

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

Dated: 18.08.2021

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 FY22 toFY23"

Preamble:

1. Section 86(1)(e) of the Electricity Act, 2003 (the Act), mandates the State Electricity Regulatory Commissions to promote generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid. Section 61(h) of the Act provides that, while specifying the terms and conditions of determination of tariff, the Commission shall be guided by the objective of promotion of co-generation and generation of electricity from renewable sources of energy. While Section 62(1) empowers the Commission for determination of Tariff, Section 64 of the Act provides procedure for determination of tariff in respect of generating companies or licensees.
2. 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

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and financial parameters for different control periods from the year 2005 onwards. This approach of the Commission has enabled creation of a favorable 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 generation capacity addition.

3. The Commission, vide its Order dated 22.05.2020, had extended the validity of the Tariff Order dated 01.08.2019 relating to solar power projects (including Solar Rooftop Photovoltaic Projects) for FY21, wherein, Commission determined a Levelled tariff of Rs.3.08 per unit for Megawatt scale solar project, Rs.3.07 per unit for 1kW to 2000 kW scale solar rooftop photovoltaic projects and Rs.3.99 per unit for 1kW to 10kW for domestic consumer's 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 01.04.2020. This Order was in force till 31.03.2021.

4. As on 31.07.2021 the State had an installed Solar Power Generation capacity of 5850.16 MW, in both Grid Connected ground mounted solar photovoltaic and Solar Rooftop Photovoltaic Plants. However, the Commission has 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 current installed capacity of SRTPV plants is only 292.58 MW. Further, bulk of these projects pertain to large rooftop capacity projects, indicating that smaller consumers have 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

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consumers is substantial, as the installation of SRTPV plants benefits both the consumers and the distribution licensees.

5. The Commission notes that, the Solar Mission of GoI targets installing 100 GW grid-connected solar power plants by the year 2022. As per the Government of Karnataka's Solar Policy 2014-21, it is envisaged to install a minimum of 6000MW solar power projects by March 2021, of which the share of grid connected SRTPV projects shall be 2400 MW. The Commission notes that only 12% of the target for grid connected SRTPV capacity has been achieved so far.

6. The Tariff Policy dated 28.01.2016, issued by the Government of India (GoI), 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 GoI. Pursuant to the said Policy, the Government of India had issued the Bidding Guidelines on 03rd August, 2017, duly prescribing the 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 Government of Karnataka 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 has 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.

As per the said Policy, the Commission is required to determine the Generic tariff for small ground mounted solar projects of the capacity of less than 5 MW and SRTPV projects of up to 2000kW (including SRTPV projects of 1kW to 10kW) which are not covered under competitive bidding.

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7. In order to encourage installation of SRTPV units in the State, the following steps were taken by the Commission:
- a. The Commission, vide its order dated 22.05.2020 had extended the validity of the SRTPV Tariff Order dated 01.08.2019 by retaining the same tariff in respect of new solar rooftop photovoltaic units of 1kW to 10kW capacity installed by domestic consumers at Rs.3.99 per unit (without subsidy) and Rs.2.97 per unit (with capital subsidy) valid upto 31.03.2021.
 - b. The Commission, in its Order dated 18.05.2018, had allowed the installation of SRTPV plants on the Government buildings by the ESCOMs under Government funding scheme, with the energy generated from such plants being allowed to be utilised by the concerned office/institution and inject any surplus energy into the grid, on net metering basis with the tariff as indicated in the 22.05.2020 Order;
 - c. The Commission, in its Order dated 15.09.2017, has also allowed installation of multiple SRTPV units or single SRTPV unit with the combined installed capacity in a single premise not exceeding the total sanctioned load of all the consumers in that premises, at a tariff equal to 90% of the tariff as per its Order dated 22.05.2020;
 - d. As per clause-13 of KERC (Implementation of Solar Rooftop Photovoltaic Power Plants) Regulations, 2016, the Commission has also allowed to install SRTPV plants up to the capacity of 2000 kW 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.
 - e. The Commission, vide its Order dated 09.12.2019 has allowed third party investment on the Roof of the consumers building under various models and issued the guidelines there on for Solar Roof Top Photovoltaic plants,

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by approving the Tariff as per the prevailing Generic Tariff Order issued by the Commission from time to time. However, the Order has been challenged by Amplus Energy Solutions Private limited and others, before Hon'ble ATE in Appeal No:41 of 2021 and IA No:168 of 2020 and the decision in the matter is pending before the Hon'ble ATE.

8. The Central Electricity Regulatory Commission (CERC), on 23.06.2020 has notified "CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2020", for determination of tariff in respect of Renewable energy sources. The following are the salient provisions relating to renewable energy projects:

1. Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of renewable energy projects:

- i. Solar PV power projects, floating solar projects and solar thermal power projects;
- ii. Wind power projects (both on-shore and off-shore);
- iii. Biomass gasifier based power projects and biogas based power projects – if a project developer opts for project specific tariff;
- iv. Municipal solid waste based power projects and refuse derived fuel based power projects;
- v. Renewable hybrid energy projects;
- vi. Renewable energy with storage projects; and
- vii. Any other project based on new renewable energy sources or technologies approved by MNRE.

