generating plant, either for purpose of captive use and/or selling of electricity to distribution licensee/third party whether or not under REC mechanism in accordance with Electricity Act 2003.
- There is project based provisions and incentives provided for Rooftop solar PV systems with net metering depending on the type of consumers.
- The State is blessed with several natural resources of energy that augments its renewable energy growth. Through its proactive planning on capacity addition front it has successfully

managed to eliminate the demand supply deficit. In sync with the solar power policy the Government has also launched the Industrial Policy 2015, through which Government would encourage private participation in all energy generation to meet the growing demands in the state.

- Promoting generation of green and clean power in the State using solar energy.
- To put in place an appropriate investment climate, that could leverage the Clean Development Mechanism (CDM).
- Productive use of the wastelands, thereby engendering a socio-economic transformation.
- Employment generation and skill enhancement of local youth.
- Promotion of R&D and facilitation of technology transfer.
- Establish core technical competence in professionals in the State to initiate and sustain use and effective management of newer applications.
- Promotion of local manufacturing facilities.
- Creation of environmental consciousness among citizens.

1.11 GERC Solar Tariff Order, 2015

Gujarat Electricity Regulatory Commission (GERC) determined the solar tariff in its discussion paper titled “Determination of tariff for Procurement by the Distribution Licensees and others from Solar Energy Projects” and thereafter the Commission passed an order No. 3 of 2015 dated August 17, 2015 declaring the solar tariff order for kilowatt and megawatt scale solar projects. The levelized tariffs for solar photovoltaic plants for a period from July 1, 2015 to March 31, 2018 arrived through a financial analysis were as follows:

Table 1.2: Levelized tariff for megawatt-scale and kilowatt-scale photovoltaic systems

For Megawatt Scale Projects	July 1, 2015 to March 31,2016	April 1, 2016 to March 31,2017	April 1, 2017 to March 31,2018
Without accelerated depreciation benefit	INR 6.77 per kWh	INR 6.30 per kWh	INR 5.86 per kWh
With accelerated depreciation benefit	INR 6.17 per kWh	INR 5.74 per kWh	INR 5.34 per kWh

For kilowatt Scale Projects	July 1, 2015 to March 31,2016	April 1, 2016 to March 31,2017	April 1, 2017 to March 31,2018
Without accelerated depreciation benefit	INR 8.42 per kWh	INR 7.83 per kWh	INR 7.28 per kWh

With accelerated depreciation benefit	INR 7.64 per kWh	INR 7.11 per kWh	INR 6.61 per kWh
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Table 1.3: Levelized tariff for solar thermal power plants commissioned between April 1, 2015 and March 31, 2018

Category	Levelized Tariff	Period
Without accelerated depreciation benefit	INR 11.22 per kWh	For 25 Years
With accelerated depreciation benefit	INR 10.11 per kWh	For 25 Years

1.12 Solar Tariff Orders in Other States

Regulatory commissions of many states of India including Rajasthan, Maharashtra, Madhya Pradesh, Karnataka, Tamil Nadu, etc. have determined their solar tariffs recently and they are listed below:

Table 1.4: Levelized Tariff of Different States – 2018

Category	Rajasthan (INR/kWh)	Maharashtra (INR/kWh)	Madhya Pradesh (INR/kWh)	Karnataka (INR/kWh)	Tamil Nadu (INR/kWh)
Solar Photovoltaic	3.66	3.02	5.45	4.15	3.05
Solar Thermal	Not declared	10.32	10.52	Not declared	Not declared

It must also be noted that few states have not declared a levelized tariff for solar thermal technology due to the fact that there is minimal investment activity in the solar thermal sector. There are also questions raised on the technological viability of solar thermal. The sector is yet to see the economies of scale and mature further, therefore there is no solar thermal generic tariff determined by few states. However, states like Rajasthan declared that for power plants based on thermal technology, the commission will decide the general tariff for such technologies as and when required.

1.13 Gujarat's Renewable Purchase Obligation

GERC, in its regulations titled 'Procurement of Energy from Renewable Sources' (Notification No. 1 of 2018) dated April 21, 2018 has mandated to obligatory entities for minimum purchase of electricity (in kWh) from renewable energy sources.

