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Regional Electricity Market for the Middle East

From Interconnections to Markets Along the IMEC Axis

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Summary

- This publication is part of a series of Policy Briefs under the auspices of the 'Forum for Regional Cooperation', which is an informal consortium of several institutions that conducts regular workshops to explore constructive ideas that could contribute towards achieving greater stability in the Middle East.
- The first workshop was held at the Anwar Gargash Diplomatic Academy, Abu Dhabi, in December 2025.
- This Policy Brief focuses on energy security, which is a national priority across the Middle East, but the region's technical readiness for cross-border electricity trade remains vastly underutilised.
- It highlights electricity-based interconnection networks across the Middle East portion of the India-Middle East-Europe Economic Corridor (IMEC) axis: the Gulf Cooperation Council region, the Mashreq, the Levant, and the East Mediterranean. The core geography includes Cyprus, Greece, Israel, the Palestinian Authority, Egypt, Jordan, Saudi Arabia, and the United Arab Emirates.
- It points out that while natural gas currently dominates regional electricity generation, 70% of the region's total, hydrogen is a core component of IMEC's broader vision.
- The analysis focuses specifically on electricity connectivity, given that large-scale hydrogen infrastructure remains unbuilt and natural gas sources will barely suffice to meet regional demand growth.
- It is designed for policymakers and decision-makers who are not specialists in energy infrastructure or electricity markets. The analysis draws on a synthesis of desk research and semi-structured interviews with energy and geopolitical experts.
- The Policy Brief argues that a phased, bilateral approach, beginning with high-voltage direct current (HVDC)-based interconnections and long-term Power Purchase Agreements (PPAs), offers a pragmatic, politically feasible path toward a regional electricity market with substantial energy security, geostrategic and economic benefits.

1. The Energy Security Imperative

Energy security has re-emerged as a core national priority globally. Supply is increasingly volatile, driven by geopolitical instability, trade policy and climate change [1; 2]. Without a proactive strategy, states with fiscal capacity will absorb supply shocks through rapid procurement and infrastructure spending, while others face brownouts or blackouts. The scale of disruption costs is well illustrated by recent European experience: before the Russia-Ukraine conflict, 40% of Germany's primary energy came from Russian gas; replacing disrupted volumes imposed fiscal and industrial adjustment costs of an estimated €40–50 billion [3].

The Middle East faces these pressures in amplified form. The region is warming at more than twice the global average rate [4], and electricity demand tripled between 2020 and 2024, the third-fastest growth globally after China and India [5]. Furthermore, the region's population is growing at roughly twice the pace of the rest of the world, and rapid urbanisation is driving demand for cooling and expanding desalination loads. [6] Last summer, Kuwait imported electricity from its neighbours several times, yet still experienced blackouts [7].

Geopolitical instability compounds these structural pressures. Energy infrastructure is frequently targeted in conflict settings. The 2012 explosion of the Egypt-Israel gas pipeline [8] cost billions in disruptions and eroded inter-state trust [9]. Market structure also constrains trade: subsidies and administered tariffs distort price signals, weaken export incentives and render imports politically sensitive even where system-level gains are clear [5; 10].

A credible energy security strategy requires a multidimensional approach: scaling renewables and storage, expanding distributed generation and, where implemented correctly, regional integration via electricity interconnection. This paper examines a feasible pathway for developing electricity interconnections across the Middle East. It assesses how bilateral infrastructure projects could evolve into broader market coordination along the India-Middle East-Europe Corridor (IMEC) axis [11].

2. Why Electricity Interconnections Matter

Electricity interconnections are not equivalent to raw energy transfer. Unlike oil or gas transported via pipelines or maritime routes, cross-border electricity requires the physical linking of operating power systems, real-time coordination and, depending on the architecture, governance arrangements that touch on national sovereignty in sensitive ways. Understanding this distinction is foundational to realistic policy design.

2.1 Physical Infrastructure and Market Layer

An interconnection represents the physical infrastructure layer that enables cross-border electricity transfer, but trade depends on market rules, governance arrangements and pricing mechanisms. Trade can range from emergency support or ad hoc transfers to a fully developed market where electricity is traded in real time across multiple countries, the latter requiring extensive rule configuration for access, scheduling, congestion management, balancing, pricing, and settlement.

