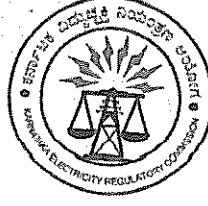


Phone : 91-080-2532 0213/214/335/339
Fax : 91-080-2532 0338/25591412
E-mail : kerc-ka@nic.in
website : www.kerc.org

ಕರ್ನಾಟಕ ವಿದ್ಯುಚ್ಛಕ್ತಿ
ನಿಯಂತ್ರಣ ಆಯೋಗ



KARNATAKA ELECTRICITY
REGULATORY COMMISSION

6 ಮತ್ತು 7ನೇ ಮಹಡಿ, ಮಹಾಲಕ್ಷ್ಮಿ ಛೇಂಬರ್ಸ್,
ನಂ. 9/2, ಮಹಾತ್ಮಗಾಂಧಿ ರಸ್ತೆ, ಬೆಂಗಳೂರು-560 001.

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

Date: 6th July 2016

No.KERC/S/F-50/Vol-8(c)/16-17/
The Managing Director
BESCOM
K.R.Circle
BANGALORE - 560 001.

1074

(Signature)

Sir,

Sub: Approval for standard model PPAs of Gross Metering / Net Metering and clarifications on calculation of excess injected Energy and approval of single line diagram relating to SRTPVs.

Ref: Letter No.BESCOM/BC-51/2016-17/179803, 1804-09 & 1810-15 dated 10.06.2016

3612
11/7/16

Inviting reference to your letter cited above, I am directed to communicate the decisions of the Commission on issues raised in respect of SRTPVs as follows:

a. Approval for single line diagram of net & gross metering:

The Commission has observed that the single line diagram of metering/interconnection of SRTPV Plants has to comply with the standards specified under the CEA Regulations and as approved by Chief Electrical Inspectorate, GoK, and therefore does not require any separate approval by the Commission.

b. Approval of draft PPAs of Gross and Net metering:

The approved standard format of PPAs for gross and net metering are enclosed. The BESCOM may take note of the change in Clause 1.6(b) regarding time for completion of the project and accordingly communicate the time limit to SRTPV owners.

c. Clarification regarding calculation of excess injected energy:

The Commission has observed that the ESCOMs are required to allow installation of SRTPV within 150% of the sanctioned load as per the Commission's Order dated 2nd May, 2016 and hence the issue of billing energy from excess installed capacity should not arise.

