GUJARAT ELECTRICITY REGULATORY COMMISSION
Gandhinagar

Order No. 3 of 2015

In the matter of: Determination of Tariff for Procurement of Power by Distribution Licensees and Others from Solar Energy Projects for the State of Gujarat.

In exercise of the powers conferred under Sections 3(1), 61 (h), 62 (1) (a), and 86 (1) (e) of the Electricity Act, 2003 (36 of 2003), guidelines of the National Electricity Policy, 2005, Tariff Policy, 2006 and all other powers enabling it in that behalf, the Gujarat Electricity Regulatory Commission (hereinafter referred to as "GERC" or "the Commission") determines the tariff for procurement of power by Distribution Licensees and others in Gujarat from Solar Energy Projects (the "Tariff Order").

1. BACKGROUND

1.1. Potential for Solar Power

1.2. National Action Plan on Climate Change

1.3. Government of Gujarat National Solar Power Policy, 2009

1.4. Jawaharlal Nehru National Solar Mission

1.5.GERC Multi Year Tariff Regulations, 2011

1.6.GERC Solar Tariff Order, 2012

1.7.GERC Renewable Purchase Obligation

1.8.GERC Discussion Paper on Solar Tariff Determination

1.9. Public Hearing

1.1 Potential for Solar Power

India, especially its western region, receives generous amount of solar radiation offering an attractive opportunity for generating substantial amount of electrical energy. Most of Gujarat ("the State") receives an average solar insolation of greater than5.5 kWh per square meter per day.

In addition, Gujarat also offers an extensive and stable infrastructure in terms of are liable and available electric grid network for power evacuation, transmission and distribution; profit- making utility companies with high credit-ratings; expansive road, air and sea port connectivity; extensive water canal network; high economic growth rate backed by a wide range of small and medium-sized manufacturing industries; various initiatives of the State Government to promote solar energy such as the Gujarat Solar Park, Canal-top Solar Project and the Gandhinagar Photovoltaic Rooftop Programme. All these factors supplement the potential of solar energy in Gujarat.

1.2 National Action Plan on Climate Change

The Prime Minister of India released the country's National Action Plan on Climate Change (NAPCC) on June 30, 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 approx. 15% of the energy mix of India.

NAPCC is the national strategy of India to achieve a sustainable development path that simultaneously advances economic and environmental objectives. This 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.

1.3 Government of Gujarat's 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 targeted a net installed solar generation capacity of 500 MW. The total installed capacity of all solar systems (ground mounted and rooftop) in Gujarat stands at just over 1 GW (MNRE. As of 4th June 2015).

1.4 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 aimed to achieve 22 GW of both off-grid and on-grid solar power by 2022. The JNNSM target has recently been revised upward 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 off-take 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 and 2). In the Phase 2 (Batch 1) of the JNNSM, the Solar Energy Corporation of India (SECI) signed the PPA on behalf of the government.

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.

Government commitments through JNNSM for development of long-term solar projects have attracted a large number of investors towards this sector in a short time frame. More than 3.8 GW of solar capacity have been commissioned in India during the last six years largely supported by the feed-in tariff.

The JNNSM document also indicates that the Tariff Policy 2006 would be modified to mandate that State Electricity Regulators would fix a percentage for purchase of solar power. Further, the Mission document states that the solar power purchase obligation for States may start with 0.25% in Phase I (by 2013) and go up to 3% by 2022. This could be complemented by solar-specific Renewable Energy Certificate (REC) mechanism to allow utilities and solar power generation companies to buy and sell certificates to meet their solar power purchase obligations.

1.5 GERC Multi Year Tariff Regulations, 2011

The Multi Year Tariff Regulations (MYT), 2011 was notified by Gujarat Electricity Regulatory Commission (GERC) for the control period from FY 2010-11 to FY 2015-16 that extended to the whole of the state of Gujarat. The objective of MYT was:

- Provide regulatory certainty to the utilities, investors and consumers.
- Address the risk sharing mechanism between utilities and consumers based on controllable and uncontrollable factors.
- Ensure financial viability of the sector to attract investment, ensure growth and safeguard the interest of the consumers.
- Review operational norms for generation, transmission, distribution and supply.
- Promote operational efficiency and through its improvement in long term rationalize tariffs.

1.6 GERC Solar Tariff Order, 2012

Gujarat Electricity Regulatory Commission (GERC), in its Order No. 1 of 2012 dated January 27, 2012 determined the tariff for procurement of power by the Distribution Licensees and others from solar energy projects for the state of Gujarat. In fact, GERC was the first SERC in the country to issue a comprehensive Tariff Order on solar energy being Order No. 2 of 2010 dated January 29, 2010.

The said Order was challenged by Solar Energy Society of India (SESI) by filing appeal No. 75 of 2012 before Hon'ble Appellate Tribunal for Electricity (APTEL). Hon'ble APTEL passed an Order dated April 17, 2013 in the said appeal and remanded 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 issued a Corrigendum to it by Order dated July 11, 2014. In the said Order/ Corrigendum GERC unveiled tariffs as listed in the table below:

Table: Solar Tariffs as per GERC Order July 11, 2014.

Period	January 29, 2012 to March 31, 2013	April 1, 2013 to March 31, 2014	April 1, 2014 to March 31, 2015
For megawatt-scale photovoltaic projects availing accelerated depreciation			
Levelized Tariff for 25 years	INR 9.70 per kWh	INR 9.02 per kWh	INR 8.39 per kWh
For first 12 years	INR 10.52 per kWh	INR 9.64 per kWh	INR 8.82 per kWh
For subsequent 13 years	INR 7.00 per kWh	INR 7.00 per kWh	INR 7.00 per kWh
For megawatt-scale photovoltaic projects not availing accelerated depreciation			
Levelized Tariff for 25 years	INR 10.92 per kWh	INR 10.15 per kWh	INR 9.44 per kWh
For first 12 years	INR 11.97 per kWh	INR 10.96 per kWh	INR 10.03 per kWh
For subsequent 13 years	INR 7.50 per kWh	INR 7.50 per kWh	INR 7.50 per kWh
For kilowatt-scale photovoltaic projects availing accelerated depreciation			
Levelized Tariff for 25 years	INR 11.64 per kWh	INR 10.82 per kWh	INR 10.07 per kWh
For kilowatt-scale photovoltaic projects not availing accelerated depreciation			
Levelized Tariff for 25 years	INR 13.10 per kWh	INR 12.18 per kWh	INR 11.33 per kWh
Levelized Tariff for Solar Thermal Projects availing accelerated depreciation			
With accelerated depreciation benefit		INR 11.83 per kWh for 25 years	
Levelized Tariff for Solar Thermal Projects not availing accelerated depreciation			
Without accelerated depreciation benefit		INR 13.23 per kWh for 25 years	

1.7 GERC Renewable Purchase Obligation

GERC, vide Notification No. 3 of 2010, dated 17th April, 2010 specified the Renewable Purchase Obligation (RPO) for the period 2010-11 to 2012-13, as under:

Table: Renewable Purchase Obligation for Gujarat, 2010-2013.

Minimum quantum of purchase from renewable energy sources (% of total energy in kWh)				
Year	**Total**	**Wind**	**Solar**	**Biomass, Bagasse and others**
2010-11	5%	4.5%	0.25%	0.25%
2011-12	6%	5.0%	0.50%	0.50%
2012-13	7%	5.5%	1.00%	0.50%

Further, the Commission, vide its order dated 16.01.2015, in the suo-motu Petition No. 1442/2014 specified the RPOs for the subsequent year (2013-14 to 2016-17) as under:

Table: Renewable Purchase Obligation for Gujarat, 2013-2017

Minimum quantum of purchase from renewable energy sources (% of total energy in kWh)				
Year	**Total**	**Wind**	**Solar**	**Biomass, Bagasse and others**
2013 – 14	7%	5.5%	1.0%	0.5%
2014 – 15	8%	6.25%	1.25%	0.5%
2015 – 16	9%	7.0%	1.5%	0.5%
2016 – 17	10%	7.75%	1.75%	0.5%

This RPO applies to:

- Distribution Licensees, and
- Any other Captive and Open-Access Users consuming electricity (i) generated from conventional Captive Generating Plant having capacity of 5 MW and above for his own use and/ or (ii) procured from conventional generation through open access and third-party sale.

Further, this regulation recognizes the REC issued within the scope of CERC Notification No. L-1/12/2010-CERC dated January 14, 2010 as the valid instruments for the discharge of the mandatory obligations set out in these Regulations for the obligated entities to purchase electricity from renewable energy sources.

1.8 GERC Discussion Paper on Solar Tariff Determination

GERC prepared and made available a Discussion Paper on Determination of Tariff for Procurement of Power by Distribution Licensee and Others from Solar Energy Projects for the State of Gujarat (the "Discussion Paper") on June2, 2015. This Discussion Paper supports the (Gujarat) Solar Power Policy in the methods of promoting solar energy in order to accelerate the advent of grid parity. This Discussion Paper was hosted on the Commission's website, for inviting comments and suggestions through affidavits. The last date for submission of comments was June 22, 2015. Various comments from stakeholders and corresponding responses by the Commission are indicated in this Tariff Order. The list of entities which have communicated their views is given in Annexure I.

1.9 Public Hearing

A public hearing was held on June 29, 2015 wherein participants expressed their views on the Discussion Paper. Various comments from stakeholders were heard at the hearing, and the corresponding responses by the Commission are indicated in this Tariff Order. The list of participants at the hearing is given in Annexure II.

