Policy and Regulatory Journey of Net Metering in Pakistan

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National Electric Power Regulatory Authority

• NEPRA approved Regulations on September 1, 2015 to put into effect Net Metering for solar and wind generation of up to 1MW.

• First net metering system of 1 MW capacity installed at Parliament House in Feb 2016.

• Prime Minister of Pakistan launched new consumer friendly framework for net metering on 3rd January, 2018

• As of September 07, 2020, 5502 customers of cumulative 94.39 MW have been issued Generation License for Net Metering.

• Addition of 3000-4000 MW of net metering based installations is envisaged in next 4-5 years.
**Application process as per NEPRA Regulations**

**Distributed Generator**
- Send application incl. Request for Interconnection to DISCO
- Submit requested information
- **Request of registration**
- Application evaluation
- **Application evaluation**
- Initial review of technical feasibility for qualification of interconnection
- **Interconnection agreement**
- Review of design of DG facility and interconnection prior to operation
- **Within 20 days**
- Pay connection charge estimate
- **Within 30 days of demand notice**
- Install and commission interconnection facility
- Review of design of DG facility and interconnection prior to operation
- **Within 7 days**
- Send copy of agreement to NEPRA
- **Within 7 days**
- Send written interconnection approval and issue connection charge estimate
- **Within 20 days**
- DG and DISCO sign interconnection agreement
- **Within 10 days**
- Acknowledge that application is complete
- **20 working days**
- Initial review of technical feasibility for qualification of interconnection
- No
- Inform DG about reason why application is not feasible
- **Yes 10 days**
- Disposal of registration review

**DISCO**
- Review and provide information & NEPRA approved documents in response
- 5 days
- **Initial review of technical feasibility for qualification of interconnection**
- **No**
- **Yes 10 days**
- **Within 7 days**
- **Payment of connection charge estimate**
NET METERING EVOLUTION IN PAKISTAN

01. Open up market for Net Metering

02. Remove existing barriers to project implementation

03. Hand-hold Net Metering Sector

04. Improved Net Metering Services by Vendors
NET METERING DEVELOPMENT AT A GLANCE

- RE Policy provides for Net Metering
- NEPRA Circulated draft Regulations
- Net Metering Promotional Activities
- Promotion and Trainings
  - All stakeholders on board
  - Further Amendments in Regulations
- ARE Policy 2020 announced Promoting Net Metering

First Draft of Net Metering Regulations Prepared
NEPRA net Metering Regulations Announced
Revisions in the Regulations based on Learning Curve
Digitalization of Net Metering Process
Renewable Energy Policy 2006
(Net Metering Provision)

• RE Policy 2006 announced Net Metering as an investment venture for the consumers

• Section 8.4.2 lays down overarching structural mechanism for Net Metering.

• The Policy envisaged that Net Metering would be particularly suitable for incentivizing dispersed small-scale RE generation, such as rooftop PV panels, helping optimize their utilization and payback rates and obviating the need for expensive on-site storage batteries

• NEPRA took lead from the metering process and netting-off mechanism for electricity units consumed/exported by the consumers as stated in RE Policy 2006
Alternative and Renewable Energy Policy 2020

(Net Metering Provision)

• Section 3.7 of the ARE Policy 2020 provides for structural mechanism for Net Metering as a special case.

• The Policy acknowledges that Net Metering would be promoted under the regulatory regime of NEPRA

• NEPRA will continue playing its roll to promote net metering in Pakistan
Existing Regulatory Environment for Net Metering in Pakistan

- NEPRA approved *NEPRA (Alternative & Renewable Energy) Distributed Generation and Net Metering Regulations, 2015* on September 1, 2015 to put into effect Net Metering:
  - Consumer with three phase 400V or 11 kV connections are eligible
  - Consumer categories include Domestic, Commercial, Industrial and Agriculture
  - Eligible RE resources are solar and wind
  - Capacity limits per system ranges between 1kW – 1000 kW
  - Applicable Tariff: approved by NEPRA for the relevant period and consumers’ category of the DISCO
  - Metering: Either single bi-directional meter or two separate meters to record in and out flow of electricity
New provisions in NEPRA Regulations (S.R.O.1261(J)/2017 dated 20-12-2017):

• The term of agreement between Consumer and DISCO is going to increase from three years to seven years (Section 7 and Schedule-I of Regulations)

• The license issuance time by NEPRA is going to be seven days

• The NEPRA determined tariff would remain valid for a term of the Agreement/License

• Requirement of certificate by Electric Inspector as per Schedule-I and Schedule-II of the Regulations are going to be omitted
Existing Regulatory Environment for Net Metering in Pakistan

  - "Applicable Tariff" means tariff determined by the Authority and duly notified by the Federal Government from time to time (R 2(1)(d))
  - Consumers of general services or single point bulk supply are allowed for net metering (R 2(1)(e))
  - The capacity of a proposed Distributed Generation Facility shall not exceed one and a half of the sanctioned load of the Applicant's premises with proviso of change after one year of notification (R 3(1)(2))
  - Revocation clause added for those who would not commission systems within six months of Generation License (R 4(4)).
  - Net of units during peak hours against peak units during off-peak against off-peak units (R 14(2))
  - The price payable by a DISCO to DG is stated as national average power purchase price of the DISCO (R 14(5))
## Safety Standards: Inverters

