Saudi Arabia's Power Sector Transformation: Execution, Resilience, and the European Partnership Opportunity

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Saudi Arabia's energy transformation is driven by economic logic as much as climate ambition: every barrel no longer burned domestically is a barrel available for export. With electricity demand growing at 7.9% in 2025 to a record 349 TWh, the pressure to restructure the power system is acute. The kingdom's objective of 100 to 130 GW of renewables by 2030, world-record solar tariffs, and a battery storage rollout that would rank it third globally has seen it overtake the UAE as the Gulf's leading renewables market. The Hormuz disruption of 2026 confirmed that renewables are a security asset as much as a decarbonisation tool, a lesson Europe learnt in 2022. For European policymakers, Saudi Arabia is now positioning itself as a long-term supplier of green hydrogen to European markets, with active engagement in EU certification frameworks signalling a choice to build regulatory convergence, not simply to comply with it.

I. The Strategic Imperative

Saudi Arabia's electricity system is undergoing a massive transformation. Grid-supplied demand rose by 7.9% in 2025 to a record 349 TWh and continued growing in Q1 2026, driven by population growth, industrial expansion, desalination, large-scale infrastructure development and rising cooling requirements. Future AI data centre investment could add materially to that load. The IEA projects electricity demand across the MENA region to surge by 50% between 2023 and 2035, with Saudi Arabia at the centre of that growth curve.

The scale of that demand challenge makes the strategic logic behind the kingdom's energy transition clear. Saudi Arabia is not pursuing renewables purely for the purpose of decarbonisation but is undertaking a structural redesign of its national power system. This policy is driven by the need to reduce the use of liquid fuels for power generation and maximise oil export revenues while building a power sector capable of supporting Vision 2030's industrial diversification agenda. Every barrel of crude no longer burned domestically is a barrel available for export at prevailing market prices. With Saudi Arabia's fiscal position closely linked to oil revenues, this calculation carries weight.

The strategy is geared to achieve a 50:50 balance between natural gas and renewables in the power sector by 2030, replacing a system historically dominated by crude and fuel oil burn. Saudi Aramco intends to boost sales gas production by 60% from 2021 levels by 2030.

Saudi Arabia is not simply pursuing renewables as a decarbonization gesture. It is undertaking a structural redesign of its national power system.

The Hormuz crisis of 2026 added a further dimension. The shut-in by Saudi Aramco of more than 3mn b/d of crude production reduced associated gas availability and exposed residual dependence on oil-fired generation. Fuel oil imports surged in response as the energy system had to operate under severe stress due to the closure of the Strait of Hormuz, which forced production shutdowns and a rerouting of exports. This shift in the internal fuel balance, likely to be temporary, does not undermine the argument for the renewable transition but makes diversification an imperative.

The kingdom has had success in reducing the amount of oil used in power generation, despite strong electricity demand growth in 2025. Oil burn dropped for the first time in four years, dropping to a six-year low of 991,000 b/d, according to JODI data. This was thanks to a combination of record gas production from Saudi Aramco and the increase in installed renewables capacity.

Riyadh drew the same lesson from the crisis that Europe learned in 2022 that energy resilience requires diversification away from hydrocarbons, and that renewables are strategic assets as much as decarbonisation tools.

II. Saudi Arabia Is Moving at Scale Toward Execution

The kingdom's two-track policy is embedded in the National Renewable Energy Program (NREP). Under this framework, 70% of projects are awarded directly to a consortium of the Public Investment Fund (PIF) and Acwa Power, enabling rapid simultaneous procurement, financing and construction without the delays inherent in fully competitive processes. The remaining 30% are tendered competitively, providing market price discovery and capping costs.

This approach has allowed Saudi Arabia to move rapidly from a relatively low base. Installed renewable capacity stood at just 12.3GW at the beginning of 2026 — to a trajectory that is expected to deliver 7.7GW of new capacity in 2026 alone, surpassing the 5.76GW added in 2025.

The most significant recent addition is the first 1GW phase of the 2GW Haden solar project, connected to the grid in Q1 2026, developed by a PIF, Acwa and Saudi Aramco consortium. The 500MW Waad al-Shamal and 600MW Al Ghat wind farms — both awarded under NREP Round 4 to a Marubeni and Ajlan & Bros consortium — were also connected last quarter. Al Ghat attracted global attention when its power purchase agreement set a world-record low levelized cost of electricity of US¢1.56/kWh, providing hard evidence that Saudi Arabia's procurement model is delivering commercially competitive outcomes.

Additional projects due online later this year include the second 1GW phase of Haden, the 2GW Al Muwaih solar plant, the 1.5GW Khushaybi project, and the first NREP Round 5 projects, including the 400MW Al Henakiyah 2 and 300MW Rabigh 2 facilities. Solar PV dominates the current portfolio, accounting for around 13.3GW of installed capacity against roughly 1.5GW for wind, but wind is expected to become increasingly prominent in future tender rounds as the kingdom develops its wind resource zones.