Now, the Commission determines the tariffs, for the third control period, for procurement of power by Distribution Licensees and others from solar photovoltaic (PV) and concentrated solar thermal (CST) technologies for the State of Gujarat. The tariffs are determined as a single-part, generic and levelized, derived on a cost-plus basis.

2. DETERMINATION OF TARIFF FOR PROCUREMENT OF POWER FROM SOLAR PHOTOVOLTAIC POWER PROJECTS

2.1 Cost of Photovoltaic System

2.1.1 Cost of Photovoltaic Modules

The cost of the photovoltaic modules account for about half the cost of the entire photovoltaic power plant, and hence, have a substantial impact on the resultant Levelized Cost of Electricity (LCOE). However, the photovoltaic module prices, irrespective of module technology, have been steadily declining owing to research and development, industry adaptation and economies of scale. The module prices have declined by more than half over the last decade. Moreover, the price for modules varies depending on the country of origin.

Recent trends for PV module prices obtained from domestic and international suppliers of various technologies have indicated a price range of INR 30-45 per watt. Further, the Commission had proposed an additional capital cost of INR 50 lakh/MW for domestically manufactured modules using imported cells and INR 100 lakh/MW for domestically manufactured modules using domestically manufactured cells with the intention of promoting domestic manufacturing.

Suggestions of the Objectors

Various projects developers have submitted upward revisions to the cost of photovoltaic modules. One particular Developer suggested that module prices must be clearly specified as the DC watt peak price. It was suggested that in actual field condition and on AC basis, the price will be around 20% higher as there are thermal deration plus several other losses. Also it has been suggested that the proposed module cost for imported modules is in the range of INR37-40 per Watt. It is submitted that the recent trend suggest that while there was a decreasing trend in the module cost from January 2014 to December 2014 whereas the trend has reversed thereafter and there is an increasing trend in the module cost. Comments were also received onthe standard conversion rate of Euro to Rupees. One developer in particular suggested a futuristic exchange rate in order to consider volatility in exchange rate over the course of this Tariff Order. It was also suggested by several Stakeholders to do away with different capital cost for domestically manufactured modules and cells since the resulting

tariff of this would lead to challenges in verification and potential disputes between Developers and Purchasers, complicating the entire monitoring process.

Commission's Ruling

The Commission has considered various submissions from stakeholders and has decided to retain the cost of solar photovoltaic modules at INR 3.50 Crore/MW as this number is based on various data points collected from research and on-ground data from recently commissioned solar PV plants in Gujarat.

The Commission however, decides to remove the differential capital cost between imported modules and domestically manufactured cells and/or module keeping in mind the interest of the end Consumer.

2.1.2 Capital Cost of Large Rooftop and Megawatt-Scale Photovoltaic Plant

The current capital cost of a 1 MW photovoltaic power plant consisting of imported poly-crystalline silicon modules, and including land cost, is determined to be INR 6 Crore. Also indicative costs of various components for such plants are shown in the Table below.

The capital cost of large rooftop and megawatt-scale photovoltaic power plants is determined taking a standard plant size of 1 MW. The cost is determined based on independent surveys of components, and feedback from private Developers, Engineering Procurement & Commission (EPC) Contractors and Government Agencies. While the costs of individual heads indicated in the Table below may vary slightly from case to case, no major deviation in the total (capital) cost of such plants is observed. Along with imported modules the cost of locally manufactured modules (where the cells are imported) and modules in which both the cells and modules are manufactured locally is considered. The inverter replacement cost has also been included in the capital cost itself.

Hence, the capital cost per megawatt for a large rooftop and megawatt-scale photovoltaic power plant considering imported poly-silicon modules is taken as INR 6.0 Crore.

Table: Typical cost heads per MW of ground-mounted grid-connected PV power plant as per the Discussion Paper.

Sr. No.	Head	Cost (INR Cr.)
1	Photovoltaic Modules	3.50
2	Inverters	0.30
3	Module Mounting Structures	0.50
4	Land, Building and Civil Works	0.40
5	Evacuation Switchyard	0.30
6	Cables and Electrical Accessories	0.50
7	Engineering and Project Management	0.20
8	Contingency	0.30
9	**TOTAL**	**6.00**
Capital Cost Per Megawatt (Imported Modules): INR 6.00 Crore		
Capital Cost Per Megawatt (Domestic Modules, Imported Cells): INR 6.50 Crore		
Capital Cost Per Megawatt (Domestic Cells And Modules): INR 7.00 Crore		

Suggestions of the Objectors

Several Stakeholders have submitted their comments under the main categories of:

1) Cost for modules
2) Cost for inverters
3) Land, building and civil works cost
4) Evacuation costs

For the land, building and civil works cost one of the Developers suggested keeping the costs similar to the one considered by Hon'ble CERC. Many Developers suggested that the price points are on the lower side and should be between INR 125 Lakhs/ MW. Also, one of the Developers suggested that the land cost should be considered INR 105 Lakhs/ MW as per the charges by GPCL in Charanka Solar Park. In addition the cost for civil works should over and above this cost.

It was also suggested that the inverter replacement cost was not considered since most inverters have a lifetime of 12-13 years. It was also suggested to keep the pricing in line with

prices indicated by Hon'ble CERC at INR 45 Lakhs/ MW including the replacement cost. Some of the Developers also suggested to consider INR 65 Lakhs/ MW for inverter considering the global inverter prices.

The Discussion Paper suggests that the evacuation responsibility lies with GETCO. It has been suggested by a Distribution Company that the evacuation should be the responsibility of Developers since this would optimize site selection and reduce any arbitration issues that might arise due to right of way challenges. A reference of JNNSM was given where under both Phase I and Phase II, the work of laying the transmission line up to the STU substation is in the scope of the Solar Developer.

It has been suggested by one of the Developers to include the financing charges and IDC of 1% and 5% respectively, of the capital cost in line with the Hon'ble CERC.

Commission's Ruling

The Commission has taken into account various comments by different stakeholders and has arrived at the following costing per MW.

Table: Typical cost heads per MW of large rooftop and megawatt scale PV power plant as considered in this Tariff Order.

Sr. No.	Head	Cost (INR Cr.)
1	Photovoltaic Modules	3.50
2	Inverters	0.30
3	Module Mounting Structures	0.50
4	Land, Building and Civil Works	0.40
5	Evacuation Switchyard	0.30
6	Cables and Electrical Accessories	0.50
7	Evacuation Infrastructure	0.15
8	Engineering and Project Management	0.20
9	Contingency	0.30
10	**TOTAL**	**6.15**
Capital Cost Per Megawatt: INR 6.15 Crore		

Most importantly, the Commission has decided that the responsibility of laying the transmission infrastructure to the nearest STU substation will lie with the Developer, similar to the central solar policy under the JNNSM. Accordingly, an additional cost of INR 0.15 Crore/MW is now considered under the head of Evacuation Infrastructure.

2.1.3 Capital Cost of Kilowatt-Scale Photovoltaic Plant

One of the major differences affecting the normalized cost of kilowatt-scale photovoltaic power plants compared to megawatt-scale plants is the cost of inverters and other equipment and accessories which are found to be on the higher side as indicated in Table below.

Table: Typical cost heads per kW rooftop grid-connected PV power plant as per the Discussion Paper.

Sr. No.	Head	Cost (INR '000)
1	Photovoltaic Modules	35.00
2	Inverters	13.60
3	Module Mounting Structures	11.40
4	Building and Civil Works	7.00
5	Isolation Transformer	4.00
6	Wires and Electrical	1.00
7	Engineering and Project Management	3.00
8	Contingency	5.00
9	**TOTAL**	80.00
Capital Cost Per Kilowatt (Imported Modules): INR 80,000/-		
Capital Cost Per Kilowatt (Domestic Modules): INR 85,000/-		
Capital Cost Per Kilowatt (Domestic Modules And Cells): INR 90,000/-		

Commission's Ruling

There were no objections or suggestions against the proposed costs for a kilowatt-Scale photovoltaic plant. However separate categories for locally manufactured cells and/or

modules have been eliminated similar to the previous Section (2.1.2), and the Commission decides to retain the capital cost as under:

Table: Typical cost heads per kW rooftop grid-connected PV power plant as considered in this Tariff Order.

Sr. No.	Head	Cost (INR '000)
1	Photovoltaic Modules	35.00
2	Inverters	13.60
3	Module Mounting Structures	11.40
4	Building and Civil Works	7.00
5	Isolation Transformer	4.00
6	Wires and Electrical	1.00
7	Engineering and Project Management	3.00
8	Contingency	5.00
9	**TOTAL**	80.00
Capital Cost Per Kilowatt (Imported Modules): INR 80,000/-		

2.1.4 Evacuation Cost

The Solar Power Policy, 2009 of the Government of Gujarat provides that the transmission line from the switchyard of the substation of the megawatt-scale solar power plant to the Gujarat Energy Transmission Corporation Ltd. (GETCO) substation shall be laid by GETCO.

For smaller photovoltaic systems such as rooftop systems that are connected to the distribution grid at 11kV or below, the infrastructure typically exists as the Solar Power Generator is also the Consumer of the Distribution Company. However, in case the existing infrastructure is not sufficient for evacuation of solar power, such infrastructure should be developed or upgraded by the relevant Distribution Company.

Hence, evacuation cost is not considered for calculation of solar tariff in the Discussion Paper.

Suggestions of the Objectors

Some Developers appreciated the Hon'ble Commission's proposition that GETCO be responsible for the construction of the transmission line from the project switchyard till the evacuation point of the Transmission Utility's switchyard. However, the construction of the said transmission line by only GETCO involves substantial time period and could hamper the timelines of the project. Hence, it was requested to provide an option to the solar project Developers to construct the transmission line on its own, with reimbursement of the actual evacuation cost by GETCO, which would help in expeditious development of the solar power project.

