

**KARNATAKA ELECTRICITY REGULATORY COMMISSION**

No.9/2, 6<sup>th</sup> & 7<sup>th</sup> Floor, Mahalaxmi Chambers,  
M.G.Road, Bangalore-560 001.

Present: Shri K.P.Pandey	Chairman
Shri Vishwanath Hiremath	Member
Shri K. Srinivasa Rao	Member

**In the matter of:**

**"Determination of tariff for grid interactive Solar Power demonstration projects"**

**ORDER**

**No.**

**Date: 26<sup>th</sup> November 2008**

**1. Preamble:**

1.1 Section 86(1) (e) of the Electricity Act, 2003 mandates the Commission to promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.

1.2 Clause 6.4 of the Tariff Policy stipulates that,

*'.....It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.*

*(2) Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.*

*(3) The Central Commission should lay down guidelines within three months for pricing non-firm power, especially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding".*

1.2 Clause 5.12.1 and 5.12.2 of the National Electricity Policy stipulates that,

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

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

power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies".

- 1.3 The Ministry of New & Renewable Energy (MNRE) has issued guidelines for Generation based incentive for Grid Interactive Solar Photovoltaic power generation projects and Grid Interactive Solar Thermal power generation projects in January 2008 and March 2008 respectively. As per these guidelines,
- MNRE would be providing incentive for installation of up to 50MW capacity solar power projects in the country during the 11<sup>th</sup> plan period.
  - Solar power projects with an aggregate capacity of a maximum of 10MW under each category in a State would be considered for support.
  - Any project developer can set up grid interactive solar thermal power generation projects up to a maximum of 5 MW capacity in the country, either through a single project or multiple projects of a minimum capacity of one MW each. In case of photovoltaic power generation the maximum and minimum capacity is 5MWp and 1MWp respectively (p is with reference to peak generation).
  - MNRE will provide generation based incentive up to Rs.12 per kwh for solar photo voltaic power generation and up to Rs.10 per kwh for solar thermal power generation fed to the grid by the solar power

developer after taking into account the power purchase rate provided by the State Electricity Regulatory Commission. This would be applicable for projects commissioned by 31.12.2009.

- The projects commissioned after 31.12.2009 would get an incentive with a 5% reduction on the above rates with a ceiling of Rs. 11.40 per kwh for solar photo voltaic power generation and up to Rs.9.50 per kwh for solar thermal power generation.
- The generation based incentive approved for a grid interactive solar power generation project may be available for a maximum period of ten years from the date of approval and regular power generation from that project, provided the utility continues to purchase power from that grid interactive solar power plant.

In pursuance of the requirement for determining tariff for grid interactive solar power, the Commission issued and widely circulated a discussion paper on 21.08.2008 inviting suggestions/comments & views of the stakeholders and experts. The last date which was earlier indicated as 15.09.2008 was extended up to 15.10.2008.

**Comments/suggestions/views of the stakeholders:**

The gist of comments / suggestions / views expressed by various stakeholders and experts are as follows:

- i. **Prof. K.N.Ninan, Institute of Social & Economic Change**, has opined that the proposal to fix tariff at Rs.3.40 per unit of solar energy is correct and the same may be reviewed after getting actual cost data.
- ii. **Dr. S.B.Somannavar, Member, Advisory Committee, KERC**, has stated that the suggestion made by KREDL that a tariff of Rs.15 per unit for ten years may be appropriate according to cost consideration. He has further stated that, the impact of this tariff on different categories may become more significant as already the state utilities are seeking higher tariff.

- iii. **GESCOM**, has opined that the proposal of the Commission to fix a tariff of Rs.3.40 per unit of solar power for demonstration projects is acceptable.
- iv. **Gadag District Chamber of Commerce & Industry**, has opined that the tariff proposal made by the Commission is acceptable.
- v. **Consumer Care Society, Bangalore**, has observed that as per KREDL the solar energy would cost Rs. 25 per unit. They have further stated that a suitable cost data is verified by auditors and tariff is worked out.
- vi. **Essar Power, Mumbai**, has suggested to adopt a competitive bidding route for setting up of solar photo voltaic and solar thermal power plants as proposed by Rajasthan Renewable Energy Corporation Ltd(RRECL).
- vii. **CESC,Mysore** have opined that if the tariff is Rs.3.40 per unit and if the incentive is provided by the MNRE, then only the proposal can be considered.
- viii. **IREDA, New Delhi**, have suggested that the tariff proposed by the Commission is reasonable and has opined that the proposed tariff be at least for a period of 12-15 years.
- ix. **HESCOM**, has opined that, in the absence of correct data on the cost and sustainable technology know-how, it is difficult to arrive at the tariff for solar power. However, it is suggested to adopt the wind tariff proposed by the Commission for the demonstration projects.
- x. **KPTCL**, has suggested that solar projects are commercially not viable but they being eco friendly and incentives are being given by MNRE, the solar power generation is to be accepted. KPTCL has further agreed that the proposal of the Commission to fix a tariff of Rs.3.40 per unit as reasonable.
- xi. **CPRI, Bangalore** have commented on the cost of a solar power plant wherein they have concluded that the pay back period for a solar power plant would be 20 years if interest burden is also considered.