2. Financial and operational norms specified in those Regulations, except for capital cost shall be the ceiling norms while determining the project specific tariff.



9. As per Section 61 (a) of the Electricity Act, 2003, the Commission is guided by the Regulations issued by the CERC in the matter of transmission and generation tariffs. Under this provision, the Commission have to determine the tariff for the supply of electricity by a generating company to a distribution licensee.
10. The Rules issued by the Ministry of Power, Government of India, provide that wherever the SERCs have issued Regulations prescribing the maximum capacity for net metering, such regulations shall prevail. However, in the absence of Regulations, the Electricity (Rights of Consumers) Rules, 2020 issued by the Ministry of Power, Government of India, prescribe the maximum capacity in respect of SRTPV with net metering facility as 10 kW and for Gross metering capacity above 10 kW of SRTPV plants.
11. Since, the validity of the order dated 1st August, 2019 on generic tariff of Solar projects was extended up to 31.03.2021, vide Commission's Order dated 22nd May, 2020, the Commission was required to determine the generic tariff in respect of the Solar projects to be given effect from 1st of April, 2021. Hence, the Commission issued a Discussion paper on 3rd February, 2021 inviting suggestion/ views / objections from the stakeholders.
12. In response to the said Discussion Paper issued by the Commission, various stakeholders including some of the ESCOMs have submitted their written comments/views/suggestions. The Commission has considered some of the relevant suggestions relating to the operational parameters for determining the tariff and the Commission has also noted other views/suggestions submitted by the stakeholders.



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13. Subsequently, the Ministry of Power, Government of India has notified the Electricity (Rights of Consumers) Amendment Rules, 2021 in the Gazette of India, Extraordinary, Part-II, Section 3, Sub-section (i), wherein sub rule (4) has been substituted as detailed below:

"(4) The arrangements for net-metering, gross-metering, net-billing or net feed-in shall be in accordance with the regulations made by the State Commission, from time to time:

Provided that where the regulations do not provide for net-metering, net-billing or net feed-in, the Commission may allow net metering to the Prosumer for loads up to five hundred Kilowatt or upto the sanctioned load, whichever is lower and net-billing or net feed-in for other loads:

Provided further that in the case of Prosumers availing net-billing or net feed-in, the Commissions may introduce time-of-the-day tariffs whereby Prosumers are incentivised to install energy storage for utilization of stored solar energy by them or feeding into the grid during peak hours thus helping the grid by participating in demand response of the Discoms:

Provided also that in case of net-metering or net-billing or net feed-in, the distribution licensee may install solar energy meter to measure the gross solar energy generated from the Grid Interactive Rooftop Solar Photovoltaic system for the purpose of renewable energy purchase obligation credit, if any:

Provided also that the Commission may permit gross-metering for Prosumers who would like to sell all the generated solar energy to the distribution licensee instead of availing the net-metering, net-billing or net feed-in facility and the Commission shall decided for this purpose the generic tariff for gross-metering as per tariff regulations:'

14. The Commission held a public hearing in the matter on 04.08.2021. Before the hearing was conducted, the stakeholders were notified that in accordance with Electricity (Rights of Consumers) Amendment Rules, 2021, the Commission would allow net metering for installing SRTPV for capacity upto 500kW or upto sanctioned load whichever is lower, in modification of the earlier proposed capacity of 10kWs



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15. The stakeholders who participated in the hearing, made their oral submissions before the Commission. The list of Stakeholders who filed their comments/suggestions and those who made oral submissions in the public hearing is given in the Annexure, to this Order. The decisions of the Commission on the suggestions relevant to the issue, are discussed in the subsequent paras of this Order.
16. The Commission, as per its KERC (Implementation of Solar Rooftop Photovoltaic Power Plants) Regulations and Order dated 1st August, 2019, has allowed to install SRTPV plants upto 2000 kW or sanctioned load whichever is lower. Hence, the applicability of the Electricity (Rights of Consumers) Rules and Amendments thereon, prescribing 500 kW as the maximum capacity, was re-examined and since the Commission's Regulation permit installation of a maximum capacity upto 2000 kW, the Commission has decided to regulate maximum capacity upto 2000 kW or upto the sanctioned load whichever is lower, as per above Regulations and Order of the Commission.
17. The Commission, in the discussion paper had proposed a three-year control period for the generic tariff from FY22 to FY24. But the Commission has observed that there is considerable increase in the cost of the modules/equipment and the cost of other related costs. It is likely that the costs may increase further in the years to come. In order to ensure that the prospective investors do not incur such unforeseen losses due to increase in the costs of installing the Solar units, and also to ensure reasonable returns to the investors, the Commission has decided to curtail the proposed Control Period from three years to two years i.e. from FY22 - FY23.



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18. Due to Covid-19 Pandemic and closure of office, the working of the Commission was hampered and there has been delay in finalizing and determining the Generic Tariff.
19. After considering the view and submissions made by the stakeholders and in exercise of powers conferred under section 62(1)(a), read with Section 64 and 86(1)(e) and other enabling provisions of the Electricity Act, 2003, the Commission hereby proceeds to determine the Generic Tariff for ground mounted solar power projects of capacity up to 5 MW and the kW scale solar roof top Photovoltaic Power Plants up to 2000 kW capacity (including 1kW to 10 kW SRTPV) for period FY22 to FY23.