Table 1.5: Renewable Purchase Obligation for Gujarat, 2017-2022⁴

Year	Minimum Quantum of purchase (in %) from renewable energy sources (in terms of energy in kWh).			
	Wind (%)	Solar (%)	Others (Biomass, Bagasse, MSW and Hydro) (%)	Total (%)

⁴ <https://bit.ly/2QCjJal> | Notification: No. 01 of 2018

(1)	(2)	(3)	(4)	(5)
2017-18	7.75	1.75	0.5	10.00
2018-19	7.95	4.25	0.5	12.70
2019-20	8.05	5.5	0.75	14.30
2020-21	8.15	6.75	0.75	15.65
2021-22	8.25	8.0	0.75	17.00

The Commission has also decided that if the above mentioned minimum quantum of power purchase either from Solar or Wind or Others (including Biomass, Bagasse, Hydro and MSW) is not available in a particular year of FY 2017-18 to 2021-22, then in such cases, additional renewable energy available either from Solar or Wind or Others shall be utilised for fulfilment of RPO in accordance with Column 5.

The Commission has also added new third para after second para of Regulation 4.1 of the Principal Regulations as under:

Distribution Licensee(s) shall compulsorily procure 100% power produced from all the Waste-to-Energy Projects in the State of Gujarat, in the ratio of their procurement of power from all sources including their own, at the tariff discovered through a Competitive Bidding Process as envisaged in the Gujarat Waste to Energy Policy, 2016 subject to ceiling of generic tariff as determined by the Commission.

1.14 Policy for development of Small Scale Distributed Solar PV Power Projects-2019

The Government of Gujarat, Energy and Petrochemical department declared a Policy for development of Small Scale Distributed Solar PV Power Projects-2019, vide G.R. No: SLR/11/2019/51/B1 dated 6th March, 2019, which would be operative for a period of 5 years. This Policy for the Development of Small Scale Distributed Solar Projects - 2019 aims at facilitating the development of Small Scale Solar Projects with a size of 0.5 MW and above up to 4 MW in the distribution network of licensees of Gujarat State in rapid manner and at the same time the rate of power purchase is proposed at reasonable level. Any individual, company or body corporate or association or body of individuals, Co-operative Society of individuals/farmers or artificial juridical person shall be eligible for setting up Small Scale Solar Projects under this policy exclusively for the purpose of sale to Obligated Entities i.e. Distribution Licensees for fulfilment of RPO of such Obligated Entities. The main aim of this policy is to encourage small investors to participate in the energy transition without having to participate in the auctions, for which they may not have the relevant institutional capacity.

The tariff applicable under this Policy shall be as per following mechanism:

The tariff contracted in the Competitive Bidding Process conducted by GUVNL at which PPAs are signed for procurement of Solar Power from projects located outside the Solar Park prevailing as on 31st March (computed based on simple average of such tariff discovered and

contracted over six months ending on 31st March) of any given year with an addition of Rs. 0.20 per unit shall be the applicable tariff at which the PPAs shall be signed during the immediately succeeding period of April to September by the Obligated Entities with these Solar Projects under this policy and similarly the contracted tariff prevailing as on 30th September of any given year (computed based on simple average of such tariff discovered and contracted over six months ending on 30th September) with an addition of Rs. 0.20 per unit shall be the applicable tariff for PPAs to be signed during the immediately succeeding period of October to March

The additional INR 0.20 per unit addition in tariff is allowed for INR 0.12 per unit for saving in transmission loss as power will be injected in distribution grid and INR 0.08 per unit is to compensate for expensive land cost, higher capital investment and maintenance cost due to small size of projects. The above mentioned tariff shall be applicable for a PPA term of 25 years from Commercial Operation Date of the Projects.

1.15 Amendments in Gujarat Solar Power Policy for MSME Manufacturing Enterprises

The State Government amended the provisions of Solar Power Policy 2015, vide G. R. No. SLR-11/2015/2442/B1 dated 26th September 2019, to make special provisions for the MSME sector, which is the backbone of industrial activity in Gujarat, to provide special dispensation in the policy to Micro, Small and Medium Manufacturing Enterprises (MSME) so that MSME (Manufacturing) can arrange affordable power by setting up solar capacity as per their consumption requirement. In respect of Micro, Small and Medium Manufacturing Enterprises (MSME) - Manufacturing consumers across the State, Micro, Small and Medium Manufacturing Enterprises shall be allowed to set up of Solar Project of any capacity, irrespective of its sanctioned load/contract demand with the concerned DISCOM. Any surplus solar power not consumed by consumers shall be purchased by DISCOMs at INR 1.75/Unit and Energy Accounting shall be carried out on 15 minute time block basis.

