

# MANGALORE ELECTRICITY SUPPLY COMPANY LTD.,

(A Government of Karnataka Undertaking)



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No: SEE(Coml)/EE(Coml)/AEE(Coml)/19-20/ 5380-461

Date :

Encl :

17 AUG 2019

All Chief Engineer(Ele),  
MESCOM, O & M Zone.

All Superintending Engineer(Ele),  
MESCOM, O & M Circle.

All Executive Engineer(Ele)  
MESCOM, O & M Division.

Sir,

Sub : Determination of tariff in respect of Solar Power Projects  
(including Solar Rooftop Photovoltaic projects) for FY 20 –reg.  
Ref : KERC Order dtd. 01.08.2019.

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The Hon'ble Karnataka Electricity Regulatory Commission (KERC) has issued the order on "**Determination of tariff in respect of Solar Power Projects (including Solar Rooftop Photovoltaic projects) for FY 20**" vide letter cited under reference.

Hence, I am directed to request you to implement the Hon'ble Commission's above said order forthwith and the copy of the same is enclosed herewith for your reference.

The order copy is also available in MESCOM web site: [www.mesco.in](http://www.mesco.in) and [www.karnataka.gov.in](http://www.karnataka.gov.in).

Yours faithfully,

  
Superintending Engineer Ele., (Coml)

MESCOM, Mangalore.

**Copy to:**

1. Financial Adviser (I/A), MESCOM, Corporate Office, Mangaluru.
2. All Asst. Executive Engineer (Ele), O & M Sub-division, MESCOM– for information & needful action.
3. SPS to MD/DT.
4. PS to CFO.



**BEFORE THE KARNATAKA ELECTRICITY REGULATORY COMMISSION**

No. 16 C-1, Miller Tank Bed Area, Vasanth Nagar, Bengaluru- 560 052

**Dated: 1<sup>st</sup> August, 2019**

**Present:**

Shri Shambhu Dayal Meena : Chairman  
Shri H.M. Manjunatha : Member  
Shri M.D. Ravi : Member

**In the matter of:**

**Determination of tariff in respect of Solar Power Projects (including Solar Rooftop  
Photovoltaic Projects) for FY20**

**ORDER**

**Preamble:**

1. Section 86(1)(e) of the Electricity Act, 2003, mandates the State Electricity Regulatory Commissions to promote generation of electricity from renewable sources of energy. Accordingly, the Karnataka Electricity Regulatory Commission has been promoting generation of power from renewable sources, by determining the feed-in-tariff (generic tariff) periodically, based on the normative operational and financial parameters for different control periods from the year 2005 onwards. This approach of the Commission has enabled creation of a favourable environment for investment in Renewable Energy (RE) projects in the State, ensuring the investors to get reasonable returns on their

investments. As a result, the State has made substantial progress in Wind and Solar capacity addition.

2. The Commission, vide its Order dated 18.05.2018 had determined a levelized tariff of Rs.3.05 per unit for Megawatt scale solar projects and Rs.3.56 per unit for kW scale solar rooftop photovoltaic projects, applicable for the life of the projects, i.e. for 25 years. These tariffs were applicable to all such new solar power projects for which PPAs are entered into and approved by the Commission, after the date of issue of the said Order and also those which achieved commercial operation on or after 01.04.2018. This Order was in force till 31.03.2019.
3. Thereafter, as on 31.12.2018, the State had an installed Solar Power Generation capacity of 5329 MW in both Grid Connected ground mounted solar photovoltaic and rooftop solar photovoltaic plants. However, it was noticed that, the investment in solar rooftop installations is not encouraging as could be seen from the fact that, out of the above capacity, the installed capacity of SRTPV plants is only 154 MW. Further, bulk of these projects pertained to large rooftop capacity projects, indicating that smaller consumers had not shown much interest in installing SRTPV units on their rooftops, even though the potential for installation of small capacity SRTPV units, especially by the domestic consumers, is substantial and the installation of SRTPV plants benefits both the consumers and the distribution licensees. It was also noted that earlier, the domestic consumers have actively supported the State Government's initiative in installation of solar water heaters across the State.
4. The Commission notes that as per the revised National Solar Mission target of 1,00,000MW solar projects has to be achieved by the year 2021-22. As per the Government of Karnataka's Solar Policy 2014-21, it is proposed to install a

minimum of 6000MW solar power projects by March 2021, of which the share of grid connected SRTPV projects shall be 2400MW.

