STANDARD OPERATING PROCEDURE (SOP)

ON-GRID SOLAR ROOFTOP NET METERING

BIE-PIEDMC

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Punjab Industrial Estate Development and Management Company (PIEDMC)

PIEDMC Commercial Area (NORTH) Sundar Industrial Estate, Raiwind Road, Lahore

Phone No. (042) 35297203-5

INTRODUCTION:-

Pursuant to 153rd Board of Directors meeting dated 30th November, 2021 for implementation of Net-Metering in PIEDMC Estates and subsequently approval of consumer reference guide / application procedure in 65th BOM-SIE meeting dated 10th March, 2022. SOP is hereby proposed for guidance of the field staff for expeditious implementation to encourage large scale solar generation in Industrial Estate **in line with above approval for BIE.**

NEPRA Alternative & Renewable Energy, Distributed Generation and Net Metering Regulations, 2015 (Amended time to time), Net-Metering Reference Guide issued by Alternative Energy Development Board (AEDB) and Net-Metering reference guide for BIE consumers shall remain integral part of SOP.

REGISTRATION OF APPLICATION:-

1. The applicant shall submit application in-line with PIEDMC-BIE consumer reference guide / application procedure.
2. Application form / consumer reference guide can be downloaded from PIEDMC website www.pie.com.pk as well as available at One Window.
3. The filled-in application along with necessary documents shall be submitted by the intending Distributed Generator to One Window, PIEDMC for its further processing.

APPLICATION PROCESSING

1. Within three (3) working days of receiving an application, BIE-PIEDMC shall acknowledge its receipt and inform the applicant whether the application is complete in all respects.
2. In case of any missing information or documents, the applicant shall provide the same to the BIE-PIEDMC office within five (5) working days of being informed by the office.
3. The BIE-PIEDMC office shall perform an initial review to determine whether the applicant qualifies for interconnection facility, or may qualify subject to additional requirements provided that the initial review shall be completed within ten (10) working days.
4. Technical Feasibility studies shall be prepared considering following factors based on applications:-
    a. Transformer loading (including proposed SRTPV system load) shall be within technical limits.
    b. Whether the proposed interconnection will require upgrading the capacity of existing distribution network.
    c. Phase balancing to avoid unbalancing of load in secondary circuit of distribution line.
    d. Sanctioned and running load on distribution transformer / feeder.
    e. The solar net metering approvals for general consumers will be accorded on first come first served basis until the grid connected Solar PV installed capacity reaches 30% of the closest upstream distribution transformer rated capacity.
5. In case the initial review / Load Flow Study reveals that the proposed facility is not technically feasible, the office shall return the application and communicate

the reasons to the applicant within three (3) working days after the completion of initial review or submission of load flow study by the applicant.

6. If the applicant qualifies as Distributed Generator, then applicant shall deposit following cost in favor of PIEDMC Electric (A/C No.) within thirty (30) days:-
    a. Fee as per schedule-V of BIE-PIEDMC consumer reference guide
    b. Connection Charge Estimate (CCE) as per Demand Note
7. After acknowledgment of fee and CCE, PIEDMC and the applicant shall enter into an Agreement (as per schedule-I of BIE-PIEDMC consumer reference guide) within five (05) working days.
8. The office shall install bi-directional energy meter on the proposed interconnection facility within five (05) working days of the payment of demand note and Fee by the applicant **or meter may be purchased by consumer in case of non-availability of meter in BIE store and accuracy /features shall be ascertain by BIE-PIEDMC at consumer's cost.**
9. If bi-directional energy meter already installed at proposed facility than current reading of meter shall be considered as initial reading for Net-Metering billing, provided agreement signed.