1.16 Surya Urja Rooftop Yojana (SURYA)

The Government of Gujarat launched the Surya Urja Rooftop Yojana-Gujarat (SURYA-Gujarat), vide G. R. No. SLR-11/2015/401/B1 dated 5th August, 2019 to give further boost for promotion of Solar Roof Top in the State for residential sector. The Policy has targeted 2 lakh residential consumers during the year 2019-20 and 8 lakh residential consumers cumulatively until the year 2021-22. This is over and above the capacity commissioned as on 31st March, 2019. The Policy operative period shall be up to the financial year 2021-22. Any capacity of solar rooftop system equal to or greater than 1 (one) kilowatt DC can be installed irrespective of the sanctioned load of the residential consumers. The electricity generated from the solar rooftop system shall be net metered on the billing cycle period and the surplus power fed to the grid upon self-consumption shall be purchased by the concerned distribution licensee at the rate of INR 2.25 per unit.

2. Study of Competitive Bids for Solar

2.1 Introduction

Ministry of Power (MoP), Government of India has formulated the National Tariff Policy, 2016 giving specific guidance on purchase of power generated from renewable energy sources. As per Section 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. Procurement of power by Distribution Licensee from renewable energy sources, from Solar PV Power Projects above the notified capacity, shall be done through Competitive Bidding Process, from the date to be notified by the Central Government. However, till such notification, any such procurement of power from Renewable Energy sources Projects, may be done under Section 62 of the Electricity Act, 2003.”

The Govt. of India has pronounced the competitive bidding guidelines for the solar based energy projects in the country. The guidelines provides the distribution licensee shall procure the power by following the competitive bidding process. The relevant clause of the said guidelines are reproduced below:

2. SCOPE OF THE GUIDELINES

2.1. Applicability of Guidelines:

2.1.1. These Guidelines are being issued under the provisions of Section 63 of the Electricity Act, 2003 for long term procurement of electricity by the ‘Procurers’, from grid-connected Solar PV Power Projects (‘Projects’), having size of 5 MW and above, through competitive bidding.

After the notification of the said guidelines the Solar Energy Corporation of India, NTPC and various State have carried out the competitive bidding process for procurement of power generated from the solar energy-based projects. The rate discovered under the various bidding process are stated in the table below.

Moreover, the distribution licensee of the State have also conducted the competitive bidding process for procurement of solar energy-based generation from the discovered tariff in the bidding process from the selected supplier of the energy in the said bidding process. The tariff discovered in the aforesaid bidding process are quite lower than the tariff determined by the Commission in its earlier tariff Order No. 2 of 2010 dated 29.01.2010, Order No. 1 of 2012 dated 27.01.2012 and Order No. 3 of 2015 dated 17.08.2015. The details of the competitive bidding process carried out by the GUVNL, other States, SECI and NTPC and tariff discovered under the same are reproduced in the table below:

RfS No. GUVNL /500 MW / Solar (PHASE II-R), Dated 28.06.2018		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Aditya Birla Renewables Limited	100	2.44
Avaada Sunrise Energy Pvt. Ltd. (SPV of Giriraj Renewables Private Limited)	300	2.44
Gaya Solar (Bihar) Pvt. Ltd. (SPV of Adani Green Energy Ltd.)	100	2.44

(Source: GERC Order, 1768/2018 Dated 19.06.2019)

RfS No. GUVNL / 700 MW / Solar (Phase-III-R) dated 06.03.2019 (Raghnesda Solar Park)		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Electro Solar Private Limited	200	2.65
Gujarat State Energy Corporation Limited	100	2.68
Gujarat Industries Power Company Limited	100	2.68
Tata Power Renewable Energy Limited	100	2.70

(Source: GERC Order, 1803/2019 Dated 17.07.2019)

RfS No. GUVNL / 200 MW / Solar (Phase-VI) dated 24.06.2019 for Raghnesda Solar Park		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Gujrat State Electricity Corp. Ltd.	100	2.65

(Source: GERC Order, 1819/2019 Dated 23.10.2019)

RfSNo. GUVNL/1000MW/Solar dated 16.01.2019 (Phase V) & 24.06.2019 (Phase-VII) for Dholera Solar Park		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Tata Power Renewable Energy Ltd.	300	2.75

(Source: GERC Order, 1818/2019 Dated 23.10.2019)

