

**KERALA STATE ELECTRICITY REGULATORY COMMISSION
THIRUVANANTHAPURAM**

PRESENT: Sri.T.M. Manoharan, Chairman
Sri. K.Vikraman Nair, Member
Sri. S. Venugopal, Member

**In the matter of the petition under regulation 18 (1) and regulation 19 of the
KSERC (Grid Interactive Distributed Solar Energy Systems)
Regulations, 2014, seeking modifications in the regulation 13
in the matter of procedure for granting connection to solar
energy system.**

Petitioner : Kerala State Electricity Board Limited,
Vydyuthi Bhavanam, Pattom,
Thiruvananthapuram.

Order No : 1521/CT/2015 dated 01.01.2016

T.M. Manoharan, Chairman

1. KSEB Ltd as per its letter No.KSEB / TRAC/ KSERC / Net metering regulations/ 2015-16 / 2036 dated 28.07.2015 submitted a petition with the following prayers.
 - (i) Approve the charges for the pre-commissioning tests / routine tests of grid connected solar PV plants as Rs.8000/- (Rupees Eight Thousand only)
 - (ii) Approve for recovery from consumers, the meter rent for net meters to be installed by KSEBL for grid connected solar PV systems, as tabulated under paragraph 8 above.
 - (iii) Approve the decision of the Board to allow banking facility for generation from large scale solar plants, exceeding 1 MW, on a zone to zone basis of ToD, such that withdrawal and injection match in quantity within the time zone.
 - (iv) Approval may also be granted to allow the generation to adjust the extra energy injection, if any, against off peak consumption (zone 3 consumption) only. Further, approval may also be granted for barring the generator from withdrawing the banked energy of the previous months, during the months from February to June every year.

2. Regarding the first prayer, the petitioner has submitted that
- KSEB Ltd has prepared the schematic diagram of grid interactive solar energy system as per the Annexure- I in the petition; and
 - KSEB Ltd has prepared the charges for pre-commissioning tests / routine tests as per Annexure II.

The details of testing charges as proposed by KSEB Ltd are as given below,-

Sl. No.	Particulars	Amount in Rs.
1	Setting up charges for testing facilities including establishment charges for half day	3000
2	Testing charges	2300
	(i) Harmonic injection	135
	(ii) Direct current injection	135
	(iii) Flicker	135
	(iv) Voltage fluctuation on synchronization	135
	(v) Voltage function	541
	(vi) Frequency function	541
	(vii) Fault in feeding circuit	135
	(viii) Anti islanding on grid failure	271
	(ix) Voltage and frequency sensing time delay function to prevent energizing, de energizing circuit	135
	(x) Voltage withstanding test of paralleling device	135
3	General inspection charges (inspection on compliance for clauses 5 (1), 5 (2), 5 (3), 5 (4), 5 (6), 5 (7), 5 (11.4), 5 (11.5), 5 (11.7 (c)) in CERC regulation	1000
4	Conveyance charges (about 50 km @ Rs.16)	800
5	Hire charges for special testing equipment	900
		8000

3. With regard to the second prayer relating to the meter rent, KSEB Ltd submitted that as per sub-regulation (1) of regulation 10 of KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, the distribution licensee has to make available a correct net meter and solar meter to the eligible consumer who proposes to install a solar energy system in his premises, unless the eligible consumer elects to purchase the said meters. Sub-regulation (2) of regulation 10 authorizes the licensee to collect, at the rates approved by the Commission, the meter rent and security deposit for the solar meter and net meter provided by the licensee to the consumer. The petitioner submitted that it

has purchased LT and HT bi-directional meters having the following specifications and price.

Sl. No.	Specification	Price (Rs.)
1	Three phase, four wire, LT CT operated, bi-directional, accuracy class 0.5 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	6901.91
2	Three phase, four wire, LT whole current, bi-directional, accuracy class 1S, 10-60A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	4597.95
3	Three phase, four wire, HT / CT/PT operated, bi-directional, accuracy class 0.2 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	30000

Considering a life of 10 years including warranty period of 5 years and interest rate of 12%, KSEB Ltd has computed the meter rent payable by the consumers as follows

Sl. No.	Specification	Meter rent (Rs. / month)
1	Three phase, four wire, LT CT operated, bi-directional, accuracy class 0.5 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	110
2	Three phase, four wire, LT whole current, bi-directional, accuracy class 1S, 10-60A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	70
3	Three phase, four wire, HT / CT/PT operated, bi-directional, accuracy class 0.2 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	450

