



LEBANESE CENTER FOR ENERGY CONSERVATION
المركز اللبناني لحفظ الطاقة

efficient resources, sustainable achievements

Renewable Energy Status

in Lebanon

*National Meeting on “Women Empowerment and
Entrepreneurial Development in the Rural Context:
The Role of Renewable Energy”*

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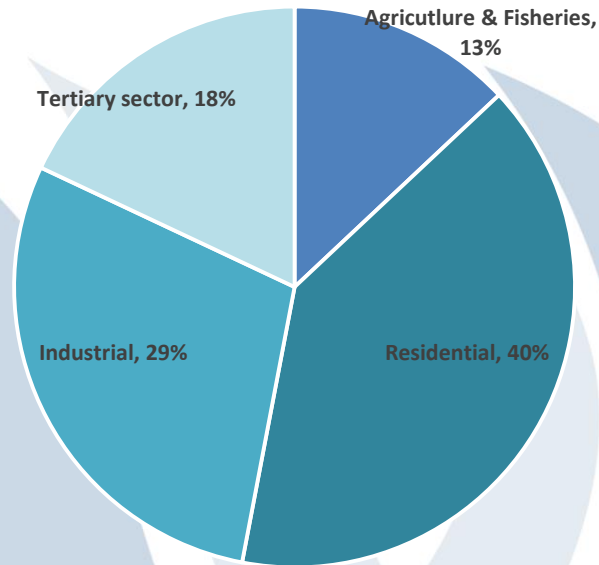
July 30, 2019

Beirut, Lebanon

Introduction to Energy Sector in Lebanon

- Lebanon relies essentially on oil imports as its main resource for energy production
- The gap between EDL's electricity production and total electricity consumption increases every year
- EDL generates only part of the electricity consumption
- Reliance on diesel generators to overcome the electricity shortages
- The electricity sector is facing several problems such as load shedding, technical losses, and the aging of power plants
- This impacts customers, the Government, and the entire economy on a technical and financial level

