KERALA STATE ELECTRICITY REGULATORY COMMISSION

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DISCUSSION PAPER

FEED-IN TARIFF

FOR ELECTRICITY FROM SOLAR POWER TECHNOLOGIES

1.0 Introduction

1.1 The National Action Plan on Climate Change (NAPCC) released by the Prime Minister of India on 30th June 2008 sets a target of 5% renewable energy purchase for FY 2009-10. It also envisages that the target will increase by 1% annually for the next 10 years, so that the renewable energy constitutes approximately 15% of the energy mix of India. The Jawaharlal Nehru National Solar Mission announced by the Central Government for the development of Solar Energy in the country is one of the eight key National Missions which comprise India's National Action Plan on Climate Change. The Solar Mission envisages development of installed capacity of 20,000 MW by the end of the 13th Five Year Plan in 2022. It is also envisaged that as a result of rapid scale up as well as technological developments, the price of solar power will attain parity with grid power at the end of the Mission, enabling accelerated and large-scale expansion thereafter. The Mission will adopt a 3-phase approach, spanning upto first year of the 12th Plan (up to 2012-13) as Phase 1, the remaining 4 years of the 12th Plan (2013-17) as Phase 2 and the 13th Plan (2017-22) as Phase 3.

1.2 The Commission vide Order dated 4-08-2011 has fixed preferential tariff for Solar PV Power Plants (above 3MW), Roof Top (PV) and other small Solar Power Plants of capacity from 1 MW up to 3 MW connected to Distribution Network (below 33 kV for which power purchase agreements are signed by 31-03-2011 and projects commissioned by 31-03-2012 and for Solar thermal Plants for which power purchase agreements are signed by 31-03-2011 and projects commissioned by 31-

03-2013. Now the Commission proposes to fix preferential tariff for Solar PV Power Plants (including Roof Top and other small solar PV Power Plants) for which power purchase agreements are to be signed with distribution licensees.

1.3 Objective

The objective of the discussion paper is to seek comments on the proposed *feed-in tariff* for grid connected Solar PV projects including roof top and other small solar power systems for the first two phases of National Solar mission ie., 2012-13 (phase 1) and upto 2016-17 (phase 2).

2.0 Legal Provisions

2.1 The Electricity Act, 2003

The following provisions of the Act provide the legal framework for the involvement of Regulatory Commissions in renewable energy:

Section 86 (1) (e) of the Electricity Act 2003 mandates promotion of cogeneration and generation of electricity from renewable sources of energy:

> *"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 license."*

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 cogeneration and generation of electricity from renewable sources of energy.

> *"The promotion of cogeneration and generation of electricity from renewable sources of energy."*

Section 62 (1) (a) of the Act provides for determination of tariff for supply of electricity by a generating company to a distribution licensee.

“Supply of electricity by a generating company to a distribution licensee: Provided that the Appropriate Commission may, in case of shortage of supply of electricity, fix the minimum and maximum ceiling of tariff for sale or purchase of electricity in pursuance of an agreement, entered into between a generating company and a licensee or between licensees, for a period not exceeding one year to ensure reasonable prices of electricity.”

Section 3 (1) of the Electricity Act 2003 requires the Central Government to formulate, inter alia, the National Electricity Policy in consultation with the Central Electricity Authority (CEA) and State Governments. The provision is quoted below:

"The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

2.2 National Electricity Policy, 2005

The National Electricity Policy, 2005 formulated in compliance with the above-stated Section 3 of the Electricity Act envisages:

“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."

2.3 Tariff Policy, 2006

The Tariff Policy, 2006 issued by the Ministry of Power, Government of India, also emphasizes on the importance of non-conventional sources of energy generation and states:

"Pursuant to provisions of section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006."

The Commission has already specified the renewable obligation for the distribution licensees in the State of Kerala as 3% of the consumption as on the year 2010, which is to be escalated by 10% every year. Out of the specified quantity of renewable energy 0.25% shall be solar energy. Accordingly, the renewable obligation for 2012-13 will be about 4% of the consumption, of which 0.25% shall be from solar.

Based on the above provisions for promotion of renewable sources of power, the Commission proposes to bring out promotional tariff for the solar PV plants of varying scale in the State of Kerala. As a first step, promotional tariff for solar projects which are supplying to the grid is considered.