Yours faithfully,

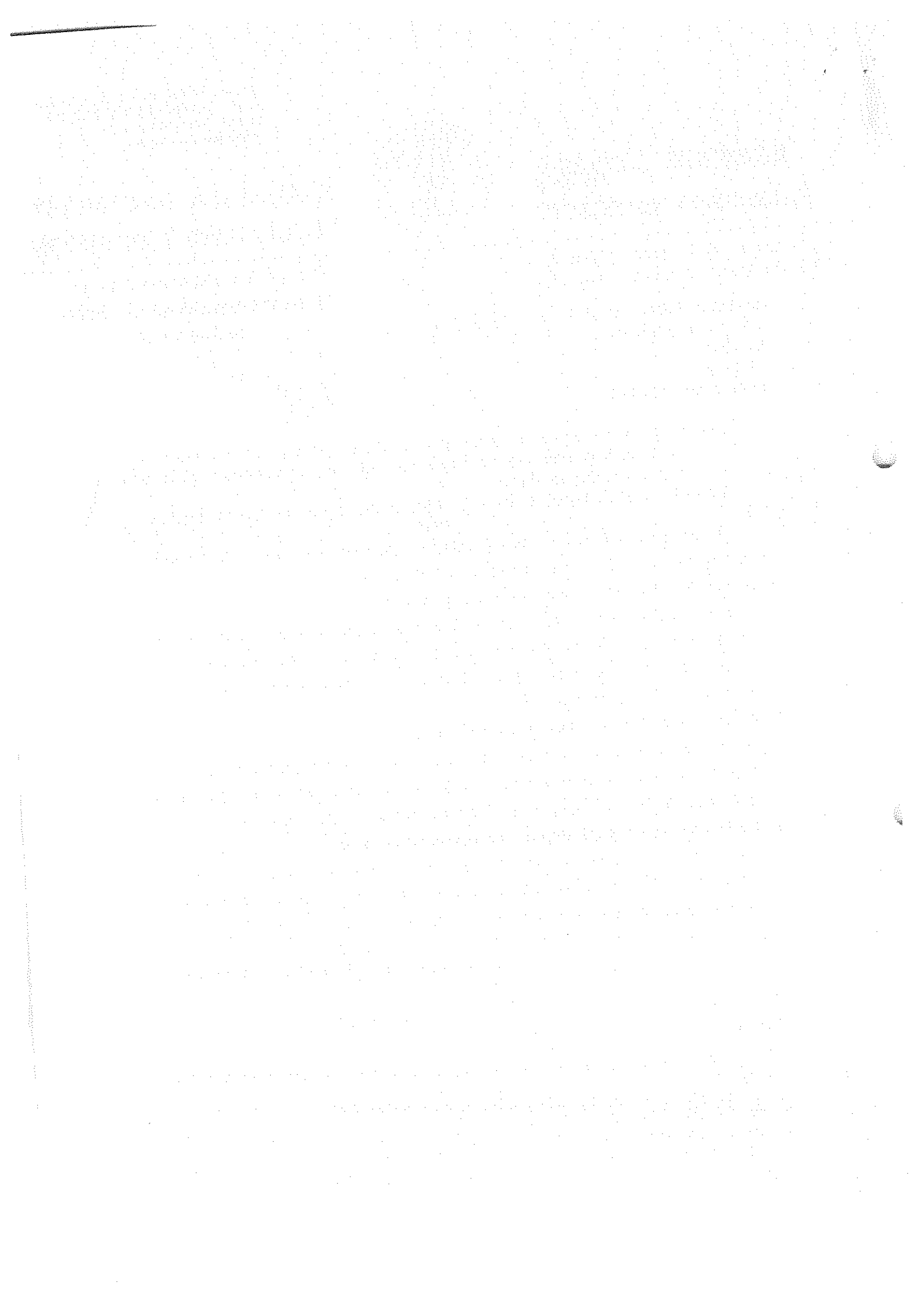
For Karnataka Electricity Regulatory Commission

(Signature)
SECRETARY

Copy to:

1. The Additional Chief Secretary to Govt. Energy Department, GoK, Vikasa Soudha, Bangalore - 560 001.
2. The Managing Directors, MESCOM, CESC, HESCOM & GESCOM
3. The Managing Director, KREDL, Bangalore
4. Office Copy / MF

(Signature)



STANDARD APPROVED FORMAT OF POWER PURCHASE AGREEMENT FOR ROOFTOP SOLAR PV PLANTS

WITH

GROSS METERING ARRANGEMENT

This Power Purchase agreement is entered into at (place)..... on this day of between Electricity Supply Company Limited (...ESCOM), a Government of Karnataka undertaking, a Company formed and incorporated in India under the Companies Act-1956, with its registered office located at, Karnataka State, represented by hereinafter referred to as the "...ESCOM", (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) as party of the first part

AND

.....(Name) the consumer of ...ESCOM residing at (address) hereinafter referred to as the "Seller" (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) as party of the second part.

Whereas,

- a. The Seller intends to connect and operate the Solar Roof Top Photo Voltaic (SRTPV) system with ESCOM's HT/LT Distribution system for sale of Solar Power to ESCOM in terms of the Karnataka Electricity Regulatory Commission (KERC) Order No. S/03/01 dated: 2.5.2016 as amended from time to time.
- b. The Seller intends to install a SRTPV system of kWp capacity on the existing roof top of the premises situated at..... and bearing RR. No..... in the same premises under Sub-Division of ESCOM.
- c. The Seller intends to sell the energy generated from the SRTPV system to ESCOM on gross metering concept, from the date of commissioning of the SRTPV system.
- d. ESCOM intends to purchase the energy generated by such SRTPV system, on gross metering concept, at the tariff determined by the KERC.