RfS No. GUVNL/ 500 MW/Solar (PHASE IV) Dated 29.12.2018		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Paryapt Solar Energy Private Limited	50	2.55
Gujarat State Energy Corporation Limited	75	2.67
Juniper Green Energy Private Limited	120	2.67
Adani Renewable Energy Park (Gujarat) Limited	150	2.67
Renew Solar Power Private Limited	105	2.68

(Source: GERC Order, 1787/2019 Dated 19.06.2019)

MSEDCL 1000 MW Non Solar Park (PHASE IV) 18th Feb 2019		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Shiv Solar Pvt. Ltd.	50	2.74
Acme Solar	300	2.74
Renew Power	300	2.75
Avada Energy	350	2.75

Source: <https://mercomindia.com/maharashtra-auction-1-gw-solar-2-74-11/>

SECI 1200 MW ISTS-III Non Solar Park 25th Feb 2019		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Renew Solar Power Private Limited	300	2.55
Azure Power India Pvt. Ltd	300	2.58
EDEN Renewable Cite Pvt. Ltd	300	2.61
SBSR Power cleantech Eleven Pvt. Ltd.	300	2.61

Source: [https://seci.co.in/web-data/docs/1200%20MW%20ISTS-connected%20Solar%20Tranche-III%20result%20website%20upload\(1\).pdf](https://seci.co.in/web-data/docs/1200%20MW%20ISTS-connected%20Solar%20Tranche-III%20result%20website%20upload(1).pdf)

SECI 750 MW Rajasthan Non Solar Park 1st March 2019		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Fortum Solar	250	2.48
Palimarwar Solar house (LNB Group)	40	2.48
ACME Solar	250	2.48
UPC Renewable	100	2.48
Renew Power	110	2.49

Source: <https://mercomindia.com/solar-auction-results-750-mw-rajasthan/>

SECI 250 MW Dondaicha Solar Park (Maharashtra) 14th May 2019		
Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Talettutayi Solar (Solar Arise)	50	2.87
Tata Power	100	2.88
NTPC Ltd.	100	2.91

Source: <https://mercomindia.com/secis-250-mw-solar-auction-maharashtra/>

ISTS IV 1200 MW, 12th June, 2019

Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Ayana Renewable	300	2.54
ReNew Power	300	2.54
Azure power	300	2.54
mahindra Susten	250	2.54
Avaada Energy	50	2.55

Source: <https://mercomindia.com/seci-solar-auction-1-2-gw/>

ISTS VI 1200 MW 31st October, 2019

Name of Solar Developer	Quantity (MW)	Rate (Rs./kWh)
Avaada Energy	300	2.71
ReNew Power	300	2.71
Masaya Solar Energy	300	2.71
Tata Power	60	2.72

Source: <https://mercomindia.com/renew-avaada-upc-renewables-tata-power-winners-960-mw-seci-tender/>

KREDL 550 MW/1200 MW Pavagada Solar Park 23rd March 2018

Name of Developers	Quantity (MW)	Rate (Rs./kWh)
ReNew Power	300	2.91
Avadda Solar	150	2.92
Azure Power	100	2.93

Source: <https://mercomindia.com/lowest-tariff-kredl-pavagada-solar-auction/>

NTPC 750 MW Anantpuram Solar Park 10th May 2018

Name of Developers	Quantity (MW)	Rate (Rs./kWh)
Sprng Energy	250	2.72
Ayana Renewables	250	2.73
SBG Cleantech	250	2.73

Source: <https://mercomindia.com/ntpc-750mw-solar-auction-results/>

SECI 200 MW Pavagada Solar Park 18th May 2018

Name of Developers	Quantity (MW)	Rate (Rs./kWh)
SoftBank	200	2.82

Source: <https://mercomindia.com/seci-auctions-200mw-solar-pavagada/>

KREDL 500 MW Pavagada Solar Park 3rd July 2018		
Name of Developers	Quantity (MW)	Rate (Rs./kWh)
Fortum Solar	250	2.85
Tata Power	250	2.85

Source: <https://mercomindia.com/fortum-tata-power-solar-pavagada/>

SECI ISTS-I 2000 MW Non Solar Park 3rd July 2018		
Name of Developers	Quantity (MW)	Rate (Rs./kWh)
ACME Solar	600	2.44
Sapoorji & Pallonji	250	2.52
Hero Future Energy	250	2.53
Mahindra Susten	250	2.53
Azure Power	600	2.53
Adani Power	50	2.54

