THE INTERNATIONAL REC STANDARD

Country Assessment Report

Country/Region name:

Lebanon (officially the Lebanese Republic)

The Lebanese Republic is a sovereign state located in Western Asia on the eastern edge of the Mediterranean region. It has a total territory of 10,452 km^2, with a 225 km coast and two mountain chains (Lebanon and Anti-Lebanon mountains). The population of Lebanon was more than 4.8 million in 2018-2019, according to the Central Administration of Statistics, with a considerable influx of refugees from neighbouring countries.

The Lebanese economy is heavily affected by power generation costs, with reported annual deficits of around USD 2 billion by the national utility (Electricite du Liban – EDL). The country relies on imports to satisfy its energy demand which increases the vulnerability of the Lebanese economy to oil price fluctuations. In addition, in recent years Lebanon has experienced significant intermittency of electricity imports owing to regional instability and significant decrease in electricity generation due to a deteriorating economic situation.

Recently, a consensus has been growing in the country on the importance of the deployment of renewable energy sources due to its role in improving the country's energy security as well as reducing the electricity supply shortage.

(Source: IRENA Renewable Energy Outlook: Lebanon)

Generation and demand: (type, MW, TWh)

Electricity generation in Lebanon does not meet the demand. Numerous projects executed by the Ministry of Energy and Water (MEW) throughout the years only contributed in maintaining the level of supply despite the natural - and exceptional due to influx of refugees - increases in demand, as per the updated Policy Paper for the Electricity Sector published by the MEW and adopted by the Council of Ministers (CoM).

The Lebanese Center for Energy Conservation (LCEC) calculates, based on MEW/EDL numbers, a peak demand of 3,639 MW in 2019, while the maximum available supply capacity was only at 2,103 MW. This resulted in a total demand in 2019 of 22.91 TWh compared to 14.63 TWh of supply during the same year. The mismatch between supply and demand has deteriorated furthermore in 2020 and 2021, mainly due to the economic situation of the country. The shortage in supply is reflected in rotating power cuts for end-consumers. These end-consumers are therefore forced to rely on private or neighbourhood-level diesel generators having high economic and environmental costs. The prices for private diesel generation of electricity have increased 20 times from December 2019 till December 2021 (as per the official numbers of the MEW), which is driving several end-consumers to start considering and installing decentralized solar systems.

The total installed renewable capacity as of 2020 was 350 MW[1] including

- 286 MW hydropower
- 7 MW landfill
- 56.37 MW solar power

[1] https://irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Outlook_Lebanon_2020.pdf

RE Market Potential:

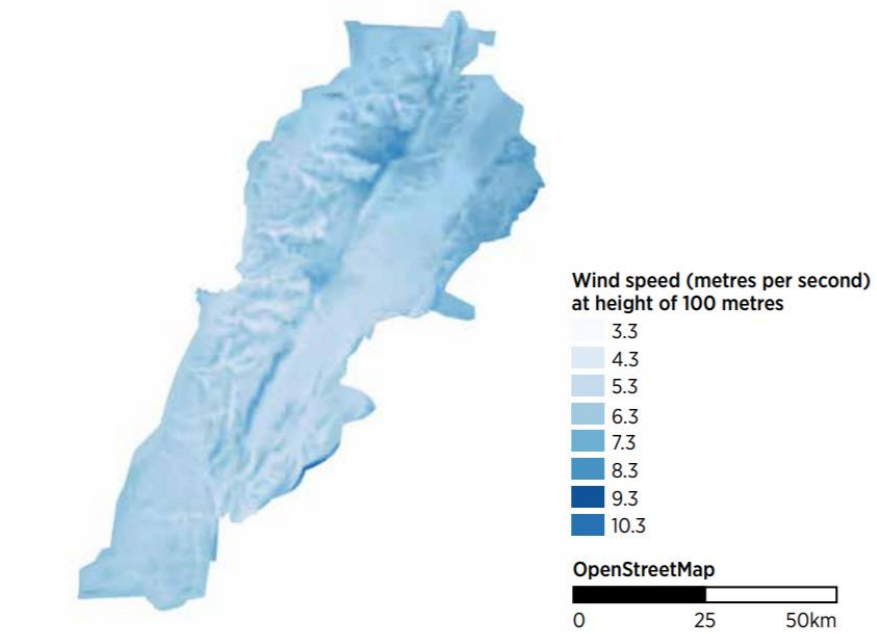
The government of Lebanon has committed itself to ambitious plans varying from the first commitment in 2009 of 12% renewable energy by 2020 to the last commitment made in September 2021 in which Lebanon submitted its SDG7 Energy Compact of the Republic of Lebanon with reaffirmed commitment to generate 30% of its electricity demand in 2030 from renewables, adopt a new legal framework for renewable energy, establish modern laws to ensure a faster transition towards sustainable energy, and use renewables to increase access of its population to affordable and secure energy sources, especially in rural areas.

