

# LEBANON'S ENERGY STORAGE INSTALLED CAPACITY



What are the energy data based on in Lebanon? The energy data employed by this study was largely based on two reports published by the Lebanese Centre for Energy Conservation (LCEC), namely the NREAP 2016-2020 (LCEC, 2016) and The First Energy Indicators Report of the Republic of Lebanon (LCEC, 2018). 1. Primary energy supply Lebanon relies on imports to satisfy its energy demand.



How does energy affect Lebanon's economy? Energy and electricity demand have weighed heavily on Lebanon's economy. Imported fuel oil accounts for nearly a quarter of the national budget deficit, while electricity demand outpaces power generation capacity. Renewable energy technologies, in contrast, offer the prospect of clean, fully domestically sourced power and heat systems.



Why does Lebanon have a power shortage? Along with other Middle Eastern net energy importers, Lebanon has faced a widening gap between the supply and consumption of electricity in recent years. Economic development and population growth have pushed its existing power infrastructure to the limit.



Is electricity a good investment in Lebanon? Electricity in Lebanon is highly subsidised. Therefore, the potential for future investments within the sector remains limited, resulting in high technical and non-technical losses (34%, combined) and an old fleet of power plants.



Which energy storage technology has the most installed capacity in MENA? Pumped hydro storage (PHS) has the largest share of installed capacity in MENA at 55%, as compared to a global share of 90%. Pumped hydro storage is one of the oldest energy storage technologies, which explains its dominance in the global ESS market.

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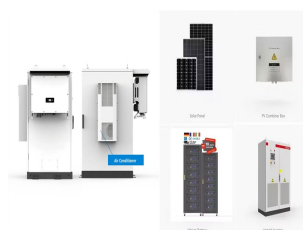


Which country has the most battery storage capacity in MENA?

Currently, NaS battery technology dominates the battery storage capacity in operation in MENA, particularly in the UAE, with a total of 108 MW/648 MWh projects developed by the Abu Dhabi Water and Electricity Authority (ADWEA).



adoption of renewable energy sources in Lebanon needs energy storage solutions to ensure a continuous and reliable power supply. COUNTRY TRENDS OVER THE LAST FIVE YEARS The estimated installed Solar PV capacity is 1,500 MWp by end of 2023. The recent introduction of a decentralized renewable energy law (318/2023)



India's total Battery Energy Storage System (BESS) capacity reached 219.1 MWh as of March 2024, according to Mercom India Research's newly released report, India's Energy Storage Landscape. According to the report, 1.6 GWh (~1 GW) of standalone BESS, 9.7 GW of renewable energy projects with energy storage, and 78.1 GW of pumped hydro projects were ???

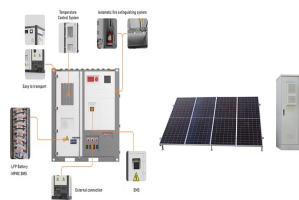


Battery energy storage systems: the technology of tomorrow. The market for battery energy storage systems (BESS) is rapidly expanding, and it is estimated to grow to \$14.8bn by 2027. In 2023, the total installed capacity of BES stood at 45.4GW and is set to increase to 372.4GW in 2030.



that combine solar energy on the national grid with existing diesel and battery storage. The capacity of each of the nine sites ranges from 130 kWp to 300 kWp, with a total of 1.44 MW of power to be installed. The outcome of this stream is devoted to increased energy access and reliable power supply, while also a

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In 2020, Lebanon's photovoltaic distribution and storage rate reached 12%, with a total of 11,087kWp of photovoltaics equipped with energy storage systems. Industrial and commercial energy storage Taking the factory in Iraq as an example, when operating at full capacity, if a diesel generator is used for power supply, the cost is \$294,690/year.



Europe has seen its first year when energy storage deployments by power capacity exceeded 10GW in 2023. The eighth annual edition of the European Market Monitor on Energy Storage (EMMES) was published last week by consultancy LCP Delta and the European Association for Storage of Energy (EASE).



The government of Lebanon launched the "National Energy Efficiency and Renewable Energy Action" in 2010 a mechanism dedicated to the financing of green energy projects in the country. Carbon Capture, Utilisation and Storage; Decarbonisation Enablers; Explore all. Topics . Understand the biggest energy challenges. COP28: Tracking the Energy



The cumulative installed capacity of new energy storage projects is 21.1GW/44.6GWh, and the power and energy scale have increased by more than 225% year-on-year. Figure 1: Cumulative installed capacity (MW%) of electric energy storage projects commissioned in China (as of the end of June 2023)



The Lebanese Center for Energy Conservation (LCEC) has said Lebanon's cumulative solar capacity stood at 89.84 MW at the end of last year. Whilst that figure was short of the national target of