GETCO made a submission that the responsibility of constructing the transmission line until the nearest GETCO substation should lie with the Developer. This would ensure faster project execution and optimize site selection so that the project is closer to an existing substation.

It was also suggested that the evacuation cost should also be considered for solar rooftop projects that are connected to the distribution grid at 11 kV or below.

Commission's Ruling

The Commission decides that the responsibility of constructing the transmission line shall lie with the Developer. The Commission has accordingly kept a provision for this in the Capital Cost for MW scale projects as indicated in the Table in Section 2.1.2.

2.1.5 Operation and Maintenance Cost and its Escalation

Photovoltaic power plants are characterized by their simple and low-cost operation and maintenance (O&M). The operation and maintenance of a photovoltaic power plant mainly involves cleaning of the photovoltaic modules at a regular interval. The cleaning frequency of the modules of a commercial plant may be as high as once per week or as low as once per month.

In addition to cleaning staff, the photovoltaic power plants typically require security staff and site supervisors. Performance monitoring of such plants are typically done remotely, and an engineer is deployed onsite only during troubleshooting of issues or preventive maintenance.

Earlier CERC and GERC tariff orders considered the operation and maintenance cost of 0.5% of the plant capital cost. However, the capital costs of the solar power plant equipment

(especially the modules and inverters) have substantially reduced, while the labor cost involved in the operation and maintenance has witnessed escalation.

Hence, for the near term, the typical operation and maintenance cost of photovoltaic power plants is considered to be INR 10.75 lakh/MW/annum. This number has been arrived considering Honorable APTELs direction vide Judgment dated April 17, 2013 in Appeal No. 75 of 2012. Accordingly Honorable GERC passed Order No.1 of 2012 dated July 7, 2012 where the Commission determined the O&M to be fixed at INR 9.10 lakh/MW/annum escalating at 5.72% annually. Considering this as the cost for 2012-2013 and subsequently escalating this by 5.72% for the years 2013-14, 2014-15 and 2015-16 the Commission has arrived at the figure of INR 10.75 lakh/MW/annum.

Further, as most of this cost is human resource-related, the annual escalation of the operation and maintenance cost is considered to be 5.72% annually.

Suggestions of the Objectors

One of the Developers remarked that under the Finance Act, 2015 the service tax has been increased to 14.00%. Since O&M is a service on which service tax is applicable, the Commission needs to increase the O&M price. Accordingly, it was requested to replace the service tax rate from 12.36% to 14.00% resulting in an increase in the O&M cost.

Some of the Developers suggested that annual escalation rate as considered for escalating Normative Operation & maintenance Expenses for Coal, Gas and Lignite based thermal power stations at 6.30% in the CERC (Terms and Conditions of Tariff) Regulations,2014.

Commission's Ruling

The Commission takes into account that the service tax has been increased to 14.00% under the Finance Act 2015 and accordingly the O&M cost of a photovoltaic power plant is working out to INR 10.90 lakh/MW/annum escalated annually at 5.72%.

2.2 Performance Parameters of the Photovoltaic System

The energy output of a photovoltaic power plant primarily depends on two parameters:

- Plant Performance Parameters
- Weather Parameters

2.2.1 Plant Capacity

The capacity of a solar photovoltaic power plant can be defined as the cumulative rated capacity of the photovoltaic modules at Standard Testing Conditions (STC) used in that power plant. Further, as it may not be practical to achieve the exactly desired plant capacity due to design constraints, a tolerance of ±2% is allowed.

Additionally, during the supply of photovoltaic modules, the actual power output of the module at STC may be different from the rated module power due to the nature of its manufacturing. The net allowable module tolerance between the module rating and actual performance in a photovoltaic power plant is considered at ±3%.

Suggestions of the Objectors

It is suggested that the allowable limits of tolerance may be decided by the power purchaser and Developer on case-to-case basis but in no case it should be more than 3% or 150 kW whichever is lower.

For PV modules, it was suggested to consider AC rating instead of DC rating and was also suggested to consider atleast 10-20% higher DC capacity per1MW AC solar plant in order to optimize output of the inverter.

It was also suggested that the size of rooftop systems be limited to the sanctioned demand. This is to ensure that all rooftop systems cater to their self-use and not to encourage over sizing the systems for commercial purposes.

Commission's Ruling

The Commission notes the comments of the stakeholders but does not find any merit to change the parameters suggested in the Discussion Paper. In case of inverter sizing and plant design, this is left entirely upto the developer as long he can fulfill the obligations under the PPA. The Commission therefore decides to retain the definition of the capacity of the solar plant as the cumulated rated capacity of the photovoltaic modules at Standard Testing Conditions (STC). Moreover a tolerance of ±3% is retained due to design and module constraints.

The Commission also decides to limit the size of all rooftop systems below 100kW to the consumer's /building's connected load or sanctioned demand, whichever is applicable.

2.2.2 Performance Ratio

The plant performance parameters are collectively represented through a single value known as the Plant Performance Ratio (PR). This performance ratio is a measure of the quality of a photovoltaic plant that is independent of the location and incident irradiation, and hence, often known as the 'Quality Factor.'

The performance ratio is expressed as a percentage value and indicates the fraction of nominal incident solar radiation energy incident on a plant array that is converted into useful electrical energy injected into the grid. The performance ratio takes into account energy losses within a photovoltaic power plant such as thermal losses, module mismatch losses, Ohmic (resistive) losses, inverter losses, soiling losses, etc. The procedure for determining the performance ratio of a photovoltaic power plant is prescribed in the Standard IEC 61724: Photovoltaic System Performance Monitoring: Guidelines for Measurement, Data Exchange and Analysis.

Based on independent surveys, analysis and feedback from private Developers, EPC contractors and government agencies it is determined that typical photovoltaic plants in Gujarat and India have recorded or quoted performance ratios between 70% and 80%, while 75% is an acceptable industry standard.

Table: Typical losses affecting the performance ratio of a photovoltaic power plant.

Loss Mechanism	Loss
Loss due to temperature	13%
Loss due to inverter efficiency	3%
PV module mismatch loss	2%
DC and AC wiring ohmic (resistive) losses	2%
Soiling loss	3%
Transformer loss	1%
Other losses	1%
TOTAL LOSS	25%
NET PERFORMANCE RATIO	75%

2.2.3 Irradiance Data

As solar radiation is the primary source for the photovoltaic power plant, it is obvious that the energy output of the plant will be site specific; similar plants installed at different geographical locations will yield different energy outputs.

Gujarat is an attractive state for installation of solar energy systems due to the high levels of solar radiation that it receives. While irradiation and other weather data are available from the India Meteorological Department (IMD) and National Aeronautics and Space Administration (NASA) based on a limited number of observatories, many other private services are now available that claim to provide more site-specific and accurate weather data by interpolating existing long-term data with short-term measured data and advanced modeling.

2.2.4 Capacity Utilization Factor

The electrical energy output of a photovoltaic power plant can be calculated using the performance ratio and the global irradiance on the plane of the photovoltaic arrays, which are oriented at an optimum tilt angle. Further, the Capacity Utilization Factor (CUF) can be calculated based on the energy output of the plant. In Gujarat, well-established solar generating plants are at Charanka and referring to the generation data of Charanka solar plants presented by Gujarat State Load Dispatch Centre (SLDC) and considering the average CUF of all solar PV generating plants, the CUF of Gujarat is considered 19%in the Discussion Paper for the purpose of determination of tariff.

Suggestions of the Objectors

It is requested by the Developers to clarify whether CUF is on AC or DC basis. It is also suggested that SLDC data is export energy at feeder level that is after auxiliary consumption. Hon'ble CERC has also determined the solar PV tariff considering average CUF for the country at 19%. Since, Gujarat has higher number of sunny days, also the modules and project components having higher efficiency are also available, therefore, CUF for solar PV project is requested to be considered atleast 20% on net basis (that is after auxiliary consumption).

One of the Developers requested to consider a different CUF for rooftop projects due to various losses such as shading losses.

Some of the Developers considering the GHI data suggested that the CUF should be reduced to 18%.

Commission's Ruling

The Commission has noted comments of various stakeholders and decides that the CUF be retained at 19% to be calculated on the gross AC energy generated by the solar plant.

2.2.5 Annual Degradation in Performance

A performance warranty for 25 years on photovoltaic modules is an industry standard today. Typical warranties guarantee a performance of more than 90% for the first 10 years, and a performance of more than 80% for the next 15 years, adding to a total of 25 years. This implies an annual degradation rate of 0.9% for the photovoltaic modules.

Looking at some studies done based on long-term performance of modules in the climatic conditions of India; the Commission considers the degradation to be 1% per annum over the lifetime of the solar power plants.

No substantial degradation is expected in the performance of the balance of system.

Hence, the acceptable annual degradation in the performance of the grid-connected photovoltaic system is 1%

Suggestions of the Objectors

It is suggested that the efficiency and quality of modules and cells have been increasing and therefore the degradation should not be more than 0.5% per annum. Moreover, Hon'ble CERC has not considered any separate degradation as the impact of degradation in Capital cost.

Commission's Ruling

The Commission decides to retain degradation of 1% given the climatic conditions in India and ground realities based on the experience of several developers in India. Also the Commission has factored the annual degradation in the computation of the levelized tariff.