As demonstrated above, the country is committed to the promotion and development of renewable energy in Lebanon and the market has to grow to meet this commitment. In fact, LCEC is currently finalizing the Second National Renewable Energy Action Plan for Lebanon (NREAP 2021-2025) to be presented to the MEW, with specific actions and targets for 2025.

(Source: LCEC Internal)

Potential according to Renewable Energy Outlook written by the Lebanese ministry of energy and water, LCEC, and IRENA (**link**)

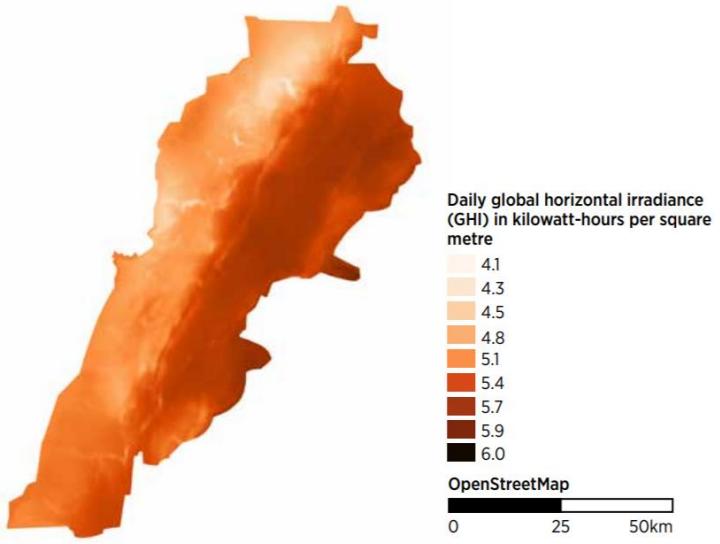
- Hydro capacity increase of 382 – 487 MW (current 386 MW)
- Wind potential 6223 MW (policy plan 2020: 200 MW; 2030: 450 MW)
- Enormous solar potential of 182,000 MW with over 300 sunny days a year and solar irradiation ranges between 1,520 kWh/m2/year and 2,148 kWh/m2/year. Current capacity is 56 MW.



Source: IRENA (n.d.), Global Atlas for Renewable Energy, DTU Global Wind Dataset v1 ;1 km onshore wind speed at 100 metres height.

Disclaimer: Boundaries and names shown on this map do not imply any official endorsement or acceptance by IRENA.

Figure 20: Solar resource potential: Annual average daily GHI (kWh/m²)



Source: IRENA (n.d.), Global Atlas for Renewable Energy; World Bank; 1 km Global Horizontal Irradiation.

Disclaimer: Boundaries and names shown on this map do not imply any official endorsement or acceptance by IRENA.

Electrical interconnection and import/export:

Lebanese electrical grid is connected only to Syria through three interconnections. The first one is a single circuit 400 kV level line via Ksara (Lebanon)–Dimas (Syria). The line is in double circuit in the Lebanese territories and single circuit in the Syrian territories. By end of 2020, this line is used to import power only from Syria without synchronization. The second is a double circuit 220 kV tie line via Deir Nbouh (Lebanon)–Samaria (Syria) which is not frequently used to import power due to technical restrictions from the Syrian side (after the Syrian crises). Finally, there are two 66 kV overhead tie lines via Ksara–Dimas which are used from time to time.

Since the start of the war in Syria in 2011, Lebanon's electrical grid became more like an energy island; electricity imports were disrupted. Moreover, no electrical energy exchange took place between Syria and Jordan during 2016 due to the current prevailing conditions in the region.

It is to be noted that Lebanon imported 0.078% of its electricity from Syria in 2018 (against 3.61% in 2017 and 0.59% in 2016).

(Source: MEDREG regional integration: Sub-regional regulatory convergence)

In September 2021, Lebanon started working with the World Bank to fund a power supply plan to ease Lebanon's power crisis. The U.S.-backed plan involves using Egyptian gas to generate power in Jordan that would be transmitted to Lebanon via Syria.

Historical support or development of renewables in the country/region:

On 25 November 2010, the National Energy Efficiency and Renewable Energy Action (NEEREA Financial Mechanism) was launched by the Central Bank of Lebanon (BDL), it allows end-consumers to have access to subsidized green loans in collaboration with the European Union. NEEREA focuses on energy efficiency, certified green buildings, and renewable energy. It has a ceiling of 10 million USD and is offered at a low interest rate for a maximum of 14 years including a grace period of up to 6 months to 4 years. The EU contributed to NEEREA by offering a grant over 15% of the investment cost of maximum 5 million USD

on a result-based basis. By June 2020, more than 1,000 projects were approved by the NEEREA financing mechanism with a total amount of more than 600 Million USD. Results show that around 76% of the projects were for solar photovoltaic while 42% of loans amount were for green buildings. These projects all together contribute to an annual saving of 73,253,210 USD. By end of 2020, NEEREA had achieved to reduce yearly energy consumption by 260,163,325 kWh and 281,245 tons of CO_2. Starting end of 2018, liquidity became scarce at Lebanese commercial banks which gradually decreased access to NEEREA until end of 2020. By 2021, no NEEREA project was being submitted or approved.

