

IRAQ ENERGY STORAGE CAPACITY PLANNING



How can Iraq improve electricity supply during the summer peak?

Promoting the more efficient use of electricity, including by introducing more progressive tariffs, would play an important role in ensuring that the growth in demand during the summer peak does not continue to outpace supply. Iraq also needs to take advantage of its abundant renewable energy potential.



What is Iraq's refining capacity? Iraq's total operating refining capacity is about 1.2 million b/d.²⁷ The Iraqi government plans to reduce petroleum product imports by rehabilitating the refining sector and building new refineries, but the government has struggled in its efforts to attract the foreign investment needed in the downstream sector.



Why is Iraq's energy system vulnerable? However the capacity to capture and process this gas has not kept pace. The inability to utilise its gas riches means that the country's gas deficit has grown, and Iraq now relies on imports from Iran to meet increasing demand. This has introduced a number of vulnerabilities to Iraq's energy system.



Does Iraq approve a \$153 billion budget? Ahmed Rasheed and Timour Azhari, Reuters, Iraq approves record \$153 billion budget including big public hiring, June 11, 2023. International Monetary Fund, 2022 Article IV Consultation with Iraq, February 2023, Table 2, page 27. U.S. Energy Information Administration, OPEC Revenues Factsheet, June 2023.



Can Iraq cut its electricity network losses? The new IEA report, Iraq's Energy Sector: A Roadmap to a Brighter Future, maps out immediate practical actions and medium-term measures to tackle the most pressing problems in Iraq's electricity sector. The analysis finds Iraq has huge potential to cut its electricity network losses, which are among the highest in the world.

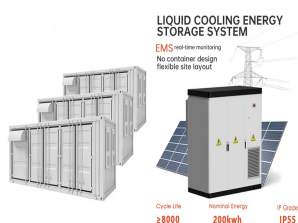
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Will Iraq's Electricity Supply increase in 2030? Iraq's electricity demand is set to double between now and 2030, and its shortfall in electricity supply will widen, as the country's population grows by more than 1 million people each year.



New energy storage methods based on electrochemistry can not only participate in peak shaving of the power grid but also provide inertia and emergency power support. It is necessary to analyze the planning problem of energy storage from multiple application scenarios, such as peak shaving and emergency frequency regulation. This article proposes an energy storage method.



Traditional generating units, such as coal-fired units, cause large amounts of carbon emissions in electricity generation, which is one of the main reasons for climate change [1]. Thus, clean and renewable energy generations have been developed massively [2], [3] to increase energy supply and reduce carbon emissions. Energy storage (ES) is one of the most effective methods.



Establishment of Iraq Renewable Energy and Energy Efficiency Agency: 2012: Legal framework for renewable energy: Target of 10 % energy capacity from R.E. by 2015: National Energy Strategy: 30 % of total capacity from R.E. by 2025: 2013: Iraq total photovoltaic (PV) capacity reaches 50 MW: 2015: Initiatives to liberalize the renewable energy



This paper proposes a method of energy storage capacity planning for improving offshore wind power consumption. Firstly, an optimization model of offshore wind power storage capacity planning is established, which takes into account the annual load development demand, the uncertainty of offshore wind power, various types of power sources and line types.

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Harry Istepanian is an independent energy and water expert based in Washington D.C. He is a senior fellow at the Iraq Energy Institute. He can be reached at the following email address: harry@istepanian.uk and Twitter. Noam Raydan is a Baghdad-based independent energy researcher and reporter, focusing on Iraq, Lebanon and Iran.



With the acceleration of supply-side renewable energy penetration rate and the increasingly diversified and complex demand-side loads, how to maintain the stable, reliable, and efficient operation of the power system has become a challenging issue requiring investigation. One of the feasible solutions is deploying the energy storage system (ESS) to integrate with ???



(3) A capacity planning method is proposed, which can give the required minimum VCI/ESS capacity for a specific stability margin and SCR range. Analysis shows that as long as the ESS converters with a capacity of no less than 6% of the CCIs are configured as VCIs, large-scale CCIs that are originally critically stable at $SCR = 1.9$ can operate



The total submitted capacity for 2017 was 4.9GW, the highest yearly submitted capacity so far. For 2021, the submitted capacity is currently at 4.7GW. Very soon, 2021 will reach record-breaking status for submitted energy storage capacity in the UK by calendar year.