5. The new Tariff Policy dated 28.01.2016, issued by the Government of India (Gol), envisages that all the future procurements of renewable energy (except from waste to energy plants) shall be made only through competitive bidding, as per the bidding guidelines issued by the Gol. Pursuant to the said Policy, the Central Government has issued the Bidding Guidelines on 03<sup>rd</sup> August, 2017, which has prescribed standard bidding documents along with Models for Request For Selection (RFS), Power Purchase Agreement (PPA), Power Sale Agreement (PSA) etc., to facilitate power procurement by the DISCOMs. Even prior to this, the Karnataka State has been procuring megawatt scale solar power through a transparent process of competitive bidding, using the Commission determined tariff, as a bench mark. The Commission also decided that all the future power procurements of RE shall be made through the process of competitive bidding, subject to the capacity limit, as may be fixed by the Government. In respect of power purchased from the small ground mounted solar projects of the capacity of less than 5 MW, which are not covered under competitive bidding and SRTPV projects of up to 2000kW, the Commission has to determine tariff effective from 01.04.2019.
6. The Commission also notes that, one of the reasons for the poor response for installation of SRTPV units by the domestic consumers may be, a low Feed in Tariff (FIT), fixed by the Commission, as compared to a relatively higher capital cost involved in installing the SRTPV units. Hence, the Commission is of the considered view that, there is a need to promote smaller capacity solar

rooftop power plants by the domestic consumers, in order to achieve the desired capacity addition in respect of SRTPV units, in the State.

7. In order to encourage installation of SRTPV units in the State, the following steps were taken by the Commission:
  - a. The Commission, on 19.12.2018 issued an Order revising the tariff in respect of new solar rooftop photovoltaic units of 1kW to 10kW capacity installed by domestic consumers to Rs. 4.15 per unit (without subsidy) and Rs. 3.08 per unit (with capital subsidy);
  - b. The Commission, in its Order dated 18.05.2018, allowed installation of SRTPV plants on the Government buildings by the ESCOMs under funding from the Government, with the energy from such plants being allowed to be utilised by the concerned office/institution on net metering basis and inject any surplus energy into the grid, with the tariff as indicated in the said Order;
  - c. The Commission, in its Order dated 18.05.2018, also allowed installation of multiple SRTPV units or single SRTPV unit with the combined installed capacity in a single premises not exceeding the total sanctioned load of all the consumers in that premises, at a tariff equal to 90% of the tariff as per Order dated 18.05.2018;
  - d. As per Regulation 13 of KERC (Implementation of Solar Rooftop Photovoltaic Power Plants) Regulations, 2016, the Commission has also allowed to install SRTPV up to 2000kW subject to further limit based on the sanctioned load of the consumer's installation, as may be specified by the Commission from time to time.
8. The Commission notes that the tariffs discovered through competitive bidding continue to show a significant downward trend as compared to the

Feed In Tariff (FIT). The rapidly growing solar markets and increased competition along with reduction in capital costs, resulted in discovery of lower tariffs, which are far below the tariff determined by the Commission. In other States as well, there is a downward trend in the tariffs discovered through competitive bidding.

9. In order to determine a Tariff which reflects the latest market trend and price, the Commission had issued a Discussion Paper in the matter, on 06.02.2019 duly inviting comments / suggestions from the stakeholders, to be submitted to the Commission on or before 26.02.2019.
10. The Commission has received many representations/ letters from Solar Roof Top Developers and SRTPV consumers requesting for extending the existing tariff of solar roof top projects, as per the existing order until a new tariff is determined. In the above circumstances, pending determination of tariff, the Commission has decided to permit the ESCOMs vide its letter dated 15.04.2019 to execute the PPA with the SRTPV consumers for FY 20, by suitably amending the Article 6.1 (a) of the approved standard format of PPA relating to SRTPV projects as indicated below;

"6.1 (a). The .... ESCOM shall pay for the net energy/ gross energy (as the case may be) at the tariff that may be determined by the Commission for the period from 1.4.2019 to 31.03.2020, subject to such other conditions, if any, as may be imposed in the tariff Order, for the term of the agreement."

