SAARC Energy Center Webinar Conference
“Promotion of Net-Metering in SAARC Member States”

Solar Market Prospect and Net-Metering Strategy of Afghanistan

Tuesday, September 08, 2020 11:00 AM – 2:00 PM (PKT)

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:: Detailed Presentation Content

- Afghanistan's Energy Demand
- Afghanistan's Energy Resources or Potential
- Afghanistan's National Grid Plan
- Afghanistan's Regional connectivity Plan
- Afghanistan's Solar Potential
- Afghanistan's Solar Map
- Afghanistan's Solar Plan Projects
- Afghanistan's Solar Rooftop Plan
- Afghanistan's Tariff Implementation Plan
- Afghanistan's Planned Net-Metering Strategy and Policy
- Afghanistan's Broad Net-Metering Implementation Plan
Afghanistan Energy Sector

- Afghanistan undergoes a process of re-industrializing its economy and rebuilding its energy infrastructure. This goes along with an increasing energy demand that cannot be met by conventional energy sources only. Thus, alternative energy sources have to be explored.

- Solar photovoltaic has already reached or is about to reach grid parity in most countries of the sun-belt countries. Also in Afghanistan Solar PV has a great economic potential and its efforts can be seen to deploy it.

- Afghanistan’s Energy sector is governed by Ministry of Energy and Water. MEW is in charge of shaping all policies and regulations for the country’s energy sector, including the design of sector plans.

- Afghanistan’s Energy sector is operated by Da Afghanistan Breshna Sherkat (DABS). A vertically integrated utility company, DABS is responsible for the operation and management of the electric power system, including generation, import, transmission, distribution and billing throughout the country on a commercial basis.

- Ministry of Finance is the sole shareholder of DABS and final Guarantor.
Afghanistan On-Grid, Generation and Transmission Lines Installed Capacity

### HV Transmission Lines Installed Capacity

- **Republic of Uzbekistan**: 400 MW (42%)
- **Islamic Republic of Iran**: 164 MW (14%)
- **Republic of Tajikistan**: 483 MW (42%)
- **Republic of Turkmenistan**: 110 MW (9%)
- **Total**: 1,157 MW

### Afghanistan Domestic Generation Installed Capacity in MW

- **Hydro (MW)**: 318
- **Thermal (MW)**: 200
- **Diesel Generator (Gen.Set) (MW)**: 48
- **Solar (MW)**: 18
- **Total (MW)**: 584
Afghanistan Energy Generation Potential

- Hydro: 7% (2,300 MW)
- Solar: 21% (22,200 MW)
- Wind: 69% (6,700 MW)
- Biomass: 1% (400 MW)
- Gas and Coal: 1% (400 MW)
- Geothermal: 1% (350 MW)

Total renewable energy potential: 323,500 MW

<table>
<thead>
<tr>
<th>No</th>
<th>Source</th>
<th>Capacity [MW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydro</td>
<td>23,000</td>
</tr>
<tr>
<td>2</td>
<td>Solar</td>
<td>22,200</td>
</tr>
<tr>
<td>3</td>
<td>Wind</td>
<td>6,700</td>
</tr>
<tr>
<td>4</td>
<td>Biomass</td>
<td>4,000</td>
</tr>
<tr>
<td>5</td>
<td>Gas and Coal</td>
<td>4,000</td>
</tr>
<tr>
<td>6</td>
<td>Geothermal</td>
<td>3,500</td>
</tr>
</tbody>
</table>

Total = 323,500 MW
Regional Power Trade Projects (Central Asia - South Asia)

CASA-1000 Project

Transmission of electrical energy from Kirgizstan, Tajikistan as seller to I.R. of Pakistan as buyer through I.R. of Afghanistan via 500 kV HVDC TL with the capacity of 1300MW.

TAP Project

Transmission of electrical energy from Republic of Turkmenistan as seller through I.R. of Afghanistan to I.R. of Pakistan as buyer via 500 kV OHTL with the max capacity of 4000MW.

TUTAP Project

Transmission of electrical energy from Republic of Turkmenistan, Uzbekistan & Tajikistan as seller to I.R. of Afghanistan & from Afghanistan to Pakistan as buyer via 500/220 kV HVAC TL, Four site (Nangarhar, Paktika, Khost and Kandahar) with the capacity about 450 MW.
:: Afghanistan’s 2000 MW Solar Power Plant Package

- The 2,000 MW Solar power project is planned in five provinces:
  - Kabul Solar Power Plant = 400 MW
  - Herat Solar Power Plant = 400 MW
  - Kandahar Solar Power Plant = 400 MW
  - Balkh Solar Power Plant = 400 MW
  - Nangarhar Solar Power Plant = 400 MW
Current Signed Power Purchase Agreements with Independent Power Producers (IPPs)