Source: <https://mercomindia.com/seci-2-gw-ists-solar-auction-winners/>

SECI 750 MW Kaddapa Solar Park 6th July 2018		
Name of Developers	Quantity (MW)	Rate (Rs./kWh)
Softbank	250	2.70
Sprng Energy	250	2.70
Ayana Renewables	250	2.71

Source: <https://mercomindia.com/seci-750-mw-solar-auction-kadapa-results/>

Lowest solar bids in reverse auctions since 2018 are shown in figure 2.1

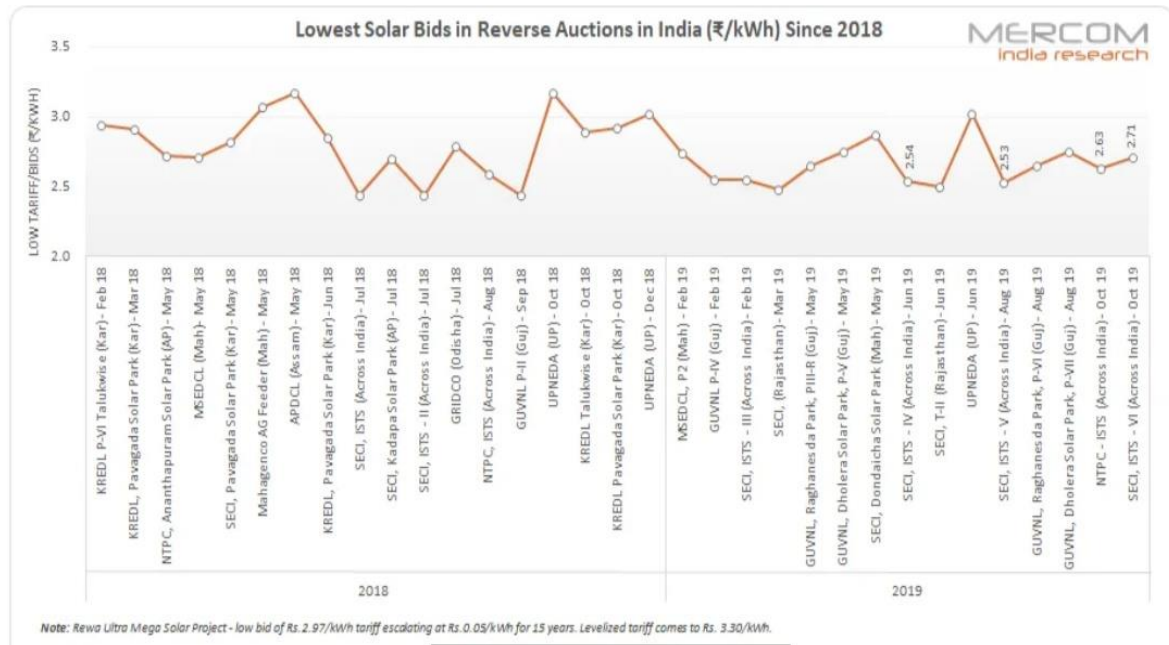


Figure 2.1: Lowest solar bids in reverse auction since 2018

The aforesaid tables and graph reflect that the rate discovered under the competitive bidding process by SECI, NTPC, various States and the distribution licensee of the State of Gujarat is quite lower in comparison to the feed-in-tariff determined by the various Commissions which include the GERC also. Thus, it is clear that the tariff discovered in the bidding process is quite lower than the tariff determined by the Commission in its previous orders as feed-in-tariff.

3. Tariff Framework, General Principles and Other Considerations

3.1 Tariff Framework

The Commission has already directed the Distribution Licensees to procure power from Solar Projects through competitive bidding under Section 63 of the Act or by following competitive bidding process followed by SECI/MNRE etc. The tariff determined by the Commission in the respective category of renewable energy orders will act as a ceiling tariff.

Further, the Commission has directed the Distribution Licensees through letter dated 18th March, 2017, which states as under:

“The Commission has observed that, as per the provisions of the National Tariff Policy, procurement from renewable energy projects by distribution licensees is recommended through competitive bidding to keep the tariff low. Accordingly, the Govt. of India and various State Governments have initiated competitive bidding process for procurement of power from wind and Solar energy projects, in which the discovered tariff for Solar and Wind energy projects has shown a substantial reduction.