3.0 Solar Cell and Module Technologies

3.1 Photovoltaics (also called 'PV') is the direct method of converting sunlight into electricity through a device known as the 'Solar Cell.' When semiconductors such as silicon are exposed to sunlight, they produce small amounts of electric charge (electrons and holes). A well-designed solar cell separates this charge to form a positive and negative terminal. Hence, these terminals produce a voltage, and when connected to an external circuit, cause a flow of current. In this way, a solar cell in the Sun works just like a battery. Many different solar cell technologies are available in the market today. Further, substantial R&D efforts are also underway globally for enhancing efficiencies and reducing costs of these solar cells, as well as developing novel cell technologies.

3.2 'First-Generation' solar cells are derived from the knowledge of the Semiconductor IC industry, where high-purity and expensive mono-crystalline silicon ingots are sliced into wafers, which are then processed into solar cells. This technology has now evolved into utilizing slightly lower grade poly-crystalline silicon also known as solar-grade silicon, where the efficiency of cells made from solar-grade silicon is slightly lower compared to that of semiconductor-grade silicon, but offers a substantial cost advantage. Both mono- and poly-crystalline silicon solar cells are bulk-silicon technologies, wherein the typical thickness of the wafer is around 170 μm (1 μm or '1 micrometer' is one thousandths of a millimetre).

3.3 As the required thickness for a solar cell is substantially less than the current thicknesses of bulk-silicon solar cells and the silicon contributes to approximately one third the cost of a photovoltaic module, current efforts are underway to reduce the thickness of the solar cells without inducing excessive breakage during manufacturing. Research is also carried out to optimize the device designs and obtain higher efficiencies. While typical efficiencies for bulk-silicon solar cells are around 14-18%, some companies have developed novel designs to achieve commercial efficiencies around 22-23%. The current bulk-silicon solar cell technology has a global market share of around 85-90%.

3.4 The 'Second-Generation' photovoltaic technology, also known as 'Thin-Film Technology' targets reducing the cost of photovoltaics by utilizing very thin layers of semiconductors. This technology utilizes only 1-2 μm of semiconductor absorber material, which is directly deposited on a supporting substrate such as glass, metal sheet or polymer. Amorphous silicon (a-Si) has historically been widely-used semiconductor for thin-film solar cells, while novel semiconductor structures like microcrystalline silicon (μc-Si), Cadmium Telluride (CdTe) and Copper Indium Gallium Selenide

3.5 However, the efficiencies of thin-film solar cells are currently lower compared to their bulk-silicon counterparts at around 6-12% due to the lower crystalline quality and higher material defects. Moreover, large-area deposition of thin semiconductor films is a considerable technological challenge, and hence, the thin-film market growth has been slower than what was earlier speculated. Thin-film technologies are expected to perform better under diffused light than their crystalline-silicon counterparts. The thin-film technologies today have a combined photovoltaic market share of around 10-15%. Global research efforts are currently underway to improve efficiencies and develop commercial-scale large-area deposition technologies.

3.6 The 'Third-Generation' photovoltaic technology employs very specialized high-efficiency solar cells. These solar cells are expensive and typically used in space applications, but are now finding a place in terrestrial applications as the cost of these technologies are also declining. The effective cost of such solar cells is further reduced by concentrating large amount of light onto the cell using relatively inexpensive lens or mirrors. Such solar cell assemblies are designed to physically 'track' the Sun in order to focus the concentrated light at the solar cells and also increase the energy yield. Due to the high concentration of incident sunlight, this technology usually requires an active cooling mechanism such as forced air or water. Although a few such ground-mounted photovoltaic plants have been installed commercially in Europe and USA, the market share of this technology is negligible. However, this technology is attracting much attention as many experts believe that the key to cost-effective solar energy lies in such high-efficiency third-generation technologies. Substantial research is currently being carried out to develop high-efficiency solar cells, while companies are involved in designing cost effective mounting and tracking assemblies for such solar cells for commercialization.

3.7 Usually, the solar cells are fragile, and the power output of a single solar cell is limited; for example, the typical power output of a single 6" x 6" poly-crystalline silicon solar cell is around 3.5-4 W at Standard Testing Conditions (STC). Therefore, they are connected in series and parallel, then encapsulated into a laminate to obtain a net higher power output and withstand harsh environmental conditions. Such a laminate is called a 'Solar Module' or a 'Photovoltaic Module.' Robust photovoltaic modules with different cell technologies are available in the market, and are sold based on their power output at STC, which is rated in watts.