- With the support of Donors, a strong base has been created for development of power generation, transmission and distribution infrastructure.
- A national grid is being established that includes regional connections with the neighbouring countries. The grid currently spans the northeast and southeast of Afghanistan and is rapidly expanding to cover all regions of the country.
- With this infrastructure base, some initial successes achieved with Independent Power Producers (IPPs):

<table>
<thead>
<tr>
<th>No</th>
<th>Propjets</th>
<th>Source</th>
<th>Period or Time</th>
<th>Installed Capacity</th>
<th>Tariff in USD Cent</th>
<th>Total Cost in Million USD</th>
<th>Upfront Subsidy in Million USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>77 Construction Company</td>
<td>Solar</td>
<td>20 Year</td>
<td>15 MW</td>
<td>8.50</td>
<td>19.40</td>
<td>7.00</td>
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<tr>
<td>2</td>
<td>Zolaristan</td>
<td>Solar</td>
<td>20 Year</td>
<td>15 MW</td>
<td>8.50</td>
<td>19.40</td>
<td>7.00</td>
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<tr>
<td>3</td>
<td>Dynasty</td>
<td>Solar</td>
<td>15 Year</td>
<td>10 MW</td>
<td>7.30</td>
<td>14.40</td>
<td>10.00</td>
</tr>
<tr>
<td>4</td>
<td>77 Construction Company</td>
<td>Hydro</td>
<td>20 Year</td>
<td>100 MW</td>
<td>5.90</td>
<td>175.00</td>
<td>Current Hydro Station (Inst. Cap. 55.5 MW)</td>
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<tr>
<td>5</td>
<td>Bayat Power</td>
<td>Thermal</td>
<td>20 Year</td>
<td>40 MW</td>
<td>7.50</td>
<td>39.00</td>
<td>UDS 75 / 1000m3 gas</td>
</tr>
<tr>
<td>6</td>
<td>Ghazanfar Group</td>
<td>Thermal</td>
<td>20 Year</td>
<td>50 MW</td>
<td>7.50</td>
<td>75.00</td>
<td>UDS 75 / 1000m3 gas</td>
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It is planned that the implementation would be done over 3-5 year period in the country from 2021 to 2025 in the following manner:

Year 1: Residential and Commercial Buildings (R&C) in Kabul.
Year 2: Residential and Commercial Buildings (R&C) in Provincial Zones.
Year 3: Residential and Commercial Buildings (R&C) in other provinces.

<table>
<thead>
<tr>
<th>Province</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kabul</td>
<td>R&amp;C</td>
<td>R&amp;C</td>
<td>R&amp;C</td>
</tr>
<tr>
<td>Nangarhar, Herat, Balkh, Parwan and Kandahar</td>
<td>R&amp;C</td>
<td>R&amp;C</td>
<td>R&amp;C</td>
</tr>
<tr>
<td>Other Provinces</td>
<td></td>
<td></td>
<td>R&amp;C</td>
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</table>
Proposed Funding Mechanism of National SRT Program

- Proposed funding solution for the National Solar Rooftop and Solar Water Heater Program is co-financing (Customer and Private Sector).
  - Option I: 100% system cost will be covered by customer.
  - Option II: Customer will pay the 50% of the cost upfront and the private sector will invest 50% of system cost as loan and will recover that from customer over the next 1-3 years in monthly instalments.

- Private Sector may finance the program in the form of loans to the Customer through Financial Institutions and/or Suppliers may be made available for instalment payment.

- Private Sector loan to the Customers will be recovered by monthly instalment of 1-3 years or through Utility monthly electricity bills.

- Customers will provide bank or any other form of financial guarantee if they want to benefit from the loan subsidy.

- RESCO Modell is proposed for Commercial Customers and CAPEX Model is proposed for Residential Customers.
Solar Project implementation - Tariff Determination Principles

- According to the Electricity Act of Afghanistan, all registered companies, government entities, partnership companies/firms/individuals, and all consumers of DABS will be eligible for setting up of Solar Rooftop Projects (SRP) for sale of electricity to DABS/captive use or for self-consumption, as amended from time to time.
- SRP with installed capacity lower than or equal to 50 kW shall be connected at LT level of distribution network. SRP with installed capacity of 50 kW above and up to 1000 kW shall be connected at 20 KV level of distribution network.

- Proposed Tariff Determination Principles:
  - Upto 1 MW – grid connected solar rooftop solar projects under net metering scheme
  - 1 – 10 MW – Feed in tariff based projects. Feed in Tariff to be determined by the Regulatory Authority
  - > 10 MW – To be undertaken through competitive bidding basis. Projects to be identified by the Government
Thanks for Your Attention…. Any Questions?

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