4. KSEB Ltd submitted that many large scale solar plants are seeking connectivity to its EHT feeder. The KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, deal with the grid connectivity to only LT and HT levels. KSEB Ltd has further submitted that it has approved in principle to adopt the following regulations for granting connectivity at EHT level to the solar plants.
- (i) CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007 which has been amended as per CEA (Technical Standards for Connectivity to the Grid) Regulations, 2013.
 - (ii) CEA (Technical Standards for Connectivity of Distributed Generation Resources) Regulations, 2013, for granting connectivity at HT and LT levels.
 - (iii) KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014

5. KSEB Ltd has also submitted that banking facility as per KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, can be granted to solar plants of capacities of and below 1 MW. However granting such banking facilities for large capacity solar plants exceeding 1MW is not advisable. Therefore KSEB Ltd has decided to allow banking facility for the generation from such large scale solar plants on a time zone to time zone basis of the time of the day (ToD) billing system. Extra energy if any injected into the distribution system can be allowed to be consumed during night off peak hours. It has also been submitted that considering the power shortage during the period from February to June, the generator cannot be allowed to withdraw the banked energy of previous months during the months from January to June. It is in view of the above facts and circumstances, KSEB Ltd has submitted the prayers as mentioned in para 1 of this order.

Analysis and decision

6. The prayers of KSEB Ltd have to be examined in view of the developments taking place in the field of renewable energy in our nation, including the statutory frame works and policy initiatives introduced by the State and Central Governments to augment and accelerate such developments. Renewable energy has been accepted as a supplementary source of energy all over the world. In tune with the global trend, our nation has also accelerated implementation of Renewable Energy Projects. Solar, wind and small hydel are the major sources of renewable energy in our nation including in our state. The national target for renewable energy till the year 2022, has been fixed at 1,75,000 MW, out of which 1,00,000 MW is solar. As per letter No.03/13/2015-16/GCRT dated 30.06.2015 from the Joint Secretary to Government of India in Ministry of New and Renewable Energy, the target for roof top solar systems for the nation is 40000 MWp till 2022 and the annual targets for roof top solar systems for Kerala are as given below,-

2015-16	4 MW
2016-17	96 MW
2017-18	100 MW
2018-19	120 MW
2019-20	140 MW
2020-21	160 MW
2021-22	180 MW
Total	800 MW

It has been reported that Kerala has the following potentials for harnessing renewable energy

Roof Top Solar Photo voltaic systems (domestic) more than 13000 MW

Roof Top Solar Photo voltaic systems (institutional)	more than 18000 MW
Wind energy systems	more than 3000 MW
Small hydro-electric projects	more than 500 MW

7. The Commission has a statutory duty under Section 86 of the Electricity Act, 2003, to promote renewable energy and co-generation. Clause (e) of sub-section (1) of Section 86 of the Electricity Act, 2003, is quoted hereunder.

“(e) promote co-generation 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;”

From the above statutory provision, it is clear that the Commission has a mandatory duty to,-

- (i) Promote co-generation and generation of renewable energy
- (ii) Provide suitable measures for connectivity to grid
- (iii) Provide suitable measures for sale of renewable energy and
- (iv) Specify by regulation the RPO of the obligated entity as a percentage of the total consumption in its area of supply.

Therefore the Commission has to take all possible proactive steps to incentivize installation of solar energy systems including roof top solar energy systems and to remove all disincentives and difficulties. It was with a view to promoting the harnessing of solar energy, the Commission has issued KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014. The Commission has also issued orders relating to generation based incentives payable to the renewable energy generated using off grid solar systems.

8. Government of India has, as per its letter No.30/58/2014-15/NSM dated 10.07.2015, issued directives under Section 86 (1) (e) of the Electricity Act, 2003 and Tariff Policy, 2006, for the compliance of Renewable Purchase Obligation by the State Utilities and DISCOMS. The Joint Secretary to Government of India in Ministry of New and Renewable Energy has, as per letter No.03/09/2014-15/GCRT dated 10.08.2015, issued further instructions relating to installation of grid connected roof top solar systems on the roofs of buildings belonging to Government, public sector undertakings and such other institutions. Government of India is also providing incentives such as capital subsidy, soft loans, accelerated depreciation and Income Tax concessions.
9. Government of Kerala and the Commission, have taken many pro-active policy initiatives and regulatory initiatives to facilitate harnessing of renewable energy. The Agency for Non-conventional Energy and Rural Technology (ANERT) and the Energy Management Centre (EMC) have also been promoting the implementation of projects for harnessing renewable energy and for improving

energy efficiency. Government in Power Department has been regularly reviewing the progress of implementation of renewable energy projects. With a view to facilitating speedy implementation of solar PV projects, the Chief Electrical Inspector has standardized the schemes and liberalized the procedures relating to scheme approval and energization for small solar PV projects with a capacity up to 10 kW. A large number of consumers have shown interest in installation of roof top solar systems. Similarly many persons have shown interest in establishing solar energy projects with capacity above one Mega Watt. In spite of such initiatives from the Central and State Governments, the Central and State Commissions, ANERT, EMC and the Electrical Inspectorate, the tangible results in installation of renewable energy plants / projects in Kerala, are seen to be much below the targets fixed for the State.