Now therefore, in consideration of the foregoing premises, the parties hereto, intending to

be legally bound hereby agree as under:

1. Technical and Interconnection Requirements:

Seller shall ensure his SRTPV system complies with the following technical and interconnection requirement and shall:

- 1.1 Comply with the applicable standards and conditions in respect of integrating the SRTPV system with the distribution system.
- 1.2 Connect and operate the SRTPV system to ESCOM's distribution system in accordance with the State Grid Code and Distribution Code as amended from time to time.
- 1.3 Install, prior to connection of SRTPV system to ESCOM's distribution system, an inverter with an automatic inbuilt isolation device.
- 1.4 Provide external manual isolation mechanism with suitable locking facility so that SRTPV system will not back-feed into the ESCOM's network in case of power outage of the ESCOM's distribution system, and it shall be accessible for ESCOM to operate, if required, during maintenance / emergency conditions.
- 1.5 Install all the equipment of SRTPV system compliant with relevant International (IEEE/IEC) and Indian standards (BIS).
- 1.6
 - (a) SRTPV system shall be designed, engineered and constructed and operated by the seller or any other person on his behalf, with reasonable diligence subject to all applicable Indian laws, rules, Regulations as amended from time to time and orders having the force of law.
 - (b) The seller shall commission the SRTPV system within six months from the date of approval of the PPA.
- 1.7 Adhere to the following power quality measures as per the International and Indian standards and/or such other measures stipulated by KERC/ESCOM:
 - a. Harmonic current: Harmonic current injections from a generation unit shall not exceed the limits specified in IEEE 519.

- b. Voltage at the injection point should be in the operating range of 80% to 110% of the nominal connected voltage.
- c. Flicker: Operation of Photovoltaic system shouldn't cause voltage flicker in excess of the limits stated in the relevant sections of IEC standards or other equivalent Indian standards, if any.
- d. Frequency: When the system frequency exceeds the upper limit specified in the IEGC, as amended from time to time, the SRTPV system shall shift to island mode.
- e. DC Injection: Photovoltaic system should not inject DC power more than 0.5% of full rated output at the interconnection point or 1% of rated inverter output current into distribution system under any operating conditions.
- f. Power Factor: While the output of the inverter is greater than 50%, a lagging power factor of greater than 0.9 shall be maintained.
- g. The SRTPV system in the event of voltage or frequency variations must island/disconnect itself as per IEGC/KEGC Regulations within the stipulated period.

2. Safety:

The seller shall comply with the following safety measures:

- 2.1 The seller shall comply with the Central Electricity Authority (Measures Relating to Safety and Electricity Supply) Regulations 2010.
- 2.2 The seller shall ensure that, the design, installation, maintenance and operation of the SRTPV system are in a manner conducive to the safety of the SRTPV system as well as the ESCOM's distribution system.
- 2.3 If the Seller's SRTPV system either causes damage to and/or produces adverse effects on the other consumers' or ESCOM's assets, Seller will disconnect SRTPV system immediately from the distribution system by himself or upon directions from the ESCOM and rectify the same at his own cost before reconnection.

3. Clearances and Approvals

The Seller shall obtain ESCOM's and other statutory approvals and clearances before connecting the SRTPV system to the distribution system.

4. Access and Disconnection

- 4.1ESCOM shall have access to metering equipment and disconnecting device of SRTPV system, both automatic and manual, at all times.
- 4.2 In emergency or outage situation, where there is no access to a disconnecting device either automatic or manual, the ...ESCOM shall have the right to disconnect power supply to the premise.

5. Liabilities

The Seller shall be solely responsible for availing any fiscal or other incentive provided by the State/ Central government, at his own expenses.

6. Commercial Settlement

6.1 Tariff:

a. The ...ESCOM shall pay for the gross energy at Rs. ---per KWh as determined by the KERC in the Order dated 2.5.2016, for the term of this agreement.

b. If for any reason the date of commission is delayed beyond the date of commissioning agreed, the tariff payable by the ESCOM shall be lower of the:

i) Tariff agreed to in this agreement

OR

ii) Tariff as per the average pooled power purchase cost notified by the Commission prevailing on the date of commissioning.

c. In case any import of energy is recorded in the bi-directional meter during a billing period, such energy shall be billed at higher of the:

i) Tariff agreed to in this agreement

OR

ii) Prevailing retail supply tariff applicable to the category of the installation of the seller.

Note: The Seller is allowed to install SRTPV system upto 150% of the sanctioned load.

d. The Seller shall pay the Electricity tax and other statutory levies, pertaining to SRTPV generation, as may be levied from time to time.

e. The seller shall not have any claim for compensation, if the Solar power generated by his SRTPV system could not be absorbed by the distribution system due to failure of power supply in the grid/ distribution system for the reasons, such as line clear, load shedding and line faults, whatsoever.