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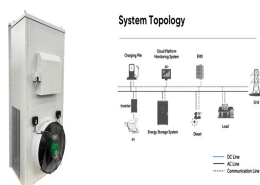
Looking ahead to 2024, TrendForce anticipates that global new energy storage installed capacity will reach 71GW/167GWh, marking a substantial year-on-year increase of 36% and 43%, maintaining a commendable growth trajectory. However, compared to the remarkable growth rates of 115% and 133% in 2023, the growth pace in 2024 has noticeably



Pumped Hydroelectric Storage (PHS) PHS systems pump water from a low to high reservoir, and release it through a turbine using gravity to convert potential energy to electricity when needed 17,18, with long lifetimes (50-60 years) 17 and operational efficiencies of 70-85% 18.; PHS provides more than 90% of EES capacity in the world 19, and 96% in the U.S 20.



MENA countries are currently home to nearly 15% of the world's installed energy storage capacity, but this total will need to grow to enable variable renewable energy systems to be integrated into the region's power grids in a flexible and stable manner.



3 ? India has set a target to achieve 50% cumulative installed capacity from non-fossil fuel-based energy resources by 2030 and has pledged to reduce the emission intensity of its GDP by 45% by 2030, based on 2005 levels. (NEP) 2023 of Central Electricity Authority (CEA), the energy storage capacity requirement is projected to be 82.37 GWh (47).



GSL Energy Solar Battery Storage System Installed in Lebanon Published on 12 Oct 2022 He connected 4 units of batteries in parallel reaching 40kWh power capacity to supply his villa. And 2 units of 8kw inverters are used in parallel also. after he installed the GSL solar energy storage system, all the electrical appliances in the house

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The solar resource potential of Lebanon is even higher, with an estimated 5558 km<sup>2</sup> of land deemed suitable for large-scale solar installations estimated to be capable of 182,615 MW capacity . Lebanon's installed solar PV capacity amounted to a fraction of this potential in 2018, merely 56.37 MW .



, around 1,300 MW of PV capacity has been installed in Lebanon, mostly from small solar and battery systems. 22 Ilias Tsagas, "Lebanon introduces Peer to Peer Renewable Energy Trading", PV-Magazine, 2 Jan. 2024, Could you provide an overview of your approach to solar energy storage, if applicable?



Global installed base of energy storage projects 2017-2022, by technology  
Leading countries by energy storage capacity in the EU 2022-2030;  
Energy storage needs in the European Union 2030-2050;



developing areas. Energy self-sufficiency has been defined as total primary energy production divided by total primary energy supply. Energy trade includes all commodities in Chapter 27 of the Harmonised System (HS). Capacity utilisation is calculated as annual generation divided by ???



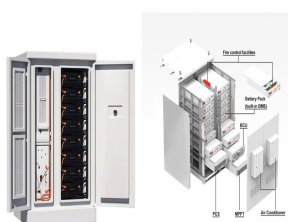
The total installed capacity of pumped-storage hydropower stood at around 160 GW in 2021. Global capability was around 8 500 GWh in 2020, accounting for over 90% of total global electricity storage. India released its draft National Electricity Plan, setting out ambitious targets for the development of battery energy storage, with an



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In 2010, Lebanon's solar PV installed capacity equaled 330 kWp. Lebanon's energy generation by EDL reached 15.39 TWh in 20191. EXECUTIVE SUMMARY 2 All numbers in United States Dollars (\$) in this report are based on the exchange rate of 1,500 LBP/\$. From 2010 until the end of 2019, the cumu-



As of the first half of 2023, the world added 27.3 GWh of installed energy storage capacity on the utility-scale power generation side plus the C& I sector and 7.3 GWh in the residential sector, totaling 34.6 GW, equaling 80% of the 44 GWh addition last year. Despite a global installation boom, regional markets develop at varying paces.



Fill the energy gap and reduce Lebanon's current energy dependency on the external Power Rental from the floating power barges adding 370 MW Renewable Energy 614,000 sqm of installed SWH Up to 2.5 million cubic meters of storage capacity in Tripoli and Zahrani



China is targeting a non-hydro energy storage installed capacity of 30GW by 2025 and grew its battery production output for energy storage by 146% last year, state media has said. The statement from the National Development and Reform Commission (NDRC) and the National Energy Administration said the deployment is part of efforts to boost



Based on CNESA's projections, the global installed capacity of electrochemical energy storage will reach 1138.9GWh by 2027, with a CAGR of 61% between 2021 and 2027, which is twice as high as that of the energy storage industry as a whole (Figure 3).

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By the end of 2020, Lebanon fell short of its national target of 100 MW for solar capacity, reaching a cumulative total of 89.84 MW. This shortfall reflected the bleak state of the solar sector