<table>
<thead>
<tr>
<th>Grid Tied Solar Inverters</th>
<th>Grid Interconnection Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UL 1741</strong>: Inverter, Converters, Controllers and Interconnection System Equipment for use with distributed Energy Resources (the U.S)</td>
<td><strong>IEEE 1547</strong>: Standard for Interconnecting Distributed Resources with Electric Power Systems (India and the U.S.)</td>
</tr>
<tr>
<td><strong>IEC 62109-1/2</strong>: Safety of Power Converters for use in Photovoltaic Power Systems – General/Particular Requirements (India &amp; the EU)</td>
<td><strong>IEC 61727</strong>: Photovoltaic (PV) Systems Characteristics of the Utility Interface (India)</td>
</tr>
<tr>
<td><strong>IEC 61000-6-2/4</strong>: Electromagnetic compatibility (EMC) (India &amp; the EU)</td>
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## Safety Standards: PV equipment

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<tr>
<td><strong>IEC 61730-1/2</strong>: PV module safety qualification (India &amp; EU)</td>
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<tr>
<td><strong>IEC 60947-3:2008 + A1:2012</strong>: Low-voltage switchgear and control gear (India &amp; EU)</td>
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<tr>
<td><strong>UL 1703</strong>: safety and product requirements of PV modules (U.S.)</td>
</tr>
<tr>
<td><strong>UL 703</strong>: safety and product requirements of PV wire</td>
</tr>
<tr>
<td><strong>IEC 61439-1:2011</strong>: Low-voltage switchgear and control-gear assemblies (India &amp; EU)</td>
</tr>
<tr>
<td><strong>EN 50618</strong>: Electric cables for photovoltaic systems (IEC standard under development)</td>
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Digitalization of Net Metering Process

• NEPRA is receiving and approving net metering applications on-line through its portal connected to all DISCOs digitally

• This is:
  • Automating Net- Metering and Interconnection process for integration with existing systems, compliance and policy adherence
  • Demand Adjustment based on forecast through e-governance of solar installations and interconnection
  • Review and Manage Activities of installers and staff for management and maintenance
YEAR-WISE NET METERING INSTALLATIONS IN PAKISTAN

Status of Net Metering Connections and Size as of 07/09/2020

Year-wise Installed Capacity of Net Metering Connections (MW)

Year-wise No. of Net-Metering License Issued
<table>
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<tr>
<th>DISCO</th>
<th>No. of Connections</th>
<th>Installed Capacity (MW)</th>
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<tr>
<td>PESCO</td>
<td>143</td>
<td>3.335</td>
</tr>
<tr>
<td>TESCO</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IESCO</td>
<td>1556</td>
<td>18.449</td>
</tr>
<tr>
<td>GEPCO</td>
<td>248</td>
<td>6.948</td>
</tr>
<tr>
<td>LESCO</td>
<td>1521</td>
<td>27.822</td>
</tr>
<tr>
<td>FESCO</td>
<td>233</td>
<td>5.565</td>
</tr>
<tr>
<td>MEPCO</td>
<td>235</td>
<td>6.043</td>
</tr>
<tr>
<td>HESCO</td>
<td>8</td>
<td>0.246</td>
</tr>
<tr>
<td>SEPCO</td>
<td>6</td>
<td>1.43391</td>
</tr>
<tr>
<td>QESCO</td>
<td>2</td>
<td>0.02618</td>
</tr>
<tr>
<td>K-Electric</td>
<td>1116</td>
<td>19.902</td>
</tr>
<tr>
<td>Bahria Town</td>
<td>347</td>
<td>3.655</td>
</tr>
<tr>
<td>DHA-XII (EME Sector)</td>
<td>87</td>
<td>0.966</td>
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<tr>
<td>Total</td>
<td>5502</td>
<td>94.39109</td>
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DISCO: Distribution Companies of Pakistan

- **PESCO**: 143 connections, 3.335 MW
- **IESCO**: 1556 connections, 18.449 MW
- **GEPCO**: 248 connections, 6.948 MW
- **LESCO**: 1521 connections, 27.822 MW
- **FESCO**: 233 connections, 5.565 MW
- **MEPCO**: 235 connections, 6.043 MW
- **HESCO**: 8 connections, 0.246 MW
- **SEPCO**: 6 connections, 1.43391 MW
- **QESCO**: 2 connections, 0.02618 MW
- **K-Electric**: 1116 connections, 19.902 MW

**Total**: 5502 connections, 94.39109 MW

- **TESCO**: 0 connections, 0.0 MW
- **LESCO-DHA**: 1608 connections, 28.788 MW
- **FESCO**: 233 connections, 5.565 MW

Pakistan Direct Normal Solar Radiation Annual

Model estimates of monthly average daily solar radiation using inputs derived from satellite and surface observations of cloud cover, aerosol optical depth, precipitable water vapor, albedo, atmospheric pressure and temperature sampled at 40-km resolution.
SOP = Standard Operating Procedure
FO = Focal Office
D = Done
ND = Not Done
Future Actions for Net Metering Promotion

- Integrating battery storage to meet peaking load of customers
- Keeping distribution business viable for DISCOs with high penetration of net metering connections
- Minimizing impact of net metering on non-participating customers
- Supply-demand balance
- Net metering at high-loss feeders
- Interconnection requirements for safe grid operations with high share of net metering connections
- 3 phase vs single phase options
Thank You

Any Questions Please?

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