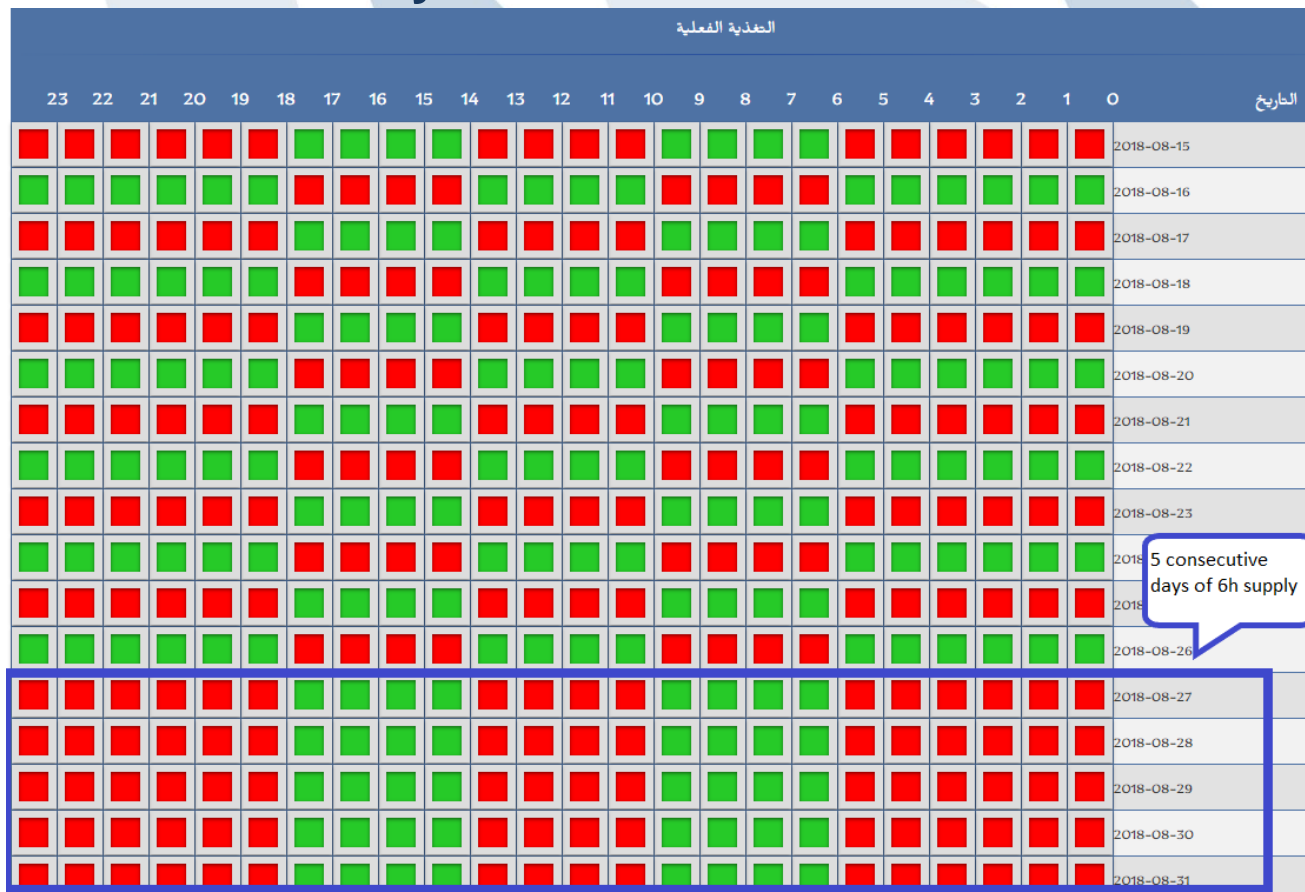
Energy Consumption by Sector



- **Agriculture sector consumption reaches 13% in Lebanon**
- **Residential consumption is a total of 40%**
- **Tertiary sector consumption is 18%**

Access to Electricity

- The electrification rate in Lebanon is higher than 99.5%
- However, the supply in rural area is limited
- Rural area supply can be as low as 6h/day – even for 5 consecutive days!



Introduction to Energy Sector in Lebanon

- **In 2009, at the 15th session of the Conference of Parties (COP) to the United Nation Framework Convention on Climate Change (UNFCCC) meeting in Copenhagen, Denmark, the Lebanese Government made a pledge to develop Renewable Energy (RE) production capacity to reach 12% by 2020**
- **MEW published a comprehensive energy policy (2010 Policy Paper for the Electricity Sector) that was approved by the Council of Ministers (COM) on June 21st, 2010**
- **Updated Policy Paper for the Electricity Sector was published in March 2019 with a target to reach 30% of the consumed energy by 2030**

Lebanese Center for Energy Conservation

- **LCEC is the National Energy Agency for Lebanon**
- **LCEC is the technical arm of the MEW in energy efficiency, renewable energy, and green buildings**
- **LCEC is the technical consultant for BDL for NEEREA / LEA loans**

Renewable Energy Status

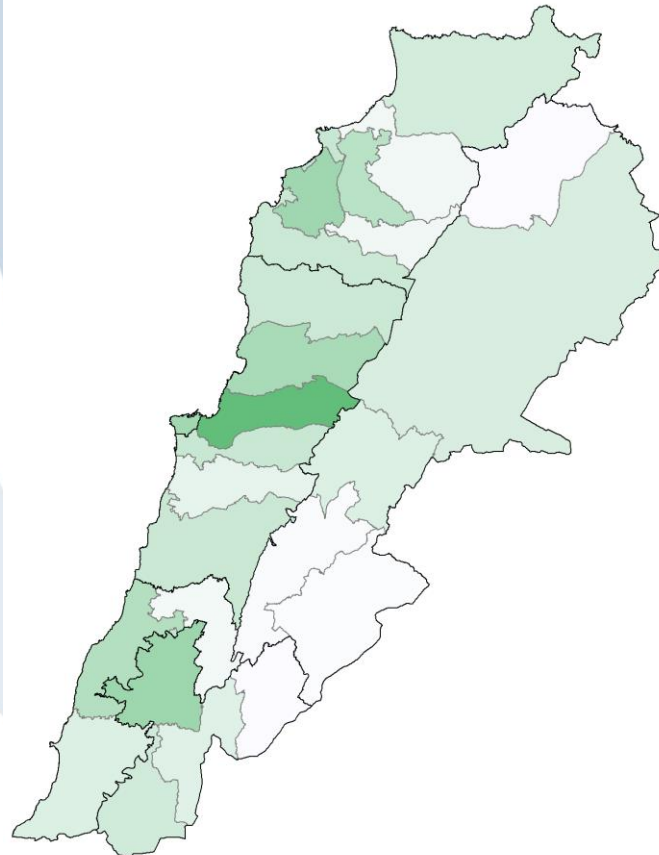
- **Hydropower**
- **Solar PV (on grid, off grid, solar water pumping, solar street lighting)**
- **Solar water heaters**

Hydropower

- **Installed capacity of c. 280MW which constitutes nearly 4.5% of the total production based on the electricity generation profile (MEW 2010)**

SWH implementation in Lebanon

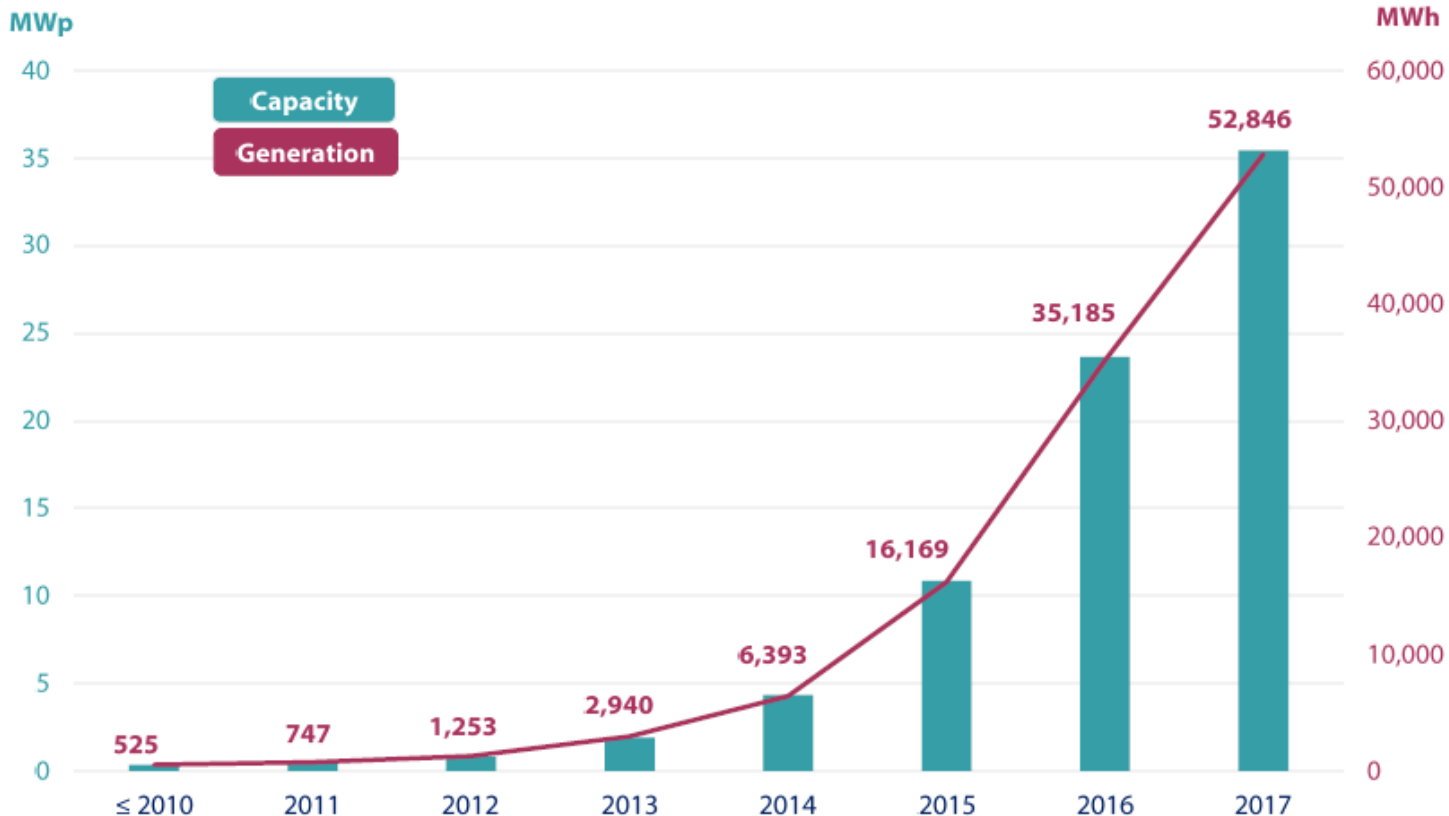
- Up to 2017, the installed surface area of SWHs had reached more than **608,000 m²**
- SWHs have reduced energy production in Lebanon by 239,820 MWh/year and offset the yearly production emission of **156 Ktons of CO₂**



District	Number of Projects	Share (%)
Metn	4137	12.9
Nabatieh	2570	8.0
Koura	2490	7.7
Beirut	2450	7.6
Kesrouan	2244	7.0
Saida	1958	6.1
Zgharta	1804	5.6
Baabda	1406	4.4
Tripoli	1401	4.4
Chouf	1361	4.2
Batroun	1341	4.2
Jbeil	1318	4.1
Bint Jbeil	1191	3.7
Akkar	1117	3.5
Baalbek	987	3.1
Tyr	883	2.7
Zahle	881	2.7
Marjeyoun	804	2.5
Aley	607	1.9
Bcharre	375	1.2
Miniyeh-Danniyeh	342	1.1
Jezzine	285	0.9
Western Bekaa	95	0.3
Rashaya	68	0.2
Hermel	43	0.1
Hasbaya	27	0.1

Solar PV implementation in Lebanon

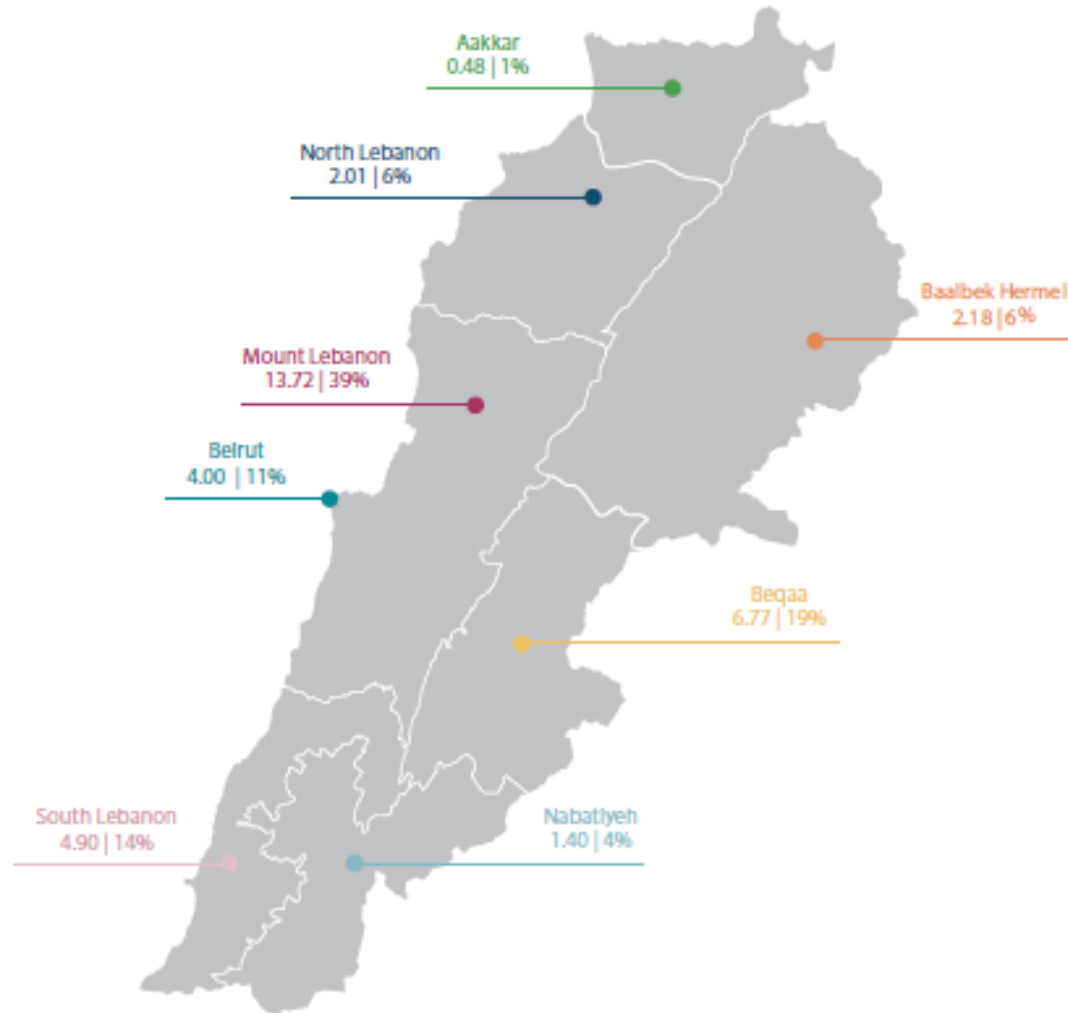
(source 2017 Solar PV Status Report)



Solar PV electricity generation increased from 35,000 MWh in 2016 to 53,000 MWh in 2017 which constitutes 0.35% of the total annual electricity generation by EDL.

Solar PV implementation in Lebanon

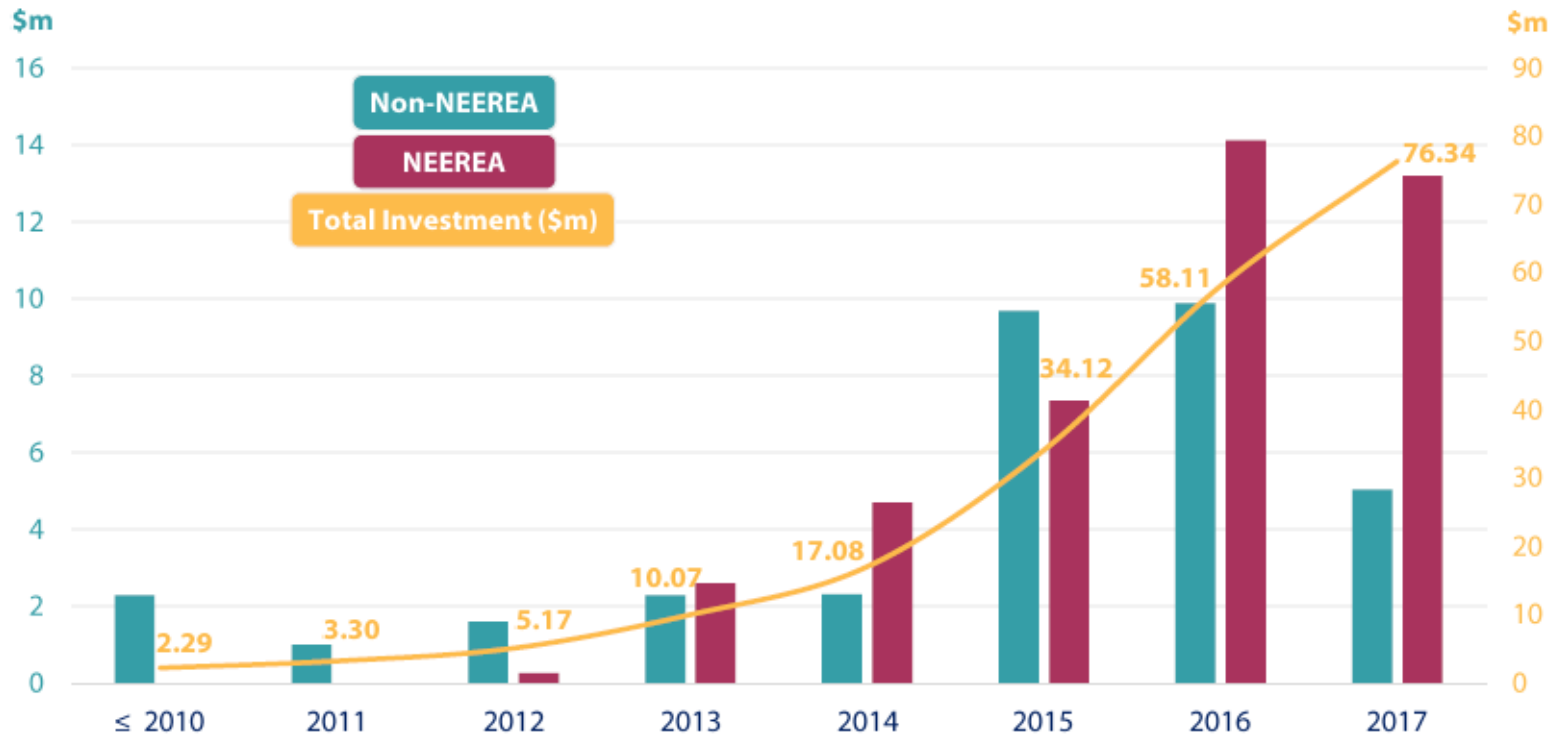
(source 2017 Solar PV Status Report)



The top 3 Governorates leading the solar PV Market in Lebanon are Mount Lebanon with 13.72 MWp, Beqaa with 6.77 MWp, and South Lebanon with 4.90 MWp.

Solar PV implementation in Lebanon

(source 2017 Solar PV Status Report)



The total cumulative investment in the solar PV sector increased from \$2.29m in 2010 to \$76.34m in 2017.

Investments in 2017 reached \$18.23m thanks to \$13.19m from NEEREA and \$5.04m from non-NEEREA investments.

Other Projects

- **Beirut River Solar Snake (BRSS)**
 - **1 MWp Solar PV Station on Beirut River**
 - **1st Large Scale Grid-Connected Project in Lebanon**



Other Projects

- **Zahrani PV Farm**
 - **1 MWp Solar PV Project at the Oil Installations of Zahrani**
 - **Intended for the Internal Consumption of the Facility with a Net Metering Scheme**



Solar Water Pumping

- The main objective is to ease the load on the municipal services and areas/communities hosting Syrian refugees

Site	Name	Capacity (kW)
1	Al Maslaha	225.28
2	Al Maslakh	107.52
3	Asayra 1	174.08
4	Asayra 2	174.08
5	Douris	122.88
6	Hawsh Tal Safiyye	25.6
7	Majdaloun 1	20.48
8	Majdaloun 2	20.48
9	Maqneh 1	163.84
10	Maqneh 2	230.4
11	Younine	143.36
	Total	1,408



Solar Water Pumping

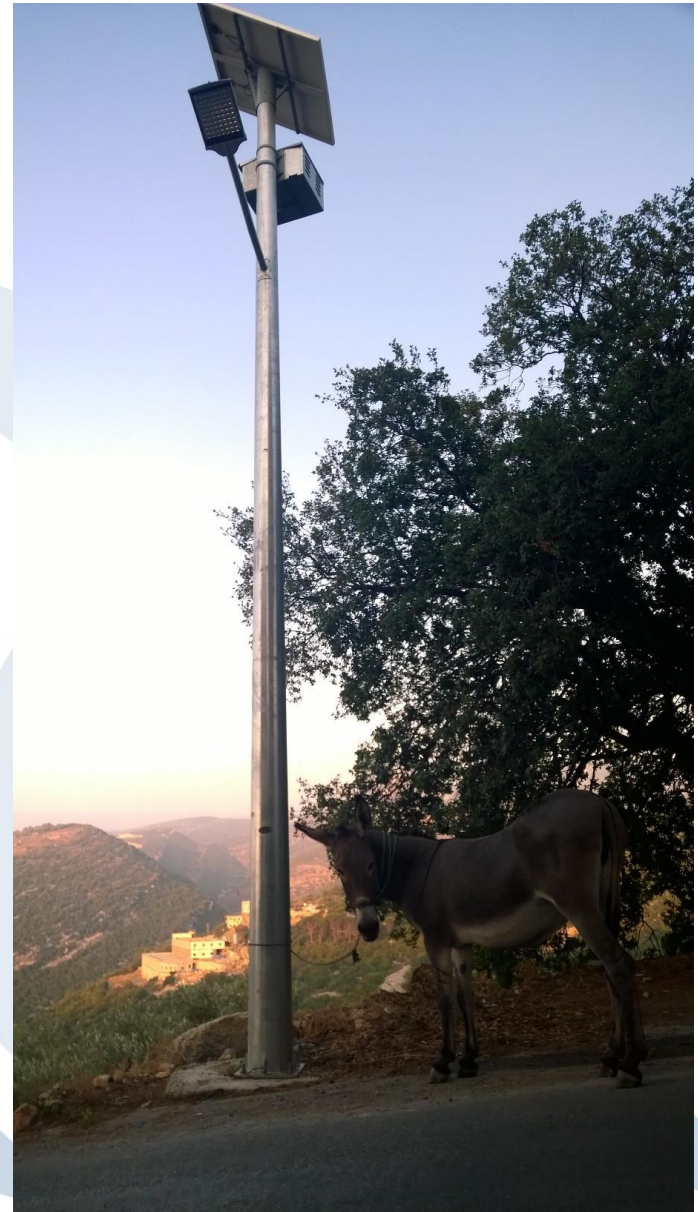


PV Solar Street Lighting

3 Unions of Municipalities participated in West Bekaa:

- **Al Sahel (11 municipalities)**
- **Al Istiklal (12 municipalities)**
- **Jabal Al Cheikh (14 municipalities)**

Around 800 PV Street Lighting Systems in total



Renewable Energy Status

- **It is difficult to measure all of the installed capacity especially in relation to the rooftops PVs**
- **A market survey is being done to reach more accurate data**
- **From the data above, as of 2019, the estimated installed capacity of renewable energy is:**
 - **280 MW Hydropower**
 - **57 MW decentralised Solar PV**
 - **4 MW other Solar PV (BRSS, Zahrani, Public Buildings, Solar Pumping)**
 - **Total 341 MW of installed RE capacity**