2.2 Technology Choice: AC Synchronisation vs HVDC

Two primary interconnection architectures exist. Synchronous AC connections link systems at a shared frequency (typically 50 Hz or 60 Hz), require deep operational coordination and trust and offer limited individual flow control. The Continental Europe Synchronous Area (CESA), the world's largest, serves over 400 million customers across 32 countries at a unified 50 Hz frequency [12]. By contrast, asynchronous HVDC connections allow electricity exchange without frequency synchronisation. The Saudi grid, operating at 60 Hz, connects to the rest of the Gulf Cooperation Council (GCC) grids, which operate at 50 Hz, through an HVDC interconnection [13]. HVDC increases controllability and limits operational coupling, making it well-suited to low-trust environments and subsea links, at a higher fixed cost. Critically, all types of trade (from PPAs to intraday spot markets) are possible on both types of interconnections.

Interconnection does not imply loss of sovereignty [14]. As Robin Mills, CEO of Qamar Energy, put it, 'Countries do realise electricity trade increases redundancy, but no one wants to be a structural importer, especially if trust is weak in the neighbourhood'. The policy question is not whether to import electricity, but rather what share of the national supply is exposed to external control and under which governance rules.

2.3 Benefits

When implemented correctly, interconnections tend to generate value across three dimensions:

- **Energy security:** adding redundancy during peak load or outages; compensating for local supply constraints, including depleted domestic resources; and reducing reliance on single-supplier fuel imports.
- **Geostrategic value:** electricity interdependence can reinforce diplomatic ties by creating mutual stakes in system stability. As Peleg Gottdiener of EcoPeace Middle East observed, 'Interdependencies in critical assets build healthier relationships'. The creation of the European Coal and Steel Community, pooling coal and steel production, was Europe's first concrete step toward peace after centuries of conflict [15].
- **Economic opportunity:** cross-border trade can reduce system costs and enable industrial activity. The Pan Arab Electricity Network (PAEN) is projected to reduce system costs by $107-196 billion by 2035 [16]. Climatic conditions across MENA, high irradiance and wind across available land, could support clean electricity generation to meet high European demand, especially in winter.

3. The Current Landscape: Infrastructure Without Trade

The electricity interconnections landscape across the Middle East presents a striking paradox. The region possesses some of the most interconnected and technologically advanced transmission networks globally [5]. Yet, cross-border electricity trade is almost non-existent. Three major interconnection frameworks define this landscape.