2.2.6 Auxiliary Energy Consumption of Photovoltaic Power Plant

A photovoltaic power plant consumes minimal energy for auxiliary purposes. Auxiliary power may be required for air-conditioning in inverter and control rooms, cleaning water softening and pumping system, security night lighting and general office lights and fans.

The auxiliary consumption of the mega-watt scale photovoltaic power plant can be estimated at 0.25% of the total energy generation and that of kilo-watt scale photovoltaic plant is estimated to be NIL.

Suggestions of the Objectors

It was brought to the notice by some developers that according to the published data by SLDC the auxiliary consumption is around 0.90% of the total energy generation during FY 2014-15, FY 2013-14 and FY 2012-13. Also, the auxiliary consumption remains constant or increase due to the aging of the equipment annually over the useful life of the project. Hence, it was requested to consider the auxiliary consumption as 1% of the total energy generation during the first year of operation and the absolute kWh derived for the first year of operation shall be kept constant (in terms of absolute kWh) throughout the useful life of the Project.

One Developer in particular suggested that even rooftop systems on a kW scale basis have auxiliary consumption and this must be considered in the computation of the levelized tariff.

Commission's Ruling

The Commission has taken into account various objections with regard to auxiliary consumption and has decided to retain the auxiliary consumption at 0.25% of the total energy generated for MW-scale PV plants, while the same for kW-scale plants is considered nil.

2.2.7 Useful Life

The standard warranty of photovoltaic modules, which account for more than half of the cost of the entire plant, is for a period of 25 year. However, the photovoltaic power plant including the modules is expected to last substantially beyond this period.

GERC, in its current Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has stipulated a solar power plant life of 25 years. Further, CERC in Clause 2 (1) (a) of its Renewable Energy Regulation No L-1/94/CERC/2011 dated February 6, 2012 also defines the useful life of solar photovoltaic or a solar thermal power plant as 25 years.

Hence, the useful life of solar photovoltaic projects is taken as 25 years for calculation of the tariff.

2.3 Finance – Related Parameters of the Photovoltaic Power Plant

2.3.1 Debt-Equity Ratio

The GERC MYT Regulations, 2011, notified by the Commission provides a normative debt-equity ratio of 70:30 for Generating Companies/ Licensees. Further, Clause 5.3 (b) of the Tariff Policy, 2006, notified by the Ministry of Power, GOI, stipulates a debt-equity ratio of

70:30 for financing of power projects. Further, the GERC, in its current Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has stipulated the same debt-equity ratio.

Hence, the debt-equity ratio of 70:30 is considered for financing.

Suggestions of the Objectors

Some stakeholders have suggested that some solar projects have been set up with equity of 20% as the higher debt entail. Hence, Debt: Equity ratio should be considered 80:20 instead of 70:30.

Commission's Ruling

The Commission notes that most infrastructure projects in India are leveraged in the ratio of Debt: Equity of 70:30. While the Commission does not rule out that there have been some projects that have secured debt of greater than 70%, it is usually because of the financial capability of the promoter and the comfort of the lender, this is more an exception rather than the norm. Also as per Section 34 of the Multi Year Tariff (MYT) Regulations, 2011, the debt to equity ratio has been already considered at 70:30. Hence the Commission decides to retain this.

2.3.2 Loan Tenure

The GERC MYT Regulation, 2011, notified by the Commission provides for a loan tenure of 10 years. Further, GERC in its last Solar Tariff Order has stipulated the same loan tenure.

Hence, loan tenure of 10 years is considered.

2.3.3 Interest Rate on Loan

The interest rates have increased substantially in the Indian financial market due to the continuously rising inflation rate. While there is adequate data to show that inflation is falling largely supported due to falling price of crude oil, inflation still remains a concern. This is reflected in the interest rates of all major banks in India. While all banks have their own base rates, project financing interest rates are typically indicated by their relation with the State Bank of India (SBI) base rate. A reasonably sound project usually gets funding at rate 100 to 300 basis points above the base rate.

While the Reserve Bank of India (RBI) has already cut repo rate (the rate at which RBI lends to banks) and likely to do so in line with falling inflation, there seems to be no reason to

expect a significant reduction in interest rates. This is partly because India's growth cycle is on the upward trend and inflation is strongly correlated to growth. In the current scenario, the base rate of SBI is 9.85%. A reasonable mark-up of 300 basis points on this base rate would result in an effective interest rate of 12.85%, which could be used for tariff determination purpose in this document. The Hon'ble GERC has used the same methodology to determine the interest rate in its Order No. 2 of 2012, "In the matter of: Determination of Tariff for procurement of Power by the Distribution Licensee and Others from Wind Power Projects" and Order No. 4 of 2013,"In the matter of Determination of Tariff for Procurement of Power by the Distribution Licensees and Others from Biomass based Power Projects and Bagasse based Co-generation Projects".

Hence, the interest rate on loan for tariff computation is determined to be 12.85 %.

Suggestions of the Objectors

It is suggested that pursuant to the relaxation in REPO rate by RBI, the SBI has downward revised the Base Rate at 9.70%. Further, RBI has also indicated for relaxation in monetary policy indices in the near future which will result into further reduction in the financial cost. Hence, the rate of interest should be reduced to 11.70%.

Commission's Ruling

The Commission accepts the comments of the stakeholder and has factored in the decrease in the REPO rate by the RBI as per this tariff order. Accordingly, the interest rate is now 9.70% plus 300 bps which results in the interest rate of 12.70%.

This methodology is in line with Order No. 2 of 2012, "In the matter of Determination of Tariff for procurement of Power by the Distribution Licensee and Others from Wind Power Projects" and Order No. 4 of 2013,"In the matter of Determination of Tariff for Procurement of Power by the Distribution Licensees and Others from Biomass based Power Projects and Bagasse based Co-generation Projects".

2.3.4 Insurance Cost

Insurance cost at the rate of 0.35% of the capital cost is considered annually. This insurance cost is as per GERC's last Solar Tariff Order, and is considered over and above the operation and maintenance cost.

Suggestions of the Objectors

It is brought into consideration by some Distribution Companies that insurance cost mentioned in the Discussion Paper is on the higher side. More specifically, the insurance companies seem to be considering a high rate of reduction in the asset value for the subsequent years due to depreciation. It is suggested that the Hon'ble Commission may consider the insurance cost as a part of O&M cost in line with the provisions in Order of Hon'ble CERC.

It was also suggested that due to the effect of increase in service tax from 10.30% to 14.00% the insurance rate should be considered 0.36% of the capital cost.

Commission's Ruling

The Commission has examined the comments by the stakeholders and has decided to retain the insurance cost at 0.35% of the capital cost since the increase due to service tax increase (14%) is negligible.

2.3.5 Working Capital

GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered the following to be included as working capital, which is also considered here:

- One month's expense on operation and maintenance expenses, and
- Receivables equivalent to one month's energy charges for sale of electricity calculated on a normative CUF.

Suggestions of the Objectors

It was suggested by one of the Developers that the time period to realize the revenue for a month of generation varies from 50 days (from the end of month of generation) to 80 days (from the start of month of generation). Accordingly the developer requests an increase in the working capital requirements.

Some of the Developers suggested that to avoid any discrimination between solar and other technologies, the terms for working capital should be considered (i) O&M expenses for one month (ii) One month receivables (iii) @1% of capital cost escalated @6% per annum as per MYT Regulations. Alternatively, it was suggested to adopt the Working Capital allowed by Hon'ble CERC for Solar projects i.e. (i) O&M expenses for one month (ii) receivables

equivalent to two months of the energy charges and (iii) Maintenance spare @ 15% of O&M expenses.

Commission's Ruling

The Commission has considered one month's receivable for energy charges for the working capital considering the prompt payments made by Distribution Companies in Gujarat and delay penalties for payment included in the PPA. Moreover, the cost related to operation and maintenance is already covered through other provisions for tariff determination.

Hence, the Commission shall retain the working capital as the sum of (i) one month's expense on operation and maintenance expenses, and (ii) receivables equivalent to one month's energy charges for sale of electricity calculated on a normative CUF.

2.3.6 Interest Rate on Working Capital

Interest rates on working capital are found to be lower than long-term interest rates for power project over the last ten years. This gap between the long-term loan and working capital loan rate is typically between 150 and 250 basis points. The working capital is decided based on different parameters, and hence, interest rate on working capital was proposed at 12.00% in the Discussion Paper.

Suggestions of the Objectors

As suggested in Interest Rate on Loan and looking at the prevailing SBI base rate pursuant to the monetary policy review undertaken by RBI, the interest rate for working capital was suggested at 11% instead of 12%.

Commission's Ruling

The SBI has revised the base rate to 9.7% since the Discussion Paper was floated, which results in reduction of Base Rate by 0.15%. Accordingly, the Commission revises the Interest on Working Capital from 12.00% proposed in the discussion paper to 11.85%.

2.3.7 Discount Rate

The Commission had determined the discount rate as in CERC Order in its suo-motu Petition No. SM/004/2015 dated March 3, 2015.

The explanation for determining the discount rate is as under:

Discount Rate is to be used for bid evaluation and Weighted Average Cost of Capital (WACC) has been considered as discount rate.

The WACC has been computed as under:

WACC = Cost of Debt + Cost of Equity

Where, Cost of Debt=0.70 x (Market Rate of Interest) x (1- Corporate Tax Rate)

Cost of Equity= 0.30 x Return on Equity

Discount Rate has been computed using following table:

Table: Discount rate calculating parameters.