7. Metering:

7.1 In addition to the existing consumer meter, the seller shall arrange to install Bi-directional meter (whole current/CT operated) at the point of interconnection to the distribution system, at a suitable place in the premises accessible for recording export of energy from the SRTPV system to the grid and import of energy to the SRTPV system. The bi directional meter shall comply with the Central Electricity Authority (Installation and operation of meters) Regulations, 2006 and shall have the following features:

- i. Separate registers for recording export and import energy with facility to download by Meter Reading Instrument (MRI).
- ii. kVA, kW and kVAR measuring registers for both import and export.
- iii. Meter shall have RS232 (or higher) communication optical port / Radio Frequency (RF) port to support Automatic Meter Reading (AMR).

8. BILLING AND PAYMENT:

8.1 ESCOM shall raise monthly electricity bill for the gross energy on the scheduled date of meter reading.

8.2 ESCOM shall pay for the gross energy exported as per Tariff agreed in this agreement within 30 days of issue of bills.

8.3 In case of any import of energy recorded in the bi-directional meter during the billing period, such energy shall be billed as per Clause 6.1 of this agreement.

8.4 ESCOM shall pay interest at the same rates as is being levied on the consumers for late payment charges in case of any delay beyond 30 (thirty) days period from the date of issue of bill in payment, for the gross energy exported.

9. Term and Termination of the Agreement

9.1 This agreement shall be in force for a period of 25 years from the date of commissioning of the SRTPV system unless terminated otherwise as provided here under.

9.2 If the ESCOM commits any breach of the terms of the Agreement, Seller shall serve a written notice specifying the breach and calling upon the ESCOM to remedy/ rectify

the same within 30 (thirty) days or at such other period and at the expiry of 30 (Thirty) days or such other period from the delivery of the notice, Seller may terminate the agreement by delivering the termination notice, if the ESCOM fails to remedy/ rectify the same.

9.3 If the Seller commits any breach of the terms of the Agreement, ESCOM shall serve a written notice specifying the breach and calling upon the seller to remedy/ rectify the same within 30 (thirty) days or at such other period and at the expiry of 30 (Thirty) days or such other period from the delivery of the notice, ESCOM may terminate the agreement by delivering the termination notice, if the seller fails to remedy/ rectify the same.

9.4 Upon termination of this Agreement, seller shall cease to supply power to the distribution system and any injection of power shall not be paid for by the ESCOMs.

10. Dispute Resolution:

All the disputes between the parties arising out of or in connection with this agreement shall be first tried to be settled through mutual negotiation.

The parties shall resolve the dispute in good faith and in equitable manner.

In case of failure to resolve the dispute, either of the parties may approach the appropriate Forum of law.

IN WITNESS WHEREOF, the Seller and the ...ESCOM have entered into this Agreement executed on the date and year first set forth above.

For AND ON BEHALF OF	
.....Electricity Supply Company Limited	SELLER
By: (Name) Designation: Address:	By: (Name) RR No: Address:
WITNESS In Presence of Name: Designation:	WITNESS In Presence of Name:
WITNESS In Presence of Name: Designation:	WITNESS In Presence of Name:

STANDARD APPROVED FORMAT OF POWER PURCHASE AGREEMENT FOR ROOFTOP SOLAR PV PLANTS

WITH

NET METERING ARRANGEMENT

This Power Purchase agreement is entered into at (place)..... on this day of between Electricity Supply Company Limited (...ESCOM), a Government of Karnataka undertaking, a Company formed and incorporated in India under the Companies Act-1956, with its registered office located at, Karnataka State, represented byhereinafter referred to as the "...ESCOM", (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) as party of the first part

AND

.....(Name) the consumer of ...ESCOM residing at (address), hereinafter referred to as the "Seller" (which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) as party of the second part.