In January 2011, the "National Wind Atlas for Lebanon" was published. It was prepared part of consultancy services for the Lebanese Republic commissioned by the United Nations Development Programme (UNDP) and performed by the UK firm Garrad Hassan. The wind atlas development was financed by a grant from the Spanish Government through the Lebanon Recovery Fund (LRF) and was implemented under the direct management of the CEDRO team.

In December 2011, Net metering was launched by MEW and adopted by EDL. The idea of net metering was initiated by UNDP and was developed by national stakeholders through the establishment of the net metering committee including EDL, UNDP-CEDRO, LCEC, and national experts. By end of 2020, 865 net-meters were installed in Lebanon.

On 23 April 2013, the Ministry of Energy and Water launched a call for expressions of interest (EOI) for the Beirut River Solar Snake project, the first utility solar power plant in Lebanon. The first phase of the project consisted of an installed capacity of 1 MWp extending over the Beirut River. The execution of the first phase started in July 2014, and the plant has been connected to the grid since September 2015. It helped promote renewable energy in Lebanon, drive the solar PV market, and demonstrate the role of renewables in bridging the gap between electrical demand and supply.

In December 2014, the MEW – Tripoli and Zahrani Oil Installations launched a 1 MWp grid-tied solar PV system. The project was finally commissioned in 2016 in Zahrani Oil Installations Facility in the South of Lebanon. The produced energy is being consumed by the facility, while the excess is directly fed to the national grid through net-meters.

In February 2015, a proposal was prepared by LCEC (within MED-DESIRE project co-financed by the EU under the ENPI CBC MED Programme) and submitted to the Lebanese Standards Institution (LIBNOR). It included the update of existing solar PV standards and the adoption of others. A national committee "NL TC 180 - Solar Energy" was created at LIBNOR on 5 February 2015 including all stakeholders. Standards were approved by the committee on 16 September 2015, proposed to the board of LIBNOR for official adoption, including a suggestion to transform selected standards to technical regulations. These standards were adopted as mandatory (as technical regulations) in October 2020 with the issuance of Decree 6887.

The EU-funded CEDRO project, the Global Environment Facility (GEF) - funded DREG project, and the LCEC, in coordination with the MEW and EDL, published in December 2016 and May 2017 the national grid codes for solar photovoltaic farms and onshore wind farms, respectively. The reports outline the major requirements and criteria for connecting these renewable sources to the grid, such as the allowable operating ranges, protection standards, active and reactive power control, voltage quality, communication and monitoring protocols, among others.

In January 2017, an expression of interest (EOI) was launched to procure up to 180 MW of solar PV farms equally distributed across the four main Lebanese regions: North, South, Mount Lebanon, and the Bekaa. A total of 12 PV farms across these regions will be selected based on a competitive negotiation

procedure based on the lowest received tariff. These projects are in the final negotiation procedure before licensing.

In September 2017, the MEW launched the 10 solar PV public bid initiative, which aims at installing solar PV systems in 10 public buildings. The project was implemented by LCEC between 2018 and 2020. The rationale behind this initiative was to sustain the renewable energy momentum, strengthen the collaborations between the public and private sectors in renewable energy national efforts, and present the public sector as a successful role model and key player in the energy transition.

On 1 February 2018, 3 wind farm PPAs were signed. Following a competitive bidding process and several rounds of negotiations, three companies from the private sector were awarded the contract based on the lowest submitted price. The awarded companies, Hawa Akkar, Sustainable Akkar, and Lebanon Wind Power, are currently developing 3 wind farms in Akkar with a total capacity of 226 MW.

In April 2018, MEW launched a call for Expression of Interest (EOI) to participate in proposal submissions of PV farms with energy storage in Lebanon. The EOI is for interested parties to develop a total of 3 Solar PV farms with Battery Energy Storage adding up to 210 MWp – 300 MWp at various locations throughout Lebanon as selected by the developers. In each project, the minimum power capacity of one given Solar PV farm is 70 MWp and the maximum power capacity is 100 MWp with Battery Energy Storage of minimum of 70 MW power with a minimum of 70 MWh of storage capacity, regardless of the Solar PV sizing. The project tender documents are currently being prepared with technical assistance financed by the European Bank for Reconstruction and Development (EBRD).