3.8 The Ministry of New and Renewable Energy (MNRE) of the Government of India (GoI) has specified certain standards developed by the International Electrotechnical Commission (IEC) that qualify the photovoltaic modules for design as well as safety. Further, as per current industry practices, photovoltaic modules are warranted to exhibit more than 90% of their rated power during the first 10 years of operation, and more than 80% of their rated power during the subsequent 15 years. Such a standard 25 year warranty on the photovoltaic modules indicates the highly robust and reliable nature of the photovoltaic technology. It should be mentioned at this point that even though many thin film technologies offer 25 year performance warranties, there is no long-term performance data available for such technologies and hence there is a need within the market to develop confidence on the long-term performance in the harsh Indian weather conditions.

4.0 Balance of System

4.1 All components of a photovoltaic power plant except the photovoltaic modules are collectively termed as the Balance of System or 'BoS.' With the reducing costs of the photovoltaic modules, the cost of balance of system may surpass the cost of photovoltaic modules. The balance of system includes components such as:

- Photovoltaic inverters,
- Transformers,
- Module mounting structures,
- Combiner/ junction boxes,
- DC and AC power cables, communication cables,
- Engineering, civil works and labour.

4.2 The commercial photovoltaic modules generate only DC power, photovoltaic inverter become essential to convert the DC power into AC power for either direct AC applications or for feeding into the grid. The photovoltaic inverter helps to : (i) maximizing the output power from the modules by maximum power point tracking (MPPT), (ii) converting the DC power into AC power, (iii) in case of grid-tied inverters, synchronizing the output voltage and frequency to match the grid parameters, and (iv) offer safety and protection to and from the photovoltaic system.

4.3 Photovoltaic inverters are rated for their power handling capacity, and are commercially available from less than 1 kW to more than 1 MW capacity. The price of the PV inverter is governed by the capacity of the inverter, which accounts for 10-20% of the cost of the photovoltaic power plant.

4.4 With increasing supply of invertors in global market, by enhancing capacities by existing producers and influx of Chinese manufactures, the prices of inverters have started coming down at an annual rate of 10-15%. Other components in the balance of system, such as transformers, module mounting structures, DC and AC power cables and civil works can be sourced from the domestic market. It is expected that the costs associated with project engineering, module mounting structures, and civil works are expected to decline in the coming years.

5.0 Land Requirement

The land requirement solar power projects primarily depends upon efficiency of the photovoltaic technology and type of tracking system used. The land requirement for a particular technology will be inversely proportional to its photovoltaic module efficiency. The land requirement for crystalline silicon solar photovoltaic power plant is considered at approximately 5 acres per megawatt (MW) of installed capacity. This land requirement increases for photovoltaic projects utilizing either lower efficiency technologies or solar tracking; however, in such instances, the cost of land as well as balance of system are compensated either due to a lower cost of photovoltaic modules or higher capacity utilization factors (CUF), respectively. It is acknowledged that tracking technologies would require more area, but the cost of land is compensated through the increase in the plant's energy yield. Further, this benefit through increase in energy yield may be considered as an advantage by project developers for implementing novel technologies.

5.1 Considering the limited availability of land in the State, the cost of land can form substantial portion of capital cost. However, the land cost can be optimized through contractual arrangements or leasing to reduce the impact on capital cost. This is especially critical in the case of large projects.

5.2 However, small systems are generally installed at roof top, thereby saving the cost of land. The developer can obtain the roof top space through leasing or rental basis, without ownership.

6.0 Photo voltaic System Classification

Considering the basic differences in the size, scale and implementation of the PV systems, it can be categorized as **(a) megawatt-scale ground mounted systems**, and **(b) kilowatt-scale rooftop systems**. Since the cost of the project differs considerably based on the scale, the tariff applicable can also be different. The kilowatt-scale can be upto 1MW, and the megawatt-scale applicable to systems of capacities more than 1MW. Based on the type of systems, the connectivity conditions would also be different.