10. According to the information available to the Commission, there are several practical problems faced by the consumers for installing roof top solar energy systems. Such problems relate to availability of solar meter and net meter, lack of clarity relating to the safety standards for giving connectivity to the grid, nature of tests to be conducted before commissioning the project etc. Many consumers who propose to install grid interactive distributed solar energy systems have brought to the notice of the Commission that the registration fee authorized to be collected by the distribution licensee under regulation 13 of the KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, is exorbitantly high and that in many other states such as Tamil Nadu, the registration fee collected by the distribution licensee is fully refunded as soon as the solar energy system is installed. Regulation 13 of Solar Energy Regulation, 2014, is quoted hereunder,-

13. Procedure for granting connection to the solar energy system.- (1)

The eligible consumer who proposes to install a solar energy system in his premises shall apply in the form in Annexure-I to the local office of the distribution licensee, for permission to connect the solar energy system to the distribution feeder of the licensee along with the application fee as specified in the schedule to these regulations:

Provided that application fee, once paid, shall not be refundable.

(2) The licensee shall acknowledge the receipt of the application form and register the applications and shall process the application in the order of its receipt.

(3) In the case of application for connection to low tension feeder, the distribution licensee shall assess the average minimum load of all consumers as specified in sub-regulation (2) of regulation 5.

(4) In the case of application for connection to high tension feeder, the distribution licensee shall assess the average minimum load of the high tension feeder as specified in sub-regulation (2) of regulation 6.

(5) The distribution licensee shall complete the assessment of minimum load as specified in sub-regulation (3) or sub-regulation (4) as the case may be and intimate the applicant within fifteen days from the date of receipt of the application form, the feasibility or otherwise and the capacity available in the feeder for connecting the solar energy system to the low tension or high tension feeder of distribution system as the case may be:

Provided that the intimation regarding feasibility shall be valid only for a period of one month, unless extended by the distribution licensee.

(6) While intimating the feasibility for connecting the solar energy system as specified in sub-regulation (5), the distribution licensee shall furnish to the applicant, (i) the details of documents to be submitted by the applicant along with scheme for the installation of solar energy system;

(ii) the fee for registration of the scheme for installation of solar energy system as specified in schedule;

(iii) the technical specifications as well as other particulars of the grid-tied inverter and manually operated isolating switch to be installed by the applicant;

(iv) the technical specifications and other particulars of the solar meter and net meter.

(7) The eligible consumer shall, on receipt of the intimation regarding feasibility and capacity as specified in sub-regulation (5), submit an application in the format specified in Annexure-II for the registration of his scheme for installing the solar energy system, along with the documents and technical specifications as stipulated in sub-regulation (6), indicating specifically therein the capacity of the solar energy system which he proposes to install and the licensee shall acknowledge its receipt on the spot.

(8) The distribution licensee shall scrutinise the application and the documents submitted under sub-regulation (7) within a period of three working days and shall intimate the eligible consumer on the next working day,-

(a) the particulars of registration fee to be remitted, and

(b) the particulars of defects if any noticed along with the instructions to cure such defects.

(9) The distribution licensee shall, on receipt of the registration fee and on curing defects if any noticed in the application and the documents submitted under sub-regulation (7), register the scheme and assign a registration number:

Provided that the registration made under this sub-regulation shall be valid only for a period of six months from the date of registration and the distribution licensee may allot to other applicants in accordance with the

provisions of these regulations, such capacity for connectivity of solar energy system, if the eligible consumer whose scheme has been registered does not avail the connectivity within the period of six months;

Provided further that the distribution licensee may allot to other applicants in accordance with the provisions of these regulations, the balance capacity for connectivity of solar energy system if the eligible consumer whose scheme has been registered does not avail the full capacity requested for by him within a period of six months;

Provided also that the registration fee remitted shall not be refundable.

(10) The applicant shall, within six months from the date of registration as specified in sub-regulation (8), procure the solar energy system conforming to the technical specifications and get it installed by a licensed electrical contractor.

