RES sale in the market in different countries of MEDREG and ECRB Region

The Case of Lebanon

MEDREG – ECRB Joint Workshop on
“Integrating RES in the Electricity Networks and Balancing Mechanism in MEDREG and ECRB Regions”

By Dr. Sorina Mortada

April 15, 2021
Challenges in the Lebanese Electricity Sector

- More than 96% of primary energy is imported
- Shortage in electricity supply
- Burden on the Lebanese National Economy (subsidies)

To ensure Energy Security and reduce emissions coming from old conventional power plants and private generators using diesel oil ➔ Increase RE sources in the Lebanese Energy Mix
Boosting EE and RE

End-User

Boosting EE and RE

Regulatory Framework
Stakeholders' commitment
Incentives
Awareness

Policies and Action Plans
Policies and Action Plans


National Renewable Action Plan (NREAP 2016-2020)

Updated Policy Paper for the electricity sector 2019

NREAP 2021-2025 will be published soon

12% RE in the energy mix by 2020

30% RE of 2030 electricity consumption
NREAP 2016-2020

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>MW</td>
<td>MW</td>
<td>MW</td>
<td>MW</td>
<td>MW</td>
</tr>
<tr>
<td>Wind</td>
<td></td>
<td></td>
<td>200.00</td>
<td>350.0</td>
<td>450.0</td>
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<tr>
<td>PV, CPV</td>
<td></td>
<td></td>
<td>150.00</td>
<td>200.0</td>
<td>300.0</td>
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<tr>
<td>Distributed PV</td>
<td></td>
<td></td>
<td>100.00</td>
<td>125.0</td>
<td>150.0</td>
</tr>
<tr>
<td>CSP</td>
<td></td>
<td></td>
<td></td>
<td>50.00</td>
<td>50.0</td>
</tr>
<tr>
<td>SWH</td>
<td>211,988 m²</td>
<td>413,988 m²</td>
<td>1,053,988 m²</td>
<td>1,345,185 m²</td>
<td>1,716,835 m²</td>
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<tr>
<td>Total Hydro</td>
<td>190.00</td>
<td>190.00</td>
<td>331.50</td>
<td>402.3</td>
<td>473.0</td>
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<tr>
<td>Geothermal</td>
<td>1.30</td>
<td></td>
<td>6.5</td>
<td></td>
<td>15.0</td>
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</tbody>
</table>

And contribute to Lebanon’s New Target of 30% renewable energy from total electricity consumption in 2030
Stakeholders Commitment

• National: ministries, IRI, Libnor, EDL…
• International:
  • Grant from RVO for feasibility of CSP in Hermel region Northern Lebanon
  • MEDREG TA and WS
  • EBRD
  • World Bank Group
  • IMLES
  ....
  ....
  ....
Regulatory Framework

- Energy Conservation law
- Decentralized Renewable Energy law
- Law 288 for large scale projects
- Solar Ordinance: the obligation of all types of buildings (new and under major renovation) to opt for solar water heaters and/or heat pumps for the production of domestic hot water.
**Incentives**

1- Ten public bids for PV installation in ten public buildings initiated and financed by the Ministry of Energy and Water

<table>
<thead>
<tr>
<th>Facility/Owner</th>
<th>Capacity (kWp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ministry of Energy and Water</td>
<td>135.30</td>
</tr>
<tr>
<td>Directorate of Engineering and Planning - LAF</td>
<td>155.70</td>
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<tr>
<td>El Helou Barrack</td>
<td>32.30</td>
</tr>
<tr>
<td>Lebanese Army Health Dispensary of Qobbeh</td>
<td>54.40</td>
</tr>
<tr>
<td>Lebanese Army Health Dispensary of Ablah</td>
<td>54.40</td>
</tr>
<tr>
<td>Wheat Silos at Beirut Port</td>
<td>220.00</td>
</tr>
<tr>
<td>Casino du Liban</td>
<td>315.24</td>
</tr>
</tbody>
</table>
155.7 kWp at the Lebanese Army – Directorate of Engineering
The project was commissioned ten days before the terrible Port explosion that shook the country on 4 August 2020. The system was fully destroyed.

220 kWp at the Wheat Silos at the Port of Beirut
Incentives

2- Net Metering

3- National Heat Pumps programme: 30% grant for systems and 100% for the monitoring system

4- Solar PV Public Street Lighting Initiative

5- International initiatives: CEDRO-UNDP, USAID-Rene Mouawad Foundation …

6- Solar Water Heaters Programme:

200 USD subsidy for 7,311 system from a total of 7,500 available subsidies.
Incentives

SQM collectors installed

Thousands

Incentives

7- NEEREA: National Energy Efficiency and Renewable Energy Account

- Beneficiary
- Engineering Consultant
- Commercial Bank
- Official Technical Review by LCEC
- Unofficial Technical Review by LCEC
- Central Bank of Lebanon (BDL)

If loan >20,000 $

If loan <20,000 $
Incentives: NEEREA

• By June 2020, more than 1,000 projects approved

• Total amount since 2012 = more than 600 Million USD.

• 76% of the projects: Solar PV

• 42% of loans amount: Green buildings.
Incentives: NEEREA

• These projects all together contribute to an annual saving of 73,253,210 USD.

• Until today, NEEREA has achieved to reduce yearly energy consumption by 260,163,325 kWh and 281,245 tons of CO2.

• The EU grant has been provided to 59 different projects that had NEEREA Loans

• NEEREA created sustainable job opportunities; 76 new energy companies recently entered the energy market with 40% more of job vacancies.
Solar PV Market in Lebanon
The turnkey price of solar PV continued its steady decrease from $7,186 per kWp in 2011 to $935 in 2019. This constitutes a remarkable price drop of 87% in a span of nine years.
Yearly Average Solar PV Turnkey Price By Project Type ($/kWp)
Solar PV Investment ($Million)

Total cumulative investment in the solar PV sector grew from $2.29 Million in 2010 to $125.83 Million in 2019.
Large Scale Projects

Wind 1st round: 226 MW PPA

• 20-year Power Purchase Agreement signed in February 2018

• Land acquisition

• Environmental Impact Assessment

• Interconnection on high voltage network according with EDL requirements

• 10.4 USc/kWh (or the equivalent of 156 LBP/kWh based on BDL's official exchange rate) for the first 2 years, to account for the required auxiliary grid infrastructure upgrade and development, and at 9.6 USc/kWh (or the equivalent of 144 LBP/kWh based on BDL's official exchange rate) afterwards and until the end of the term of the PPA.
Large Scale Projects

- First Round - Solar PV - 180 MW (12 farms)
- Second Round - Solar PV - 360 MW (24 farms)
- Third Round - Solar PV - 180 MW (12 farms)
- Solar PV with storage - 210-300 MW
- CSP with storage - 50 MW
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315.24 kWp at the Casino du Liban