7.0 Connectivity Conditions

7.1 As per the provisions of the Act, the State Commission has to promote the generation from renewable sources by providing suitable measures for connectivity with the grid and sale of electricity to a person. It is necessary to have interconnection with the grid system for the development of solar power generation either on IPP mode or captive mode if wheeling is required. Considering the nature and size of Solar PV system, connectivity may be required in the distribution system for kilowatt scale systems and distribution/Transmission system for megawatt scale systems. For smaller photovoltaic systems such as rooftop systems which are connected to the distribution grid at 11kV or below, the infrastructure typically exists as the solar power Generator may also be the Consumer of the Distribution Utility. **However, in case the existing infrastructure is not sufficient for evacuation of solar power, such infrastructure shall be developed or upgraded by the relevant Distribution Utility**. As a promotional measure for large scale development of solar projects following connectivity conditions are proposed to be made mandatory:

(a) It is the duty of the distribution licensee/STU to provide connectivity for solar power generators seeking interconnection with the grid in a time bound manner.

(b) The distribution licensee/STU is duty bound to provide all assistance and necessary advice for Solar PV generators, irrespective of size, seeking interconnection with the grid.

(c) The cost of providing interconnection up to the nearest point in the distribution system/Transmission system shall be met by the developer at his cost. It is also the duty of the developer to install necessary protection systems for proper connectivity as per the requirements of the licensee, which is to be ensured by the licensee.

(d) The cost of system strengthening for receiving supply of electricity, where ever required shall be the responsibility of distribution licensee/STU and may be loaded to the ARR&ERC. The distribution licensee/STU shall plan for co-ordinated development of the system considering the potential development of solar power generation in a specified area.

(e) The owner of the building and developer of roof top system need not be same person. The developer shall sign PPA with the Distribution utility with the consent of the owner. If the developer desire to follow the Renewable Energy Certificate (REC) mechanism to recover the cost , the energy pumped in to the grid will be eligible for the average pooled cost of power purchase (APCPP) as per CERC guide lines from time to time.

(f) The Developer shall provide adequate protective mechanism to protect the various components of the photovoltaic power plant including the photovoltaic modules and the Balance of Systems (BoS) such as Photovoltaic inverters, Transformers etc. The Distribution Licensee shall be exonerated against the disturbances in the LT and HT lines such as voltage fluctuations , frequency variations, supply interruptions etc. The developer shall also provide adequate protective mechanism to ensure that electricity from the solar systems do not flow into the Grid when the grid supply fails.

(g) With the approval of the Commission, the licensee shall publish a self contained document on the procedure for connectivity and other conditions.

The type of system and voltage levels proposed for connectivity are shown below:

Capacity	Type	Evacuation level	Scale
Upto 5kW	Roof top/ground mounted	Single Phase, 230V, 50 Hz	Kilowatt Scale
5 kW to 100 kW	Roof top/ground mounted	Three phase, 415V, 50 Hz	Kilowatt Scale
100kW to 1 MW	Roof top/ground mounted	Three phase, 11kV 50 Hz	Kilowatt Scale
1 MW to 3 MW	ground mounted	Three phase, 11kV/33kV 50 Hz	MW Scale
>3 MW	ground mounted	Three phase, 66kVorhigher 50 Hz	MW Scale

8.0 Metering

8.1 There are two types of metering and interconnection schemes in vogue at present : **feed in metering** and **net metering**.   In the feed in metering system, all the energy generated is fed into the grid through a dedicated feed in meter and shall be allowed a feed-in-tariff determined by the Commission. This is generally called Feed In Tariff (FIT) system.   At the same time the energy consumed by the consumer will be metered through a utility meter and billed at consumer tariff. In the case of net metering, the electricity received from the distribution licensee for own use and solar electricity   pumped in to the grid shall be billed at the same tariff. That is, billing shall be only for the   net energy fed to the Grid or consumed by the consumer..   In the initial stages, as a promotional measure, the Commission proposes to introduce ‘Feed In Tariff (FIT)’ system in the State. Also in order to avoid the complications of time differentiated drawal and injections of energy, **the feed in system (FIT) will be suitable** in the initial phase. Separate meters for energy injection and drawl shall be installed under the scheme.   **It is also proposed that Solar plants below 5MW shall be treated as ‘must run’ and shall not be covered under merit order principl**e.