Components of Debt/Equity	Assumptions (%)
Debt	70
Equity	30
Corporate Tax Rate (CTR) from 11th year until 25th **year**	33.99
Market Rate of Interest (MR)	12.85
Return on Equity	14

The WACC computed as per the above formula i.e. 10.138% has been notified as discount rate for solar tariff determination.

Suggestions of the Objectors

It has been suggested by the developers that the power plant will be in MAT for the first 10 years and subsequently at CTR for the next fifteen years. Hence, MAT should be used rather than CTR for computation of WACC.

It was brought into the consideration by one of the developers that considering weighted average tax rather than tax rate over the useful life of project works out to 10.61% instead of 10.138%.

Commission's Ruling

The Commission decides to compute WACC based on the MAT for the first 10 years and the CTR for the next 15 years. Accordingly the WACC over the lifetime of the project works out to be 10.647%.

The WACC has been computed as under:

WACC = Cost of Debt + Cost of Equity

Where, Cost of Debt (For first 10 Years) =0.70 x (Market Rate of Interest) x (1- MAT)

Cost of Debt (From 11th Year until 25th Year) =0.70 x (Market Rate of Interest) x (1-CTR)

Cost of Equity = 0.30 x Return on Equity

Resulting WACC = $\frac{\text{WACC (For first 10 Years)} * 10 + \text{WACC (From 11th year until 25th Year)} * 15}{10 + 15}$

The Computation of the discount rate is as follows:

Table: Discount rate calculating parameters.

Components of Debt/Equity	Assumptions (%)
Debt	70
Equity	30
Minimum Alternate Tax (MAT) for the first 10 years of the project	20.008
Corporate Tax Rate (CTR) from 11th year until 25th **year**	32.445
Market Rate of Interest (MR)	12.70
Return on Equity	14

Accordingly, the WACC for the first 10 years of the project works out to 11.311% and the WACC for the next 15 years works out to 10.206%. The weighted average of these two periods results in the discount rate of 10.647%. **Therefore the Commission decides to adopt the discount rate of 10.647%.**

2.3.8 Rate of Depreciation

CERC, in Clause 15 of its Renewable Energy Regulation No L-1/94/CERC/2011 dated February 6, 2012 indicates that the value base for purpose of depreciation shall be based on the capital cost of the asset; salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and the period beyond loan tenure over useful life computed on 'Straight Line Method'. Depreciation

shall be chargeable from the first year of commercial operation. Provided that in case of commercial operation of the asset for part of the year the depreciation shall be charged on pro rata basis.

GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered a high rate of depreciation as a promotional measure during the loan tenure, and then the remaining depreciation is spread over the remaining useful life.

Hence, depreciation of 6% per annum is considered for the first 10 years, and 2% for the next 15 years.

2.3.9 Return on Equity (RoE)

The GERC MYT Regulation, 2011, notified by the Commission provides norms for the Return on Equity as 14% per annum. GERC has also allowed Income Tax at 20.008% (18.5% MAT + 5% Surcharge + 3% Education Cess) per annum for 10 years, and Corporate Tax at 33.99% per annum from 11th year onwards. Any further enhancement in the Return on Equity will burden the consumers. (Ref. MYT)

This was challenged vide Appeal No.75 of 2012 dated 17th April 2013 before the Hon'ble APTEL, in the matter of SESI versus GERC and Gujarat Urja Vikas Nigam Ltd. (GUVNL). Accordingly, Hon'ble GERC in its Order No.1 of 2012 dated 07.07.2014 and subsequent corrigendum dated July 11, 2014, determined that solar project developers are "eligible for ROE available 14% post-tax with grossing up of Income Tax" (clause 12.3).

Hence, the return on equity considered is 14% post tax and grossed up.

Suggestions of the Objectors

It is suggested by some of the distribution companies that Government of India has announced roadmap for rationalization of Corporate Tax in next 4 years. Therefore, it will not be appropriate to consider the Corporate Tax @ 33.99% after 11th year. Hon'ble Commission may consider the effect of year on year tax reduction road map indicated by Government of India. Moreover, tariff regulations of Hon'ble Commission as referred in the Discussion Paper provides for reimbursement of tax on actual basis without any provision related to grossing up. Hon'ble Commission may consider the reimbursement of tax on actual basis with the ceiling limit as per the provision of tariff Regulation of Hon'ble Commission.

It was also suggested that considering the prevailing surcharge rate applicable on the base tax rate has been increased to 12% instead of 5%. Accordingly, the minimum alternate tax rate works out to 21.3416% and the corporate rate works out to 34.608%.

It was also requested to consider ROE on pre-tax basis in line with CERC RE Tariff Regulations and norms stipulated by various other SERCs RE Regulations.

Some Developers also suggested to consider ROE 16% post tax considering the Hon'ble CERC and different SERCs RE Regulations.

Some Developers also suggested that for the sake of uniformity the surcharge may be kept at 10% for both MAT and Corporate Tax, which increases the MAT from 20.008% to 20.961% and Corporate Tax as 33.99%.

Commission's Ruling

The Commission has noted the comments of various stakeholders and has decided to retain the Return on Equity at 14% as per the GERC MYT Regulation, 2011.

According to the new Finance Act, 2015 the Commission accordingly decides the Minimum Alternate Tax to 20.008% and the Corporate Tax Rate to 32.445%.

2.4 Tariff for Photovoltaic Systems

2.4.1 System Classification

Based on the basic differences between implementation of megawatt-scale ground-mounted photovoltaic systems, and kilowatt-scale rooftop photovoltaic systems, all photovoltaic systems can be categorized basically into two types (kilowatt scale and megawatt scale) for tariff applicability:

Table: Photovoltaic system classification for tariff applicability.

System Size	System Type	Evacuation Specification	Applicable Tariff
1 kW – 6 kW	Rooftop	230 V, 1-ph, 50 Hz	Kilowatt-scale Photovoltaic Tariff
6 kW – 100 kW	Rooftop	415 V, 3-ph, 50 Hz	
100 kW – 1 MW	Rooftop/ Ground-mounted	11 kV, 3-ph, 50 Hz	Megawatt-scale Photovoltaic Tariff
1 MW – 4 MW	Ground-mounted	11 kV, 3-ph, 50 Hz	
> 4MW	Ground-mounted	66 kV, 3-ph, 50 Hz	

Suggestions of the Objectors:

It was suggested by some of the developers that the 100kW – 1MW should be considered as kilowatt scale photovoltaic projects instead of megawatt scale photovoltaic projects as in the last Order. The tariff applicable to rooftop should be considered for 100kW – 1MW.

Commission's Ruling

The Commission notes this suggestion and accordingly modifies the system classification as follows.

Table: Photovoltaic system classification for tariff applicability.

System Size	System Type	Evacuation Specification	Applicable Tariff
From 1 kW up to 6 kW	Rooftop	230 V, 1-ph, 50 Hz	Kilowatt-scale Photovoltaic Tariff
More than 6 kW – up to 100kW	Rooftop	415 V, 3-ph, 50 Hz	
More than 100 kW up to 1MW	Rooftop/ Ground-mounted	11 kV, 3-ph, 50 Hz	Large Rooftop and Megawatt-scale Photovoltaic Tariff
More than 1 MW up to4 MW	Ground-mounted	11 kV, 3-ph, 50 Hz	
Greater than 4MW	Ground-mounted	66 kV, 3-ph, 50 Hz	

2.4.2 Levelized Tariff

The tariff is determined based on various parameters considered by the Commission.

Suggestions of the Objectors:

It was requested to consider the two sub-period's tariff as it helps the solar project Developers in the repayment of the term loan over the tenure of the loan.

The Distribution Companies suggested that the differential tariff due to different categories of modules and cells would lead to dispute between developers and procurers. Moreover, it will be cumbersome to monitor the procurement process of power producer in relation to different kind of modules and cells used for setting up the project for the purpose of applicability of tariff and will lead to disputes and litigations. It will also affect the contractual relationship of

power producer and power procurer. For kilowatt-scale the same approach should be considered.

Commission's Ruling

While the Commission decides to retain a single part tariff system it has decided to remove the concessions to imported modules and/or cells. Resultantly, the summary of various parameters and the tariff works out as follows:

Table: Summary of parameters for photovoltaic power projects

Parameters	Value		
Plant Cost			
Capital Cost	INR	615	Lakhs per MW for large rooftop and megawatt-scale system
	INR	0.80	Lakhs per kW for kilowatt-scale system
O & M Cost	INR	10.90	Lakhs/MW/annum
		0.01	Lakhs/kW/annum
Escalation in O & M Cost		5.72%	Annually
Performance Parameters			
Capacity Utilization Factor		19%	
Performance Degradation		1%	Annually
Auxiliary Consumption		0.25%	of Energy Generation for megawatt scale
		NIL	of Energy Generation for kilowatt scale
Useful Life		25	Years
Financial Parameters			
Debt : Equity Ratio		70 : 30	
Loan Tenure		10	Years
Interest Rate on Loan		12.70%	Annually
Insurance Cost		0.35%	Annually
Interest on Working Capital		11.85%	Annually
Working Capital	Sum of:	1	Month's O&M Expense
		1	Months' Energy Charges at normative CUF
Rate of Depreciation		6%	Annually for the first10 years
		2%	Annually for the next15 years
Minimum Alternate Tax Rate		20.008%	Annually for the first10 years
Corporate Tax Rate		32.445%	Annually from the 11th year until 25th year
Return on Equity		14%	Annually
Discount Rate		10.647%	Annually

Table: Levelized tariff for megawatt-scale and kilowatt-scale photovoltaic systems commissioned between July 1, 2015 and March 31, 2018.