(11) If the eligible consumer elects to purchase the solar meter and net meter conforming to the technical specifications stipulated by the distribution licensee as specified in sub-regulation (6), he shall procure them under intimation to the distribution licensee and present the same to the distribution licensee for testing and installation.

(12) The eligible consumer shall obtain from the Electrical Inspector having jurisdiction over the area, necessary sanction for commissioning the solar energy system, in accordance with the provisions of the Central Electricity Authority (Technical Standards for Connectivity of Distributed Generation Resources) Regulations, 2013 and produce the sanction to the distribution licensee.

(13) The distribution licensee shall, within fifteen days from the date of submission of approval of the Electrical Inspector as specified in sub-regulation (12), test the solar energy system in accordance with the provisions of the Central Electricity Authority (Technical Standards for Connectivity of Distributed Generation Resources) Regulations, 2013.

(14) On successful completion of the test as specified in sub-regulation (13) the distribution licensee and the eligible consumer shall execute a connection agreement in the format containing the general and specific conditions, as approved by the Commission in accordance with the provisions of the Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013:

Provided that the distribution licensee shall, within two months from the date of commencement of these regulations, submit to the Commission for approval, the format containing the terms and conditions of the agreement.

(15) The licensee shall, within seven days from the date of execution of agreement as specified in sub-regulation (14), commission the solar energy system.

11. In fact the purpose of introducing a high registration fee under the above regulation was to discourage the frivolous applicants from registering for the installation of solar energy system and thereby blocking the chances of genuine prosumers. There is a limit up to which solar energy systems can be connected to a feeder. This limit has been specified in sub-regulation (2) of regulation 5 of the Solar Energy Regulations, 2014, as **80% of the minimum load on the feeder**. If frivolous applicants register for installation of solar energy systems and the capacity in a feeder for granting connectivity is reserved for them by the distribution licensee, the genuine applicants will not get chance to install solar energy systems. A high registration fee was introduced in the above context. If a person wants to install solar energy system of 1MW, he will have to remit Rs.10 lakh as registration fee. Many prosumers have informed the Commission that the rate of registration fee is very much on higher side. Therefore the request of the prosumers is to refund the registration fee once the solar energy system is installed. In certain cases, the prosumer who has registered for installation of solar energy system, may not be able to install the solar energy system due to genuine reasons beyond his control. There is also request to the effect that the registration fee should be refunded in such cases where the prosumer cannot install solar energy system due to reasons beyond his control.
12. Under the above facts and circumstances, the Commission has conducted a review of the progress in implementation of solar projects in the state on 22.05.2015. As decided in the meeting dated 22.05.2015, a Technical Committee under the Chairmanship of Member (Engineering) was constituted, as per the order No. 1158/CT/KSERC/2015 dated 13.07.2015 of the Commission. The objectives of the committee were to examine the technical and other issues impeding the implementation of solar energy projects and to suggest solutions for such issues. The Committee after due deliberations, submitted its report on 14.09.2015. The Committee was of the view that,-
- (i) the registration fee authorized by the Commission to be collected by the distribution licensee under the above regulation is on the higher side;
 - (ii) provisions in sub-regulation (9) of regulation 13 of the Solar Energy Regulations, 2014 to the effect that registration fee is non-refundable would be a disincentive to the prosumers; and
 - (iii) the said sub-regulation should therefore be amended.
13. The Technical Committee again met on 11.11.2015 and after due deliberations the following decisions were taken.
- (i) The total installed capacity of solar systems that can be connected to a distribution transformer without conducting measurement of the load on the feeder under it, shall be 15% of the transformer capacity. Connectivity exceeding 15% of the transformer capacity need be granted after conducting necessary studies relating to the load on the feeder.