3.1 The Mashreq (EIJLLPST) Network

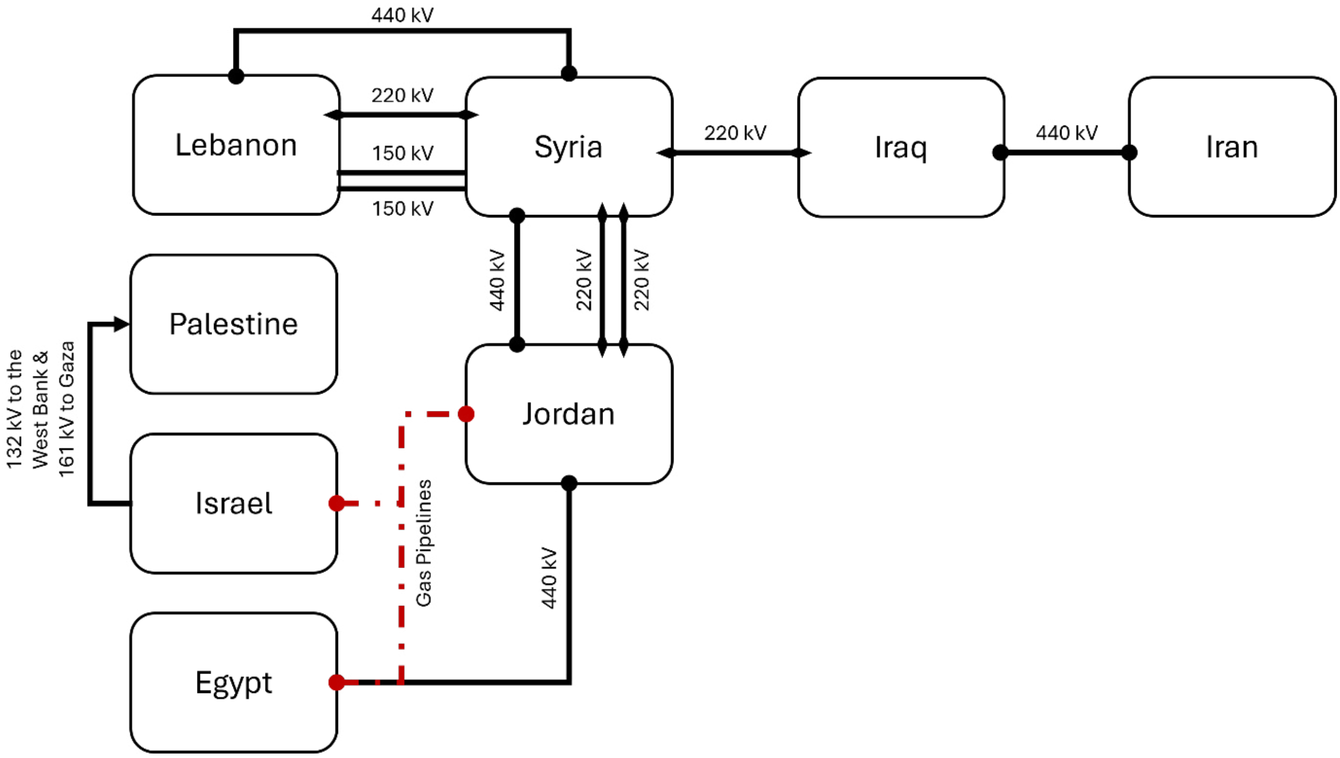

Figure 1: EIJLLPST, Israel & Iran International Electricity Interconnection Network

The Egypt-Iraq-Jordan-Lebanon-Libya-Palestine-Syria-Turkey (EIJLLPST) interconnection, launched in the early 1980s, represents the Middle East's earliest attempt at multinational grid integration. Linking eight countries through an AC-synchronised chain of 220–400 kV bilateral interconnectors, it was conceived as the backbone of a harmonised Eastern Mediterranean grid [17]. In practice, its incremental construction without unified planning led to heterogeneous technical standards and weak operational alignment. Prolonged conflicts, particularly in Syria, have damaged critical infrastructure and stalled grid synchronisation [18]. As a result, the framework has fragmented into a loose set of bilateral corridors with no network-level coordination [19].

Israel occupies a unique position within this landscape: it is the only nation at the heart of the EIJLLPST network and yet is excluded as a member. Despite this, Israel has developed multiple bilateral energy exchanges. Israel's gas exports from the Leviathan field support Jordan and Egypt. Jordan imports approximately 70% of its electricity from Israeli gas. Additionally, Israel signed a $35 billion gas export deal to Egypt in 2025 [20; 21]. Israel's reserves, however, are projected to be depleted as early as 2043 [22], meaning that Israel's energy security trajectory constitutes a regional risk, not merely a national concern.

