

Energy Storage:

A Strategic Pillar for the Middle East's Energy Security and Economic Future

By:

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Introduction

As the Middle East races ahead with ambitious renewable energy targets, the real challenge is not just generation, it's consistency. It's not just the sunset that halts solar production; sometimes it's a passing dust storm, a cloudy afternoon, or a slow wind interrupting clean power flow.

The Middle East remains dominated by fossil fuels to generate electricity, with oil and natural gas occupying most of the blend. But the region has been increasingly

diversifying its energy mix following growing power demand, deteriorating infrastructure, and carbon commitments. Without adequate energy storage, the promise of renewables remains only half fulfilled.

In this piece, we explore: Where the Middle East stands in its clean energy transition, how energy storage supports renewable integration and economic diversification, and how policies and innovations can shape the future of storage in the region.



Mapping the Middle East's Path to Clean Energy

Electricity consumption in the Middle East grew 3.2% in 2024, up from 2.8% in 2023, primarily due to economic development and rising temperatures that accelerated cooling loads. Demand will increase at a 3% average annual rate during 2025-2027, exerting long-term stress on fossil-fuel-based systems.

Meeting this demand using conventional generation sources is not an option. Hence, countries in the Middle East are investing heavily in renewables.

Here is a quick snapshot of their present status and where they are headed on the path to clean energy transition:

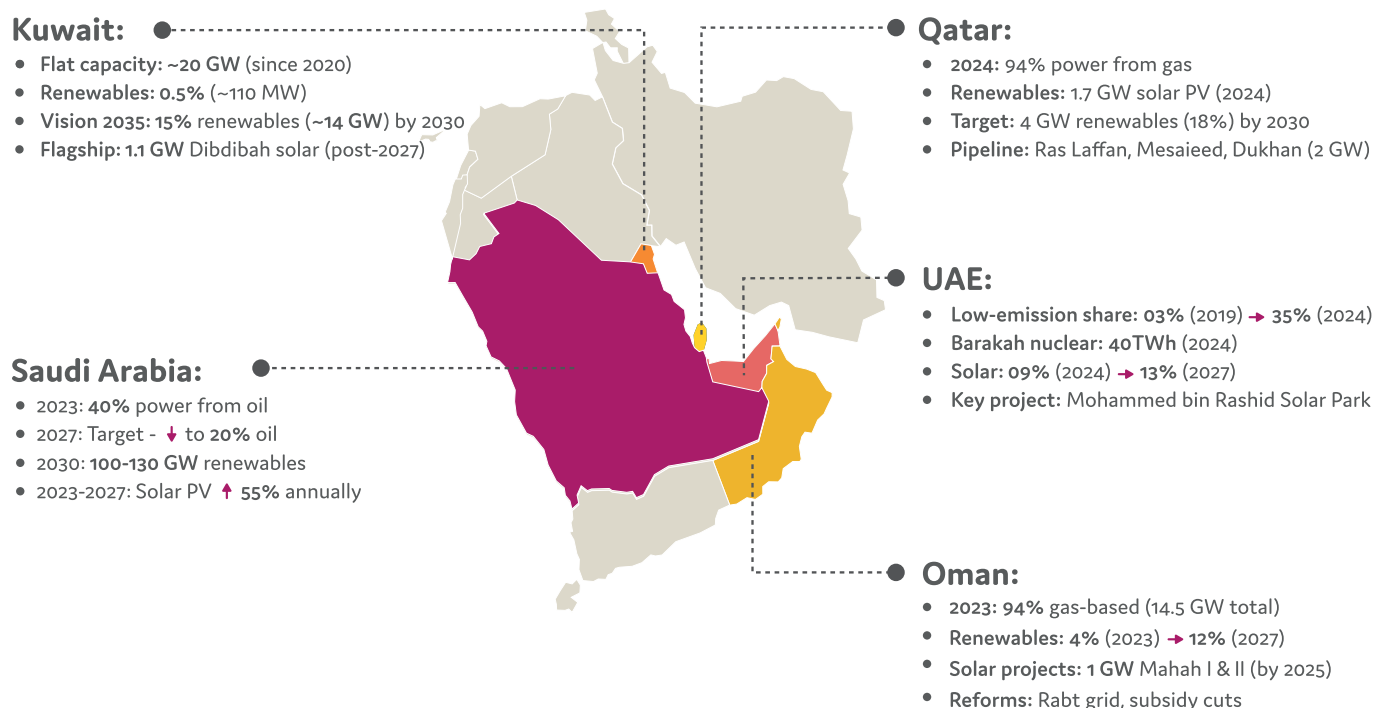


Figure 1: Key highlights of renewable energy transition across the Middle East
Source: PTR Inc.

Barriers to Renewable Grid Integration in the Middle East

Integrating variable renewable energy (VRE) into the region's fossil-fuel-based electricity grids is causing a series of technical and institutional problems.

- The intermittency of solar and wind generation is a significant problem. These sources change with the weather and the hour of the day, and it isn't easy to balance generation and consumption.
- Constraints on grid flexibility compound this, as most national grids have been constructed to be centered on centralized, dispatchable fossil fuel power plants and lack the agility to accommodate decentralized and variable generators.
- Poor energy storage capacity also enables excess renewable production to go unfilled for utilization, detracting from efficiency and slowing decarbonization plans.
- These problems highlight the need for future-proof energy storage technologies to cushion supply, provide stability to grids, and facilitate a secure power supply.

The Role of Storage in Energy Security

With the increasing utilization of renewable energy in the Middle East, storage will provide increased flexibility between supply and demand. Storage will help integrate variable sources like wind and solar by smoothing changes and shifting clean energy to peak demand hours, i.e., evenings. By storing surplus power and dispensing it when needed, storage enables a more consistent and efficient grid even on cloudy or windless days.

Energy storage becomes critical to diversifying the power mix through low-cost, low-carbon energy, contributing to grid stability and energy security.

Case Studies:

- Abu Dhabi Water and Electricity Authority (ADWEA) has commissioned over 100 MW of sodium-sulfur (NaS) battery units at 10 locations. Batteries store surplus electricity during off-peak hours and release it during peak demand periods, enhancing load balancing and preventing spinning reserves.
- The 1.3 GWh NEOM smart city development includes the region's largest battery energy storage system, at 1.3 GWh. The system delivers a secure and resilient power supply solely from renewable energy sources, demonstrating the role of large-scale storage in supporting off-grid, clean energy systems.



Economic Diversification through Energy Storage

But beyond stabilizing the grid, can energy storage also spark new economic opportunities for the region?

The answer is yes.

Investment in renewable technologies and energy storage is becoming a strategic cornerstone for Middle Eastern countries that desire to move away from fossil fuel revenues. These nations enhance energy security by emphasizing clean energy infrastructure and developing new economic growth opportunities outside hydrocarbons.

Regional leaders in renewable energy transition, i.e., Saudi Arabia and UAE, are moving aggressively to encourage the deployment of energy-storage supply chains locally.



Saudi Arabia:

- The National Industrial Strategy and Vision 2030 demand high-technology domestic production in Saudi Arabia. The government has initiated incentives, such as a SAR 10 billion fund covering up to 35% of CapEx, to attract projects that “enhance national capacities” and cut imports.
- Chinese firm Hithium and local partner MANAT are building a 5 GWh battery-storage factory, one of the region’s first advanced BESS manufacturing facilities. The kingdom is also heading upstream: Aramco and Ma’aden intend to mine local lithium by 2027 to feed a projected battery demand boom.



UAE:

- Likewise, the UAE’s Operation 300bn (aiming industry GDP at AED 300bn by 2031) emphasizes “in-country value” and high-value industries. The Emirates Development Bank has even allocated AED 30bn to priority sectors such as renewable-energy equipment manufacturing (with ambitions of ~25,000 new jobs). These rules have created concrete initiatives in both countries.
- Statevolt Emirates is constructing a US\$3.2 billion gigafactory in Ras al-Khaimah (40 GWh yearly production) to serve local and export markets such as Africa. This one factory alone will create 2,500 jobs and “play a key role in addressing the growing demand for energy storage” under UAE Vision 2031.
- Coupled with new R&D and training partnerships (e.g., Sungrow’s MoU with Khalifa University to develop storage solutions for Gulf conditions), these efforts promise thousands of manufacturing and service jobs, greater industrial diversification away from oil, and reduced dependence on importing finished battery systems.

Cross-Border Trade of Electricity

With successful scaling of efforts, Middle Eastern nations will not only have the potential to reduce their domestic carbon emissions but also export clean technologies and energy storage solutions to nearby neighbors and developing countries. This shift might give them a new geopolitical influence, particularly in solar-plus storage and grid balancing technologies.

From Plans to Progress: Strengthening the Policy Backbone

To realize the complete energy storage potential of the Middle East, supportive and far-sighted policy structures will be essential. At present, policy instruments specific to energy storage are underdeveloped. Most countries have renewable energy targets in place, but lack incentives, market signals, or mandates that aim to accelerate storage system deployment.

In the years to come, the region can learn valuable lessons from better-performing regulatory measures of global leaders. For example, technology-neutral auctioning, pricing storage flexibility with time-of-use prices, and maintaining a level playing field for grid access to storage facilities can make an investible environment a reality. Permissive permitting paths and safety regulations would also attract private sector developers and investors.

Aligning policies with international best practices — like those in the U.S., EU, or China — would reduce investor risk and attract global energy players to set up regional manufacturing, deployment, and R&D hubs.

What Lies Ahead?

Looking forward, the Middle East is poised for significant growth in energy storage, particularly with the ambition of nations to interlink variable renewable resources such as solar and wind. Global agencies' estimates show regional energy storage capacity could grow more than tenfold by 2030, driven by country plans such as Saudi Arabia's Vision 2030 and the UAE's Energy Strategy 2050.

New forms of storage, including flow batteries, sodium-ion, and thermal storage, are on the horizon to support the region's long-duration needs and extreme weather requirements. With the proper innovation support and pilot deployment, the Middle East can potentially be the world's testing ground for next-generation storage technologies.

Regional coordination will also be essential. A unified GCC energy policy with shared infrastructure, collective research facilities, and unified standards would simplify effective scaling and knowledge exchange. Through this process, the Middle East will become a leader in consuming innovative energy storage and a center of production and innovation, driving the global clean energy revolution.



About the authors



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Saqib is a highly accomplished market research professional and a data storyteller in the international energy industry. With over a decade of experience in the field, he currently serves as the Chief Product Officer at PTR Inc. His expertise lies in the power grid and e-mobility equipment sectors.

Throughout his career, Saqib has overseen numerous global market research studies and provided valuable insights to key decision-makers at various Fortune 500 companies.

He is a member of the editorial board for Transformers Magazine and a member of the Advisory board of CWIEME Berlin. In addition to his market research career, Saqib has also worked in the manufacturing sector. Saqib holds a Master's degree in Electrical Power Engineering from the Technical University of Munich.



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Siddiqa Batool is a Research Analyst at PTR Inc, with a focus on the topic of energy storage. Her research includes analyzing market developments regarding energy storage, ranging from legislative landscapes to business cases, installations, pipeline projects, and the developments in battery chemistries and their supply chain.

She has also undertaken custom projects on the topic of energy storage, further advancing her knowledge and research on the topic. She has a bachelor's degree in electrical engineering from Mehran, UET, which brings the value of technical background to her role as a market analyst.



About PTR

With over a decade of experience in the Power Grid and New Energy sectors, PTR Inc. has evolved from a core market research firm into a comprehensive Strategic Growth Partner, empowering clients' transitions and growth in the energy landscape and E-mobility, particularly within the electrical infrastructure manufacturing space.

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