xii. **BESCOM, Bangalore** has suggested that the tariff at Rs. 3.15 per unit is to be considered on par with Tamil Nadu since geographical conditions are almost identical.

xiii. **Shankar Sharma**, has suggested that there should have been much more incentive for harnessing solar power. Shankar Sharma has viewed the utilization of solar power in a broader perspective like installing roof top solar panels for commercial and domestic usage which will also reduce the T&D losses. He has suggested that the Commission has to encourage the concept of roof top solar PV panels.

**4. a. Tariff Determination for solar power demonstration projects eligible for incentives as per the MNRE guidelines:**

In the first instance, the Commission would like to fix the tariff in respect of solar energy for all the demonstration projects during the 11<sup>th</sup> plan period. The highest power purchase tariff in Karnataka, as approved by the Commission is for wind power which is Rs. 3.40 per kwh. The Commission decides to adopt this rate as the tariff for all the solar power demonstration projects duly allowing the generator to avail the incentive in terms of MNRE guidelines. This approach would be suitable only for the demonstration projects as envisaged in the guidelines issued by the MNRE. The tariff approved by the Commission and the maximum incentive for the eligible demonstration projects in Karnataka would be as follows:

Type of Tariff	Commission's approved Tariff	Maximum Incentive from MNRE for projects commissioned before 31.12.2009*	Maximum Incentive from MNRE for projects commissioned after 31.12.2009*
Solar PV energy	Rs. 3.40	Rs. 12.00	Rs. 11.40
Solar Thermal	Rs. 3.40	Rs. 10.00	Rs. 9.50

\*Eligibility of projects for incentives are as per the MNRE guidelines dated January 2008 & March 2008.

**b. Tariff Determination for solar power plants outside demonstration projects:**

M/s Essar Power Ltd has suggested to adopt a competitive bidding route for fixing tariff as planned by the Rajasthan Renewable Energy Corporation Ltd (RRECL). As envisaged in the tariff policy and the National Electricity Policy, the power procurement by utilities shall be made at the tariff fixed by the Regulators or through a transparent process of competitive bidding.

Further, competitive bidding among the NCE sources is yet to take off. Even if competitive bidding is offered, the solar power, whose capital costs being much higher than that of the other renewable sources of energy, may not be able to compete with other sources.

KREDL, in its report to the Commission, has informed that as per the data available with them, the cost of solar photovoltaic grid connected project varies from Rs. 19.20 Crs to Rs. 25 Crs per MW.

Tariff determination by the Commission for solar power plant outside the demonstration projects requires definite data on the cost of solar photovoltaic plants as well as solar thermal plants. Since both these technologies are at an evolving stage, reliable data on cost is not available. In the absence of definite and reliable cost data, the Commission is unable to determine the tariff based on cost plus approach.

The Commission is of the view that for the present, the Commission would restrict the fixation of an appropriate tariff for only demonstration projects that would fulfill the eligibility criteria laid down in the guidelines issued by the MNRE. The Commission decides to adopt a tariff of Rs. 3.40 per Kwh for all the Grid interactive solar thermal power demonstration projects & Grid interactive solar

photo voltaic power demonstration projects eligible for the incentives as per the MNRE guidelines issued in January 2008 & March 2008.

For projects other than the demonstration projects, the Commission would deal with the same separately at an appropriate time.

This Order is valid for a period of ten years from the date of approval and regular power generation from the project or the expiry of incentive scheme provided in the MNRE guidelines discussed above, whichever is earlier, provided the utility continues to purchase power from the grid interactive solar power plant.

This order is signed and issued by Karnataka Electricity Regulatory Commission on 28<sup>th</sup> day of November 2008.

Sd/-	Sd/-	Sd/-
<b>K.P.Pandey</b>	<b>Vishwanath Hiremath</b>	<b>K. Srinivasa Rao</b>
<b>Chairman</b>	<b>Member</b>	<b>Member</b>
		Sd/- <b>Secretary</b> <b>KERC</b>

**Memo No: S/03/1/ 5185**

**Date: 26.11.2008**