ORDERS

1. The proposals in the Discussion paper, stakeholder's suggestions and decisions of the Commissions on the operational and financial parameters, for determination of tariff for the above plants are as follows:

i) Life of the Plant:

The Commission had proposed the life of the plant as 25 years, for the purpose of determination of tariff.

Balark Solar Pvt Ltd., has suggested that the Grid Tied Inverter and solar PV Modules used in solar power Generation System forms the core components. Hence, Three-time replacement of Grid Tied Inverter (after-10 years, 15 years and 20 years) may be considered for the life of the solar Power Generation System.



Commission's Decision:

The Commission notes that till date the life of the Solar plants has not been established through studies in the country. The life of the plants as 25 years is generally based on the warranty of 25 years given by the manufactures of the Photovoltaic modules. Since, the solar modules are the core component of the solar power generation, the life of the plant shall have to be based on the life of the core component. Further as per CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2020, the life of the planned is specified as 25 years. Further, the Commission, in all its previous 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:

Since the life of the plant is being considered as 25 years, the Commission proposes to adopt levellised tariff for a period of 25 years. The levellised tariff is considered to provide regular revenue streams duly taking into account the time value of money. In the discussion paper, the Commission desired to know from the stakeholders and interested persons as to whether a separate tariff should be determined for power plants availing the benefits of capital subsidy from MNRE.

BESCOM, PCKL and KREDL have suggested subsidy of 40% of the capital cost for residential sector, and 20% for other than residential sector based on the likely subsidy allocation by the MNRE.



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:

The Commission has not proposed allowing any degradation factor in the discussion paper. But the Commission has been considering the degradation factor in its earlier Orders. The Commission notes that, there is no reliable data on degradation, as solar power generation in the country is in growing stage. The stakeholders have also not proposed any degradation factor for determination of tariff.

Commission's Decision:

The Commission in its earlier Order has considered reduction of 0.5% of net generation as annual degradation factor commencing from fifth year onwards, for MW scale projects. The Commission, therefore, decides to allow degradation factor of 0.5% of the net generation, as annual degradation from the fifth year onwards only in respect of MW scale projects.

iv) Capacity Utilisation Factor: (CUF)

In the Discussion Paper, the Commission had proposed a CUF of 19% for all the Solar Power Plants. The following are the suggestions from the stakeholders:

- a) BESCO has suggested to consider the CUF of 20% for MW scale projects.

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- b) Powergate Energy (Mysore) Pvt Ltd., has suggested to consider CUF of 17.5% for SRTPV.
- c) KREA has also suggested, to consider CUF of 17.5% for SRTPV.
- d) PCKL has suggested to consider the CUF of 27% for MW scale projects.
- e) Sri. Raghunandan S.S, Karnataka Renewable Energy Association, has suggested to considered the CUF of 17.5% for SRTPV.
- f) Sri. C.S Gopinath, GTSS infrastructure, has suggested to consider the CUF of 17.5% for SRTPV.
- g) Sri. Sunil Mysore, Hinren Engineering, Bengaluru, has suggested to consider the CUF of 17.5% for SRTPV.
- h) Sri. Kesari, Power Gate Energy, Mysore, has suggested to consider the CUF of 17.5% for SRTPV.

Commission's Decision:

The Commission, in its earlier tariff Orders had considered CUF of 19% for solar photovoltaic plants. In the CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2020, notified on 23.06.2020, it has allowed the minimum CUF for Solar PV Power Projects as 21%. The Commission notes that the CUF of Solar Plants would vary based on the irradiation profile and other parameters prevailing in the locations. It is always advisable 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 results in a lower CUF which is not in the interest of the investors/ other stakeholders. In any case, while determining generic tariff, locational disadvantages of a few plants cannot be generalised and factored.

The Commission is of the view that, since the available technologies are yet to establish the exact CUF and the degradation factor and since adequate

data is not available, the Commission has to consider a reasonable CUF to balance the interest of the investors as well the consumers., Hence, based on the earlier orders of the Commission it decides to adopt a CUF of 19% for solar Plant (both ground mounted and SRTPV Plant).

v) Debt Equity Ratio:

For determination of Generic Tariff, this Commission in its earlier Tariff Orders and the CERC has considered 70:30 as the Debt Equity ratio. The Commission proposes to continue to consider the debt equity ratio of 70:30 for all the Solar Power Plants.

vi) Capital Cost:

a. The Commission, in its earlier Solar Generic Tariff Orders had considered the Capital Cost as follows:

- i. 1kW to 10 kW (domestic consumer) at Rs.45,000 per kW;
- ii. 1kW to 2000 kW-at Rs.32,800 per kW for SRTPV plants (other than SRTPV consumer covered under (i)) and;
- iii. Rs.340 lakhs per MW for MW scale and ground mounted solar power plants.

b. The Commission had proposed to consider the following latest market rates as compared to the capital cost considered in its earlier Generic Tariff Order:

- i. 1kWto 10 kW (domestic consumer) at Rs. 43,760 per kW;
- ii. 1kW to 2000 kW-at Rs. 30,218 per kW for SRTPV plants (other than SRTPV consumer covered under (i)) and;
- iii. Rs.327.18 lakhs per MW for MW scale and ground mounted solar power plants.