In September 2019 a request for proposals (RFP) to procure up to 520 MW of wind farms based on the same concept of the first round of wind energy bids, and with technical assistance financed by EBRD. The private sector will be responsible for the development of all the project including the authorizations, the choice of the lands, and the connection to the grid.

Based on a study completed by CEDRO in 2012, Hermel was the most suitable region for a concentrated solar power plant as it has a high insolation rate and the most available lands for use. In cooperation with the Netherlands Enterprise Agency (RVO), and under a D2B project, the LCEC launched in 2019 a "request for proposal for consultancy services for the development of a concentrated solar power plant at Hermel, Lebanon". By December 2021, the consultancy services are ongoing, they include the preparation of a preliminary study to investigate the feasibility of a 50 MW CSP plant with 7.5 hours of storage and all parameters tied with its implementation, the installation of 2 weather stations to measure the DNI values on the potential sites where the plant should be erected, the development of a fully-fledged Environmental and Social Impact Assessment along with developing tender documents for the implementation of the recommended solution.

In October 2021 and following concerns on the safety of rooftop solar installations, MEW initiated in collaboration with the Ministry of Interior and Municipalities (MoIM), a facilitation procedure for solar PV systems. The LCEC checks compliance of these systems with national standards based on a set application form, and afterwards the MEW issues facilitation letters addressed to the MoIM confirming that the systems do not constitute a public safety hazard.

(Source: LCEC Website and UNDP-CEDRO Website)

Electricity market structure:
Law No. 462 from 2002 allows up to 1.5 MW private generation for personal use as long as environmental, safety and health measures are respected, whereas any private generation greater than 1.5 MW requires

an authorization from the Electricity Regulatory Authority (ERA) and any power plant greater than 10 MW requires a license from the ERA.

Currently, the ERA, which would have technical, administrative and financial autonomy and would perform its duties as defined by Law No. 462 from 2002, is still not formed. The regulatory duties are currently performed by the CoM, the MEW, and the Ministry of Finance (MoF).

The provisions of Law No. 462 from 2002 also include the unbundling of electricity activities and corporatisation of EDL as per the three functions of generation, transmission and distribution, which is still to be started. Consequently, the corporate framework relating to the sector comprises mainly EDL, in addition to the historic independent power producers (IPPs), the importers (currently only EDL), and the renewable energy producers.

Additionally, due to the frequent power cuts by EDL, end-consumers are relying on neighbourhood-level diesel generators that are illegally producing electricity and supplying it during power cuts to end-consumers through informal distribution grids. These generators are estimated to be around 37,000 as per a World Bank – ESMAP report on Distributed Power Generation for Lebanon: Market Assessment and Policy Pathways.

EDL:

EDL is a public establishment under the supervision of the MoEW with an industrial and commercial vocation responsible for generation, transmission and distribution of electricity to all Lebanese territories up to the highest possible quality standards and in compliance with the laws and regulations of the Lebanese Republic.

Currently, EDL controls over 90% of the Lebanese electricity sector (including its Kadisha concession in North Lebanon). Other participants in the electricity sector include the Litani River Authority which owns hydro power plants and the Nahr Ibrahim, Al Bared and Safa which have concessions for hydro power plants. Also, concessions have been given for distribution in Zahlé, Jbeil and Bhamdoun. Noting that the concession of Bhamdoun has already expired and the assets were transferred to EDL, while the concession of Zahlé (EDZ) expired and a special law for 2 years was ratified in 2018 allowing EDZ to continue providing its services within the geographic boundaries set in its expired concession.

EDL Generation:

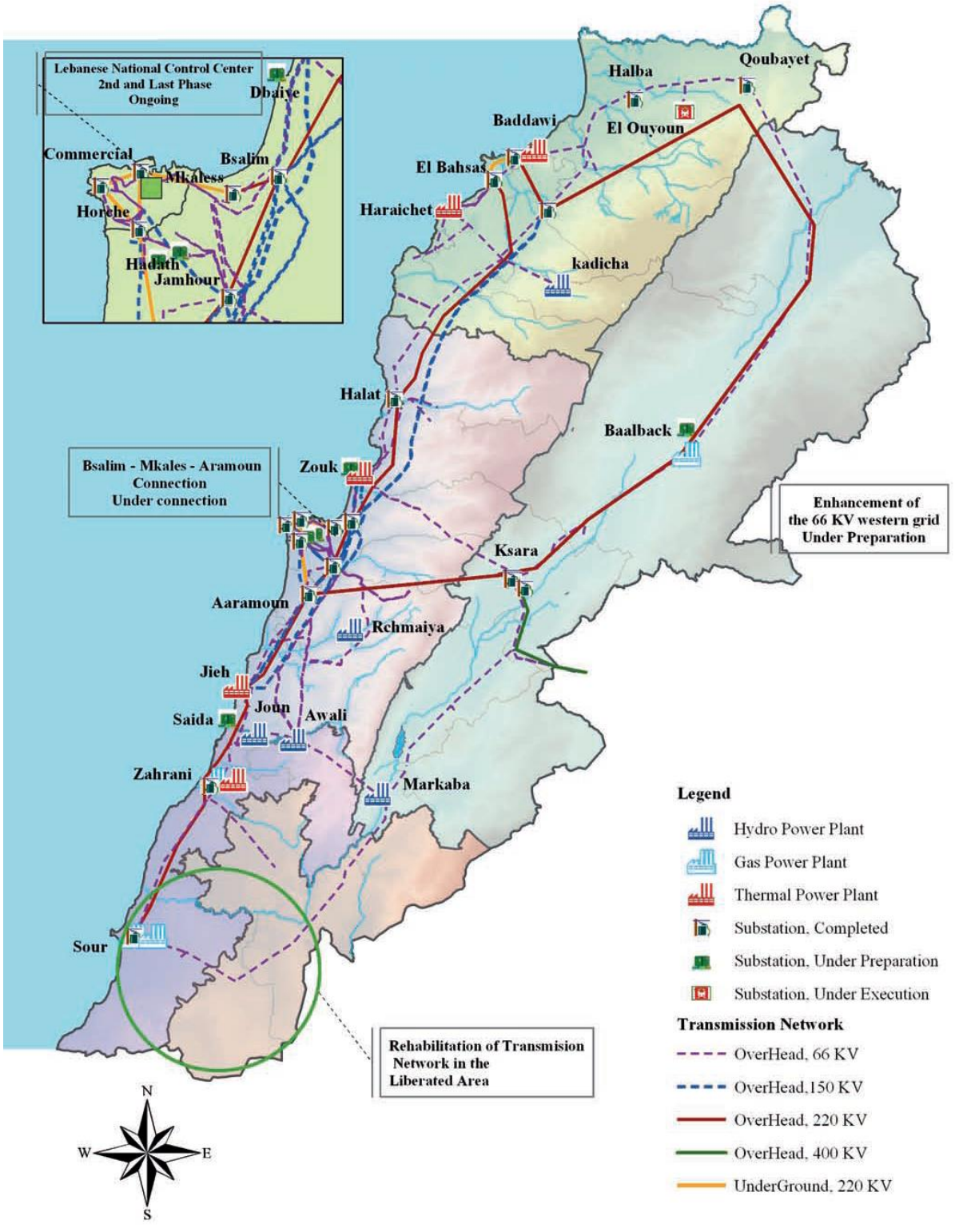
EDL owns directly or indirectly 7 major thermal power plants of 2,330 MW of total installed generation capacity from which it generates approximately 13 TWh annually. It also own Kadisha hydro power plant with 21 MW of additional installed generation capacity. In addition, EDL purchases a limited quantity of electricity from hydro power plants under concessions with total installed generation capacity of 261 MW. It also imports electricity from Syria.

EDL Transmission:

EDL's transmission network consists of:

1. high voltage overhead transmission lines of 66 kV (689 km), 150 kV (163 km), 220 kV (489 km) and 400 kV (21 km),
2. high voltage underground cables of 66 kV (102 km), 150 kV (26 km) and 220 kV (50 km), and
3. 68 major substations converting power from high voltage to medium voltage.

The transmission network's length amounts to more than 1,540 km (1,362 km of overhead transmission lines and 178 km of underground cables) of various voltages.



EDL's transmission network (source: Council for Development and Reconstruction – Physical Infrastructure)

EDL Distribution:
EDL's distribution network, which is divided into distribution areas, consists of substations converting power from medium to low voltage and using more than 15,000 transformers with their accessories and appurtenances, in order to deliver electricity to every final customer. EDL has outsourced several tasks out of its distribution activities through the Distribution Service Provider (DSP) project, the scope of which is to design, implement, operate and maintain distribution network with customer and metering services. The aim of the DSP project is to ensure proper investment planning, effective execution of distribution network extension, distribution network operation and maintenance, metering and billing activities with full correlation of energy distributed, billed and collected to minimise and eliminate technical and non-technical losses.

Currently, the EDL serves more than 1.4 million final customers at low, medium and high voltage.

It is to be noted that EDL developed the net-metering process and application by way of which it can allow a distributed renewable energy plant to export excess renewable energy to the EDL's network and benefit from a likewise deduction from final customer's electricity import/consumption bill.