- (ii) KSEB Ltd will ensure availability of sufficient net meters for which purchase orders shall be issued on or before 30.11.2015. The availability of net meters required for roof top solar systems will be reported to the Commission at the end of each month.
 - (iii) KSEBL agreed to publish on or before 30.11.2015, the model numbers and specifications of selected three phase net meters and single phase net meters in their website and to report compliance to the Commission.
 - (iv) Installation of meters are to be carried out according to Central Electricity Authority (Installation and Operation of meters) Regulations 2006.
 - (v) Officials of KSEB Ltd and Electrical Inspectorate will conduct inspection and testing of the solar system jointly on a day convenient to them within ten days.
 - (vi) The Type Test Certificates issued by the laboratories accredited by the National Accreditation Board For Testing and Calibration Laboratories (NABL) or by the institutions at international level for the testing and calibration of electrical equipment can be accepted without conducting further test for the equipment like MCB, ELCB, Fuse, inverter etc. The circular No. DREP / Solar / General / 14-15 dated 23.3.2015 of Director (Renewable Energy and Planning), KSEB Ltd may be reviewed to simplify the procedural formalities required for commissioning of roof top solar systems of capacity of and below 10 kW and the tests required to be conducted at site for the installation of roof top solar energy systems of and below the capacity of 10kW may be decided accordingly.
 - (vii) KSERC will take necessary steps to amend Regulation 5 (2) and 13 of KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014 for enhancing the penetration level of solar energy systems and enabling refund of the registration fee.
14. The Commission has issued the KSERC (Grid Interactive Distributed Solar Energy System) Regulations, 2014 with a view to expediting the installation of solar systems. At the same time the Commission has also taken sufficient safeguards for the safety of the grid of the distribution licensee by reiterating that the regulations issued by CEA regarding safety and standards shall be complied with. Regulation 8 of the said Regulations issued by the KSERC, which deals with specifications, standards and safety is quoted hereunder,-
- 8. Specifications, standards and safety.-** (1) *The distribution licensee shall ensure that,-*
- (a) *the interconnection of the solar energy system with the distribution system of the licensee conforms to the specifications and standards as provided in the Central Electricity Authority (Technical Standards for*

connectivity of the Distributed Generation Resources) Regulations, 2013, as amended from time to time;

(b) the interconnection of the solar energy system with the distribution system of the licensee conforms to the relevant provisions of the Central Electricity Authority (Measures relating to Safety and Electric Supply), Regulations, 2010, as amended from time to time;

(c) the net meter and solar meter installed conform to the standards, specifications and accuracy class as provided in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, as amended from time to time and are installed in such a way that they are accessible for reading.

(2) The licensee shall, while intimating the feasibility as per sub-regulation (6) of regulation 13, inform the eligible consumer, the specifications and such other details of the components if any to be installed along with the solar energy system as per the provisions of the regulations mentioned in sub-regulation (1).

15. The CEA has issued the CEA (Technical Standards for Connecting the Distributed Generation Resources) Regulations, 2013, with a view to facilitating and expediting installation of distributed generation systems. Fourth regulation deals with the general connectivity conditions and the fifth regulation deals with standards & codes of practice. The sixth, seventh and eighth regulations deal with safety, sub-station grounding and metering respectively. These Regulations refer to CEA (Measures relating to Safety and Electricity Supply) Regulations, 2010, the specifications in 153043 of Bureau of Indian Standards (BIS), CEA (Installation and Operation of Meters) Regulations, 2006 etc. Similarly Regulation 9 (Schematic Diagrams), Regulation 10 (Inspection, Test, Calibration and Maintenance prior to Connection), Regulation 11 (Standards of Distributed Generation Resources) etc refer to standards IEEE 519, IEC 61000 etc.
16. The Electrical Inspector is the statutory authority to inspect and test the electrical installations and to certify their fitness for energization, in accordance with the provisions of the regulations issued by CEA. The Government of Kerala in the Department of Electrical Inspectorate have, as per GO (Ms) No. 34 / 2012 / PD Dated, Thiruvananthapuram, 31. 12. 2012 and GO (Ms) No. 15 / 2013 / PD Dated, Thiruvananthapuram, 05. 04. 2013, fixed the inspection and testing fee for electrical installations. The fee fixed for inspection and testing of electrical installations as per the above government orders are extracted below