11. In response to the said Discussion Paper, various stakeholders including some of the ESCOMs have submitted their written comments / suggestions. The Commission had proposed in the public hearing Notice published on

- 11.06.2019 to consider a revised capital cost of Rs.373.30 Lakhs, duly considering the levy of Safeguard Duty imposed by the Government of India (GoI) and Goods & Services Tax (GST) charged on solar modules/panels.
12. The Commission also held a public hearing in the matter on 25.06.2019 in the Court Hall of the Commission. The list of the stakeholders who filed their comments/suggestions and those who made oral submissions in the public hearing is given in the Annexure to this Order.
13. After considering the views and submissions made by the stakeholders and in exercise of powers conferred under Section 62(1)(a), read with Sections 64 and 86(1)(e) and other enabling provisions of the Electricity Act, 2003, the Commission hereby proceeds to determine the generic tariff Order for ground mounted solar power projects of capacity up to five MW and the kW scale Solar Roof Top Photovoltaic Power Plants up to 2000kW capacity.

### **ORDER**

1. The analysis and decisions on the operational and financial parameters, for determination of tariff in respect of the above mentioned solar capacity plants/ units, are discussed in the following paragraphs:

**i) Life of the Plant:**

The Commission had proposed to consider the life of the solar plants as 25 years. No comments or suggestions have been received on this proposal.

**Commission's Decision:**

The Commission, in its earlier Orders has considered 25 years as the useful life of the Solar Power Plant. **The Commission, therefore, decides to adopt the useful life of the Solar Power Plants as 25 years, from the date of their commissioning.**



**ii) Term and Tariff design:**

The Commission had proposed to adopt levelled tariff for a period of 25 years. No comments or suggestions have been received on this proposal.

**Commission's Decision:**

The Commission, in its earlier Orders has adopted the levelled tariff for a period of 25 years, in order to ensure certainty of revenue streams to the investors.

**The Commission, therefore, decides to adopt levelled tariff for a period of 25 years.**

**iii) Degradation Factor:**

While the Commission had not separately proposed allowing any degradation factor for kW scale projects, Hinren Engineering has suggested to consider the degradation factor from the first year of installation of panels for solar roof top projects(SRTPV).

**Commission's Decision:**

The Commission in its earlier Order has considered reduction of 0.5% of net generation as annual degradation from the fifth year onwards for MW scale projects. The rate adopted earlier cannot be reviewed based on only one manufacturer's unauthenticated pamphlet. **The Commission, therefore, decides to allow reduction of 0.5% of net generation as annual degradation from the fifth year onwards for MW scale projects.**

**iv) Capacity Utilisation Factor:**

The Commission, in its earlier tariff Orders had considered CUF of 19% for solar photovoltaic plants.

BESCOM, in its suggestion letter dated 23.03.2019, has submitted that Rajasthan ERC, vide its Order dated 09.10.2017, has considered CUF of 20% with deration

factor of 0.5% of CUF for every year after second year and requested the Commission to adopt CUF of 20% .

Sri M.T Kesari suggested that, for plants less than 10kW, the inverter losses are higher and suggested a CUF of 17.5% and 18% for more than 10kW plants. ECO Soch Solar suggested CUF of 16% for SRTPV projects. Hinren Engineering Suggested to consider reduction of CUF every year. Balark Solar has suggested to consider CUF of 15% Powergate Energy (Mysore) Private Limited has suggested to consider 17.5% of CUF for less than 10kW and 18% for more than 10kW plants.

**Commission's decision:**

The Commission notes that, the CUF of solar plants would vary based on the irradiation profile and other parameters of their locations. It is safe to assume that solar power Projects are taken up based on the initial studies of specific locations and their economic viability. Selection of locations with higher CUF would benefit the grid and also the investor. Commissioning of the Solar power plants in suboptimal locations, thereby resulting a lower CUF is not in the interest of the stakeholders including the investors/developers. In any case while determining generic tariff, locational disadvantages of a few plants cannot be factored.

As per the data published by the MNRE and the capacity utilization factor for solar PV plants considered by the CERC and most of the SERCs in the country, the CUF is 19%.

**The Commission, therefore, decides to adopt a CUF of 19% for Solar Power plants (both ground mounted and SRTPV plants).**

**v) Debt Equity Ratio:**

Based on the Tariff Policy and CERC RE Regulations, the Commission decides to continue with same **Debt Equity Ratio of 70:30 in the present tariff determination process.**

**vi) Capital Cost:**

The Commission had proposed to adopt a Capital Cost of:

- i. 1kw to 10kW (domestic consumer) at Rs. 45,000 per kW;
- ii. 1kW to 2000kW-at Rs.35,000 per kW for SRTPV plants (other than SRTPV consumer covered under (i)) and;
- iii. Rs.314 lakhs per MW for MW scale and ground mounted solar power plants.