QuEst Planning is a capacity expansion planning model that identifies cost-optimal energy storage, resource, and transmission investments to meet grid decarbonization targets. This tool is part of QuEst 2.0: Open-source Platform for Energy Storage Analytics. Below is a high-level overview of the

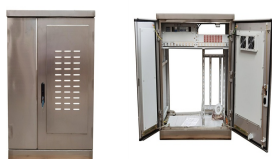
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The cost structure of energy storage is taken as an input, including the power capacity cost (c_t in \$/kW) and energy capacity cost (c_u in \$/kWh). Capital costs of energy storage and generation technologies (c_z) can be adjusted to account for applicable tax credits such as the technology-neutral investment tax credits that are available to



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In BloombergNEF's 2H 2023 Energy Storage Market Outlook report, the firm forecasts that global cumulative capacity will reach 1,877GWh capacity to 650GW output by the end of 2030, while DNV's annual Energy Transition Outlook predicts lithium-ion battery storage alone will reach 1.6TWh by 2030.



The energy storage capacity planning results in Case 2 and Case 3 are shown in Table 4. In Case 2, the total optimal energy storage planning capacity of large-scale 5G BSs in commercial, residential, and working areas is 9039.20 kWh, and the corresponding total rated power is 1807.84 kW. The total energy storage planning capacity of large-scale



, Iraq has started operating three thermal power plants with a combined capacity of 2.6 GW, and Iraq has plans to add 6 GW of new generation capacity by 2025. Iraq also plans to increase

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16 hours of energy storage in the upcoming projects in the UAE and Morocco. Today the total global energy storage capacity stands at 187.8 GW with over 181 GW of this capacity being attributed to pumped hydro storage systems. So far, pumped hydro storage has been the most commonly used storage solution. However, PV-plus-storage, as well as CSP



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Iraq makes the third-largest contribution to the increase in global oil supply in the period to 2030. Iraq's refining sector is not well matched to the country's needs. Only 60% of the nominal ???



Optimal capacity planning for energy devices is significantly crucial for saving economic costs and enhancing operational efficiency in an integrated energy system (IES). In this study, a reinforcement learning (RL)-based capacity planning approach for IES is proposed, where a multistage decision-making strategy is designed to reduce the action dimensionality ???



Energy storage (ES), with its flexible characteristics, has been gaining attention in recent years. The ES planning problem is highly significant to establishing better utilization of ES in power systems, but different market regulations impact the ES planning strategy. Thus, this paper proposes a novel ES capacity planning model under the joint capacity and energy markets, ???

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Iraq is seeking to raise the share of clean energy to 33% by 2030, helped by a solid expansion in the country's solar capacity, oil minister Ihsan Abdul Jabbar Ismail said at the Saudi Green Initiative Forum earlier this week.



Therefore, from the perspective of operation, the planning capacity of physical energy storage can be effectively reduced after considering the time delay of the heating network, and the scheduling requirements can be met at the same time. FIGURE 6. FIGURE 6. Operation results before and after considering time delay characteristics of the



However, the production capacity of other renewable energy sources such as solar PV, wind energy, geothermal energy, and biomass energy is currently very low as presented in Table 3. Table 3 . Production capacity of renewable energy sources in Iraq for 2021 [98].



The core of smart grid energy storage capacity planning and scheduling optimization is maximizing the use of energy storage devices to balance the difference between power supply and demand to



Ireland's national planning body has approved a ???140 million battery storage facility proposed by Strategic Power Projects in County Kildare. The Australian Energy Regulator (AER) said increased energy storage capacity will be essential to manage daily and seasonal variations in output on the National Electricity Market (NEM).

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Iraq's State Company for Oil Projects (Scop), a subsidiary of the Oil Ministry, is planning a major expansion of its crude storage facilities across the country. Five new facilities are planned, taking Iraq's total storage capacity to more than 15 million cubic metres, according to Ali Awash, Scop's major projects division manager.



Where measures are taken to both curb demand and increase available capacity, Iraq could establish a capacity margin by 2030 (where available capacity exceeds peak demand). At that point, grid supply would be available to most consumers 24 hours per day.



Energy storage (ES), with its flexible characteristics, has been gaining attention in recent years. The ES planning problem is highly significant to establishing better utilization of ES in power



In addition, in the model of energy storage capacity planning, there are few research results on energy storage life loss. Barelli et al analyzed the life of the HESS by rain flow counting method, and formulated the operation strategy of the HESS to prolong the life of the storage system [19].