

KARNATAKA ELECTRICITY REGULATORY COMMISSION

Date: **9th February, 2017**

“Discussion paper on revision of tariff for megawatt scale Solar Power Plants”

1. Preamble:

The Karnataka Electricity Regulatory Commission (KERC) considers that there is an urgent need to review the current generic tariff determined for megawatt scale solar power projects in the State for the reasons discussed in this paper.

The Commission as a part of its efforts to promote generation of electricity from renewable sources of energy by issue of appropriate regulations has stipulated that (apart from other obligated entities) every distribution licensee in the State should purchase 0.25% of their total procurement from solar power. The Commission has also made provisions for purchase of solar Renewable Energy Certificates (REC) by the obligated entities to meet their stipulated solar Renewable Purchase obligation (RPO). This measure is in addition to periodical determination of generic tariff for solar power projects based on capital cost and other relevant parameters to encourage investments.

The Government of India has adopted a mission mode approach to promote solar power generation in the country and extended financial and other incentives to the investors and also to the distribution licensees. By its Resolution dated 1st July, 2015, the Government of India has revised the National Solar Mission targets from 20,000 MW to 1, 00,000 MW to be achieved by the year 2021-22. This targeted capacity is proposed to be achieved through deployment of 40,000 MW of Rooftop solar projects and 60,000 MW of large and medium-scale solar projects. The target for the State are at 2300 MW and 3397MW respectively by 2021-22.

While in order to encourage this nascent sector, initially, distribution licensees were encouraged to purchase solar power at preferential tariff fixed by the appropriate Commissions. The Central and State Governments have later on

recognised the advantages of procurement through competitive bidding in the overall interest of all the stakeholders. The Clause 6.4(2) of the Tariff Policy issued on 28th January, 2016 states that:

“States shall endeavour to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from waste to energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to be notified by the Central Government.”

Subsequently, the Ministry of New and Renewable Energy(MNRE), on 22nd March, 2016 has issued draft guidelines for tariff based competitive bidding process for grid connected Solar Photovoltaic power projects. The final version of such guidelines is yet to be notified by the MNRE. Even before these developments, the State had initiated the process of solar power procurement through bidding.

In its periodical determination of the tariff for the grid connected solar photovoltaic, solar thermal power plants and rooftop solar photovoltaic and other small solar power plants, this Commission has kept in view the market developments and changes in capital costs. The following Orders issued by the Commission so far reflect these changing factors in declining tariff:

Sl. No	Date of issue of Tariff Order	Tariff	Applicable Period
1	26.11.2008	Solar PV Plants- Rs.3.40 per unit Solar Thermal Plants- Rs.3.40 per unit (Plus additional incentives from MNRE)	For demonstration projects during the 11th Plan period (2007-2012)
2	13.07.2010	Solar PV Plants- Rs.14.50 per unit Solar Thermal Plants- Rs.11.35 per unit.	For plants commissioned on or before 31 st March, 2013
3	10.10.2013	Solar PV Plants- Rs.8.40 per unit Solar Thermal Plants- Rs.10.92 per unit.	For plants entering into PPA on or after 1 st April, 2013 and upto 31 st March, 2018.
4	30.07.2015	Solar PV Plants- Rs.6.51 per unit Solar Thermal Plants- Rs.10.85 per unit	For plants entering into PPA on or after 1 st September, 2015 and getting commissioned during the period 1 st September, 2015 to 31 st March, 2018.

The Commission is issuing this discussion paper as a part of its continued exercise to ensure that, in the interest of the consumers, the tariff determined reflects the current costs.

2. Amendments to Karnataka Solar Policy 2014-21

The Government of Karnataka has notified certain amendments to the Solar Policy 2014-21 on 12th January, 2017. The solar energy potential for the State is estimated at 24700 MW. It is proposed to install a minimum of 6000MW of solar power projects including grid connected rooftop generation projects upto 2400 MW by March, 2021. The policy also concurs with the target of Solar RPO of 8% for the State as fixed by the MNRE, by March, 2021. The capacity addition also focuses on distributed generation spread across all Taluks of the State.

3. Progress of Solar Power Sector in Karnataka:

The energy requirement in the State has been increasing every year. The State's energy requirement from FY 2011-12 to FY 2016-17 is as follows:

Figures in Million Units					
FY12	FY13	FY14	FY15	FY16	FY17
52934	56794	57606	59945	62745	65439

(Data for FY12 to FY15 is as per Annual Performance Review and for FY16 & FY17 is as per approved ARR)

The cumulative growth in energy requirement between FY12 and FY17 is 24% i.e., an annual average growth of about 5%. To meet this increasing energy requirement, investment in the required additional generation capacity, especially with short gestation period and dependent on locally available resources having no adverse impact on environment, needs to be encouraged. It also needs to be ensured that the cost of power is not high. Solar power projects meet substantially all these parameters.