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c. Suggestions from the Stakeholders:

- i. Powergate Energy Pvt Ltd., (Mysore), has suggested that the capital cost for 1 kW to 10 kW domestic-as Rs.54000 per kW and suggested for 1 kW to 2000 kW (non-domestic) as detailed below.

Capacity	Cost per kW
1-4 kWp	Rs.60,000
5-14 kWp	Rs.52,000
15-48kWp	Rs.46,000
49 – 2000 kWp	Rs.41,000

- ii. AMP Energy India Private Limited has suggested that the Capital cost of SRTPV has increased in the past 3 months, post lock down due to shortage of raw materials (like toughened glass, metal etc.) and disruption in supply chain globally (module delivery etc.). Also the Govt. of India is contemplating levy of basic Custom Duties on solar cells and solar modules, which will likely to increase the cost of Indian and International modules, in this year and the next financial year.
- iii. KREA has suggested to consider capital cost of Rs.54,000 per kW for the 1-10 kWp category. And for the 1-2000 kWp SRTPV category, as weighted average cost based on the installed capacities in each category with ranges 1-5 kW-Single Phase, 5-17.5 kW Three Phase LT, 17.5 kW to 50 kW Three Phase LT and 51 – 2000 kW.
- iv. Tata Power solar, has suggested the capital cost for SRTPV as detailed below;

Category	Benchmark Price (Rs./Wp)
Up to 2	60
>2 to 4 kW kW	58
5 kW – Single Phase	54



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5 kW – Three Phase	58
6 kW – to 10 kW	54
> 10 to 100 kW	44
> 100 to 500kW	40

And MW Scale and ground mounted solar power plants – Rs.360 Lakhs per MW.

- v. Federation of Karnataka Chambers of Commerce & Industry, has suggested to retain the capital cost for SRTPV for capacity 1 kW to 2000 kW as Rs.32800 per kW.
- vi. KPTCL has requested to explicitly indicate that the Capital Cost considered includes the cost of dedicated evacuation line from the power plant to KPTCL Sub-station and the O&M cost allowed also includes O&M charges payable to KPTCL for maintenance of bays and lines as per the KERC order dated 14.12.2018.
- vii. Balark Solar Pvt Ltd., has suggested to increase the capital cost at least 15% to 20%.
- viii. PCKL has suggested the capital cost for 1 kW to 500 kW as detailed below.

Capacity Range	Bench mark Cost (Rs. per Watt)
1kW	47
>1 to 2kW	43
>2 to 3 kW	42
>3 to 10kW	41
>10 to 100 kW	38
>100 to 500kW	36

- ix. Sri. Ramesh Shivanna, Chairman, Energy Committee, FKCCI, has suggested the capital cost for 1 kW to 10 kW at Rs. 50000/- per kW, 1 kW to 2000 kW - Rs.40000 per kW and for MW scale- Rs.360 lakhs per MW.



- x. Sri. Raghunandan S.S, Karnataka Renewable Energy Association, has suggested to consider the Capital cost for SRTPV as detailed below:

Capacity	Capital Cost/kW including GST without maintenance
3 kW	Rs.77,600
5 kW	Rs.72,100
10 kW	Rs.62,400
17.5 kW	Rs.55,200
50 kW	Rs.52,200
100 kW	Rs.52,600

Commission's Decision:

The Commission takes note of the suggestions from the various stakeholders and also finds that there is increase in the cost of PV modules with other civil and electrical equipment.

The Capital cost of Rs.327.18 lakhs per MW was proposed in the discussion paper based on the market prices as on 19.01.2021 available on the website-i PV Insight, a network of reliable price information contributors of actual prices and sales contracts of Solar PV components. The average module cost was Rs.12.32 per watt. It is noted that most of the developers have shown serious concern about the increase in the cost of module/panel/inverter cost due to levy of safeguard duty and GST on the solar panels and have proposed a higher capital cost. The Commission has found that as per PV Insight report as on 09.08.2021, the average module cost is at Rs.14.45 per watt. The increase in the cost is also due to increase in the exchange rate of USD per MW. The average of 6 months USD rate as per RBI is considered. The Commission also notes that there is an increase in

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the cost of works relating to civil, cost of mounting structure, power conditioning unit, evacuation lines and equipment and general works etc., which accounts for an increase by more than 8% to 10% as compared to the earlier costs adopted in the previous tariff year.

As per the Ministry of Finance Notification dated 29.07.2020, for the solar cells, the applicable rate of safeguard duty is 14.9% for imports during the period from 30.07.2020 to 29.01.2021, 14.5% for imports during the period from 30.01.2021 to 29.07.2021. After 29.07.2021 there is an uncertainty in the applicable rate of safeguard duty.