Period	July 1, 2015 to March 31, 2016	April 1, 2016 to March 31, 2017	April 1, 2017 to March 31, 2018
Levelized Tariff for Large Rooftop and Megawatt Scale Power Plant			
Without Accelerated Depreciation Benefit	6.77	6.30	5.86
With Accelerated Depreciation Benefit	6.17	5.74	5.34
Levelized Tariff for Kilowatt Scale Power Plant			
Without Accelerated Depreciation Benefit	8.42	7.83	7.28
With Accelerated Depreciation Benefit	7.64	7.11	6.61

2.4.3 Successive Revisions to Tariff

It is the intention of GERC to support the development of a long-term solar industry in Gujarat taking advantage of its enormous solar energy potential, which would accelerate the reduction in solar energy prices both in Gujarat as well as India. However, it may be inappropriate to commit the solar energy tariffs for the long term in view of the dynamically changing prices of solar energy technologies, and the potential economic burden on Consumers in case of deviation or reduction of actual solar energy prices from currently determined project prices.

The global trends in the photovoltaic industry indicate a continual drop in the price of photovoltaic modules of various technologies, and also a steady drop in the price of photovoltaic inverters. Further, the decrease in costs of photovoltaic systems is ensured through widespread industry learning and economies of scale. The Indian market has seen a steep drop in the cost of solar projects during the past years but the recent trends has shown that the prices have reached the saturation point and hence no revision in the tariffs have been included.

Suggestions of the Objectors

Several Distribution Companies suggested that there is a possibility of further decrease in equipment prices due to the size of India's market due the revised goals of 100 GW under the National Solar Mission. Therefore it was requested to introduce a declining tariff in subsequent years for the next three years in the purview of this Order.

Commissions Ruling

The Commission has decided to include a sliding tariff of 7% per annum for the next three years until the end of this tariff order – that is a 7% reduction in tariff for the period April 2016 to March 2017 and a further reduction of 7% for the period of April 2017 to March 2018 as reflected in the Table for levelized tariff.

3. DETERMINATION OF TARIFF FOR PROCUREMENT OF POWER FROM SOLAR THERMAL POWER PROJECTS

3.1 Cost of Solar Thermal Technology

3.1.1 Capital Cost

The CERC in its suo-motu Petition No SM/005/2015 dated March 3, 2015 determined the normative capital cost for the Solar Thermal power projects as INR 1200 Lakh/MW for the FY 2014-15. GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered a capital cost of INR 1400 Lakh/MW.

Upon reviewing the current state of technology and associated costs, and in order to support the development of solar thermal technology, a capital cost of INR 12 Crore per megawatt is considered.

3.1.2 Evacuation Cost

The Solar Power Policy, 2009 of the Government of Gujarat provides that the transmission line from the switchyard of the sub-station of the megawatt-scale solar power plant to the GETCO substation shall be laid by GETCO. This is further reflected in GERC's last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012.

Hence, evacuation cost is not considered for calculation of solar tariff in the Discussion Paper.

Suggestions of the Objectors

Some Developers appreciated the Hon'ble Commission's proposition that GETCO be responsible for the construction of the transmission line from the project switchyard till the evacuation point of the Transmission utility's switchyard. However, the construction of the said transmission line by only GETCO involves substantial time period and could hamper the timelines of the project. Hence, it was requested to provide an option to the solar project developers to construct the transmission line on its own, with reimbursement of the actual evacuation cost by GETCO, which would help in expeditious development of the solar power project.

GETCO made a submission that the responsibility of constructing the transmission line until the nearest GETCO substation shall lie with the developer. This would ensure faster project execution and optimize site selection so that the project is closer to an existing substation.

Commission's Ruling

The Commission decides that the responsibility of constructing the transmission line shall lie with the Developer and the cost of the same shall be considered within the Capital Cost of the project.

3.1.3 Operation and Maintenance Cost and its Escalation

The operation and maintenance costs of solar thermal power plants are higher than solar photovoltaic power plants. In addition to the cost of operating staff, solar thermal power plants also utilize fuels such as diesel for its auxiliary processes, water for cooling, and heat transfer fluids, which have a limited life.

GERC retains the O&M escalation at 1.5% of capital cost as the capital cost of solar thermal projects has not seen a dramatic decline as compared to solar PV plants. Moreover, there is a paucity of data available in the market with regard to the operations of solar thermal plants to arrive at a number.

Hence, the operation and maintenance cost of solar thermal power plants is considered at 1.5% of the capital cost.

Further, the annual escalation of the operation and maintenance cost is considered to be 5.72%.

3.2 Performance Parameters of Solar Thermal Power Plants

3.2.1 Capacity Utilization Factor

Taking into account the irradiation in the State of Gujarat, a capacity utilization factor of 23% is considered for solar thermal power plants.

3.2.2 Annual Degradation in Performance

Considering the nature of the solar thermal power plants, there are many components which may be subject to degradation. Based on learning's from working solar thermal power plants,

the net degradation due to degradation in the heat transfer fluid, reflector assembly, thermal storage system, power block, etc. is in the range of 0.25-0.5% annually.

Hence, the annual degradation in performance of solar thermal power plants is considered to be 0.25%.

3.2.3 Auxiliary Consumption

GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered an auxiliary consumption of solar thermal power plants at 10%. CERC, in its Order dated March 3, 2015 in suo-motu Petition No. SM/004/2015 of 2015 also considered an auxiliary consumption of 10%.

Hence, the auxiliary consumption of 10% of the generation of solar thermal power plants is considered.

3.2.4 Useful Life

The useful life for solar thermal power plants is estimated between 20 and 25 years based on the technology. Both GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012, and CERC, in its Order dated March 3, 2015 in suo-motu Petition No. SM/004/2015 of 2015 has considered the useful life for solar thermal power plants as 25 years.

Hence, the useful life of solar thermal power plants is considered as 25 years.

3.3 Finance Related Parameters

3.3.1 Debt – Equity Ratio

The GERC MYT Regulation, 2011, notified by the Commission provides a normative debt-equity ratio of 70:30 for Generating Companies/ Licensees. Further, Clause 5.3 (b) of the Tariff Policy, 2006, notified by the Ministry of Power, GOI stipulates a debt – equity ratio of 70:30 for financing of power projects. Further, the GERC, in its current Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has stipulated the same debt-equity ratio.

Hence, the debt-equity ratio of 70:30 is considered for financing.

3.3.2 Loan Tenure

The GERC MYT Regulation, 2011, notified by the Commission provides for loan tenure of 10 years. Further, GERC in its last Solar Tariff Order has stipulated the same loan tenure.

Hence, loan tenure of 10 years is considered.

3.3.3 Interest Rate on Loan

As explained in 'Section 2.3.3 Interest Rate on Loan' due to high volatility in the SBI base rate, the average over one year base rate of 9.85% is further marked up by 300 basis points for consideration as the interest rate on long term loan for solar power projects.

Hence, the interest rate on loan for tariff computation is determined to be 12.85%.

Suggestions of the Objectors:

It is suggested that pursuant to the reduction in REPO rate by RBI, the SBI has downward revised the base rate to 9.70%. Further, RBI has also indicated for relaxation in monetary policy indices in the near future which will result into further reduction in the financial cost. Hence, the rate of interest should be reduced to 11.70%.

Commission's Ruling

The Commission accepts the comments of the stakeholder and has factored in the decrease in the REPO rate by the RBI as per this tariff order. Accordingly, the interest rate is now 9.70% plus 300 bps which results in the interest rate of 12.70%.

This methodology is in line with Order No. 2 of 2012, "In the matter of Determination of Tariff for procurement of Power by the Distribution Licensee and Others from Wind Power Projects" and Order No. 4 of 2013: In the matter of: Determination of Tariff for Procurement of Power by the Distribution Licensees and Others from Biomass based Power Projects and Bagasse based Co-generation Projects"

3.3.4 Insurance Cost

Insurance cost at the rate of 0.35% of the capital cost is considered annually. This insurance cost is as per GERC's last Solar Tariff Order, and is considered over and above the operation and maintenance cost.

Suggestions of the Objectors

It is brought into consideration by some distribution companies that insurance cost mentioned in the Discussion Paper is on the higher side. More specifically, the insurance companies seem to be considering a high rate of reduction in the asset value for the subsequent years due to depreciation. It is suggested that the Hon'ble Commission may consider the insurance cost as a part of O&M cost in line with the provisions in Order of Hon'ble CERC.

It was also suggested that due to the effect of increase in service tax from 10.30% to 14% the insurance cost should be considered 0.36% of the capital cost.

Commission's Ruling

The Commission has examined the comments by the stakeholders and has decided to retain the insurance cost at 0.35% of the capital cost since the increase due to service tax increase (14%) is negligible.

3.3.5 Working Capital

GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered the following to be included as working capital, which is also considered here:

- One month's expense on operation and maintenance expenses
- Receivables equivalent to one month's energy charges for sale of electricity calculated on a normative CUF.

Suggestions of the Objectors

It was suggested by one of the developers that the time period to realize the revenue for a month of generation varies from 50 days (from the end of month of generation) to 80 days (from the start of month of generation). Accordingly the developer requests an increase in the working capital requirements.

Some of the developers suggested that to avoid any discrimination between solar and other technologies, the terms for working capital should be considered (i) O&M expenses for one month (ii) One month receivables (iii) @1% of capital cost escalated @6% p.a. as per MYT Regulations OR the Working Capital allowed by Hon'ble CERC to Solar projects i.e. (i) O&M expenses for one month (ii) receivables equivalent to two months of the energy charges and (iii) Maintenance spares @ 15% of O&M expenses.