Whereas,

- a. The Seller intends to connect and operate the Solar Roof Top Photo Voltaic (SRTPV) system with ESCOM's HT/LT Distribution system for sale of Solar Power to ESCOM in terms of the Karnataka Electricity Regulatory Commission (KERC) Order No. S/03/01 dated: 2.5.2016 as amended from time to time.
- b. The Seller intends to install a SRTPV system of kWp capacity on the existing roof top of the premises situated at..... and bearing RR. No..... in the same premises under Sub-Division of ESCOM.
- c. The Seller intends to sell the energy generated from the SRTPV system to ESCOM on net metering concept, from the date of commissioning of the SRTPV system.
- d. ESCOM intends to purchase the energy generated by such SRTPV system, on net metering concept, at the tariff determined by the KERC.

Now therefore, in consideration of the foregoing premises, the parties hereto, intending to be legally bound hereby agree as under:

1. Technical and Interconnection Requirements:

Seller shall ensure his SRTPV system complies with the following technical and interconnection requirement and shall:

- 1.1 Comply with the applicable standards and conditions in respect of integrating the SRTPV system with the distribution system.
- 1.2 Connect and operate the SRTPV system to ESCOM's distribution system in accordance with the State Grid Code and Distribution Code as amended from time to time.
- 1.3 Install, prior to connection of SRTPV system to ESCOM's distribution system, an inverter with an automatic inbuilt isolation device.
- 1.4 Provide external manual isolation mechanism with suitable locking facility so that SRTPV system will not back-feed into the ESCOM's network in case of power outage of the ESCOM's distribution system, and it shall be accessible for ESCOM to operate, if required, during maintenance / emergency conditions.
- 1.5 Install all the equipment of SRTPV system compliant with relevant International (IEEE/IEC) and Indian standards (BIS).
- 1.6 (a) SRTPV system shall be designed, engineered and constructed and operated by the seller or any other person on his *behalf*, with reasonable diligence subject to all applicable Indian laws, rules, Regulations as amended from time to time and orders having the force of law.

(b) The seller shall commission the SRTPV system within six months from the date of approval of the PPA.
- 1.7 Adhere to the following power quality measures as per the International and Indian standards and/or such other measures stipulated by KERC/ESCOM:
 - a. Harmonic current: Harmonic current injections from a generation unit shall not exceed the limits specified in IEEE 519.
 - b. Voltage at the injection point should be in the operating range of 80% to 110% of the nominal connected voltage.
 - c. Flicker: Operation of Photovoltaic system shouldn't cause voltage flicker in excess of the limits stated in the relevant sections of IEC standards or other equivalent

Indian standards, if any.

- d. Frequency: When the system frequency exceeds the upper limit specified in the IEGC, as amended from time to time, the SRTPV system shall shift to island mode.
- e. DC Injection: Photovoltaic system should not inject DC power more than 0.5% of full rated output at the interconnection point or 1% of rated inverter output current into distribution system under any operating conditions.
- f. Power Factor: While the output of the inverter is greater than 50%, a lagging power factor of greater than 0.9 shall be maintained.
- g. The SRTPV system in the event of voltage or frequency variations must island/disconnect itself as per IEGC/KEGC Regulations within the stipulated period.

2. Safety:

The seller shall comply with the following safety measures:

- 2.1 The seller shall comply with the Central Electricity Authority (Measures Relating to Safety and Electricity Supply) Regulations 2010.
- 2.2 The seller shall ensure that, the design, installation, maintenance and operation of the SRTPV system are in a manner conducive to the safety of the SRTPV system as well as the ESCOM's distribution system.
- 2.3 If the Seller's SRTPV system either causes damage to and/or produces adverse effects on the other consumers' or ESCOM's assets, Seller will disconnect SRTPV system immediately from the distribution system by himself or upon directions from the ESCOM and rectify the same at his own cost before reconnection.

3. Clearances and Approvals

The Seller shall obtain ESCOM's and other statutory approvals and clearances before connecting the SRTPV system to the distribution system.

4. Access and Disconnection

- 4.1ESCOM shall have access to metering equipment and disconnecting device of SRTPV system, both automatic and manual, at all times.
- 4.2 In emergency or outage situation, where there is no access to a disconnecting device either automatic or manual, the ...ESCOM shall have the right to disconnect power supply to the premise.

5. Liabilities

The Seller shall be solely responsible for availing any fiscal or other incentive provided by the State/ Central government, at his own expenses.