The State receives an annual average daily Global Horizontal Irradiance (GHI) in the range of 5.41-6.02kWh/m²/day and an annual average Direct Normal Irradiance (DNI) of 4.87-5.68kWh/ m²/day. The State's average GHI is 5.82 kWh/ m²/day and DNI is 5.39 kWh/ m²/day. KREDL, the State nodal agency mandated to promote renewable energy sector in the State, has allocated 3004 MW of Solar Power Generation for development and 329 MW has been

commissioned as on 30th October, 2016. The figures available regarding the proposed projects currently at various stages of implementation both by private and public entities however indicate that the State is likely to achieve a installed capacity exceeding 6000MW by 2022. The Commission recognises that as a part of the State's efforts to curb carbon emission and protect environment, while keeping in view grid issues of stability, financial interests of the utilities and tariff impact on the consumers, a reasonable capacity beyond the RPO requirement may have to be considered at a later date.

4. RPO Targets:

By the Commission's notification dated 19th November, 2015 the Distribution Licensees in the State are required to purchase 0.25% of their total power purchase in FY16 and the same is increased every year to reach 2.50% in FY20. Available figures indicate that the distribution licensees should be able to easily achieve these RPO targets by purchasing power from solar power projects in the State.

5. Market Development and Competition:

With the increasing demand for power from highly diversified generation sources, there is rapid development in solar power sector in terms of investments, technology and innovations. The benign policies of the Central Government and the State Governments have made it possible for local, national and international players to participate in the Indian power markets. This trend is largely visible in the last five years both in manufacturing of solar cells/panels and commissioning of solar power plants. Such positive developments in Solar power market have resulted in healthy competition resulting in drastic reduction in the cost of solar power generation. Thereby the end consumers of electricity stand to benefit by cheaper and environmentally friendly source of power generation.

6. Tariff of Solar Power from Megawatt scale projects Purchased by ESCOMs:

The Commission notes that, in the recent years except for the 1-3MW solar power plants allocated to farmers, all other solar power procurement by

ESCOs is made through bid route. The ESCOs in the State are buying solar power based on rates discovered in the competitive bidding. KREDL, is coordinating procurement of Solar power on behalf of the ESCOs by floating tenders.

The price discovery for solar power procurement in FY13 through bids was in the range of Rs.7.94 to Rs.8.50 per unit. The same in FY14 was in the range of Rs. 6.66 to Rs.8.05 per unit and in FY15 it was in the range of Rs.6.71 to Rs.7.12 per unit.

The Commission notes that, as compared to the rates determined under Section 62, the rates discovered under Section 63 (Bid Route) are far lower. As of now, the rate determined by the Commission, as per its Order dated 30th July, 2015, is Rs.6.51 per unit for plants to be Commissioned upto 31st March, 2018. This rate would be applicable to those developers, successful in bids of the control period of earlier tariff orders, who could not commission their projects within the specified time but would be able to do so during the control period of the current Tariff Order dated 30th July, 2015.

Media reports show that some States have received bids from developers to supply solar power around Rs. 4.00 per unit. As per the results of recent tenders opened by SECI, the rates discovered are as low as Rs.3.00 per unit even for the rooftop projects (whose capital cost is higher than megawatt scale solar plants) in Uttarakhand, Himachal Pradesh and Puducherry. The rates being discovered by bid routes are equal to the average cost of power from coal fired plants of NTPC. The Commission also notes that, it has reviewed the tariff for Solar rooftop photo voltaic plants by its Order dated 2nd May, 2016 considering substantial reduction in their capital cost. Thus, there is a case for revision of the current generic tariff by cutting short the applicable control period. The Commission therefore considers that the control period of its Order dated 30th July, 2015 needs to be revised to 31st March, 2017 from 31st March, 2018.

7. Determination of tariff for the period beginning from 1st April, 2017:

In the Tariff Order dated 30th July, 2015, for the purpose of determination of tariff for megawatt scale solar power plants, the capital cost considered is

Rs.600 lakhs per MW. The CERC in its Order date 23rd March, 2016 has determined the benchmark capital cost norms for solar photovoltaic projects for 2016-17 at Rs.530.02 lakhs per MW against Rs.605.85 lakhs per MW determined for 2015-16. Considering these benchmark norms, the Commission proposes to adopt Rs.463.76 lakhs per MW as capital cost for 2017-18 (without any change in other parameters currently reckoned) and determine the levelized tariff for 25 years at Rs.4.51 per unit. In respect of Solar thermal projects, the Commission considers it appropriate to determine tariff at a later date as no field data regarding such projects is readily available.

8. Proposal:

The Commission therefore invites suggestions/comments/views of the stakeholders and the general public on the following proposals:

1. Curtail the current Control period by one year (i.e., from 31st March, 2018 to 31st March, 2017)
2. To consider the capital cost of solar PV projects at Rs.463.76 lakhs per MW and fix the levelized tariff for 25 years at Rs.4.51 per unit.

Any other issue, considered relevant may also be commented upon.

The Commission requests all stakeholders and the general public to furnish their views/suggestions/comments before 13th March, 2017. The stakeholders are also requested to furnish any documents or written material if any, in support of their proposals / views.

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