Considering the increase in the costs as discussed above, the Commission has considered capital cost of Rs.350.46 Lakhs per MW for determination of tariff, by considering the 'safeguard duty' at the rate of 14.5% till 29.07.2021 and GST as per the clarification issued by the Ministry of Finance (MoF) Government of India dated 22nd December, 2018, wherein 70% of the gross value shall be deemed as the value of supply of said goods attracting 5% rate and the remaining portion (30%) of the aggregate value of such EPC contract shall be deemed as the value of supply of taxable service attracting standard GST rate which needs to be considered for computation of GST. As per the notification dated 31.12.2018, issued by Ministry of Finance (MoF) Government of India, 18% of GST is considered for service by way of construction or engineering or installation or other technical services, provided in relation of setting up of solar power generating system.

The Commission further notes that the payment of the safeguard duty arises only in case of imported solar cells/modules and if the developer uses the

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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 the 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 concerned ESCOM on production of bill of entry and documents thereon for actual reimbursement/payment of safeguard duty paid to the competent authority by the generators/developers. This amount will be paid to the generator/developer by the concerned 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.

In respect of SRTPV plants of 1 kW to 2000 kW, the capital cost of MW projects has been considered on a prorate basis and computed as Rs. 35,046 per kW (excluding safeguard duty). The payment of safeguard duty as applicable to MW scale project on annuity basis, shall also be applicable to roof to projects of 1kW to 2000 kW.

The Commission further notes that the increase in capital cost considering the economy of scale will not be applicable to small SRTPV projects of 1kW to 10kW. Hence, to encourage the domestic consumers to put up SRTPV projects, the Commission has considered capital cost of Rs.46500 per kW

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which is inclusive of taxes, Duty and GST and extra premium to encourage small SRTPV projects.

Considering the above facts, the Commission decides to consider capital cost for ground mounted Solar projects as follows:

Capital Cost for Solar Photovoltaic power plants.		
Sl. No.	Particulars	FY22 to 23
1	Average Module cost-USD/Watt peak	0.196
2	Average of 6 months USD in Rs. as per RBI	73.74
3	Cost of Solar Module in Rs./Watt	14.45
4	Cost of Solar Module in Rs. lakhs /MW	144.53
5	As per the Ministry of Finance vide its notification dated 29.07.2020 the Commission has considered the rate of safeguard duty at rate 14.5%, imported during the period from 01.04.2021 to 29.07.2021.	20.96
6	Cost in Rs Lakhs /MW(Before GST)	165.49
7	Civil and General Works, Mounting Structure, Power Conditioning Unit, Evacuation Lines & Equipment's, preliminary and preoperative expenses IDC etc.,..... Rs Lakhs /MW	154.33
8	Total Capital Cost in Rs Lakhs /MW	319.82
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 per MW	11.19
10	GST of 18% for 30% of the total cost of the project as per clarification issued by Ministry of Finance (MoF) Government of India dated 22.12.2018) in Rs Lakhs per MW	17.27
11	Total cost of the project on Rs Lakhs per MW	348.28
12	Land Cost @ Rs.5.00 Lakhs per acre (5 Acres per MW)	25.00
13	Total Cost of the project including land cost in Rs Lakhs.	373.28
14	Less: The safeguard duty and its GST on the capital cost Rs. 20.96 lakhs + Rs. 1.86 lakhs (Rs. 22.82 lakhs/tenure of PPA), to be reimbursed on production of proof of payment of the safeguard duty by the generators/developers in Rs Lakhs per MW.	22.82
15	Total Capital cost considered for determination- in of Tariff in Rs. Lakhs per MW	350.46

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

1. 1kW to 10kW SRTPV project (domestic consumer) of Rs.46500 per kW
2. 1 kW to 2000 kW SRTPV project (other than SRTPV consumer covered under (1)) Rs.35046 per kW.
3. Ground mounted solar projects of Rs. 350.46 Lakhs per MW.

vii) Operation & Maintenance Cost:

The Commission had proposed to allow O & M expenses at Rs.670/kW for SRTPV units and at Rs.5.03 lakh/MW for ground mounted Megawatt Scale solar plants to meet the inflationary cost.

Commission's Decision:

The Commission notes that the stakeholders have submitted the proposal for O & M expenses without substantiating the reasons and document for consideration. The operation and maintenance cost consists of employee cost, administrative & general expenses and Repairs & Maintenance expenses (O&M). The Commission, in its earlier Orders, had considered O&M expenses at Rs.600/kW for SRTPV units and at Rs.4.50 lakh/MW for ground mounted Megawatt Scale solar plants, with an annual escalation of 5.72%. The Commission after considering the inflation factor, decides to allow O&M expenses at Rs.670/kW for SRTPV units and at Rs.5.03 lakh/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 the interest on loan at 9.30% per annum. The following are some of the suggestions from the stakeholders:

- a) BESCOM has suggested to adopt normative MCLR for 1-year tenure since the minimum base rate is 6.65% per annum.
- b) Powergate Energy Pvt. Ltd, (Mysore), has suggested that the interest rate for 1 kW-10 kW category be considered as 10.5% per Annum and that for the 1 kW - 2000 kW category interest rate may be considered as 9.3% per annum. The loan tenure for 1 kW-10 kW segment may be considered as 5 years and that for 1 kW-2000 kW the loan tenor may be considered as 7 years.
- c) PCKL has suggested interest rate of 8% per annum for a tenure of 15 years.