Later the Commission, vide its paper notification dated 11.06.2019 had proposed the capital cost of Rs. 373.30 lakhs, after considering the prevailing safeguard duty levied and GST rate charged on solar modules/panels to the revised capital cost for solar power plants.

CEEW Centre for Energy Finance has suggested the revision in Capital Cost based on the differential price based on size and not based on the consumer categories. It has proposed to consider:

- For 1 to 3kW, the capital cost of Rs 55,000/kW;
- 3-10kW Rs.50,000/kW;
- 10-100kW Rs.40,000/kW and
- for 100 to 2000kW Rs.35,000/kW.

Hinren Engineering suggested the capital cost for SRTPV of Rs.90,000/kW. EcoSoch Solar has suggested to consider the capital cost for SRTPV of Rs.75,000 /kW. Balark Solar suggested to consider the capital cost for SRTPV more than Rs.45,000/kW. Sri

Veerabadhraiah has suggested tariff at the rate of retail supply tariff approved by the Commission in the reverse form, but not suggested the capital cost and other parameters for computing the tariff. BESCO has suggested to consider the Capital cost for SRTPV at Rs.35000 per kW up to 50 kW and Rs.31330 for SRTPV of above 50 kW. Powergate Energy(Mysore) Pvt. Ltd has suggested to consider different rates for small, medium and large scale plants. However, BESCO and other stakeholders have not furnished any documentary evidence in support of their suggestion on the capital cost.

**Commission's Decision:**

The Capital cost, as proposed, is inclusive of evacuation infrastructure. The available literature including reports by international organisation like IRENA, indicate rapid decline in cost of the module beginning from the year 2015. They also reveal that the reductions in cost of the module is not only influenced by substantial capacity and deployment upsurge, but more recently because of improvements in the production process, more competitive supply chain, technological improvements and efficiency gains associated with increased adoption of newer cell designs. In the energy markets around the world, rising competitive pressures with continued innovation drive, in bringing down the cost of the PV modules. While equipment costs keep declining, the reduction in balance of-system, O&M and capital cost are important parameters for overall cost considerations. Also, India has emerged as a new market for the solar project developers. The Commission has taken note of these developments while considering the capital costs of the projects/ units.

The Capital Cost of Rs. 350 Lakhs per MW adopted in its Order dated 18.05.2018, is based on the market report, wherein the average module cost was at about Rs19.68/Watt. The Commission had proposed to adopt a new capital cost of Rs.314 Lakhs per MW (i.e. about 10% less), based on the latest market reports available on

the internet (PV insight) as on 22.04.2019, wherein, the average module cost is at about Rs14.89/watt i.e. a reduction in module cost by about 24% as compared to the cost adopted earlier. It is to be noted that, most of the developers have more serious concerns about the likely increase in module/ panel cost because of levy of Safeguard Duty and GST than the rate of modules cost considered in the proposed Capital Cost. While issuing the Discussion paper on 06.02.2019, the levy of Safeguard duty and Goods and Services Tax (GST) on the Solar Modules/ Panels was not considered. Further, no documents like invoices/bills etc. have been produced by any of the stakeholders to support their claim that the actual Capital Costs are higher than the proposed cost. With the reduction in costs of other equipment and materials along with reduced interest rates, the proposed Capital Cost of Rs.314 lakhs/MW is fair and reasonable for megawatt scale ground mounted solar power plants.

The Commission had proposed to consider a revised capital cost of Rs.373.30 Lakhs duly considering the 'Safeguard Duty' at an average rate of 20.79% and GST at 5 % on Solar Modules/ Panels as per Circular of Ministry of Finance (MoF) Government of India dated 31<sup>st</sup> December, 2018 and 18 % GST on Civil works as per Notification of Ministry of Finance (MoF) Government of India dated 31<sup>st</sup> December, 2018. However, as per the clarification issued by Ministry of Finance (MoF) Government of India dated 22<sup>nd</sup> December, 2018, 70% of the capital cost of the project towards the Solar Modules/ Panels and 30% of the capital cost of the project towards the EPC contract, needs to be considered.

In the above context, the Commission notes that the rate of Safeguard duty varies between 25%-15% for different periods. As per the Ministry of Finance Notification dated 30.07.2018, for the solar cells, whether or not assembled in modules or panels, the applicable rate of safeguard duty is 25% when imported during the period from

30.07.2018 to 29.07.2019 and 20% when imported during the period from 30.07.2019 to 29.01.2020 and 15% when imported during the period from 30.01.2020 to 29.07.2020.