Key Figures

Installed renewable capacity May 2026	**14.8 GW (17% of total installed capacity)**
2026 year-end target	**20 GW**
2030 target	**100–130 GW**
Capacity added in 2025	**5.76 GW**
Capacity added in 2026 (to date)	**~2.5 GW**
BESS installed / 2026 target / 2030 target	**8 GWh / 22 GWh / 48 GWh**
Grid-supplied electricity demand (2025)	**349 TWh (+7.9% year-on-year)**
2030 generation mix target	**50% gas / 50% renewables**

Source: Ministry of Energy, NREP, MEES

III. Current Position and 2030 Trajectory

Saudi Arabia's installed renewable capacity as of May 2026 has reached 14.8GW, representing approximately 17% of total installed generation capacity. The kingdom is targeting 20GW by year-end 2026, implying a further 5.2GW of additions over the remainder of the year. The 2030 target of 100–130GW represents a seven-to-nine-fold increase from the current base — one of the most ambitious renewable scale-up trajectories of any major economy with 20GW to be awarded each year between now and then.

The speed of the transformation allowed Saudi Arabia to overtake the UAE, which until recently was the Gulf's uncontested renewables leader, establishing the kingdom as the regional benchmark for deployment speed and cost competitiveness. The IEA projects renewables capacity across the MENA region to reach nearly 300GW by 2035, up from just 6% of generation in 2024, with Saudi Arabia and the UAE expected to dominate investment in new generation, grid modernisation and battery storage.

Total power sector investment in MENA reached USD 44bn in 2024 and is projected to grow by 50% by 2035, with renewables and nuclear capturing an increasing share. Grid investment alone is projected to account for close to 40% of total power sector investment over the next decade — a figure that reflects the infrastructure demands of integrating large-scale intermittent generation into rapidly expanding systems.

Alongside renewables, Saudi Arabia is executing a gas-fired capacity expansion programme to provide the dispatchable baseload that intermittent solar and wind cannot deliver. The thermal expansion pipeline includes more than 20 plants in various stages of development or tender, with combined capacity additions of over 50GW planned through 2028 and beyond (see table in Appendix).

IV. Grid Integration, Storage and the Nuclear Layer

Battery Energy Storage

The transition to high levels of renewable penetration requires infrastructure investment on a scale that matches the generation buildout. Saudi Arabia has emerged as one of the world's leading markets for utility-scale battery storage deployment. Installed BESS capacity now stands at around 8GWh; the kingdom is targeting 22GWh by end-2026 and 48GWh by 2030, which would position it as the world's third-largest energy storage market after China and the United States.

Unlike many neighbouring countries that pair batteries with hybrid solar projects, Saudi Arabia is focusing on standalone BESS systems. This gives operators greater flexibility: batteries can be charged from the wider grid whenever surplus power is available, rather than being constrained to co-located renewable output. The approach reflects a sophisticated systems integration strategy rather than simple project-level optimisation.

The rapid pace of grid integration is not without operational complexity. Two major Acwa-developed solar plants — the 1.425GW Al Kahfah and 2GW Ar Rass 2 projects — had to operate under dispatch limitations imposed by National Grid SA in April because of concerns relating to reactive power fluctuations and local grid stability. This reflects the engineering rigour with which Saudi Arabia's grid operator is managing the integration process. The discipline is evidence of mature grid management, not of systemic failure. Comparable teething issues have accompanied major renewable integration programs in Germany, the UK and Australia, all of which were resolved through a combination of technical adaptation and grid investment.

Grid Modernization

Around 40% of Saudi Arabia's distribution grids have now been automated, with continued investment in advanced control centres, real-time monitoring systems and long-distance High-Voltage Direct Current (HVDC) corridors linking major demand centres and renewable development zones. Grid investment is central to the transition strategy, and the HVDC corridors will be essential to connecting the large solar and wind resources in the kingdom's northern and central regions to the high-demand coastal and industrial zones.

Nuclear: The Post-2030 Baseload Layer

Completing the long-term picture is Saudi Arabia's nuclear programme, which is beyond the 2030 horizon but is an important signal of the kingdom's commitment to comprehensive decarbonisation of its power system. The Qurrayat program, which has yet to move to the development phase, envisions 16 reactors delivering 17.6GW of capacity by 2040. Partnership discussions with several potential supplier countries are active.

Nuclear fits naturally into the system architecture as the baseload complement to intermittent renewables. The 50:50 gas/renewables target is a 2030 objective. Nuclear provides reliable dispatchable capacity that reduces dependence on both gas and storage to firm up renewable supply.

V. The European Partnership Opportunity

The Hormuz crisis has led to a convergence of strategic thinking between Riyadh and the EU. It creates a meaningful basis for EU-Saudi energy partnership beyond commercial transactions.