In view of above, the Commission directs that the distribution licensees may procure electricity from the Wind and Solar power projects through competitive bidding under Section 63 of the Act or by following competitive bidding process followed by SECI/MNRE etc. The tariff determined by the Commission in the respective category of renewable energy orders will act as a ceiling tariff.

The distribution licensees may approach the Commission for adoption of the tariff discovered through such competitive bidding process.”

In view of the above, the Commission proposes to determine the tariff for all prospective Solar power projects, based on the rates discovered through competitive bidding, and discontinue the practice of determining the generic tariff for Solar power projects.

Further, as stated earlier, the Control Period under the present dispensation expired on 31st March, 2018. The present Discussion Paper outlines the proposed approach and tariff framework for the prospective period. However, projects have continued to be set up during the intervening period, i.e., post 31st March, 2018 and before date of commencement of the dispensation proposed in this Discussion Paper. Hence, in order to ensure regulatory certainty for such projects set up in the intervening period, it is clarified that the Control Period ended on 31st March, 2018, shall be deemed to be extended till the date of effectiveness of the tariff framework proposed in this Discussion Paper.

The Government of Gujarat vide GR No. SLR/11/2019/51/B1, dated 06.03.2019 has notified “Policy for development of Small Scale Distributed Solar Projects - 2019” and notified that any person who desire to set up solar projects of 0.5 MW to 4 MW is eligible to generate the electricity and supply to the distribution licensee at the average tariff rates

of discovered tariff under the competitive bidding process carried out in six months prior to the commissioning of the project plus 20 paisa additional on it. It is also provided that the projects which are commissioned during the months of financial year from April to September are eligible for the average tariff discovered under the competitive bidding process of the months of October to March of the financial year prior to the month of April. Similarly, the projects which are commissioned during the months of October to March of the financial year are eligible to receive the tariff discovered during the previous months of April to September of the same financial year.

The Gujarat Urja Vikas Nigam Limited has also filed a Petition No. 1802/2019 before the Commission for approval of the same and the same was decided and approved the tariff mechanism vide Order dated 08.08.2019.

We note that the tariff discovered in the competitive bidding process at State as well National level is quite lower than the feed-in-tariff determined by the Commission. The aforesaid facts prove that the tariff discovered under the competitive bidding process is quite lower than the feed-in-tariff determined by the Commission from time to time. We therefore, decides that the small projects which will be installed in the State the procurement of energy from such projects be purchased by the distribution licensee having linkage with the tariff rate discovered under the competitive bidding process.

The power generated from the small scale solar projects having size below 5 MW, the procurement price of energy is at the rate of tariff discovered under the competitive bidding process in different time period of 6 months of the year plus additional 20 paisa per kWh thereon for the projects located outside the solar park as under:

The average tariff, available as on 1st April (as discovered in the competitive bidding by GUVNL during previous six months October-March and adopted by the Commission) applicable for the project commissioned during April-September. Similarly, the average tariff, available as on 1st October (as discovered in the competitive bidding by GUVNL during previous six months April-September and adopted by the Commission) applicable for the project commissioned during October-March.

Incase average tariff is not available for particular 6 months period then latest average tariff available for 6 months period as discussed above shall be considered.

The distribution licensees shall place on its website the applicable tariff on which it will buy the energy generated from Small Scale Solar Power Projects of the capacity of 0.5 to 5 MW. The rate will be updated every 6 months.

For solar thermal technology, the Commission is of the view that solar thermal technology has failed to achieve the same economies of scale as compared to solar PV technology. Further, several projects commissioned in earlier years have failed to perform satisfactorily, showing that the technology is not yet mature for Indian conditions. Third, owing to large variations of technology and their respective costs, it is difficult to determine a generic tariff.



Therefore, the Commission adopts a project specific tariff for solar thermal technology for power generation.

3.2 General Principles

a) Control Period

The Commission proposes that the new control period of the tariff framework under this discussion paper shall be effective from the date of final order till further Order in this regard.

b) Plant and Machinery

Solar Power Projects established with only new Plants and Machinery would be eligible for the benefit of tariff determined within the scope of this Discussion Paper.

c) Useful life of Plant

The Commission proposes to continue to consider useful life of 25 years for the Solar power projects to be commissioned during the new control period starting from date of this order.

d) Tariff period

The tariff period for the tariff proposed by the Commission for procurement of Solar power projects by the distribution licenses in the State will be 25 years.

e) Eligibility Criteria

The Solar power projects commissioned during the new control period as proposed in this discussion paper will be eligible to sell power to distribution licensees of Gujarat at the tariff proposed by the Commission.