Nature of Service	Revised Rate
Renewal fee of scheme approval (Maximum Three (3) times or Two (2) Years whichever is earlier	a) Rs. 250/- (If application received on or before the expiry date of Validity of approved Scheme b) Seventy five percent (75 %) of initial inspection fee (If application received after the expiry date of validity of approved scheme.
Valuation of electrical undertakings	Rs 2000/- + 0.5% of valuation amount
Initial Inspection fee	
Extra High Voltage /High Voltage Equipments	Rs. 5/- per kVA /kW/ kVAr Subject to a maximum of Rs 30000/-
Medium Voltage/ Low Voltage Equipments	Rs.10/- per kVA/ kW/ kVAr
Bus Duct	Rs. 2 /- per Ampere per 20 M length or part thereof
Breakers/Switches/ Switch Boards	Rs. 2/- per Ampere per Incomer or Outgoing
Fruth Electrodes	Rs 50/- per Electrode
Lightning Protection	Rs 2500/- Building
Over head lines	Rs 25/- per kM
Special Equipments	
(a) CT Scanner	Rs 10000/-
(b) X- Ray	Rs 10/- per mA
(c) Neon Sign Board	Rs 1000/- per kVA
(d) Lift	Rs 2000/-
(e) Escalator	Rs 5000/-
High Rise Buildings	Rs 250/- per Medium Voltage or Low Voltage per Consumer
Compliance verification	Fifty per cent (50%) of inspection fee
Other Inspections	
1. Certificate Under Regulation 62 of Central Electricity Authority (Measures related to Safety and Electric Supply) Regulation 2010	Rs 1000/-
If the applicant is belonging to SC/ST category or BPL (Certificate from the authority shall he verified prior to inspection)	Rs 100/-
2. Soil Resistivity Measurement	Rs 1000/-
3. Temporary Installation	Rs 250 /-
Exhibition / Fair	Rs 2500 /-
Circus	Rs 1000 /-
Periodical Inspection Fee	(a) Fifty percent (50%) of Initial Inspection fee (b) 25% of Initial Inspection fee for licensees and KSEB installation
Fees for Technical Advice / Consultancy	
Detailed engineering, preparation of technical drawings and estimates and specification of the equipments and technical scrutiny of tenders	Three per cent (3%) of estimated cost of works
Supervision, Inspection and control during execution	Four per cent(4%) of total cost of works
Construction of new works including detailed engineering	Fifteen per cent (15%) of total cost of works plus actual cost of establishment employed and actual expenses
Giving opinion on plans estimates and specifications	Seventy five per cent (75%) of initial inspection fee
Scrutiny fee for initial / final scheme approval	
Initial Inspection fee	Seventy five per cent (75%) of initial inspection fee
All fees above & included in the G.O read above are subjected to minimum of Rs. 500 /- per day	

17. Consumer has to invariably get the solar PV systems installed in his premises inspected and tested by the Electrical Inspector after paying the fee at the rates

stipulated above by the Government. The tests conducted by the Electrical Inspector are sufficient for testifying the fitness of solar PV installations for commissioning. At the same time the licensee has to, before giving connectivity to its distribution system, conduct the tests relating to the functions of inverter in the solar PV systems with special reference to,-

- (i) Harmonic current injection
- (ii) Anti-islanding property
- (iii) Direct current injection and flicker.**

The experts in the Technical Committee constituted by the Commission opined that many tests as proposed in the circular No.DREP/Solar/general/14-15 dated 23.03.2015 of the Director (Renewable Energy and Planning) KSEB Ltd, cannot be conducted at site. The Committee was of the view that the Type Test Certificate issued by the laboratories accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) or by such other international institutions and the test certificates issued by the manufacturer can be accepted in view of the provisions in the CEA (Measures Relating to Safety and Electrical Supply) Regulations, 2010 and the CEA (Technical Standards for Connecting Distributed Generation Resources) Regulations, 2013.

18. In the case of concentrated solar plants (CSP) with high capacity and output either at HT level or at EHT level, the tests as proposed by KSEB Ltd in its circular dated 23.03.2015 can be insisted. But in the case of roof top solar systems which are covered under the KSEB (Grid Interactive Distributed Solar Energy Systems) Regulations 2014, only the minimum tests as indicated above have to be conducted **along with** those conducted by the Electrical Inspector. It would be better in the interest of development of renewable energy in the State, if KSEB Ltd stipulates the standards of solar PV equipment, gives appropriate instructions to the field officers regarding the tests to be conducted before commissioning of roof top solar systems and makes arrangements for such tests required for giving connectivity, by providing necessary equipment and training to its field officers. If such proactive steps are taken by KSEB Ltd, many avoidable delays can be minimized. It has to be appreciated that KSEB Ltd has also duties and responsibilities relating to promotion of renewable energy and protection of consumer interests. While ensuring the financial viability of the licensee and the technical standards and safety of the power system, the Commission has also a paramount duty to protect the interests of the consumers.
19. Considering the facts and circumstances explained above, the testing fee proposed by KSEB Ltd does not appear to be acceptable. Certain components of the fee proposed by KSEB Ltd appear to be on the higher side, when compared to the rates notified by the Government for the inspections and tests to be conducted by Electrical Inspectors. In view of the recommendations of the

Technical Committee, as mentioned above, the Commission proposes to amend the KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, to enable the prosumer to get refund of eighty percent of the registration fee and to enable the licensee to retain the balance twenty percent. The present rate of registration fee is One Thousand Rupees per kilo watt. The portion of registration fee retained by the licensee would be sufficient to meet the expenses if any, for conducting the tests required for giving connectivity. Therefore there is no need to allow a separate fee as proposed by KSEB Ltd for testing and commissioning of the grid interactive distributed solar systems of and below 1 MWp. The Commission therefore declines the request of KSEB Ltd to approve Rs 8000/- as the fee for testing and commissioning of the grid interactive distributed solar systems of and below 1 MWp.

