

# LEBANESE ENERGY STORAGE INDUSTRY CUSTOMERS



How does the Lebanese economy work? The Lebanese economy has traditionally relied heavily on the service sector ??? focusing on banking,tourism,construction and real estate??? and activities are mainly undertaken by private companies. Lebanon???s gross domestic product (GDP) was estimated at USD 53.6 billion (current USD) in 2017 (World Bank,2019b).



How has the refugee crisis affected Lebanese electricity? Impacts of regional crises: The Lebanese Crisis Response Plan (LCRP) 2017???2020 estimated that the refugee crisis has cut electricity availability by 500 MW??? equivalent to approximately five hours of electricity per day ??? obliging the state to rely more on private generators, costing around USD 150 million USD (UNDP,2016).



Is NEEREA a good investment for the Lebanese economy? NEEREA has witnessed rapid growth and broad acceptance among the public, despite the barriers and instability in the energy sector. NEEREA loans are becoming increasingly popular products in the Lebanese banking sector, with more than 938 projects worth more than USD 560 million financed as of March 2019 (see Figure 25).



How will EDL help the Lebanese economy? This increase in generation capacity will allow EDL to close the gap between electricity supply and demand, thereby reducing dependency on private generators by 2020, reducing the electricity bill for consumers and supporting the Lebanese economy by providing a reliable, low-cost electricity supply.



Does the Lebanese grid have a high frequency instability? In 2017, the UNDP CEDRO project developed a wind grid interconnection guide for Lebanon (CEDRO,2017), in which frequency readings of the Lebanese grid were published. These readings showed very high instabilities not only on the lower end where it reached 48 Hz but also on the higher end of the spectrum where it reached close to 52 Hz.

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Can Lebanese commercial banks finance NEEREA projects? As per Intermediate Circular 236, Lebanese commercial banks can free some of their required reserves at the central bank to finance NEEREA projects. Following Circular 236, the sustainability of the NEEREA financing mechanism was further secured by circulars 313, 318, 346 and 515, among others.



In May, the Lebanese Center for Energy Conservation (LCEC) stated that its projections indicate Lebanon will surpass 1 GW of solar rooftops within the first 10 days of June 2023.



Lebanon Total Energy Consumption. Per capita energy consumption was 0.9 toe/cap in 2022 (i.e. 73% below the Middle East average) and per capita electricity consumption nearly 1 600 kWh (62% lower than in the region). Total energy consumption has halved since 2017, including -16% in 2022 to 4.7 Mtoe.



Since the publication of the first wind atlas in 2011, that localizes the wind energy resources potential in Lebanon, the CEDRO projects implemented several micro-wind energy sites in Lebanese public institutions. The projects helped showcase the potential of wind technologies in systems that combine solar and wind energy and in few cases the potential of integrating ???

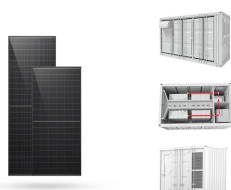


Figure 9 Legal timeline of the Lebanese energy sector 09 Figure 10 Electricity generation mix in Lebanon, 2010 10 projects with storage 26 Figure 32 Final energy consumption in industry (PJ) 37 Figure 33 Total final energy consumption by end-use sector (PJ) 38

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Given the substantial renewable energy potential that Lebanon has, a more enabling regulatory and overall sector management environment is required to enhance the adoption of large-scale renewable energy solutions, grid-connected battery energy storage, and other innovative technologies to expedite the sustainable energy transitioning.

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oriented framework would help de-risk investments in Lebanese renewable energy projects, opening the door for more innovative solutions. 2.1.2. Opportunities ??? Renewable Energy Innovation: Hardware, Software and Business Models high energy per square foot of storage and their applications in both domestic and industrial



Energy storage solutions for electricity generation include pumped-hydro storage, batteries, flywheels, compressed-air energy storage, hydrogen storage and thermal energy storage components. The ability to store energy can reduce the environmental



Corporate social responsibility (CSR) issues in developing markets have acquired a lot of attention. Organisations around the globe apply a diversified set of technologies to approaching customer expectations through banking performance. This study examines the impact of CSR on Lebanese banking performance. Primary data from questionnaires were ???



Tesla wrote about its energy storage business in its Q4 shareholder's letter: Energy storage deployments increased by 152% YoY in Q4 to 2.5 GWh, for a total deployment of 6.5 GWh in 2022, by far

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current alumni of lebanese energy storage companies -

Suppliers/Manufacturers Lebanon of Tomorrow: Green Energy Improves Life, Saves Forest Since 2014, CEDRO, a renewable energy initiative funded by the European Union and implemented by UNDP has carried out over 17 projects across Lebanon.



These questionnaires are designed to collect information on companies' environmental awareness and social responsibilities and current practices that include land development, material selections, energy efficiency, construction operations, waste handling, storage facilities, sustainable designs and so on.



This article is part of an Executive special report on Lebanese industry. Read more stories as they're published here, or pick up October's issue at newsstands in Lebanon. Fady Gemayel is president of the Association of Lebanese Industrialists (ALI). Executive spoke with him about the state of industry in Lebanon, its challenges and its future.



Projects delayed due to higher-than-expected storage costs are finally coming online in California and the Southwest. Market reforms in Chile's capacity market could pave the way for larger energy storage additions in Latin America's nascent energy storage market. We added 9% of energy storage capacity (in GW terms) by 2030 globally as a



Tesla Energy's storage business has seen big gains making the company a key player in the renewable energy BESS world. Tesla's Powerwall and Megapack have caused a revolution in energy storage giving homeowners, businesses, and large-scale utilities fresh and effective ways to store power. As the energy storage industry continues to evolve

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We are very honored to have received positive feedback from our customers in Lebanon for high-quality solar battery storage products.  
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The bidding volume of energy storage systems (including energy storage batteries and battery systems) was 33.8GWh, and the average bid price of two-hour energy storage systems (excluding users) was \$1.33/Wh, which was 14% lower than the average price level of last year and 25% lower than that of January this year.

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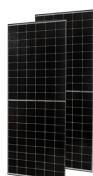


The United States Energy Storage Market is expected to reach USD 3.45 billion in 2024 and grow at a CAGR of 6.70% to reach USD 5.67 billion by 2029. Tesla Inc, BYD Co. Ltd, LG Energy Solution Ltd, Enphase Energy and Sungrow Power Supply Co., Ltd are the major companies operating in this market.



Ability to have a general budget to support the Lebanese industrial sector and an effective budget to the Ministry of Industry to continuously upgrade its equipment, develop and improve its services and performance.

Available capacities in the Lebanese economy: geographic position, human resources (expertise,



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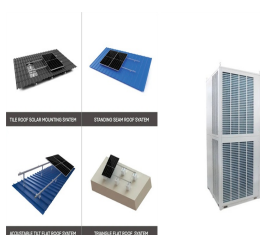


The latter engineering venture is an example of how E2 sees potential for both good business and positive economic impact by applying their expertise in robotics and systems integration to real life problems such as a Lebanese agro-industry company's need. Eco Industries and operating energy storage systems that are tailored to the needs

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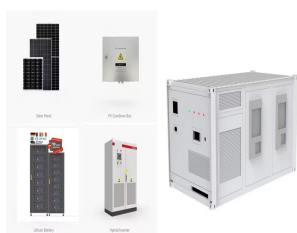
As the energy transition continues to push an industry-wide shift ??? prompting new challenges ??? it has diversified to ensure consumers in demand of clean, reliable and affordable power have access to it when needed. GE is known for its involvement in various energy storage projects, particularly when it comes to grid-scale battery storage



Lebanon could reconfigure its laws and regulations to allow private sector actors to generate renewable energy for sale to the grid, it emerged as the Middle Eastern country ???



The company is working on a large-scale 220 MW Battery Energy Storage System project in North Rhine-Westphalia and is likely to be commissioned in 2024. The battery energy storage systems industry has witnessed a higher inflow of investments in the last few years and is expected to continue this trend in the future.



Self???Charged Dual???Photoelectrode Vanadium???Iron Energy Storage ??? The photo-charging diagram of the self-charging vanadium iron energy storage battery is shown in Figure 1b, when the photoelectrode is illuminated by simulated sunlight of the same intensity (100 mW cm<sup>-2</sup>) with photon energy equal to or greater than the bandgap energy (E<sub>g</sub>), electrons in the valence ???