f) Forecasting and scheduling for Solar power

The Solar power projects shall require to follow the provisions as prescribed under the GERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019 notified dated 19th January, 2019 and its amendments issued from time to time.

g) Applicability of Merit Order Dispatch Principle

The Commission proposes to continue the practice of considering the Solar power plants irrespective of plant capacity as 'MUST RUN' power plants and shall not be subjected to 'merit order despatch' principles.

h) Reactive Energy Charges

The Reactive Energy Charges as approved by the Commission in tariff orders for the Gujarat Energy Transmission Corporation Ltd. (GETCO) from time to time shall be applicable to such projects.

3.3 Capacity

The maximum capacity for solar power projects shall be up to a maximum of 50% of consumers contracted load for captive use, Third-party sale, power projects set up under NSM with sale of power to consumers within the State.

However, MSME (Manufacturing) Enterprise are allowed to set up Solar Power project of any capacity irrespective of their sanctioned load/contract demand.

3.4 Evacuation Facilities

Grid stability and security is of prime importance. Since the penetration of infirm nature of renewable energy may endanger grid security, adequate protection measures are necessary. The Central Electricity Authority (CEA), GoI has published a Gazette Notification No 12/X/STD/CONN/GM/CEA dated October 15, 2013 known as the Central Electricity Authority (Technical Standards for connectivity to the Grid) Amendment Regulations, 2013, specifying various technical requirements for grid connection of renewable energy sources. These regulations and provisions of State Grid Code shall be binding to the Solar Project Developers and SPGs.

Interconnection voltages shall be governed as per Gujarat Electricity Grid Code-2013, Electricity Supply Code-2015 and GERC's orders, as amended from time to time.

The intending solar generator shall apply to the STU/ Distribution Licensee concerned well in advance.

The evacuation facility shall be initially approved by STU/ Discom depending on injection level after carrying out system studies.

The intending Solar generator shall lay dedicated line for evacuation of power up to sub-station of STU/ 11 kV system of Discom as per system study by STU/ Discom where the generator desires to inject power in the State grid. From there onwards, STU/ Discom shall ensure transmission/ distribution system and connectivity.

To optimize costs, Common dedicated transmission line shall be encouraged for cluster of adjoining Developers with appropriate metering at their respective end of project as well as a common meter for such SPGs at the receiving end at STU substation/ 11 kV system of Discom. Energy injection by each SPG at the receiving end shall be worked out on the basis of meter reading of common meter appropriately apportioned as per the respective meter reading at the sending end meter of that SPG by SLDC.

Switchyard equipment, metering and protection arrangement and RTUs at generator end shall be provided by the owners of solar generators at their cost. The interconnection voltage at generator switchyard will depend on the quantum of power to be evacuated and as per the connectivity granted by the STU/ Distribution licensees in line with the State Grid Code and Supply Code.

3.5 Security Deposit

For all solar power projects, it is required to submit security deposit of INR 5 lakhs per MW to STU/Discom for ensuring speedy and timely completion of evacuation facility by Solar power project developers failing which bank guarantee may be forfeited.

3.6 Operation and maintenance of dedicated lines

The Operation and Maintenance of dedicated evacuation line shall be carried out at the cost of the Solar Project/ Plant Developer as per applicable technical standards and best practices.

3.7 Metering

The electricity generated from the SPGs, shall be metered on 15-minute time block by STU/Discom/SLDC/ALDC at the receiving end of the STU substation/ 11 kV system of Discom. For the purpose of energy accounting, solar generating projects shall provide ABT compliant meters and RTUs at the interface points. Interface metering shall conform to the Central Electricity Authority (Installation and Operation of Meters) Regulations 2014 and amendment thereto. STU/ Discom shall stipulate specifications in this regard.

3.8 Energy Accounting and RPO

i. Solar projects not registered under REC Mechanism and the consumer does not take benefit of the renewable attribute

For such projects, the adjustment of the solar energy generation shall be allowed within the consumer's billing cycle. The entire Solar energy generation of such consumer shall be utilized for meeting the RPO of that Distribution Licensee.

Banking of energy shall be allowed within one billing cycle of the consumer, wherein set off may be given against energy consumed at any time of the billing cycle. However, peak charges shall be applicable for consumption during peak hours.