SOME IMPORTANT PRE-REQUISITES:

1. Load flow study for the facility having capacity up to 100kW is not required.
2. Submission of Load flow study (on PSSE software) will be compulsory for all distributed generators in case load is more than 100-kW to assess the impact of the DG facility on the existing Distribution System of BIE-PIEDMC and other important factors including following: -
    - Without impact of solar PV Net-Metering with Sanctioned load in service
    - With impact of Solar PV Net-Metering with Sanctioned Load in service
    - With impact of Solar PV Net-Metering with Sanctioned Load out of service
3. The Consultant for Load Flow Studies should be certified by Pakistan Engineering Council (PEC), must have experience of working with NTDC and DISCOs and studies shall be carried out on PSSE software (Evidence of PEC certificate, working experience with NTDC & DISCOs and Valid license certification of PSSE software from Siemens PTI required).
4. The cost for transformer augmentation (if any) shall be borne by consumer.
5. Mandatory safety precautions/features which have to be taken into consideration as part of the grid connected solar PV system installations are:-
    a. An inbuilt Inverter relay which trips on grid failure and thus prevents any solar power injection to the grid when there is no power in grid (anti-islanding protection shall be tested by the respective officers during routine service connection inspections), and necessary protection arrangements shall be made when there is no grid supply on single/two/three phases. The inspection authority shall ensure the protection before commissioning. The applicant's installation shall be disconnected in the event of such exigencies to prevent accident or damage to men and material.
    b. The Solar PV system should be separately grounded/ earthed.

DISTRIBUTED GENERATION FACILITY DESIGN AND OPERATING REQUIREMENTS:-

Pursuant to Clause-9 "Protection Requirements" of the Alternative and Renewable Energy Distributed Generation and Net Metering Regulations, 2015 for implementing solar roof-top net metering policy, following protection requirements are hereby proposed to be incorporated in design of the system.

- **Single Line Diagram:-**
  The protection and control diagrams for the interconnection of the Distributed Generator shall be in accordance with Single Line Diagram.
  Distributed Generator shall be responsible for installation of all of the equipment and protective devices to be used for the interconnection.
- **Earthing Protection:-**
  A minimum of two separate dedicated and interconnected earth electrodes must be used for the earthing of the solar PV system support structure with a total earth resistance not exceeding **5 ohms** as below:-
  (i) Equipment earth (DC)
  (ii) System earth (AC)
  Both equipment earth (DC) and system earth (AC) shall be checked for proper earthing.

- **Equipment Earth (DC)**
  All the non-current carrying metal parts such as PV modules, DCDB are bonded together and connected to earth to prevent shocks to the manpower and protection of the equipment.
- **System Earth (AC)**
  All the non-current carrying metal parts such as ACDB, Lightening Arresters are bonded together and connected to the existing earth.
- **Surge Protection**
  - Surge protection shall be provided on the DC side and the AC side of the solar system.
  - The DC surge protection devices (SPDs) shall be installed in the DC distribution box adjacent to the solar grid inverter.
  - The AC SPDs shall be installed in the AC distribution box adjacent to the solar grid inverter.
  - The SPDs earthing terminal shall be connected to earth through the above mentioned dedicated earthing system.
  - The Lightening Arresters need to be provided for the SRTPV buildings which are of more than 15 meters height only.

SOLAR NET-METERING DETAILS

Particulars of the Applicant	
Name	
Address	
Telephone No/Mobile No	
Reference No. of existing connection	
Sanctioned Load in KW	
Applicable Tariff	
Detail of existing energy meter	Make:_____ Type:_____
Solar Installer Details	
Company Name:	
AEDB Certification No.	
Solar Grid Inverter / Modules	
Make:	
Model:	
Serial number:	
Capacity:	
No. of Solar Panels	
Watts / Panel	
Total capacity of solar modules (kW):	

CHECKLIST FOR SOLAR ROOFTOP PV GRID SAFETY QUALIFICATION

Component Inspection Checklist

Sr. No	Item Type	Yes	No	Remarks
1	Installation layout – is it as per drawing?			
2	Inverter IEC standards qualified			
3	PV panel IEC standards qualified			
4	PV isolators / PV cables IEC standards qualified			
5	AC disconnect manual switch provided			

Grid Functional Safety Checklist

Sr. No	Item Type	Yes	No	Remarks
1	Check-PV Inverter and islanding (utility side) Disconnect grid and check whether PV generator seizes generation immediately			
2	Check reconnect time by reconnecting the grid: PV Generator reconnects minimum 60 seconds later (Single Phase) or minimum 300 seconds later (three phase connectivity)			
3	Bi directional flow recorded on Meter			
4	Consumption (import) only mode OK ?			
5	PV inverter anti islanding tested at array side			
6	Solar generation meter OK ?			
7	Check all earthing provided at ACDB/DCDB/LA			