IPPs:
There are five historic IPPs in the country which sell electricity to the EDL, which acts as the single-buyer. These are:

1. Litani Hydro (having 199 MW of installed generation capacity and 47 MW of effective generation capacity in 2018, and selling to the EDL at price of 3.97 cUSD/kWh at the official exchange rate),
2. Nahr Ibrahim Hydro (having 32 MW of installed generation capacity and 17 MW of effective generation capacity in 2018, and selling to the EDL at price of 2.65 cUSD/kWh),
3. Bared Hydro (having 17 MW of installed generation capacity and 6 MW of effective generation capacity in 2018, and selling to the EDL at price of 2.65 cUSD/kWh),
4. Kadisha Hydro (having 21 MW of installed generation capacity and 15 MW of effective generation capacity in 2018, and selling to the EDL at price of 2.65 cUSD/kWh), and
5. Hrayache Thermal Power Plant (based on Heavy Fuel Oil, having 35 MW of installed generation capacity and 46 MW of effective generation capacity in 2018, and selling to the EDL at price of 20.13 cUSD/kWh).

Total installed generation capacity of these five IPPs amounts to 304 MW (effective 121 MW). In comparison to 2,689 MW of total (2,203 MW of effective).

Importers:
EDL functions as a single-buyer and imports electricity from Syria (having 276 MW of installed capacity and 69 MW of effective capacity in 2018, and buying at price of 15.35 cUSD/kWh).

Renewable Energy Producers:
The Power Purchase Agreements (PPAs) for 226 MW of wind power plants have been signed with three developers. The bids for 12 solar PV power plants each with a capacity of 10 to 15 MW and distributed across the country have been received and are currently under negotiation before licensing, the bid for wind power plants with capacity between 260 and 520 MW was launched, and the call for the expression of interests for the following projects were also launched:

1. three solar PV power plants with a capacity of 100 MW each and storage capacity above 70 MWh, and
2. hydro power plants on various Lebanese rivers.

(Source: MEDREG impact of the creation of a regulator on the Lebanese electricity market)

Description of renewables support mechanism:
There is currently no direct support mechanism for renewable energy.

LCEC is assisting the MEW on a facilitation scheme for small-scale solar PV projects for self-generation. The support within this scheme is strictly administrative.

LCEC is facilitating the development of a credit enhancement mechanism for utility-scale renewable energy projects within a project financed by the European Bank for Reconstruction and Development (EBRD), to be presented to the MEW once finalized. The project is still under development, but it would include liquidity support and investment risk guarantees.

Responsible government department: (include key contacts)
Ministry of Energy and Water (MEW)
Tel: [redacted]
Email: [redacted]

Existing/Planned energy legislation: (is there a CPO)
The legal framework relating to the Lebanese electricity sector is defined by Decree No. 16878 from 1964, Law No. 20 from 1966, Decree No. 5469 from 1966, Decree No. 4517 from 1972, Decree No. 7580 from 1974, Law No. 247 from 2000, Law No. 462 from 2002, Law No. 775 from 2006, Law No. 288 from 2014, Law No. 54 from 2015, Law No 107 from 2018, and Law No. 129 from 2019.

Decree No. 16878 from 1964
Decree No. 16878 from 1964 governs the establishment of the Electricity Authority of Lebanon (Electricité du Liban, EDL) as a national public institution of an industrial and commercial nature for generation, transmission, and distribution of electricity in all Lebanese territories.

Law No. 20 from 1966
Law No. 20 from 1966 governs the establishment of the Ministry of Water and Electricity Resources.

Decree No. 4517 from 1972
Decree No. 4517 from 1972 governs the general structure of public institutions, and specifically the establishment, incorporation and cancellation of public institutions which have public facilities and enjoy personality and financial and administrative independence. It addresses the authority of administrative trusteeship. It also addresses the management and administration of EDL.

Decree No. 7580 from 1974
Decree 7580 entitled "The Investment Law of Electricity of Lebanon", states in its article 4 (entitled "source of power"), that EDL must ensure that the required electricity power for consumption is available at all times, and in order to achieve this purpose it can either produce the necessary power or purchase it. Based on this decree, EDL purchases quantities of energy from abovementioned IPPs.

Law No. 247 from 2000
Law No. 247 amends Law No. 20 from 1966 and replaces the words "Ministry of Water and Electricity Resources" by "Ministry of Energy and Water" and defines the MEW as one of the ministries which make the central apparatus of the State in the energy and water sectors.

Law No. 462 from 2002
Law No. 462 from 2002, Regulation of the Electricity Sector, sets the rules and principles governing the electricity sector. Its provisions are divided in seven chapters, namely: general provisions; national Electricity Regulatory Authority (ERA); licensing and authorisation; generation, transmission and

distribution; accounts and identifications; control, inspection and sanctions procedures; and remaining provisions. In short, the provisions of this Law No. 462 from 2002 include the ones on the unbundling of electricity activities, as well as on the setting up of the ERA, including its roles and responsibilities. However, it has not been actively implemented and consequently the ERA has never been put in place.