The Commission further notes that the payment of the safeguard duty arises only in case of import of solar cells whether or not assembled in modules or panels from outside the country and if the developer uses the indigenous panels, they need not incur such duty. Without considering the source of procurement, the inclusion of safeguard duty will result in front loading of the duty in determination of the Generic tariff and would also result in allowing extra tariff by way of safeguard duty, which the Generator/Developer will not have incurred, in case of indigenous modules/panels. Thus, the Commission decides to keep the safeguard duty and applicable GST thereon separately from the capital cost while determining the generic tariff. If the Generator/Developer imports the panel from outside India, the actual safeguard duty with GST on safeguard duty amount will be determined by the concern ESCOM on production of Bill of entry and documents thereon for actual payment of safeguard duty made to the competent authority by the Generators/Developers. This amount will be paid to the Generator/Developer by the concern ESCOM by spreading the actual safeguard duty incurred, over the Tariff period as per the PPA, every year by cash, on annuity basis during the month of April of the subsequent financial year.

The Commission notes that, the claims of increased capital cost of the SRTPV plants by some of the stakeholders are not supported by any data. It is pertinent to note that, there is a reduction in the Capital Cost of SRTPV plants from the last tariff revision. Even though there is a reduction in capital cost, in order to encourage solar rooftop projects, the Commission has considered the Capital cost of Rs.32800 per kW (excluding safeguard duty) of MW scale solar projects also to the SRTPV projects of

**Determination of tariff in respect of Solar Power Projects (including Solar Rooftop Photovoltaic Projects) for FY20.**

1 kW to 2000 kW. The payment of Safeguard Duty, as applicable to MW scale projects on annuity basis, shall also be applicable to roof top projects of 1kW to 2000 kW.

The Commission further notes that the reduction of capital cost considering the economy of scale will not be applicable to small SRTPV projects. Hence, to encourage the domestic consumers to put up SRTPV projects, the Commission has considered capital cost of Rs. 45000 per kW which is inclusive of Safeguard Duty and GST in the determination of Tariff in respect of SRTPV projects of 1kW to 10kW. Considering the above facts, the Commission decides to consider capital cost for ground mounted Solar projects as follows:

**Breakup for Capital Cost for Solar Photovoltaic power plants**

Sl no	Particulars	FY20
1	Average Module cost-USD/Watt peak	0.214
2	USD in Rs. as per RBI as on 16.04.2019	69.58
3	Cost of Solar Module in Rs./Watt	14.89
4	Cost of Solar Module in Rs. lakhs /MW	148.90
5	As per the Ministry of Finance vide its notification dated 30.07.2018. the Commission has considered the weighted average rate of safeguard duty, at rate 20.79%.	30.96
6	Cost in Rs Lakhs /MW(Before GST)	179.86
7	Civil and General Works, Mounting Structure, Power Conditioning Unit, Evacuation Lines & Equipment's, Preliminary and preoperative expenses IDC etc.	139.98
8	Total Capital Cost in Rs Lakhs /MW	319.84
9	GST of 5% for 70% of the total cost (Supply of solar modules and its accessories, as per clarification issued by Ministry of Finance (MoF) Government of India dated 22.12.2018) in Rs Lakhs	11.19
10	GST of 18% for 30% of the total cost (Civil and general works, as per clarification issued by Ministry of Finance (MoF) Government of India dated 22.12.2018) in Rs Lakhs	17.27
11	Total cost of the project in Rs Lakhs	348.30
12	Land Cost @ Rs.5.00 Lakhs per acre (5Acres per MW)	25.00
13	Total cost of the project including land cost in Rs Lakhs	373.30
14	Less: The safeguard duty and its GST from the capital cost and allow it to be paid by cash by the respective ESCOMs, every year(Rs 33.72 lakhs /tenure of PPA), on production of proof of payment of the safeguard duty by the generators/ developers in Rs lakhs	33.72
15	Total Capital cost considered for determination of tariff in Rs. Lakhs	<b>339.58</b> <b>(round off to 340.00)</b>

Accordingly, the Commission hereby decides to adopt the following capital cost for

- i. 1kW to 10kW SRTPV project (domestic consumer) of Rs 45,000 per kW.
- ii. 1kW to 2000kW SRTPV project (other than SRTPV consumer covered under (i))  
Rs 32,800 per kW
- iii. Ground mounted Solar projects of Rs.340 Lakhs per MW

**vii) Operation & Maintenance Cost:**

The Commission had proposed to allow O&M expenses of Rs. 600/ kW SRTPV plants and at Rs. 4.50Lakhs /MW for ground mounted Megawatt scale solar plants, with an annual escalation of 5.72%.to meet the inflationary costs.

BESCOM has suggested to adopt O&M factor at 4.88%. Sri M.T Kesari has suggested O&M expenses of Rs 900 per kW per annum with the escalation of 5.72%. Ecosoch Solar suggested 2% of the capital cost in respect of 1kW to 10kW plants. Powergate Energy(Mysore) Pvt. Ltd has suggested to consider Rs. 900/kW/annum with an escalation of 5.72% and to fix base price at the rate 5.72% per succeeding year.

**Commission Decision:**

The Commission notes that the stakeholders have submitted the proposed O&M expenses, without furnishing the substantial reason and documents for consideration. **The Commission, therefore, decides to allow O&M expenses at Rs.600/kW for SRTPV units and at Rs.4.50Lakh/MW for ground mounted Megawatt Scale solar plants, with an annual escalation of 5.72%.**



**viii) Interest and Tenure of Debt:**

The Commission had proposed the normative tenure of long term debts /loans as 13 years and to allow Interest on loan at 10% per annum.

Sri M.T. Kesari and Powergate Energy(Mysore) Pvt Ltd. has suggested to consider the loan tenure as 7 years and interest rate at 11%.

**Commission's Analysis & Decision:**

The Commission notes that, with effect from 19.11.2018, Indian Renewable Energy Development Agency (IREDA) has revised the interest rates, which vary from 9.80% to 10.95% for RE projects, with a reduction of 25, 20 and 15 basis points for grades 1 to 3 respectively with external grading.

Similarly, Power Finance Corporation Limited (PFC) has revised the rates of interest with effect from 28.02.2019, which varies from 10.10% to 10.75% for State Sector and 11.00% to 12.25% for private sector for RE projects other than Biomass Power Plants.

With effect from 10.01.2019, the MCLR of SBI is 8.75% for a loan tenure three years and above. Considering 200 basis points above the MCLR, the maximum interest rate would be 10.75%.

The above facts indicate that the rates of interest for domestic loans for solar projects are in the range of 9.50% to 11.00%, depending upon the credit ratings of the solar power generators and the average works out to 10.25%. The CERC, in its Order dated 11.01.2019 has considered interest rate on term loan at 10.41%.

The Commission has considered the interest rate of 10.50% for wind power project vide in its Order dated 27.02.2019.

Therefore, the Commission by considering all the factors, decides to adopt interest rate of 10.50% per annum and considered the tenure of loans as 13 years.

**ix) Working Capital:**

The Commission in the discussion paper had proposed one months' receivables for SRTPV projects and two months' receivables for megawatt scale ground mounted solar projects as working capital.

No suggestions are received from the stake holder on working capital.

**Commission's Decision:**

The Commission notes that a reasonable working capital has to be allowed for enabling the investor to sustain his operations. In respect of SRTPV plants the need for Working Capital would not be as pressing as the megawatt scale projects.

**The Commission, therefore, decides to allow one month's receivables for SRTPV projects and two months' receivables for megawatt scale ground mounted Solar Power Projects.**

**x) Interest on Working Capital:**

The Commission had proposed to adopt the interest on working capital of 11% per annum.

Sri. M.T. Keasri and Powergate Energy(Mysore) Pvt Ltd had suggested interest on working capital of 12.25%.

**Commission decision:**

The Commission notes that the CERC in its recent Order dated 11.01.2019 has considered 11.41% as the interest on Working Capital.

**Depending on the interest rate allowed for term loans, the Commission, in all its earlier orders, has considered interest on working capital at 1% more than the**

interest rate allowed for the term loan. Following the same approach, the Commission decides to allow at 11.50%.

**xi) Depreciation:**

The Commission had proposed to adopt the depreciation on 90% of the capital cost (excluding land cost) at the rate of 5.38% for the first 13 years, considering the recovery of debt amount and the remaining depreciation amount spread equally over the balance useful life of the projects. BESCO has suggested to adopt depreciation of 5.28%.

The Commission notes that the CERC in its RE Tariff Regulations on determination of tariff for renewable energy sources of 2017, has specified that the salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset. That a depreciation rate of 5.28% per annum be considered for first 13 years and the remaining depreciation be spread during the balance useful life of the RE projects considering the salvage value of the project as 10% of the project cost.

**Commission decision:**

**The Commission, by considering the amount of debt repayment and the term of the capital loan, decides to consider the depreciation on 90% of the capital cost (excluding land cost) at rate at 5.81% for the ground mounted project and 5.38% for the SRTPV Projects for the first 13 years, and the remaining depreciation spread equally over the balance useful life of the ground mounted projects and SRTPV.**

**xii) Return on Equity:**

The Commission had proposed Return on Equity (RoE) of 14% on the equity amount of the project. Sri.M.T.Keasri and Powergate Energy(Mysore) Pvt Ltd had suggested RoE of 15%.

**Commission's Decision:**

The Commission notes that the prevailing CERC Regulation specify RoE of 14% and the Commission has adopted such rates in other Generic Tariff Orders.

**The Commission, therefore, decides to allow RoE of 14%.**

**xiii) Discount Rate:**

Since the financing of capital cost is based on 70% debt and 30% equity, the Commission had proposed that it would be appropriate to reckon weighted average cost of capital (WACC) as the discount factor to arrive at the levelised tariff.

No comments or suggestions have been received on the proposal.

**Commission's decision:**

**The Commission, therefore, decides to consider the proposed discount factor of 11.55%**

**xiv) Auxiliary consumption:**

The Commission, had proposed to consider auxiliary consumption of 0.25% of the gross generation for MW scale projects and not allow any auxiliary consumption for SRTPV plants.

BESCOM suggested not to consider the Auxiliary consumption as the same is very negligible.

**Commission Decision:**

The Commission notes that the CERC has specified auxiliary consumption of 0.25% of the gross generation for Solar PV Plants. **The Commission, therefore, decides to allow auxiliary consumption of 0.25% for MW solar photovoltaic plants and not to allow any auxiliary consumption for SRTPV plants.**

**xv) Other Issues for kW projects (SRTPV plants):**

i) The Commission in its earlier Order has allowed the consumers to install SRTPV units with capacity equivalent to the sanctioned load of the respective consumer's installation based on gross or net-metering.

Renew Power suggested the capacity limit for installing SRTPV should be restricted only for net metering and to allow without any restriction for other than net metering.

**Commission's Decision:**

The Claims of restriction/allow the capacity for SRTPV by Renew Power is not supported by any data. **The Commission therefore, decides to allow installation of SRTPV with capacity equivalent to 100% of the sanctioned load of the respective consumer's installation based on gross or net metering.**

ii) The Commission in its Order dated 11.11.2016, has allowed installation of SRTPV plants on the Government buildings by the ESCOMs under funding from the Government, with the energy from such plants being allowed to be utilized by the concerned office/institution on net metering basis and inject any surplus energy into the grid with the tariff for any surplus energy injected as determined by the Commission in the Order 18.05.2018.

**Commission's Decision:**

The Commission therefore decides to continue to allow the scheme but with the tariff for any surplus energy injected as determined by the Commission in this Order.

iii) The Commission in its Order dated 15.09.2017 has allowed installation of multiple SRTPV units or single SRTPV unit with the combined installed capacity in a single premises not exceeding the total sanctioned load of all the consumers in that premises at a tariff 90% of the tariff as determined by the Commission in the Order 18.05.2018.

**Commission's Decision:**

The Commission therefore decides to continue the scheme but with 90% of the tariff as determined by the Commission in this Order.

2. With the above parameters considered, the applicable tariff works out as follows:

**(a) kW scale SRTPV projects (1 to 2000kW and 1 to 10kW):**

<b>Parameters for Kilowatt scale</b>		
<b>Cost/kW- in Rs.</b>	<b>1kW to 10kW-Rs45,000 per kW</b>	<b>1kW to2000 kW-Rs.32800 per kW</b>
Debt: Equity Ratio	70:30	70:30
Debt- in Rs.	31500	22960
Interest Rate on Debt-%	10.50%	10.50%
Debt Repayment in Yrs.	13 Years	13 Years
CUF	19%	19%
Equity- in Rs.	13500	9840
ROE-%	14%	14%
Auxiliary consumption	0.00%	0.00%
O & M expenses in Rs. /kW	0.006	0.006
O & M Escalation p.a.	5.72%	5.72%
WC interest (one month's receivables)	11.50%	11.50%
Depreciation in %	5.38%p.a for first 13 years and remaining depreciation spread equally over balance years of the plant's useful life.	5.38%p.a for first 13 years and remaining depreciation spread equally over balance years of the plant's useful life.