Green Hydrogen and Ammonia

The most concrete and commercially significant bridge between Saudi Arabia's energy transition and European clean energy priorities is green hydrogen and ammonia. Saudi Arabia is positioning itself as a long-term supplier to European markets precisely as the EU is formalising its import dependence on green molecules under REPowerEU and its successor frameworks.

The flagship signal of Saudi intent is the NEOM green hydrogen and ammonia project — developed under the Helios brand by a joint venture of Air Products, ACWA Power and NEOM — which targets production of up to 1.2 million mt/yr of green ammonia for export. Timelines have been revised and cost pressures are real, but the scale and the commitment signal a strategic direction that should be taken seriously.

Acwa Power has additional green hydrogen projects in various stages of development, and the broader Vision 2030 industrial strategy explicitly incorporates hydrogen as a future export commodity. The strategic intent is clear even if individual project timelines remain subject to revision.

What has made the NEOM green hydrogen viable is that it managed to secure an offtake agreement that allowed the project to proceed while Aramco's blue hydrogen project has stalled, mainly because of cost. Saudi Aramco had targeted 11mn mt/yr of blue ammonia (as a carrier of hydrogen) by 2030, but CEO Amin Nasser said last August that the plan has been revised down to 2.5mn mt/yr and even that would not proceed if there was no firm offtake agreement.

CBAM Alignment and Certification

European officials engaged with the Saudi transition should be aware of the regulatory dimension. Saudi producers seeking to export green hydrogen and hydrogen derivatives — including ammonia — to European markets will need to comply with the EU's Delegated Acts on renewable fuels of non-biological origin (RFNBOs). These regulations set requirements on the renewable electricity inputs used to produce green hydrogen, the additionality and temporal correlation of that electricity, and the geographic boundaries of grid accounting.

Saudi Arabia's high-quality solar resources and the scale of its renewable buildout give it a structurally advantageous cost position for green hydrogen production relative to many alternative suppliers. The regulatory compliance challenge is real but the trajectory of engagement between Saudi producers and European certification bodies is moving in the right direction. CBAM alignment — ensuring that Saudi clean energy exports meet the criteria for exemption or reduced liability under the Carbon Border Adjustment Mechanism — is a policy conversation in Brussels that the Saudi energy sector will no doubt be tracking amid a push by some EU countries to accelerate reforms to CBAM and the ETF carbon trading mechanism. Saudi Arabia's engagement with these frameworks goes beyond compliance, signalling that Riyadh has chosen to build regulatory convergence with Europe.

Technology, Investment and the NREP Competitive Track

The 30% competitive track within the NREP structure creates direct entry points for European firms with relevant technology or financing capability. European companies with expertise in grid modernisation, advanced storage systems, HVDC technology and smart-grid infrastructure are naturally positioned to participate in Saudi Arabia's

grid investment program, which the IEA projects will account for close to 40% of total power sector investment across MENA over the next decade.

EU Commission President Ursula Von der Leyen's engagement with Saudi Arabia on clean energy supply chains during 2024–2025, and the broader EU interest in diversifying green molecule import sources beyond North Africa, means EU-Saudi hydrogen cooperation is a live policy discussion in Brussels. Saudi Arabia's ability to point not just to ambition but to a demonstrated execution record — world-record solar LCOE, 8GWh of installed storage, a functioning two-track procurement model — strengthens its credibility as a partner rather than simply an aspirant.

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APPENDIX: Thermal Power Plant Capacity Expansion

Plant	Developer	Capacity	Status / Start-Up
Riyadh PP13	SEC	1.7 GW	Operational
Riyadh PP14	SEC	1.7 GW	Operational
Green Dhuba	SEC	0.6 GW	Operational
Waad Al Shamal	SEC	1.3 GW	Operational
Rabigh Expansion 1*	SEC	1.2 GW	Operational*
Taiba 1	IPP	1.9 GW	2027
Taiba 2	IPP	2.0 GW	2027
Qassim 1	IPP	1.9 GW	2027
Qassim 2	IPP	2.0 GW	2027
Rumah 1	IPP	1.8 GW	2028
Rumah 2	IPP	1.8 GW	2028
Nairyah 1	IPP	1.8 GW	2028
Nairyah 2	IPP	1.8 GW	2028
PP12 Expansion	SEC	1.9 GW	2028
Ghazlan Expansion 1	SEC	3.2 GW	2028
Ghazlan Expansion 2	SEC	3.0 GW	2028
Qurayyah Expansion 1	SEC	1.2 GW	2028
Hajr Qurayyah Expansion	IPP	3.0 GW	2028
Rabigh II Expansion	IPP	2.3 GW	2028
Shuqaiq	IPP	2.4 GW	To Be Tendered
Shuaibah	IPP	3.6 GW	To Be Tendered

** Rabigh Expansion currently operating in simple-cycle mode; effective capacity ~700MW pending combined-cycle conversion. Source: Ministry of Energy, MEES.*

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