6. Commercial Settlement

6.1 Tariff:

- a. The ...ESCOM shall pay for the Net energy at Rs. ---per KWh as determined by the KERC in the Order dated 2.5.2016, for the term of this agreement.
- b. If for any reason the date of commissioning is delayed, beyond the date of commissioning agreed, the tariff payable by the ESCOM shall be lower of the:
 - i) Tariff agreed to in this agreement
 - OR
 - ii) Tariff as per the average pooled power purchase cost notified by the Commission prevailing on the date of commissioning.

Note: The Seller is allowed to install SRTPV system upto 150% of the sanctioned load.

- c. The Seller shall pay the Electricity tax and other statutory levies, pertaining to SRTPV generation, as may be levied from time to time.
- d. The seller shall not have any claim for compensation, if the Solar power generated by his SRTPV system could not be absorbed by the distribution system due to failure of power supply in the grid/ distribution system for the reasons, such as line clear, load shedding and line faults, whatsoever.

7. Metering:

- 7.1 The seller shall arrange to shift the existing meter to the generation side of SRTPV plant to measure solar power generation and install Bi-directional meter (whole current/CT operated) at the point of interconnection to the distribution system, at a suitable place in the premises accessible for recording export of energy from the SRTPV system to the grid and import of energy to the premises of the consumer from the grid. The bi directional meter shall comply with the Central Electricity Authority (Installation and operation of meters) Regulations, 2006 and shall have the following features:

- i. Separate registers for recording export and import energy with facility to download by Meter Reading Instrument (MRI).
- ii. kVA, kW and kVAR measuring registers for both import and export of energy.
- iii. Meter shall have RS232 (or higher) communication optical port / Radio Frequency (RF) port to support Automatic Meter Reading (AMR).

8. BILLING AND PAYMENT:

- 8.1 ESCOM shall issue monthly electricity bill for the net energy on the scheduled date of meter reading.
- 8.2 In case, the exported energy is more than the imported energy, ESCOM shall pay for the net energy exported as per Tariff agreed in this agreement within 30 days from the date of issue of bill duly adjusting the fixed charges and electricity duty if any.
- 8.3 In case, the exported energy is less than the imported energy, the seller shall pay ...ESCOM for the net energy imported as per the prevailing retail supply tariff determined by the Commission from time to time.
- 8.4 ESCOM shall pay interest at the same rates as is being levied on the consumers for late payment charges in case of any delay beyond 30 (thirty) days period from the date of issue of bill in payment, for the Net energy exported.

Explanation: *Net energy means the difference of meter readings of energy injected by the SRTPV system into the grid (export) and the energy drawn from the grid for use by the seller (import) recorded in the bi-directional meter.*

9. Term and Termination of the Agreement

- 9.1 This agreement shall be in force for a period of 25 years from the date of commissioning of the SRTPV system unless terminated otherwise as provided here under.
- 9.2 If the ESCOM commits any breach of the terms of the Agreement, Seller shall serve a written notice specifying the breach and calling upon the ESCOM to remedy/rectify the same within 30 (thirty) days or at such other period and at the expiry of 30 (Thirty) days or such other period from the delivery of the notice, Seller may terminate the agreement by delivering the termination notice, if the ESCOM fails to

remedy/ rectify the same.

9.3 If the Seller commits any breach of the terms of the Agreement, ESCOM shall serve a written notice specifying the breach and calling upon the seller to remedy/ rectify the same within 30 (thirty) days or at such other period and at the expiry of 30 (Thirty) days or such other period from the delivery of the notice, ESCOM may terminate the agreement by delivering the termination notice, if the seller fails to remedy/ rectify the same.

9.4 Upon termination of this Agreement, seller shall cease to supply power to the distribution system and any injection of power shall not be paid for by the ESCOMs.

10. Dispute Resolution:

All the disputes between the parties arising out of or in connection with this agreement shall be first tried to be settled through mutual negotiation.

The parties shall resolve the dispute in good faith and in equitable manner.

In case of failure to resolve the dispute, either of the parties may approach the appropriate Forum of law.

IN WITNESS WHEREOF, the Seller and the ...ESCOM have entered into this Agreement executed on the date and year first set forth above.

For AND ON BEHALF OF	
.....Electricity Supply Company Limited	SELLER
By: (Name) Designation: Address:	By: (Name) RR No: Address:
WITNESS In Presence of Name: Designation:	WITNESS In Presence of Name:
WITNESS In Presence of Name: Designation:	WITNESS In Presence of Name: