The Solar PV Market in Lebanon: Budding Growth

BLOMINVEST BANK

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Contact Information

Research Analyst: Riwa Daou

riwa.daou@blominvestbank.com

Head of Research: Marwan Mikhael

marwan.mikhael@blominvestbank.com

Research Department

Tel: +961 1 991 784

"Renewables overtake coal as world's largest source of power capacity" reads a recent Financial Times (FT) article. Installations of wind and solar energy have hit record-highs in the world and, surprisingly to most, the cost of these installations has fallen and is expected to continue falling over the next five years.

The FT reports that "an unprecedented 153 gigawatts of green electricity was installed last year, mostly wind and solar projects, which was more than the total power capacity in Canada. It was also more than the amount of conventional fossil fuel or nuclear power added in 2015, leading renewables to surpass coal's cumulative share of global power capacity — though not electricity generation."

According to the UNDP's "Solar PV Status Report for Lebanon", renewable energies, especially solar energy, have also seen significant growth and have become less costly in Lebanon. According to the paper, "From 2010 until the end of 2015, cumulative installed Solar PV electricity capacity has grown by an average rate of 101% per year" according to a recent UNDP report. The report also notes that the number of new Solar PV projects surged from just 18 in 2011 to 259 in 2015. The turnkey price for solar PV has been on a downward trend, dropping from $7,178 per kWp in 2010 to $2,675 per kWp in 2015, the equivalent of a 63% drop over six years.

The IEA's Definition for Solar Photovoltaic Cells and their Advantages

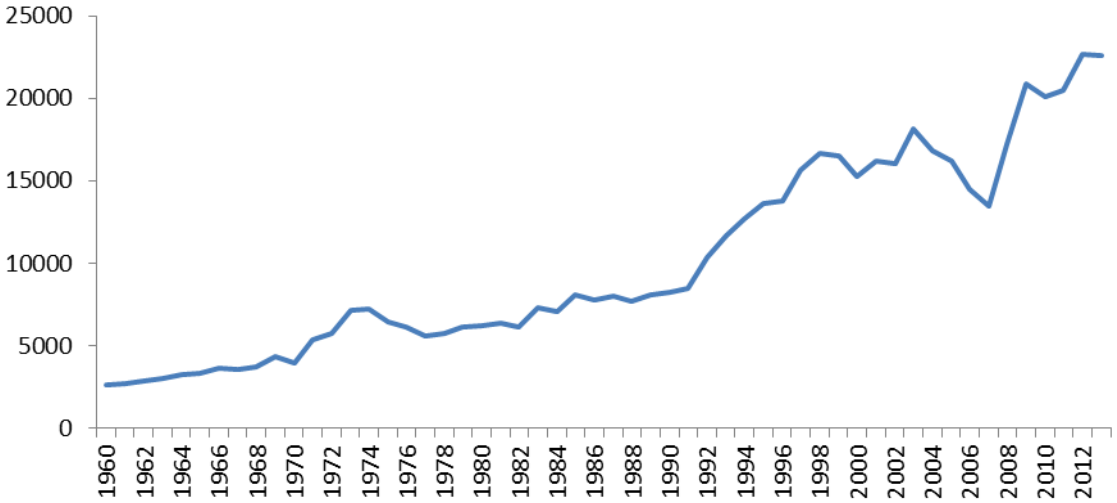
Solar photovoltaic systems directly convert solar energy into electricity. According to the International Energy Agency (IEA), a PV system starts with a PV cell, a semiconductor device that turns solar energy into direct electricity. Interconnected PV cells form a PV module and modules combined with components such as batteries and inverters form a PV system. Modules can be linked together to form PV systems that generate a few watts to hundreds of megawatts according to the IEA.

The IEA cites two advantages for solar PV systems. The first advantage is that economies of scale can be realized since modules can be manufactured in large plants. The second advantage is that the module can be deployed in small quantities at a time and therefore have a wide range of applications. Systems can be very small such as the ones used in calculators running on solar energy and can be as large as the ones used to generate electricity for large plants and facilities.

Why does Lebanon need Solar Energy?

The first and most obvious advantage for using solar energy is preserving a clean environment. Lebanon ranked 94th out of 180 countries on the Environmental Performance Index 2016 published by Yale University. In the Middle East and North Africa region Lebanon outranked Sudan, Yemen, Oman, Libya, Iraq, Kuwait, Iran, Egypt, Syria and KSA. Better rankings in the region were recorded by the United Arab Emirates, Qatar, Bahrain, Algeria, Jordan, Morocco and Tunisia. In 2012, Lebanon's CO2 emissions reached their highest level since 1960 and totaled 22,640 kiloton according to World Bank Data. On a brighter note, the UNDP states that the estimated savings from all the Solar PV projects in Lebanon increased from 351 tCO2 per year or 0.351 kilotons in 2010 to 18,000 tCO2 or 18 kilotons per year in 2015.

Lebanon's CO2 emissions in kilotons



Source: World Bank

Aside from the fact that solar energy is more environmentally friendly, it can also be a remedy to the chronic problem of electricity in Lebanon. The state-owned Electricité du Liban (EDL) has been inefficient for years due to poor collection methods and tariffs that do not reflect the real fluctuations in the price of oil. This inefficiency cost the Ministry of Finance $1.13B worth of transfers to EDL In 2015. EDL operated below its electricity generation capacity of 1,983 MW or 0.001983 TWh in 2015 and actually generated only 0.014 TWh. Given the gap between supply and demand, Lebanon has been a net energy importer, but what the development of solar energy can do is reduce the dependency of the country on imported energy.

Solar energy can also be a money-saving tool for companies and individuals in Lebanon. With EDL not being able to meet Lebanon's electricity demand, companies and individuals resort to costlier subscriptions to private generators. The UNDP estimates that the monetary savings from all solar PV projects in Lebanon grew from $191,000 per year in 2010 to a major $7,400,000 in 2015. The UNDP refers to these monetary savings as: "the savings reaped by the operators of Solar PV systems in Lebanon by deferring a portion of their electricity consumption from the grid and diesel gensets (generators) to Solar PV electricity generation".

The Present Incentives towards the Development of Solar Energy

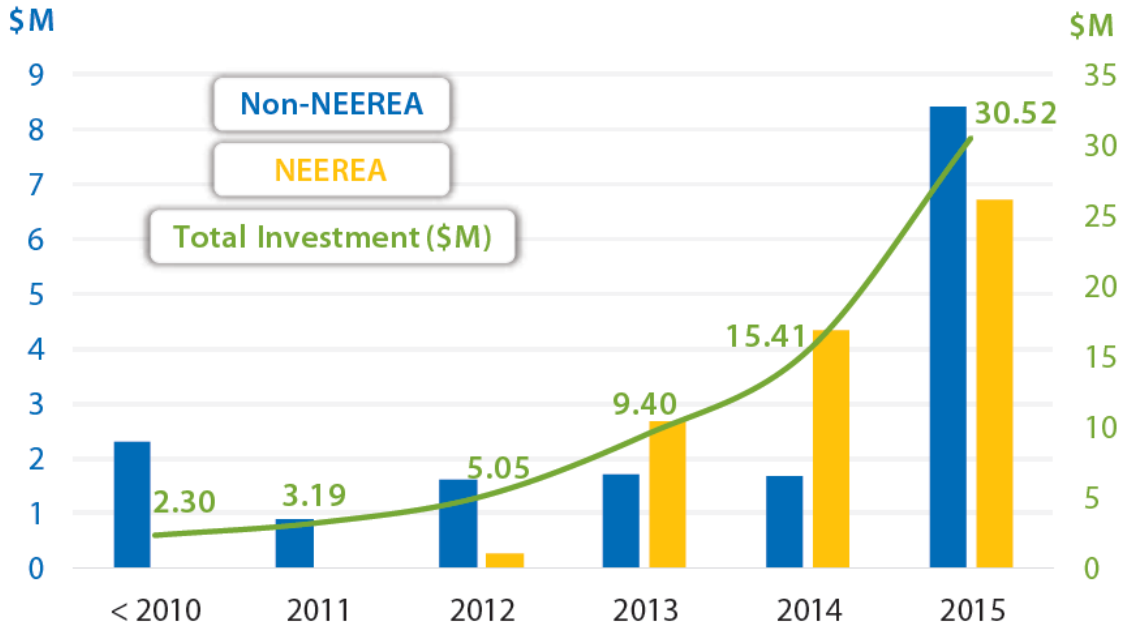
Lebanon is not blind to the advantages that renewable energies can hold and many incentives are aimed at boosting their development. Lebanon has two National Energy Efficiency Action Plans (NEEAP), one for the period 2011-2015 and one for the period 2016-2020. The NEEAP for 2016-2020 will require between 600 and 950 million dollars over a period of five years. The Central Bank of Lebanon (BDL) created the National Energy Efficiency and Renewable Energy Action (NEEREA) in 2010, in partnership with the European Union, specifically for the financing of green energy projects in Lebanon. Amongst the stakeholders aiming for higher energy efficiency in Lebanon is a non-profit association called ALMEE, The Lebanese Association for Energy Saving & for Environment, which engages in all types of renewable energy projects and energy assessment studies.

NEEREA – Details of the Financing Mechanism

- Type of Financing: long term loans
- Targeted towards: loans to residential, commercial, non-profit and industrial users for all energy efficiency and renewable energy projects for **new** and **existing** facilities
- Loan Ceiling: 20 million USD
- Interest rate: 0.6%
- Duration: Should not exceed 14 years
- Grace period: 6 months to 4 years

Source: NEEREA

Solar PV Investment (In millions of US Dollars)

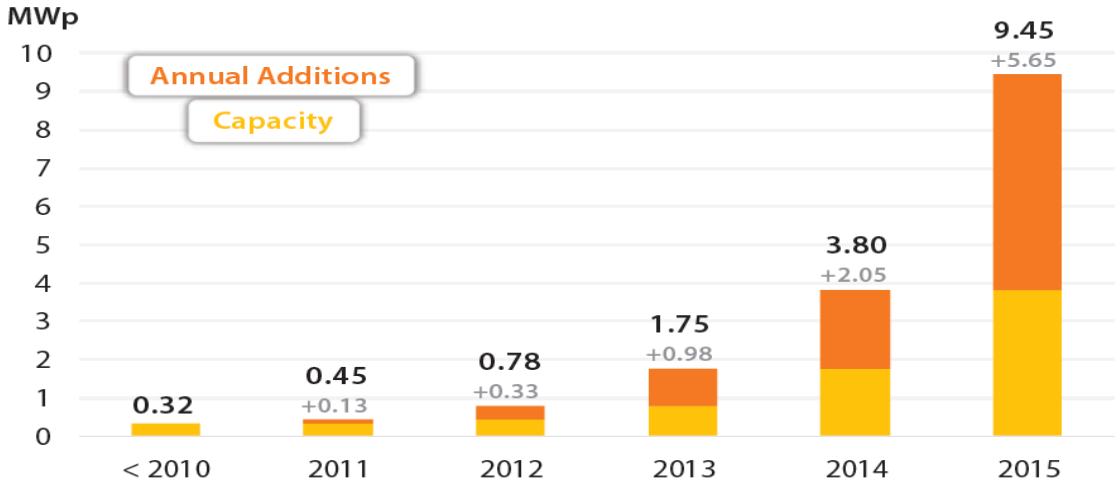


Source: UNDP

Solar Energy at its Highest Levels in 2015

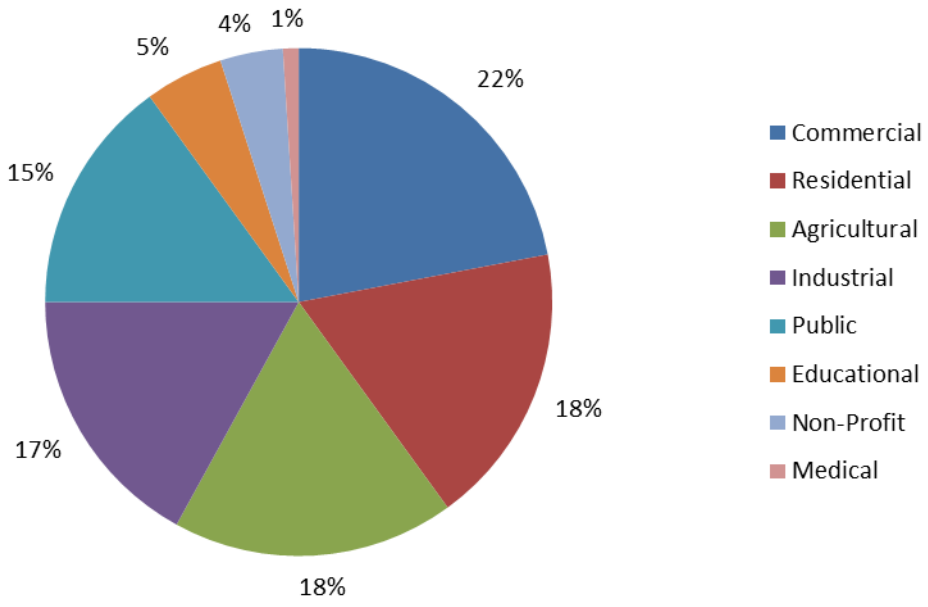
According to all examined parameters by the UNDP, engagement in solar energy has consistently been increasing since 2010. The year-on-year growth rate for Solar PV electricity capacity rose from 41% in 2011 to 149% in 2015 as did the year-on-year growth rate for the number of new solar PV projects from 27% in 2011 to 72% in 2015. Accordingly, the average size of each Solar PV project grew from 5 kWp in 2010 to 21 kWp in 2015. The total investment in the Solar PV sector also increased from 2.3 million US dollars in 2010 to 30.52 million US dollars in 2015. The UNDP attributes the exponential growth seen as of 2012-2013 and onwards as an indication of the positive impact generated by the NEEREA initiative.

Solar PV Electricity Capacity and Annual Additions



The Solar PV electricity installed capacity was 320 kWp in 2010 and reached 9.45 MWp by 2015. The 9.45 MWp installed capacity include the Beirut River Solar Snake (BRSS) Project (1.08 MWp) whereas the remainder comes from decentralized systems (8.37 MWp).*

Sectorial Breakdown for Installed Solar PV Capacity in Lebanon



Source: UNDP, 2015 Solar PV Status Report for Lebanon

For your Queries:

BLOMINVEST BANK s.a.l.
Research Department
Bab Idriss, Dowtown Beirut

Riwa Daou, Research Analyst
Tel: +961 1 991 784
riwa.daou@blominvestbank.com

Marwan Mikhael, Head of Research
marwan.mikhael@blominvestbank.com
+961 1 991 782