20. As per Regulation 7 of the CEA (Installation and Operation of Meters) Regulations, 2006 and Section 55 of the Electricity Act, 2003, it is the duty of distribution licensee to provide a correct meter to the consumer unless he chooses to purchase the meter. In the case of roof top solar energy systems there should be two meters namely the solar meter and the net meter. If the consumer purchases the meters, they have to be got tested in any meter testing laboratory approved by NABL. The cost of meters and associated equipment would be more when purchased by the individual consumer, compared to the cost of meter and associated equipment purchased by KSEB Ltd in bulk. Further getting the meter and associated equipment tested by the distribution licensee is an extremely difficult and time consuming process for a consumer. Therefore it would be better in the interest of promoting the renewable energy, if net meter and solar meter are supplied by the licensee. According to the information to the Commission, KSEB Ltd has purchased only a few solar meters or net meters. The cost of meters adopted by KSEB Ltd for calculation of the meter rent, appears to be the cost of such meters purchased by the licensee. When meters are ordered in large quantities, the cost of meter is likely to come down. The Commission has found that the rate at which KSEB Ltd has placed order for the net meter as per its purchase order no: KSEB/SCM/eP/16/2015-16 is Rs 2678/-. The above rate has been adopted to calculate the meter rent. The life of meter adopted for calculation of meter rent as per order of the Commission dated 22.07.2015 in OP Nos. 7/2014, 17/2015 and 18/2015 is 15 years. In the above petitions, KSEB Ltd had also claimed the meter rent considering the life span as 15 years and rate of interest at 12%. There is no reason to deviate from such norms as claimed earlier by KSEB Ltd and approved by the Commission. Regulations 67 and 68 of the Kerala Electricity Supply Code, 2014 permit the distribution licensee to collect security for the price of the meter, unless the consumer elects to purchase the meter. Commission has, vide the order dated 01-07-2015 in petition OP No. 4/2015, allowed KSEB Ltd to collect security

deposit equal to the cost of meter. Further, regulation 72 of the Kerala Electricity Supply Code-2014 mandates that, the licensee has to give interest on the security deposit at the bank rate. After adjusting the interest on the security deposit for the meter from the meter rent worked out with the useful life of '15'years and interest on loan at 12%, the rate of rent payable by the consumers for the net meters are approved as follows.

Sl. No.	Specification	Meter rent (Rs. / month)
1	Three phase, four wire, LT CT operated, bi-directional, accuracy class 0.5 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	40.00
2	Three phase, four wire, LT whole current, bi-directional, accuracy class 1S, 10-60A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	15.00
3	Three phase, four wire, HT / CT/PT operated, bi-directional, accuracy class 0.2 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	160.00

21. The third and fourth prayers of KSEB Ltd relates to banking facility to be offered to solar plants with capacity exceeding 1 MWp. Every such generator of renewable energy is eligible for open access as provided in clause (d) of sub-section (2) of Section 38, Clause (c) of Section 40, and Sub Section (2) of the Section 42 of the Electricity Act, 2003. Accordingly, the Commission has issued KSERC (Open Access) Regulations, 2013. The above statutory provisions are equally applicable to the connectivity for installing renewable energy system as well.
22. The Commission has issued KSERC (Renewable Energy) Regulations, 2015. As per clause (b) of regulation 2 of the said regulations banking facility has been defined as follows,-
- 'banking facility' means such facility whereby the prosumer gets the benefit of utilizing without any restriction at any time during the settlement period, a quantum of electricity equal to the renewable energy banked by him;*
23. Regulation 15 of the KSERC (Renewable Energy) Regulations, 2015, which provides for banking facility for solar PV systems with capacity of and below 1MWp is quoted hereunder,-
- 15. Banking facility.- (1) The distribution licensee shall, on application by a prosumer, provide banking facility for the renewable energy*

generated by him if the capacity of the renewable energy generating system of the prosumer is of and below one megawatt.

(2) The distribution licensee may, on application by a prosumer, provide banking facility for the renewable energy generated by him if the capacity of the renewable energy generating system of the prosumer is above one megawatt.

24. As per regulation 25 of KSERC (Renewable Energy) Regulations, 2015 the facility of open access is available to any person generating electricity from renewable sources. The said regulation is quoted hereunder,-

Open access.- Any person generating electricity from renewable sources of energy shall have open access to the transmission system of the State Transmission Utility and to the transmission system or distribution system of any licensee in the State.