9.0 Parameters for Tariff Calculation

9.1 Capital Cost related parameters

Capital Cost:

The cost of the photovoltaic modules account for more than half the cost of the entire photovoltaic power plant, and hence, have a substantial impact on the resultant Levelized Cost of Electricity (LCOE). The photovoltaic module prices, irrespective of module technology, have been steadily declining owing to research and development, industry adaptation and economies of scale. Generally the project cost includes the cost of land. The estimated current capital cost of a 5 MW photovoltaic power plant consisting of poly-crystalline silicon modules, and including land cost, is reported to be Rs.50 Crores.

Considering the cost trends of the technology the Commission proposes a capital cost of megawatt scale solar photovoltaic power projects at Rs.10 crore per megawatt, and that of kilowatt-scale solar photovoltaic power projects at Rs.1.2 lakhs per kilowatt, considering the higher cost of inverters. This capital cost shall include the cost of land if required, and the cost of interconnection upto the distribution licensee'/STU system.

O&M Cost and its Escalation

Photovoltaic power plants are characterized by their simple and low-cost operation and maintenance (O&M). The operation and maintenance of a photovoltaic power plant mainly involves cleaning of the photovoltaic modules at a regular interval. The cleaning frequency of the modules of a commercial plant may be required once in a week or even once in a month. Hence it is proposed that O&M expenses be taken at 0.5%, with annual escalation of 5%

9.2 Performance related factors

Capacity Utilization Factor

The electrical energy output of a photovoltaic power plant can be calculated using the performance ratio and the global irradiance on the plane of the photovoltaic arrays, which are oriented at an optimum tilt angle. Further, the Capacity Utilization Factor (CUF) can be calculated based on the energy output of the plant. CERC has vide Notification No L-1/94/CERC/2011 dated 06-02-2012 specified 19% as the CUF. In the present scheme also same level is proposed for tariff calculation.

Auxiliary Consumption

A photovoltaic power plant consumes minimal energy for auxiliary purposes. Auxiliary power may be required for air-conditioning in inverter and control rooms, cleaning water softening and pumping system, security night lighting and general office lights and fans in large systems. The auxiliary consumption shall be practically zero for small plants. Considering relatively low level of auxiliary consumption, this parameter has not been considered.

Useful Life

The standard warranty of photovoltaic modules, which account for more than half of the cost of the entire plant, is for a period of 25 years. However, the photovoltaic power plant including the modules, is expected to last substantially beyond this period. Hence, the useful life of solar photovoltaic projects is taken as 25 years for calculation of the tariff.

Degradation factor

Considering nature of the solar technology available, an annual degradation factor of 0.5% is applied on the energy production.

9.3 Financial Parameters

Debt-Equity Ratio

Clause 5.3 (b) of the Tariff Policy, 2006, notified by the Ministry of Power, GOI, stipulates a debt –equity ratio of 70:30 for financing of power projects. For the Solar projects also, debt-equity ratio of 70:30 is considered for financing.

Loan Tenure

Generally, the repayment period for power projects are considered as 10 years, though the lenders are now allowing upto 12 years loan tenure. However, considering the emerging nature of solar technologies, loan tenure of 10 years is considered.

Interest Rate on Loan

The interest rates have increased in the Indian financial market due to the continuously rising inflation rate. However, the cost of funds has been reducing marginally due to the efforts of RBI to maintain liquidity. Considering the necessity of scaling up the GDP growth rate, there is also a downward pressure on lending rates. CERC has considered the interest on loan as 300 points above the SBI rates. The SBI has recently reduced the based rate by 25 points and now the Base Rate from September 2012 is 9.75%. Hence for the purpose of the tariff determination, interest rate of 13% is considered.

Working Capital

The working capital requirements on the solar projects (especially KW scale) is not substantial in comparison with conventional projects. The CERC provides for one month O&M, two months receivables and 15% of O&M charges as spares. Other State Commissions have also followed norms similar to CERC, without cost of spares. For the purpose of tariff determination one month's O&M is considered for large plants. In the case of smaller plants (KW scale) working capital is not considered.

Interest Rate on Working Capital

Interest rates on working capital are found to be lower than long-term interest rates for power projects. This gap between the long-term loan and working capital loan rate is typically between 75 and 100 basis points. Accordingly, the interest rate on working capital is considered to be 100 basis points lower than that on the long-term loan. Hence, the interest rate on working capital is considered to be 12%.