Renewable Energy Plans

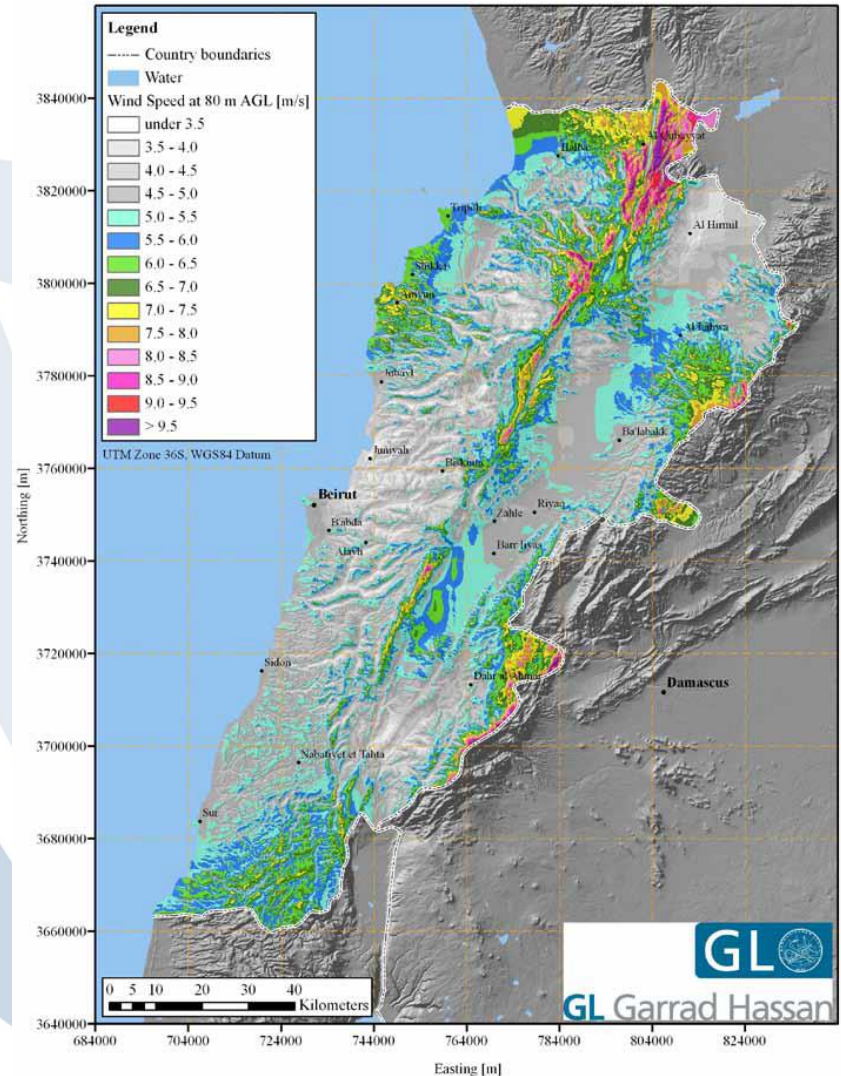
- **Updated Policy Paper has plans for 2030:**
 - **840MW of Solar PV plants**
 - **600MW of Wind**
- **In addition there are plans for 2 x 50 MW CSP**
 - **And the potential for large scale solar PV in Tfail**

Wind Energy Plans

- **First Round – Wind (200 MW):**
 - **Construction and commercial operation expected by 2020-2021**
- **Second Round – Wind (200 to 400 MW):**
 - **Submission of EOIs by 12th April 2018**
 - **Construction expected during 2021-2025**
- **Followed by a potential for another 200 MW of Wind by 2030**

Wind Energy Plans

- Lebanon onshore wind speed at 80m – Wind Atlas of Lebanon (CEDRO)



Solar Energy Plans

- **First Round – Solar PV (180 MW over 12 farms)**
 - Evaluating 42 bids received
 - Construction expected by 2020
- **Second Round – Solar PV (360 MW over 24 farms)**
 - Construction expected by 2020
- **Third Round – Solar PV (180 MW over 12 farms)**
 - Construction expected during 2021-2025
- **Solar PV with Storage (210-300 MW)**
 - EOI launched, submission of due EoI 12th July 2018
 - Construction expected during 2021-2025
- **CSP with Storage (50 MW)**
 - Construction expected during 2021-2025

Other Projects

- **10 Solar PV Project up to 300 kWp in 10 Public Buildings:**
 - **Ministry of Energy and Water**
 - **Lebanese Army – Directorate of Engineering**
 - **Helou Barracks (Internal Security Forces)**
 - **Qobbeh and Ablah Lebanese Army Dispensaries**
 - **Casino du Liban**
 - **Presidential Palace**
 - **Ministry of Defense**
- **CDR Projects:**
 - **11 Solar Water Pumping Sites in Baalbeck**
 - **Solar Street Lighting in 3 Unions of Municipalities in the Bekaa**

Challenges in RE in Lebanon

- **Political situation and country / regional stability**
- **First PPAs in Lebanon**
 - **Learning the process**
 - **Working with all stakeholders and different parties in developing this “new” concept**
- **Project finance**
 - **Bankability / country risks**
- **Other Challenges**
 - **Land availability**
 - **Data availability**
 - **EDL grid integration / connection**



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Thank You!

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