**(b) MW scale Solar Power Projects (Ground mounted)**

Parameters for Megawatt scale solar projects	
Cost/MW- Rs. Lakhs	340
Debt: Equity Ratio	70:30
Debt-Rs. Lakhs	238
Interest Rate on Debt-%	10.50%
Debt Repayment in Yrs.	13
CUF	19%
Equity- Rs. lakhs	102
ROE-%	14%
Auxiliary consumption	0.25%
O & M expenses in Rs. Lakhs/MW	4.50
O & M Escalation p.a.	5.72%
WC interest (two months' receivables)	11.50%
Depreciation in %	5.81%p.a for first 13 years and remaining depreciation spread equally over balance years of the plant useful life.

**3. Applicability of tariff determined:**

The Commission, in its earlier generic tariff Orders, had approved that the generic tariff determined for a particular RE project was applicable for the projects commissioned within a review period. The Commission always intended that the 'Commissioning of a project' means 'commercial operation of a project' with either sale to an ESCOM under a PPA or sale to third person under open access, by actual injection of energy. However, the approved standard formats of PPA, have not defined the word 'commissioning' but only the words 'commercial operation date'. Therefore, for avoiding any uncertainty, instead of the word 'commissioning', the word 'commercial operation' is specified in this Order.

4. For the forgoing reasons, we pass the following:

**ORDER**

- (i) The Commission hereby determines the generic tariff,
- a. for grid connected megawatt scale solar power projects of less than 5MW capacity at Rs.3.08 per unit;
  - b. subject to para(c) below, for grid connected Solar Rooftop Photovoltaic projects of 1kW to 2000kW at Rs. 3.07 per unit (without capital subsidy) and at Rs.2.32 only per unit (with capital subsidy); and
  - c. for grid connected Solar Rooftop Photovoltaic projects of 1kW to 10 kW for domestic consumers at Rs.3.99 per unit (without capital subsidy) and at Rs.2.97 per unit (with capital subsidy);
- (ii) The above tariff shall be applicable to all such new solar power projects for which PPAs are entered into on or after 01.04.2019 and approved by the Commission after the date of issue of this Order, that achieve commercial operation on or after 01.04.2019;
- (iii) The tenure of the PPA, shall be for the life of the solar power projects i.e., twenty-five (25) years;
- (iv) The generic tariff determined in this Order shall also be applicable for payment towards any banked energy deemed to have been purchased by the Distribution Licensees and in such other cases as specified in the relevant orders of the Commission;
- (v) All the other issues not covered under this Order, shall be governed by the respective Regulations and Orders issued by the Commission and PPAs signed by the parties; and
- (v) This Order shall be in force with effect from 1<sup>st</sup> April, 2019 and till 31<sup>st</sup> March, 2020.



*Determination of tariff in respect of Solar Power Projects (including Solar Rooftop Photovoltaic Projects) for FY20.*

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This Order is signed and issued by the Karnataka Electricity Regulatory Commission on this 1<sup>st</sup> day of August, 2019.

Sd/-  
(SHAMBHU DAYAL MEENA)  
CHAIRMAN

Sd/-  
(H.M.MANJUNATHA)  
MEMBER

Sd/-  
(M.D.RAVI)  
MEMBER

**Annexure**

**LIST OF STAKEHOLDERS WHO HAVE SUBMITTED COMMENTS / SUGGESTIONS  
ON THE DISCUSSION PAPER DATED 6<sup>TH</sup> FEBRUARY, 2019 FOR DETERMINATION OF TARIFF  
FOR SOLAR PV POWER PLANTS**

<b>Sl.No.</b>	<b>Name and Address</b>
1	CEEW Centre for Energy Finance, New Delhi.
2	ReNew Power, Gurgaon, Haryana.
3	Chamundeshwari Electricity Supply Corporation Ltd, Mysore
4	Hubli Electricity Supply Company Limited
5	Bangalore Electricity Supply Company Limited
6	Hinren Engineering, Bangalore
7	Eco Soch, Bangalore
8	Powergate Energy (Mysore) Pvt Ltd., Mysore.

**List of persons participated in Public Hearing on 25.06.2019:**

<b>Sl.No.</b>	<b>Name and Address</b>
1	M.T. Kesari, Powergate Energy (Mysore) Pvt Ltd
2	Sunil M.S. Hinren Engineering
3	Harsha Kuntu, Ecosoch Solar Pvt Ltd.
4	Krishna Revanuar (Balark Solar)
5	A.C. Eswar, Prides Renewable (KRESMA)
6	Veerabhadraiah.S
7	Vidisha Dubey, Amplus Energy