Commission's Ruling

The Commission has considered one month's receivable for energy charges for the working capital considering the prompt payments made by Distribution Companies in Gujarat and delay penalties for payment included in the PPA. Moreover, the cost related to operation and maintenance is already covered through other provisions for tariff determination.

Hence, the Commission retains the working capital as the sum of (i) one month's expense on operation and maintenance expenses, and (ii) receivables equivalent to one month's energy charges for sale of electricity calculated on a normative CUF.

3.3.6 Interest Rate on Working Capital

As explained in 'Section 2.3.6 Interest Rate on Working Capital, the interest rate on working capital is decided considering different parameters.

Hence, the interest rate on working capital is considered to be 12.00% in the Discussion Paper.

Suggestions of the Objectors

As suggested in Interest Rate on Loan and looking at the prevailing SBI base rate pursuant to the monetary policy review undertaken by RBI, the interest rate for working capital may be considered 11% instead of 12%.

Commission's Ruling

The RBI has revised the base rate to 9.70% from 9.85% i.e. reduction of 0.15% since the Discussion Paper was floated, and hence the Commission accordingly revises the Interest on Working Capital to 11.85%.

3.3.7 Rate of Depreciation

CERC, in Clause 15 of its Renewable Energy Regulation No L-1/94/CERC/2011 dated February 6, 2012 indicates that the value base for purpose of depreciation shall be based on the capital cost of the asset; salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and the period beyond loan tenure over useful life computed on 'Straight Line Method'. Depreciation shall be chargeable from the first year of commercial operation. Provided that in case of

commercial operation of the asset for part of the year the depreciation shall be charged on pro rata basis.

GERC, in its last Solar Tariff Order dated January 27, 2012 in Order No. 1 of 2012 has considered a high rate of depreciation as a promotional measure during the loan tenure, and then the remaining depreciation is spread over the remaining useful life.

Hence, depreciation of 6% per annum is considered for the first 10 years, and 2% for the next 15 years.

3.3.8 Return on Equity (RoE)

The GERC MYT Regulation, 2011, notified by the Commission provides norms for the Return on Equity as 14% per annum. GERC has also allowed Income Tax at 20.008% (18.5% MAT + 5% Surcharge + 3% Education Cess) per annum for 10 years, and Corporate Tax at 33.99% per annum from 11th year onwards. Any further enhancement in the Return on Equity will burden the consumers.

Hence, the return on equity considered is 14% post tax and grossed up.

Suggestions of the Objectors

It is suggested by some of the distribution companies that Government of India has announced roadmap for rationalization of Corporate Tax in next 4 years. Therefore, it will not be appropriate to consider the Corporate Tax @ 33.99% after 11th year. Hon'ble Commission may consider the effect of year on year tax reduction road map indicated by Government of India. Moreover, tariff regulations of Hon'ble Commission as referred in the Discussion Paper provides for reimbursement of tax on actual basis without any provision related to grossing up. Hon'ble Commission may consider the reimbursement of tax on actual basis with the ceiling limit as per the provision of tariff Regulation of Hon'ble Commission.

It was also suggested that considering the prevailing surcharge rate applicable on the base tax rate has been increased to 12% instead of 5%. Accordingly, the minimum alternate tax rate works out to 21.3416% and the corporate rate works out to 34.608%.

It was also requested to consider ROE on pre - tax basis in line with CERC RE Tariff Regulations and norms stipulated by various other SERCs.

Some developers also suggested to consider ROE 16% post tax considering the Hon'ble CERC and different SERCs RE Regulations.

Some developers also suggested that for the sake of uniformity the sur-charge may be kept at 10% for both MAT and Corporate Tax, which increases the MAT from 20.008% to 20.961 % and Corporate Tax as 33.99%.

Commission's Ruling

The Commission has noted the comments of various stakeholders and has decided to retain the Return on Equity at 14% as per the GERC MYT Regulation, 2011.

According to the new Finance Act, 2015 the Commission decides the Minimum Alternate Tax to 20.008% and the Corporate Tax Rate to 32.445%.

3.4 Tariff for Solar Thermal Power Plants

3.4.1 Levelized Tariff

As per the change in different parameters the summary of various parameters and tariff works out as follows:

Table: Summary of parameters for solar thermal power plants.

Parameter	Value		
Plant Cost			
Capital Cost	INR	1200	Lakhs per MW for megawatt-scale system
O & M Cost		1.5%	of Capital Cost
Escalation in O & M Cost		5.72%	Annually
Performance Parameters			
Capacity Utilization Factor		23%	
Performance Degradation		0.25%	Annually
Auxiliary Consumption		10%	of Energy Generation
Useful Life		25	Years
Financial Parameters			
Debt : Equity Ratio		70 : 30	
Loan Tenure		10	Years
Interest Rate on Loan		12.70%	
Insurance Cost		0.35%	Annually
Interest on Working Capital		11.85%	Annually
Working Capital	Sum of:	1	Month's O&M Expense
		1	Months' Energy Charges at normative CUF
Rate of Depreciation		6%	Annually for the first10 years

	2%	Annually for the next15 years
Minimum Alternate Tax Rate	20.008%	Annually for the first10 years
Corporate Tax Rate	32.445%	Annually from the 11th year until 25th year
Return on Equity	14%	Annually
Discount Rate	10.647%	Annually

Table: Levelized tariff for solar thermal power plants commissioned between July 1, 2015 and March 31, 2018.

Levelized Tariff for Solar Thermal Power Plants	
Without Accelerated Depreciation Benefit	INR 11.22 per kWh
With Accelerated Depreciation Benefit	INR 10.11 per kWh

3.4.2 Tariff for variants (Hybrid) in Technology

In case a Developer chooses to develop the system with thermal storage or as a hybrid, the tariff determination for such system could be taken up on case-to-case basis under 'project specific' tariff determination route based on petition filed by such Developer.

4. OTHER CONSIDERATIONS

4.1 Plant and Machinery

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

4.2 Auxiliary Power Supply

The Commission proposed that STU/Distribution Licensee shall provide auxiliary power for the solar generator under kWh to kWh adjustment basis.

4.3 Reactive Energy Charges

The Reactive Energy Charges as approved by the Commission in the tariff orders for GETCO from time to time shall be applicable to such projects. Further, the Solar Power Projects shall comply with the provisions of CEA (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013.

4.4 Evacuation Facilities

Interfacing line of appropriate capacity and voltage as per the CEA (Technical Standard for connectivity to the grid) Regulations, 2012 shall be provided by the STU/ Distribution Licensee at their cost. The intending generator shall apply to the STU/ Distribution Licensee concerned well in advance.

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 Company in line with the State Grid Code.

The transmission line from the switchyard of generator to GETCO substation shall be laid by GETCO.

Suggestions of the Objectors

Some Developers appreciated the Hon'ble Commission's proposition that GETCO be responsible for the construction of the transmission line from the project switchyard till the evacuation point of the Transmission utility's switchyard. However, the construction of the said transmission line by only GETCO involves substantial time period and could hamper the

timelines of the project. Hence, it was requested to provide an option to the solar project developers to construct the transmission line on its own, with reimbursement of the actual evacuation cost by GETCO, which would help in expeditious development of the solar power project.

GETCO made a submission that the responsibility of constructing the transmission line until the nearest GETCO substation shall lie with the developer. This would ensure faster project execution and optimize site selection so that the project is closer to an existing substation.

Commission's Ruling

The Commission decides that the responsibility of constructing the transmission line shall lie with the developer. The Commission has accordingly kept a provision in the Capital Cost of MW scale projects.

4.5 Transmission/ Wheeling Charges

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on transmission/wheeling charges. After considering the aforesaid the Commission decides the transmission and wheeling charges as under:

4.5.1 General

Whenever the power is sold to a Distribution licensee, the Solar Power Generator will supply the power at the interconnection point of the generator-STU. Thereafter, the transmission/ wheeling charges will be borne by the Distribution Licensee.

4.5.2 Wheeling with Injection at 66 kV or above

As per the scope of this tariff order, this clause will be applicable to solar plants of capacity greater than 4 MW.

For wheeling of power to consumption site at 66 kV voltage level and above, the wheeling of electricity generated from the Solar Power Generators to the desired location(s) within the State shall be allowed on payment of transmission charges and transmission losses applicable to normal Open-Access Consumers.

For wheeling of power to consumption site at a voltage below 66 KV, the wheeling of electricity generated from the solar power Generators to the desired location(s) within the State shall be allowed on payment of transmission charges as applicable to normal open-

access customers and transmission and wheeling loss @ 7% of the energy fed into the grid. This loss shall be shared between the transmission and distribution licensees in the ratio of 4:3.

4.5.3 Wheeling with Injection at 11 kV or above and below 66 kV

As per the scope of the current Order, this Clause will be applicable to ground-mounted or rooftop solar plant of capacity between 100 kW and 1 MW, and ground-mounted solar plants of capacity between 1 MW and 4 MW.

The wheeling of power generated by such generators to the desired location(s) within the area of same distribution licensee shall be allowed on payment (in kind) of distribution loss @ 3% of the energy fed in to the grid.

The wheeling of power generated by such generator to the desired location(s) within the State but in the area of a different distribution licensee shall be allowed on payment of transmission charges as applicable to normal Open-Access Customers and transmission and distribution loss @ 10% of the energy fed in to the grid. These losses shall be shared among the transmission licensee and two distribution licensees involved in the ratio of 3:4:3.