3.2 The GCC Interconnection

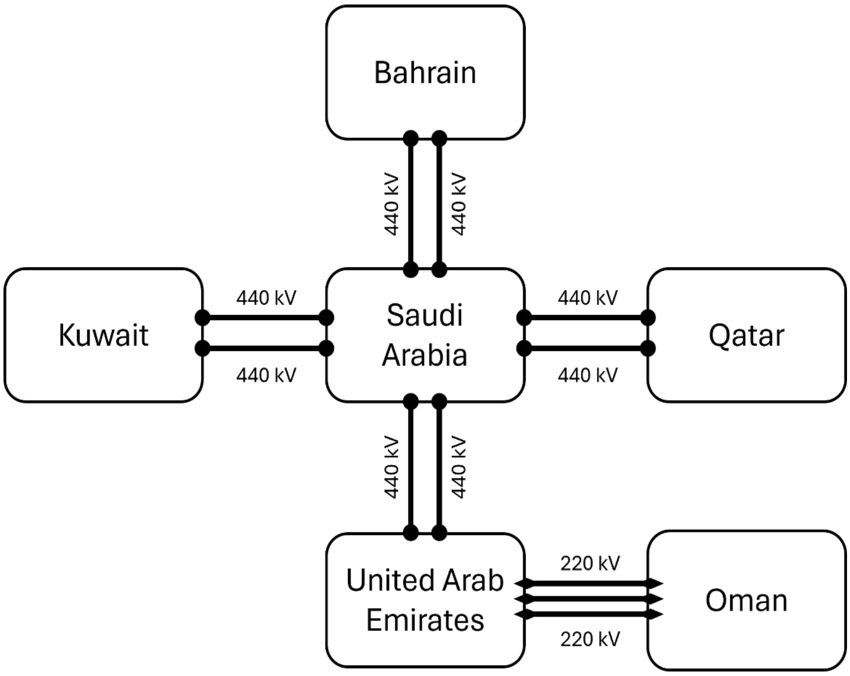

Figure 2: GCC International Interconnection Network, as per the Gulf Cooperation Council Interconnection Authority

In contrast, the GCC Interconnection Grid, launched in 2009 under the Gulf Cooperation Council Interconnection Authority (GCCIA), was purpose-built, standardised and centrally governed. Its transmission lines are considered among the most modern and globally competitive in reliability and performance [23;19]. Saudi Arabia holds a central position, connected to four of its five GCC counterparts and hosting the GCCIA headquarters. Most of the system operates as a synchronised 50 Hz AC ring; Saudi Arabia alone connects via back-to-back HVDC due to its 60 Hz system.

Despite its sophistication, cross-border electricity trading remains limited in practice, serving principally as an emergency and reserve-sharing mechanism. The current layout also reflects geopolitical influence over infrastructure design: despite geographic proximity, Bahrain and Qatar have no direct link, and Oman relies entirely on UAE-based transit. These gaps represent immediately feasible expansion opportunities. Over the medium term, bilateral PPAs and joint investments could extend GCC connectivity to Iraq, Yemen, Egypt, and, where political conditions permit, Turkey, Iran and Israel.

3.3 The Maghreb Network: A Cautionary Precedent

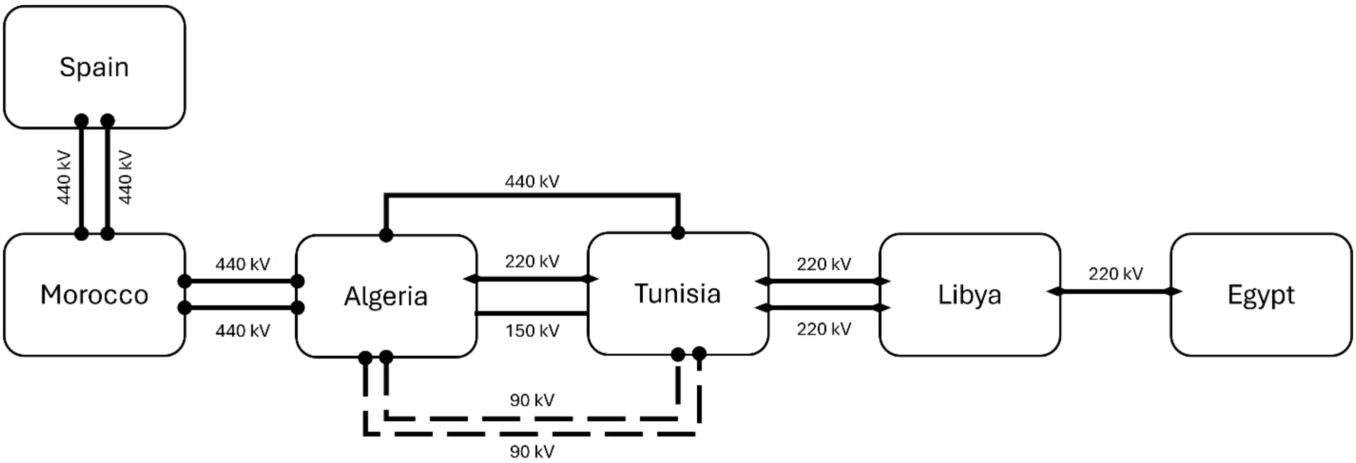

Figure 3: Maghreb & Spain International Interconnection Network

Falling outside the scope of this paper, the Maghreb interconnection network, which has uniquely achieved AC-based synchronisation with the European grid through Morocco-Spain connections, underscores the fragility of technical gains in the face of political rupture. A diplomatic freeze between Algeria and Morocco has halted exchanges along the central corridor [24; 25]. This example illustrates how geopolitical tensions can rapidly undermine decades of technical integration and investment, a lesson directly applicable to the IMEC corridor.