25. Regulation 26 of KSERC (Renewable Energy) Regulations, 2015 confers on a prosumer the facility to consume electricity generated from renewable sources with capacity above 1 MWp. The said regulation is quoted hereunder.

26. Facility to consume the electricity generated by a prosumer using renewable energy generating system with capacity above one megawatt and injected into the grid.- The distribution licensee shall, on application by a prosumer generating electricity using renewable energy generating system of capacity above one megawatt, afford to the prosumer the facility to consume such electricity injected into the grid of the licensee during the settlement period in the manner as specified hereunder,-

(a) accounting of such electricity shall be separate for normal hours, peak hours and off peak hours;

(b) the prosumer shall be allowed to consume electricity from the grid on any day the quantum of which shall be determined applying the quantitative relation as specified in the Table below,-

<i>Time zone of injection of renewable energy to grid</i>	<i>Quantum of renewable energy injected (kWh)</i>	<i>Quantum of electricity allowable for consumption (kWh)</i>		
		<i>Normal Hours</i>	<i>Peak Hours</i>	<i>Off-Peak Hours</i>
<i>Normal hours</i>	<i>1.00</i>	<i>1.00</i>	<i>0.66</i>	<i>1.33</i>
<i>Peak Hours</i>	<i>1.00</i>	<i>1.50</i>	<i>1.00</i>	<i>2.00</i>
<i>Off-Peak Hours</i>	<i>1.00</i>	<i>0.75</i>	<i>0.50</i>	<i>1.00</i>

26. Regulation 27 of KSERC (Renewable Energy) Regulations, 2015 specifies the methods for accounting and settlement of renewable energy. The said regulation is quoted hereunder.

27. Accounting and settlement of renewable energy .– (1) The accounting and settlement of solar electricity generated using a grid interactive solar energy system with a capacity of and below 1 MW and injected into the grid of the licensee by a prosumer who is availing banking facility shall be done in the manner as specified in regulations 14 and 15 of the Kerala State Electricity Regulatory Commission (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014.

(2) The accounting and settlement of electricity generated using a grid interactive renewable energy system other than solar energy system, with a capacity of and below 1 MW and injected into the grid of the licensee by a prosumer who is availing banking facility shall be done following the methodology and procedure as specified in regulations 14 and 15 of the Kerala State Electricity Regulatory Commission (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014, mutatis mutandis.

(3) The accounting and settlement of electricity generated using a grid interactive renewable energy system, with a capacity of and below 1 MW and injected into the grid of the licensee by a prosumer who is not availing banking facility shall be done in accordance with the methodology and procedure approved by the Commission based on the proposal submitted by the licensee.

(4) The accounting and settlement of electricity generated using a grid interactive renewable energy system, with a capacity above 1 MW and injected into the grid of the licensee by a prosumer shall be done in accordance with the methodology and procedure approved by the Commission based on the proposal submitted by the licensee.

(5) The licensee shall, within three months from the date of publication of these regulations, submit to the Commission for its approval the methodology and procedure for accounting and settlement of electricity generated from renewable sources.

27. In view of the above provisions in the KSERC (Renewable Energy) Regulations, 2015 no separate orders are required on the third and fourth prayers of the petitioner. It would be sufficient to comply with the above regulations.

28. Orders of the Commission :

(i) In view of the fact that KSEB Ltd would be allowed to retain an amount at the rate of Rs 200/- per kWp, it is found that there is no need for any

further fee for the pre-commissioning tests and routine tests as proposed by it and therefore the first prayer is declined.

(ii) The rates of monthly rent for the net meters to be installed by KSEB Ltd for the grid connected solar PV systems shall be as given in the table below

Sl. No.	Specification	Meter rent (Rs. / month)
1	Three phase, four wire, LT CT operated, bi-directional, accuracy class 0.5 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	40.00
2	Three phase, four wire, LT whole current, bi-directional, accuracy class 1S, 10-60A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	15.00
3	Three phase, four wire, HT / CT/PT operated, bi-directional, accuracy class 0.2 S, -/5A, static tri-vector meter with ToD facility, DLMS complaint and AMR compatible with optical port and RS232	160.00

(iii) In respect of the third and fourth prayer, it is directed to follow the relevant provisions in KSERC (Renewable Energy) Regulations 2015.

The petition is disposed of as above.

Sd/-

K. Vikraman Nair
Member

Sd/-

S. Venugopal
Member

Sd/-

T.M.Manoharan
Chairman

Approved for issue

Sd/-

Santhosh Kumar.K.B
SECRETARY