Depreciation

In power sector, depreciation is computed based on straight line method and depreciation is allowed up to maximum of 90% of the capital cost. The loan is 70% of the capital cost with 10 year repayment schedule. The differential depreciation approach with higher depreciation for loan repayment period and balance depreciation is spread out in the rest of the useful period, is the acceptable approach in tariff determination. Accordingly, depreciation rate of 6% is proposed for the first 10 years and balance is spread over the rest 15 years at 2%.

Return on Equity & Tax rate

The Commission generally allows a return of 14%, which is proposed for solar projects also. Considering the income tax at 18.5% of MAT + 5% Surcharge + 3% Education Cess, the pre tax return for first 10 years will be 20%. For the balance years, considering the Corporate Tax at 32.445% per annum, the pretax RoE will be 24%.

Discount factor

Generally discount factor is taken as the opportunity cost of capital. Accordingly, the weighted average cost of equity and loan capital at the proposed Debt Equity ratio is taken as the discount factor. The discount factor proposed is 13.30%

9.4 Summary of parameters proposed for determination of tariff

The summary of proposed tariff parameters are shown below:

Capital Cost related parameters		
Capital cost - MW system	Rs.lakh/kW	1.00
KW system	Rs.lakh/kW	1.20
O&M Expenses	%	0. 5%
Annual O&M Escalation	%	5%
Performance parameters		
Plant load factor	%	19%
Performance degradation	annual	0.50%
Aux. Consumption	%	0%
Useful life	years	25
Financial parameters		

Debt Equity Ratio		70:30
Loan tenure	Years	10
Interest on loan	%	13%
Working Capital		1 month O&M Expenses for MW scale plants only
Interest on Working capital	%	12%
Depreciation	First 10 years	6%
	Balance 15 years	2%
Return on Equity		14%
Income Tax	MAT 10 years	20%
Corporate tax	Corporate tax for balance 15 years	32.45%
Discount factor		13.30%
Declining % for capital cost		7%

9.5 Control Period

It is proposed that the present scheme is applicable for five years (first & second phase of National Solar Mission), that is, the control period shall be the period between the date of the order and end of FY 2016-17. As noted, the cost of solar power equipments are falling considerably, which was reflected in the bidding for National Jawaharlal Nehru National Solar Mission (JNNSM) Phase-I Batch-II bidding. Considering the deceleration in the cost of plant & equipments, the **feed in tariff for each year shall be reduced by 7% at compounded level for the control period considering the reduction in cost of solar equipments**. The Tariff proposed for the first year shall be applicable from the date specified by the Commission for projects synchronized before 31-3-2014 . Tariff shall be reduced by 7% there after every year from 1st April. This would incentivize the accelerated promotion of plants in the early period.

Proposed Tariff for 2012-13

Capacity	Type	Scale	Tariff for 2012-13
Upto 100 kW	Roof top	Kilowatt Scale	Rs.12.49/kWh
100kW to 1 MW	Roof top/ground mounted	Kilowatt Scale	Rs.12.49/kWh
1 MW to 3 MW	ground mounted	MW Scale	Rs.10.41/kWh
>3 MW	ground mounted	MW Scale	Rs.10.41/kWh

9.6 Impact of subsidy and incentive benefits from Government

The proposed tariff is worked out without considering the incentives such as accelerated depreciation and other capital subsidies available from the Government. The accelerated depreciation is considered, the reduction in levelised tariff is estimated to be about Rs.1/kWh. Similarly capital subsidy of 30% on capital cost will result in reduction in tariff of about Rs.3/kWh. It is proposed that if such subsidies are available, the tariff proposed shall be reduced to the tune of subsidy/incentives available to the developer.

9.7. CDM Benefits

The CDM benefits available to the solar plants availing the preferential tariff shall be as provided in the CERC regulations.

9.8 Future Directions

The Commission is planning to bring out schemes for generation from solar projects other than feed-in type such as net metering, captive projects etc., in the near future.

10. Consultation process

The Commission invites comments/suggestion on the discussion paper on feed-in tariff for generation from grid connected solar PV plants from all stakeholders. The comments may be forwarded to the Secretary, Kerala State Electricity Regulatory Commission, KPFC Bhavanam, Vellayambalam, Thiruvananthapuram, before 5th December, 2012 by post or by email at **kserc@erckerala.org**

The Commission will hold a public hearing on the proposed tariff and issue orders on the Feed in Tariff for solar electricity there after duly considering the views of the stake holders.