Law No. 775 from 2006

Law No. 775 from 2006 amends Law No. 462 from 2002 (its Article 7) by introducing that, on a temporary basis and for a maximum period of one year, permits and licences for electricity generation are granted by a decision of the CoM upon the proposal of the Minister of Energy and Water until the members of the ERA have been appointed and perform their duties. No generation permits or licences were granted based on this law.

Law No. 288 from 2014

Law No. 288 from 2014 amends Law No. 462 from 2002 (its Article 7) by introducing that for a period of two years, permits and licences for electricity generation are granted by a decision of the CoM upon the proposal of both the Ministers of Energy and Water and of Finance, until the members of the ERA have been appointed and perform their duties.

Law No. 54 from 2015

Law No. 54 from 2015 extends Law No. 288 from 2014 for two more years, from April 2016 to April 2018. Generation licences for three wind farms were granted based on Law 288 of 2014, as extended by Law 54 of 2015.

Law No. 48 from 2017

Law No.48 from 2017 Regulates Public Private Partnerships (PPP), it states in article two section (1) that the provisions of this law shall govern all PPP Projects undertaken by the state and public institutions and all moral persons of public law, with the exception of municipalities and federations of municipalities, which may choose to subject their PPP projects to the provisions of this law. This same article section (2) states that any other text notwithstanding, the provisions of this law shall govern PPP projects stipulated in the laws regulating the telecommunications sector, the electricity sector and the civil aviation sector.

Law No. 107 from 2018

By virtue of this law EDL is entrusted to contract EDZ to provide the public service within the geographic boundaries set in its expired concession for a period of 24 months after the date of expiry of its concession, being 31/12/2018. EDZ will therefore provide electricity to final consumers within the defined boundaries, in addition to the necessary services, works, maintenance, and repairs. The law also sets the contracting requirements between EDL and EDZ including pricing, payment, and auditing.

Law No. 129 from 2019

Law No. 129 from 2019 extends Law No. 288 from 2014 for additional three years (from April 2019 to April 2022). Moreover, it sets additional requirements for the construction of projects that use the design-finance-build-operate-transfer model of the public-private partnership (a clause is added on public procurement procedures and the application of public accounting law related to such projects).

(Source: MEDREG impact of the creation of a regulator on the Lebanese electricity market)

Energy Efficiency Law

The NEEAP 2011-2015, which was approved by the CoM in 2011 and was further updated for the years 2016-2020, has stressed in its second initiative on the importance of the adoption of an Energy Conservation Law. A draft of this law was sent to CoM and returned to the MEW in November 2015. Afterwards and in collaboration with LCEC, a committee has worked on developing an updated draft of the Energy Conservation Law. The law was drafted in 2019 and sent by MEW to CoM for review prior to submitting the draft to the parliament. The draft version of the law was prepared in consistency with the adopted norms in neighbouring countries and in conformity with international practices. Later, in 2020, the Netherlands Enterprise Agency (RVO) has offered technical and legal consultancy services to LCEC to address and analyse the draft Energy Conservation Law including its applicability and the ease of implementation. The draft was afterwards amended and officially presented to MEW in November 2021. It includes energy management obligations for large consumers.

Distributed Renewable Energy Law

In 2019, the MEW has decided to develop the legal framework and administrative protocols for net metering in all its facets. EBRD, through a team of experts, has supported the ministry in developing a Distributed Renewable Energy Law. A steering committee, including representatives from MEW, EDL and LCEC, was established in May 2019 to guide EBRD efforts. This law sets a basis for stimulating distributed renewable energy production by founding the main principles for the realization of projects using net metering in all its forms, and peer-to-peer (distributed) renewable energy (only) trading through direct power purchase agreements and/or renewable energy equipment leasing. A final draft of the law was prepared and officially presented to MEW in November 2021.

(Source: LCEC Website)

Environmental legislation for RE:

Paris Agreement

- Law 115 of 2019 on the ratification of the Paris Agreement: the law includes reporting obligations on the Lebanese Republic

Environmental and Social Impact Assessment

- Environmental Impact Assessment Decree No. 8633 of 2012
- Strategic Environmental Assessment Decree No.8213 of 2012 for Public Sector Policies, Plans and Programs.
- The document "Provision of Professional Services for the Preparation of the Strategic Environmental Assessment of Lebanon's Renewable Energy Sector" which sets potential environmental impacts that should be analysed for different renewable energy technologies.
- The UNDP-CEDRO guideline report on Environmental Impact Assessment for Wind Farm Developments which could be accessed here: **https://www.cedro-undp.org/publications/eia-wind-plant-development-in-lebanon**