4.5.4 Wheeling with Injection at 415 V or below

As per the scope of the current Order, this clause will be applicable to rooftop solar installations of capacity between 1 kW and 6 kW feeding at 220 V, 1φ; and rooftop solar installations of capacity between 6 kW and 100 kW feeding at 415 V, 3φ.

Wheeling of power from rooftop solar plants feeding at 415 V is allowed only to the locations within the same distribution licensee and no wheeling charges shall be applicable in such cases, as such projects decrease the transmission and distribution losses for the utility, and increase the efficiency of the grid. Further, power from rooftop solar plants at 220 V shall not be allowed to be wheeled and will have to be consumed within the same premises.

4.5.5 Wheeling at Two or More Locations

If a Solar Power Generator owner desires to wheel electricity to two or more locations, itshall pay INR 0.05 per unit on energy fed in the grid to Distribution Company in whose area power is consumed in addition to the above mentioned transmission charges and losses, as applicable**.**

4.6 Cross-Subsidy Charges

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on Cross-Subsidy charges. After considering the aforesaid the Commission decides the Cross-Subsidy Charges as under:

As a promotional measure for solar power, which is still in its nascent stage and not operating under REC mechanism, no cross-subsidy surcharge would be levied in case of third-party sale or captive use. However, normal open-access charges as specified in the Section titled "Transmission/ Wheeling Charges" would be levied from Consumers/ Users.

4.7 Banking

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on banking. After considering the aforesaid the Commission decides the banking as under:

All solar power projects that are commissioned under captive generating mode and not operating under the REC route or third party sale shall be eligible for banking of energy for one month period only. The banking period is determined with consideration of billing cycle for recipient units of the concerned Distribution Licensee, who receive the solar energy for captive use. Banking shall be considered on first in first out (FIFO) energy basis. Any surplus energy of banked units in the given billing cycle available after set-off shall be considered as deemed sale to the concerned Distribution Licensees at Average Power Purchase Cost (APPC) rate determined by the Commission for relevant year.

4.8 REC Projects

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on REC Projects. After considering the aforesaid the Commission decides the REC Projects as under:

Solar power projects that are set up and operate under the REC route shall:

- Be required to pay the entire transmission and wheeling charges and losses
- Be required to pay the cross subsidy surcharge.
- NOT be eligible for banking facility.

In the situation where there is a third party sale by the Solar Project Developer and in addition REC is availed, any surplus energy shall be considered as a deemed sale to the Distribution Licensee in the area of the Consumer at a rate equal to 85% of the APPC rate for the relevant year.

Solar Project Developers who are not operating under REC route are eligible to transmit and wheel the energy at the transmission and wheeling charges and losses as proposed in para 4.5 above. However, no banking is allowed in case of third party sale. The energy wheeled is required to be consumed in the same 15-minute time block. Any unutilized energy is to be considered as sale to the concerned Distribution Licensee in the area in which the buyer of such energy is situated. The surplus energy if available, after set-off in same time block, will be considered as deemed sale to the concerned distribution licensee at the APPC rate of relevant year as determined by the Commission.

4.9 Applicability of Intra-State ABT

The Intra-state ABT order will not be applicable to solar power generation projects.

4.10 Energy Accounting

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on Energy Accounting. After considering the aforesaid the Commission decides the Energy Accounting as under:

Solar-based energy generation projects shall be out of the purview of the Intra-State ABT. However, for the purpose of energy accounting, such projects will have to provide ABT compliant meters at the interface points. Interface metering shall conform to the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2010. The electricity generated from the Solar Power Generators shall be metered and readings shall be taken jointly by the solar power project Developer with GETCO or Distribution Company at the interconnection point of the generator bus-bar with the transmission or distribution system concerned, as the case may be.

In case of solar rooftop power projects, a separate metering system shall be provided at the output terminal of solar roof-top power project to measure gross energy generation from such project.

4.11 Connectivity Charges for Rooftop Power Plants

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on Connectivity Charges for Rooftop Power Plants. After considering the aforesaid the Commission decides the Connectivity Charges for Rooftop Power Plants as under:

The Connectivity Charges and Fees for solar PV rooftop system will be payable to the respective Distribution Licensee. The applicable fees are as follows:

Table: Applicable connectivity charges for rooftop solar PV systems

System Size	Applicable fees
From 1 kW up to 6 kW	INR 1,500 per connection
More than 6 kW up to 100 kW	INR 10,000
More than 100 kW up to 1 MW	INR 50,000

4.12 Parallel Operation Charges

As a promotional measure no parallel operation charges shall be levied by the distribution licensee for all solar PV systems for captive use.

4.13 Power Purchase Agreement

The term of the power purchase agreement that the solar Developer signs with the Distribution Licensee will be 25 years. The distribution licensee may sign the PPA at the earliest from the date of submission of the application with all relevant details by the solar generators and get it approved from the Commission.

Further, the Commission decides that the Project Developer shall submit a Bank Guarantee/ Security Deposit of INR 25 lakhs /MW to the Distribution Licensee at the time of signing of PPA.

The projects for which Power Purchase Agreement have been signed prior to effective date of this order, shall be governed by the terms and conditions of such PPAs.

4.14 Sharing of Clean Development Mechanism (CDM) Benefit

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on Sharing of Clean Development Mechanism (CDM) Benefit. After

considering the aforesaid the Commission decides the Sharing of Clean Development Mechanism (CDM) Benefit as under:

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-1/94/CERC/2011 dated February 6, 2012:

"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 shall be retained for solar projects in Gujarat.

4.15 Standards of CEA and RRF mechanism of CERC

The Project Developer shall follow the provisions of the CEA Regulations/ Standards for grid connectivity of solar projects notified from time to time. The Project Developers are governed by the CERC Regulations "Procedure for the implementation of the Mechanism of Renewable Regulatory Fund" (RRF) under Regulation 6.1 (d) of the CERC (Indian Electricity Grid Code) Regulation, 2010 (dated 18-2-2011). Developers shall be required to comply with the above regulations. In the absence of compliance of above regulations GEDA shall not issue the commissioning certificate.

4.16 Control Period

The control period proposed for the Solar Energy Tariff Order is from July 1, 2015 to March 31, 2018.

4.17 Non-Applicability of Merit Order

The Commission has considered the contents of the discussion paper and comments received from the stakeholders on Non-Applicability of Merit Order. After considering the aforesaid the Commission decides the Non-Applicability of Merit Order as under:

Considering the nature of solar energy, all solar energy power plants will be considered as 'must-run' facilities, and the power generated from such power plants will be kept out from the merit order dispatch principles.

COMMISSION'S ORDER

The Commission approves the tariff for Procurement by the Distribution Licensees and others from Solar Energy Projects for the Control Period from July 1, 2015 to March 31, 2018 as outlined in the table below:

Period	July 1, 2015 to March 31, 2016	April 1, 2016 to March 31, 2017	April 1, 2017 to March 31, 2018
Levelized Tariff for Large Rooftop and Megawatt-scale Photovoltaic Power Plants			
Without Accelerated Depreciation Benefit	6.77	6.30	5.86
With Accelerated Depreciation Benefit	6.17	5.74	5.34
Levelized Tariff for Kilowatt-scale Photovoltaic Power Plants			
Without Accelerated Depreciation Benefit	8.42	7.83	7.28
With Accelerated Depreciation Benefit	7.64	7.11	6.61

Levelized Tariff for Solar Thermal Power Plants	
Without Accelerated Depreciation Benefit	INR 11.22
With Accelerated Depreciation Benefit	INR 10.11

Sd/-

[Shri K. M. Shringarpure]
MEMBER

Sd/-

[Shri Pravinbhai Patel]
CHAIRMAN

Place: Gandhinagar
Date: 17th August 2015

Annexure I: List of Entities that have communicated their views on the Discussion Paper on Determination of Tariff for Procurement of Power by Distribution Licensees and Others from Solar Energy Projects for the State of Gujarat made public by the Gujarat Electricity Regulatory Commission.

Sr. No.	Name
1.	Abellon Clean Energy Limited
2.	Adani Green Energy Ltd.
3.	Dakshin Gujarat Vij Company Limited
4.	Madhya Gujarat Vij Company Limited
5.	Gujarat Energy Development Agency
6.	Gujarat Urja Vikas Nigam Limited
7.	Gujarat Energy Transmission Corporation Limited
8.	Hindustan EPC Company Limited
9.	Juwi India Renewable Energies Pvt. Ltd.
10.	Madhav Solar (Vadodara Rooftop) Pvt. Ltd.
11.	MIT Engineers
12.	National Solar Energy Federation of India
13.	Paschim Gujarat Vij Company Limited
14.	Sun Edison
15.	Torrent Power Limited
16.	Uttar Gujarat Vij Company Limited
17.	Akhil Gujarat Grahak Seva Kendra
18.	KPI Global Infrastructure Ltd.
19.	Utility Users Welfare Association

Annexure II: List of Entities that have participated in the public hearing on the Determination of Tariff for Procurement of Power by distribution Licensees and Others from Solar Energy Projects for the State of Gujarat at the Gujarat Electricity Regulatory Commission on June 29, 2015.

Sr. No.	Name
1.	Gujarat Energy Development Agency
2.	Adani Green Energy Ltd.
3.	Gujarat Energy Transmission Corp. Ltd.
4.	MIT Engineers
5.	Gujarat Urja Vikas Nigam Ltd.
6.	Uttar Gujarat Vij Company Ltd.
7.	Torrent Power Ltd.
8.	Paschim Gujarat Vij Company Ltd.
9.	Hindusthan EPC Company Limited
10.	KPI Global Infrastructure Ltd.
11.	Utility Users Welfare Association