In the event of any surplus solar energy not consumed as per energy accounting, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate Rs. 1.75 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

For the Solar power projects set up by MSME (Manufacturing) Enterprise above 50% of its contracted demand, energy account settlement shall be carried out on 15 minute time block basis.

ii. Solar projects not registered under REC Mechanism and the consumer takes the benefit of the renewable attribute to meet their own RPO.

The energy accounting shall be carried out on 15 minutes time block basis.

In the event of any surplus solar energy not consumed as per energy accounting based on 15-minute time block, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate Rs.1.75 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

Such surplus energy compensated by the Distribution Licensee shall be utilized for meeting the RPO of that Distribution Licensee.

- iii. **Solar projects registered under REC Mechanism and the Solar projects not registered under REC Mechanism but benefit of the renewable attribute is not given to distribution licensee.**

The energy accounting shall be carried out on 15 minutes time block basis.

In the event of any surplus solar energy not consumed as per energy accounting based on 15-minute time block, such excess electricity shall be compensated by the concerned Distribution Licensee at the rate Rs.1.50 per unit or the rate, if any, specified by the Commission for Surplus Injection Compensation (SIC) from time to time for whole life of the Solar power projects.

3.9 Transmission/ Wheeling Charge and Losses

i. General

Whenever the entire Solar generation is sold to distribution licensee, the generator will supply the power at the interconnection point. Thereafter, the transmission/ wheeling charges will be borne by the distribution licensee.

ii. Transmission Charges and Losses

Solar power project setup for captive use /Third party sale/Registered under REC, transmission charges and losses as applicable to normal Open-Access Consumers shall be applicable.

iii. Wheeling Charges and Losses

- i. Solar power projects for captive consumption and not registered under REC Mechanism, 50% of Wheeling charges and losses as applicable to normal Open-Access Consumers shall be applicable.
- ii. For Solar Projects set up for third-party sale/National Solar Mission and registered under REC Mechanism, 100% of the Wheeling Charges & Losses as applicable to normal Open-Access Consumers shall be applicable.

iv. Wheeling at Two or More Locations

If a Solar Power Generator owner desires to wheel electricity to more than two locations, he shall pay INR 0.05 per unit on energy fed into the grid to distribution licensee in whose area power is consumed in addition to the abovementioned transmission charges and losses, as applicable.

3.10 Cross-Subsidy Surcharge & Additional Surcharge

- i. For the Solar project registered under REC Mechanism with sale of power to third party (including sale of power under NSM) within the State, 100% of Cross-Subsidy Surcharge

and Additional Surcharge as applicable to normal Open-Access Consumers shall be applicable.

- ii. For the Solar power projects set up by MSME (Manufacturing) Enterprise above 50% of its contracted demand, 100% of Cross-Subsidy Surcharge and Additional Surcharge as applicable to normal Open-Access Consumers shall be applicable.
- iii. For the Solar project not registered under REC Mechanism with sale of power to third party (including sale of power under NSM) within the State, 50% of Cross-Subsidy Surcharge and Additional Surcharge as applicable to normal Open-Access Consumer shall be applicable.
- iv. For the solar projects set up for captive consumption, for sale to distribution licensee and for sale outside the State, Cross-Subsidy Surcharge and Additional Surcharge shall not be applicable.

3.11 Sharing of Clean Development Mechanism (CDM) Benefit

The sharing of CDM benefits as per the recommendation made by the Working Group for Renewable Energy Generation constituted by the Forum of Regulators and as per the CERC, in Clause 21 of its Renewable Energy Regulation No. L-7/186(201)/2009-CERC dated 16 September, 2009:

“100% of the gross proceeds on account of CDM benefit to be retained by the project Developer in the first year after the date of commercial operation of the generating station. In the second year, the share of the Beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the Generating Company and the Beneficiaries.”

This order for sharing of CDM benefit may be retained for solar projects in Gujarat.

GERC present this discussion paper to initiate the regulatory process for fixing the Solar power procurement tariff for new control period starting from the date of order on this discussion paper after considering comments received from stockholders. GERC invites comments from the potential stakeholders for fixation of Solar power tariff for the new control period.

Stakeholders may offer their comments on or before 4th March, 2020. Public hearing in this regard will held on 7th March, 2020 at 11:30 AM at GERC office GIFT CITY Gandhinagar. Stakeholder either in person or through their authorized representative may remain present.

Place: Gandhinagar
Date: 04/02/2020

Sd/-
(Roopwant Singh, IAS)
Secretary
GERC