Tax incentives

- Law 444/2002 on the protection of the environment
- Decree 167/2017 that includes tax incentives on renewable energy industries
- Decree 8471/2012 on environmental compliance certificates for establishments

Existing/Planned energy certificate systems: (purpose, extent)

Utility Scale RE

As previously mentioned, LCEC is facilitating the development of a credit enhancement mechanism for utility-scale renewable energy projects, such mechanism would include securing liquidity for renewable energy payments in a specific renewable energy escrow account. Such account would be filled trough the electricity payments by end-consumers. However, the electricity tariffs are currently heavily subsidized, and any increase on the final bills, especially when transparently reported to end-consumers as "renewable energy support fee", would have a negative impact on the development of renewable energy in the country. An energy certificate system would provide a tool for environmentally conscious end-consumers, especially multinational corporations based in Lebanon, to have a guaranteed purchase of renewable electricity at actual cost and therefore directly support renewable energy development in the country.

Due to the high impact of renewable energy development on the Lebanese economy, with considerable social benefits as well, an energy certificate system would also attract foreign support to the sector, especially with the additional P-REC label from Energy Peace Partners.

Decentralized RE

More end-consumers in Lebanon are currently resorting to decentralized renewable energy systems to provide their essential electricity needs, especially with the scarcity of supply from the public utility. These systems have a heavy financial impact on these end-consumers and are paid for on the expense on essential development needs.

Most of these systems are either off-grid systems, or hybrid off-grid systems with no possibility to inject additional electricity production to the grid.

A more sustainable solution on the long-term would be to encourage these end-consumers to install on-grid systems with battery storage able to be connected with the grid and to exchange the additional production with the grid using the net-metering mechanism.

However, currently the highest electricity prices are at 200 LBP/kWh, equivalent to 0.08 US cents at the market exchange rate, which is highly discouraging.

An energy certificate system would alleviate the financial impact on the end-consumers to install decentralized renewable energy systems, it would also encourage these end-consumers to connect their systems to the grid, with an additional benefit to the grid itself. Such system would also attract direct foreign support to end-consumers, especially with the additional D-REC label.

Extent of engagement with government:

The Lebanese Center For Energy Conservation is the national energy agency within the Lebanese Ministry of Energy and Water (MEW). LCEC does a lot of (technical) work for the Lebanese government and with the LCEC being the Issuer in the country, there is indirect involvement of the national authorities.

Response from Government in relation to attribute tracking systems:
None for the moment, we could have an internal presentation with the Minister of Energy and Water and secure a letter of support, if needed at this stage.

Demand-side market potential or strategic nature of market development:
It is expected that the demand for I-REC(E) in the country will come, especially in the beginning, from multination companies with operations in Lebanon to adhere to their environmental reporting. Some examples of companies that are known to purchase EACs and are **in** the country are: Signify, large Hotel chains, L'oreal, accounting firms, credit card companies.

In addition, given the current situation in Lebanon, there is an interest to reach out to Energy Peace Partners to see if certain issuance in Lebanon could qualify for their Peace label which could also attract more demand for the I-RECs in the country.

Analysis of political disruptions or market risks:
The system should be designed to be as transparent and independent as possible, to prevent any political disruptions. Currently the LCEC, an independent organization hosted by the Ministry of Energy and Water and assisting the Ministry in regulating the renewable energy market, will be the Issuer. This will ensure transparency and independence, and a general market acceptance. Huge efforts need to be invested in promoting the scheme to ensure market uptake.

Once a regulator is put in place in Lebanon, if this regulator agrees, this regulator will have a priority to become the Issuer in the country. In this case the LCEC is committed to do its best to ensure a smooth transition, to prevent any disruption.

Analysis of regulatory risks including linkages with carbon markets and support systems:
There is currently no other energy certificate system in Lebanon, financial support systems for renewable energy systems are not available, and the regulator is not formed. This could be the best time for the I-REC to prove itself as a viable renewable energy certification system that would be adopted by any support system or regulatory measure that would be designed in the future.

Current environmental reporting in energy:
No current reporting mechanisms in place to our knowledge.

Mechanisms in place to support the reliable verification and issuance of I-RECs:
None yet, a verification and issuance scheme would be put in place after signature of the agreement. However, it is to be noted that LCEC had a successful experience in providing technical assistance to the Central Bank of Lebanon (BDL) on the verification and approval of projects within a national financing mechanism for renewable energy and energy efficiency (NEEREA) that contributed in financing more than 1,000 projects. LCEC's verification on the good implementation of the projects was also essential before disbursement of a 15% additional result-based grant by the European Union to selected projects that were implemented by Lebanese SMEs.

Local organizations of importance and their opinion on local I-REC market development:

- Ministry of Energy and Water
- Ministry of Finance
- Central Bank of Lebanon
- Electricité du Liban
- Wind Developers
- Solar Developers

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