Commission's Decision:

CERC, in its CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020, has proposed normative interest rate (MCLR) plus two hundred (200) basis points above the average State Bank of India MCLR (One-year Tenure) prevalent during the last available six months.

Considering the prevalent lending rate being the Marginal Cost of Funds-Based Lending Rate (MCLR) at which the bank prices all its loans, the Commission proposes to adopt the latest MCLR rate of 3 years of 7.30% per annum notified by the State Bank of India plus 200 points, which works out to 9.30% per annum.

Therefore, the Commission decides to adopt interest rate of 9.30 % per annum and consider the tenure of loans as 13 years.



ix) Working Capital and Interest on Working Capital:

The Commission, in the discussion paper had proposed one month's receivables for SRTPV Projects and Two Month's receivables for MW scales Ground Mounted Solar Projects and to allow interest on working capital at the rate of 10.00% p.a.

One of the stakeholders namely PCKL has suggested to consider interest on working capital at 8.5% per annum.

Commission's Decision:

The Marginal Cost of Funds-Based Lending Rate(MCLR) is the rate at which the bank prices all its loans. The Commission, in view of the massive reduction in the interest rates being charged on the loans by the banking sector, decides to adopt the latest MCLR rate of 1 year of 7.00% notified by the State Bank of India plus 300 points which will be 10.00% per annum.

The Commission therefore decides to allow 10% per annum as the interest rate for calculating the Interest on Working Capital, equal to one month's receivables for SRTPV Projects and Two Month's receivables for MW scales Ground Mounted Solar Projects.

x) Depreciation:

The Commission, had proposed to adopt the depreciation on 90% of the capital cost (excluding land cost) at rate at 5.83% per annum for the ground mounted project and 5.38% per annum for the SRTPV Projects for the first 13 years, and the remaining depreciation spread equally over the remaining useful life of the ground mounted projects and SRTPV plants.

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The Commission notes that the CERC in its RE tariff Regulations on determination of Tariff for renewable energy sources of 2020, has specified that the salvage value of the asset shall be considered as 10% per annum and depreciation shall be allowed upto maximum of 90% of the Capital cost of the asset.

Commission's 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 5.798% per annum for the ground mounted project and 5.38% per annum for the SRTPV Projects for the first 13 years, and the remaining depreciation spread equally over the remaining useful life of the ground mounted projects and SRTPV.

xi) Return on Equity:

The Commission, had proposed RoE of 14%. The CERC, in its Regulations has also allowed normative RoE of 14%. Whereas Balark Solar Pvt Ltd, has suggested the RoE of 16%.

Commission's decision:

The Commission notes that the prevailing CERC Regulation specify RoE of 14% per annum and this Commission has also adopted such rates in other Generic Tariff Orders. The Commission, therefore, decides to allow RoE of 14% per annum.

xii) Discount Rate:

The Commission, had proposed a discount factor of 10.71%. 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

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weighted average cost of capital (WACC) as the discount factor to arrive at the levellised tariff. The Commission, therefore, decides to reckon Discount Rate of 10.71%, based on WACC.

xiii) Auxiliary consumption:

The Commission, had proposed the auxiliary consumption of 0.25% of the gross generation for MW scale projects based on the decisions in the earlier Orders and not allow any auxiliary consumption for SRTPV plants.

Commission's decision:

The Commission also notes that, there is no substantial documentary evidence to consider the maximum percentage of auxiliary consumption and hence, decides to allow the auxiliary consumption of 0.25% for MW Solar PV Plants in line with the earlier decisions and not to allow any auxiliary consumption for SRTPV.

xiv) Other Issues for kW projects (SRTPV plants):

a) 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 under their own investments.

Commission's decision:

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.

b) 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 and inject any surplus

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energy into the grid on net metering basis with the tariff for any surplus energy injected as determined by the Commission, for the purpose of accounting the power purchase cost for the surplus energy, in view of the fact that the respective ESCOMs have to maintain STRTPV.

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, for the purpose of accounting the power purchase costs towards the surplus energy, in view of the fact that the respective ESCOMs have to maintain STRTPV.

- c) 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 premise not exceeding the total sanctioned load of all the consumers in that premises at 90% of the generic tariff as determined by the Commission.

Commission's decision:

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

- d) The Commission, in its Order dated 09.12.2019 has allowed various models on the third party investments for installing SRTPV on the Consumers' building, with the Generic tariff as determined by the Commission from time to time.

Commission's decision:

The Order has been challenged by Amplus Energy Solutions Private limited and others, before Hon'ble ATE vide Appeal No:41 of 2021 and

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IA No:168 of 2020. Subject to the decision of the Hon'ble ATE in the matter, the Commission allows the tariff for any surplus energy injected as determined by the Commission, in this order.

e) The Commission approves the Timelines for various activities involved in implementation of SRTPV projects, as detailed below:

Activity	Responsibility	Timeline
Submission of Application	Consumer	Zero Date
Acknowledgment of Application by distribution licensee (ESCOM)	ESCOM	Within 03 (three) working days from zero date
Site Verification / Technical Feasibility & issuance of Letter of Approval / Rejection of application.	ESCOM	Within 10 (ten) working days from the date of acknowledging the application
Execution of PPA (including countersignature by the controlling officer for less than 500 kW SRTPV projects)	ESCOM & Consumer	Within 5 (five) working days from the date of issuance of Letter of Approval
Submission for approval of the PPA for the Commission(For more than 500kW)	ESCOM	Within 07 (Seven) working days from the date of execution of PPA
Submission of Work Completion Report by the Consumer	Consumer	150 (one hundred and fifty) days from the date of execution of PPA.
Inspection by ESCOM officials for commissioning the project, after receipt of work completion report from the consumer.	ESCOM	Within 5 (five) working days from the receipt of work completion report.
Commissioning of Rooftop Solar System	Consumer/ ESCOM	Within six months from the date of approval or deemed approval of PPA .
Billing Process	ESCOM	30 days from the date of commissioning of the Solar plant.

xv) With the above parameters considered, the applicable tariff works out as follows:



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

Parameters for Kilowatt scale		
Cost/kW- in Rs.	1kW to 10kW – Rs. 46,500 per kW as base	1kW to 2000kW- Rs 35,046 per kW as base
Useful life of the plant in years	25	25
Debt: Equity Ratio	70:30	70:30
Debt- in Rs.	32,550	24,532
Interest Rate on Debt-%	9.30	9.30
Debt Repayment in Yrs.	13	13
CUF in %	19	19
Equity- in Rs.	13,950	10,514
ROE-%	14	14
Auxiliary consumption	0	0
O & M expenses in Rs. /kW	670	670
O & M Escalation p.a. (%)	5.72	5.72
WC interest (one month's receivables) in %	10	10
Depreciation in %	5.38% p.a for first 13 years and remaining depreciation spread equally over balance years of the plant useful life.	5.38% p.a for first 13 years and remaining depreciation spread equally over balance years of the plant useful life.

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

Parameters for Megawatt scale solar projects	
Cost/MW- Rs. Lakhs	350.46
Useful life of the plant in years	25
Debt: Equity Ratio	70:30
Debt-Rs. Lakhs	245.32
Interest Rate on Debt-%	9.30
Debt Repayment in Yrs.	13
CUF	19
Equity- Rs. lakhs	105.14
ROE-%	14%
Auxiliary consumption	0.25
O & M expenses in Rs. Lakhs/MW	5.03
O & M Escalation p.a. (%)	5.72
WC interest (two months' receivables)	10%
Depreciation in %	5.798% p.a for first 13 years and remaining depreciation spread equally over balance years of the plant useful life.



For the forgoing reasons, we pass the following:

ORDER

- (i) The Commission hereby determines the generic tariff as follows:
- For grid connected megawatt scale solar power projects of less than 5 MW capacity at Rs.3.10 per unit;
 - For grid connected solar Rooftop Photovoltaic projects of 1 kW to 2000kW (excluding 1 kW to 10 kW) at Rs.3.19 per unit and
 - For grid connected Solar Rooftop photovoltaic projects of 1 kW to 10 kW for domestic consumers at Rs.4.02 per unit (without capital subsidy) and at Rs.2.67 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 01.04.2021.
- (iii) The tenure of the PPA, shall be for the life of the solar power projects i.e., twenty-five (25) years;
- (iv) All the other issues not covered under this order, shall be governed by the respective Regulations and Orders issued by the Commission and PPAs/ other Agreements executed with the parties; and
- (v) This Order shall be in force effect from 1st of April, 2021 and applicable to the control period FY 22 & FY 23.

This Order is signed and issued by the Karnataka Electricity Regulatory Commission on this 18th day of August, 2021.


(SHAMBHU DAYAL MEENA)
CHAIRMAN

18/8/2021


(H.M.MANJUNATHA)
MEMBER

18/8/2021


(M.D.RAVI)
MEMBER

ANNEXURE

List of stakeholders who have submitted their written
Comments/Suggestions within 08.03.2021

Sl. No.	List of stakeholders who have submitted their written Comments/Suggestions within 08.03.2021
1	Bangalore Apartments Federation
2	Eco Soch
3	BESCOM
4	Powergate energy(Mysore)Pvt. Ltd.
5	Amp Energy India Private Limited
6	KREA
7	Tata Power Solar
8	Emmvee Photovoltaic Power Private Limited
9	Federation of Karnataka Chambers of Commerce & Industry
10	Trinity Complex Apartment Owners Association
11	White House Association
12	Prestige Fersns Residency Apartment Owner's Association
13	Samhita Castle Apartment Owners Welfare Association
14	Sri Mitra Spring Valley Apartment Owners Association
15	Sai Nandana Gardenia Apartment Owners Association
16	Temple Bells Premier
17	RAOA-Raindrops Apartment Owners Associations
18	KPTCL
19	BESCOM (DSM Section)
20	KREDL
21	Balark Solar Private Limited
22	PCKL
23	Shogeo Power Technique Private Limited
24	Umakanth

Clearance
18/8/2021

List of persons participated in Public Hearing on 04.08.2021:

Sl. No.	Name of the participants	Name of the Firm/Company
1	Sri. Ramesh Shivanna	Chairman, Energy Committee, FKCCI
2	Sri. K.L.H. Raya	Secretary, KRESMA
3	Sri. Raghunandan S.S.	Karnataka Renewable Energy Association
4	Sri. C.S.Gopinath	GTSS Infrastructure
5	Sri. Sunil Mysore	Hinren Engineering, Bengaluru
6	Sri. Kesari	Power Gate Energy, Mysore
7	Sri. V.Shankar	Bangalore Apartment Federation
8	Sri. Aravind	Managing Director, Inergia Solar Pvt. Ltd.
9	Sri. Krishnakumar Shetty	Prasiddi Solar Pvt. Ltd.,Bangalore
10	Sri. Nithyananda	ORB Energy Pvt. Ltd.,
11	Sri. Shesha Prasanna	ESPEE Solar Pvt. Ltd, Bangalore
12	Sri. Ravindranath Hegde	Energy Empire, Hosapete
13	Sri. Uma Shankar	Bangalore
14	Sri. John D.	Ecosoch Solar Pvt. Ltd.,
15	Sri. George Kutty,	Shogeo Power Pvt. Ltd.,
16	Sri. Ekambharam	Green Energy Pvt. Ltd.,
17	Sri. Dinesh	PRDCL, Bangalore
18	Sri. Krishna Revankar	Balark Solar Pvt. Ltd., Bangalore
19	Sri. Giridhar,.	EMVEE Solar
20	Sri. Satish Malya	Centpry Saris
21	Sri. Girish,	Consumer
22	Sri. Adharsh,.	Product Supplier
23	Sri. Naveen BM,	U-Solar Clean Energy Solutions Pvt. Ltd.

The list of persons who attended the Public Hearing on 04.08.2021

Sl. Nos	Names of the Participants	Name of the Firm/Company
1	Ramesh Shivanna, Chairman,	FKCCI
2	KLH Raya, Secretary,	KRESMA
3	Shashi Kiran	Arushi Green Energy
4	Raghu Nandan	KREA
5	Gopinath	GTSS, Infrastructure Pvt, Ltd.,
6	T.K.,Mohan	Solar-Tech System Pvt. Ltd.,
7	Anthony Geroge	Mya Solar Systems Pvt.Ltd
8	Sunil Mysuru	Hinren Engeneering
9	Harish	Chartered Accountant
10	Krishnappa V, MD	PCKL,
11	Nagarajaiah	BESCOM
12	Kesari	Powergate Energy Mysore Pvt.Ltd
13	Abhishek	Powergate Energy Mysore Pvt.Ltd
14	Vikram	Bangalore Apartment Federation
15	Shankar	Bangalore Apartment Federation
16	Srinivas G V	Renewable Energy Applications & Products
17	Nataraj G	Tapan Business Solutions
18	K S Prasanna	PCKL



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19	Raghu P	Ample Energy India Pvt.Ltd
20	B R Manjunath	KPTCL
21	Anil	KPTCL
22	Rajeshwari	BESCOM
23	Sudha B R	BESCOM
24	Naveen B M	U Solar
25	KrishnakumarShetty	Prasiddi Solar Pvt.Ltd
26	Nityananda	ORB Energy
27	Muddu Krishna	Prasiddi Solar Pvt.Ltd
28	Rajashekar	Sun Amps Energy Pvt Ltd
29	Shesha Prasanna	EsPee Solar Pvt.Ltd
30	Venkatesh	DigiStar Energy Pvt Ltd
31	Prashanth	Tata Power Pvt Ltd
32	Tabish	Tata Power Pvt Ltd
33	Ravindranath Hegde	Kudlgi Energy Empire, Hospet
34	B Srinivas	Sri Shashwath Renewable Energy
35	Mahesh	Cassine Renewable Pvt. Energy
36	Raj	Saathivik Green Pvt Ltd
37	Naeen D R	Involute Engeneering Services
38	Hithesh	Arlan Energies
39	M Umesh	Instant Ventures Pvt Ltd
40	M Prabhakar	Mahindra System
41	Milind Goshi	Waaree Energy
42	Rathnakar Shastri	Avi solar Tech, Banglore
43	Uma Shankar	Girinagar
44	John D	Ecosoch Solar Pvt Ltd
45	George Kutty	Shogeo Power Technique Pvt Ltd
46	Ekambaram	Grrn Energy
47	Yogesh	Enerpare Energy
48	Rajashekar	Enerpare Energy
49	Dinesh	PRDC
50	Venkatesh Prasad	Alectrona Energy
51	Satish Malya	Centpury Saris
52	Vinay	Clean Max Solar
53	Vasu	Clean max Solar
54	Manjunath	Prompt Solar
55	Manish Asija	Enposibilitities Pvt Ltd
56	Mohan Murali	Balark Solar
57	Krishna Ravindra	Balark Solar Bangalore
58	Dhwani	U Solar
59	Harish	Win Sol Energy
60	R.Mallesh	Green Power Solution
61	Channamariyappa	Sampoorna Farms
62	Deepak	Sampoorna Farms
63	Nagarjun	Waaree Energies
64	Nikil	Nithyashree Solar
65	Sitaram Kemmannu	Wind Project, Hospet
66	Mallanagouda	Wind Project, Hospet
67	Nagaraj Rao	Tumkur
68	Giridhar	Emvee Solar