4. Key National Stakes

4.1 Israel

Israel's electricity system is currently underpinned by domestic natural gas, but proven reserves are projected to be depleted as early as 2043 [22]. This will leave a significant medium-term supply gap not only in Israel but also in Egypt, Jordan and the Palestinian Authority, all of whom are heavily dependent on Israeli gas for domestic electricity supply. To bridge this gap through imports, most likely from Qatar, would expose Israel to considerable geopolitical risk [26]. Therefore, according to Gershon Berkovitch of Israel Electric Company, an interconnection is 'unavoidable'.

The energy-water nexus intensifies these vulnerabilities. Approximately one-fifth of Israeli water consumption comes from desalinated water [27], and Jordan imports Israeli water. Both nations rank 9th and 15th, respectively, among the world's most water-stressed countries. Growing rooftop solar deployment and electric vehicle uptake are further increasing short-term fluctuations in supply and demand, thereby reinforcing rather than reducing the need for cross-border balancing capacity [28].

4.2 Saudi Arabia

Saudi Arabia faces a different but complementary set of pressures. Vision 2030 is driving rapid growth in energy-intensive sectors: data centres, advanced manufacturing, mining, and processing of critical minerals, real estate and aerospace. The Kingdom's population is projected to peak at approximately 45 million by 2050, requiring major investment in energy and water infrastructure. Desalination already accounts for about 30% of Saudi Arabia's electricity demand [29].

In parallel, Saudi Arabia has committed to ambitious renewable energy targets: 50% renewables by 2030 (68% solar, 32% wind) and up to 55 GWh of installed battery energy storage systems [30]. This transition will make generation less predictable and more weather-dependent, substantially strengthening the case for interconnection. The Kingdom also aims to position itself as a major exporter of clean electricity to Europe [31], for which it will require electrical connectivity to the continent, likely via Israel or Egypt.

Saudi Arabia's solar resources are globally competitive: the 600 MW Al Shuaiba photovoltaic Independent Power Producer reportedly achieved a levelised cost of electricity (LCOE) of US¢1.04/kWh in 2021, the lowest recorded globally [32]. The broader 'Sunrise Region', spanning North-Eastern Egypt, Jordan and North-Western Saudi Arabia, produces 30 to 75% more solar output per installed kilowatt than Greece, southern Italy or southern Germany, with wind capacity factors at above 50% year-round.

5. Geostrategic Value of Interconnections

All Israeli diplomats interviewed for this study were unanimous: regional energy interdependence is a strategic priority for Israel, which has long been excluded from regional agreements and joint initiatives. Deeper energy links, particularly with Saudi Arabia, are regarded as integral to Israel's long-term geopolitical positioning.

For Saudi Arabia, the geostrategic calculus is twofold. First, interconnections would reinforce the Kingdom's role as the central anchor of regional connectivity along the IMEC axis and within the PAEN, strengthening its standing with both Europe, as a core node in a new trade route, and the United States, by enabling closer engagement with Washington's closest regional ally. Second, any bilateral electricity interconnection with Israel remains politically conditioned on progress toward Palestinian statehood, the same consideration that has long underpinned Riyadh's reluctance to join the Abraham Accords. However, this conditionality can also serve as diplomatic leverage a credible pathway toward Palestinian statehood could transform the Palestinian question from a political constraint into a facilitative instrument.

A creative initiative by EcoPeace Middle East proposes that Gaza host an electricity interconnection node on the route from Saudi Arabia to Europe. This would create a direct, practical link between political stability in the coastal enclave and the reliable export of Saudi renewable electricity to European markets, simultaneously supporting Palestinian statehood and Israeli-Saudi normalisation [33]. Such an arrangement would carry strong regional signalling value: Israeli-Saudi cooperation in the sensitive energy domain would be read as a credible indicator of broader strategic alignment.

6. Market Models for the Region

Cross-border electricity trade in the Middle East is most likely to develop through Power Purchase Agreements (PPAs) – medium- or long-term bilateral contracts for specified volumes at set prices – determined by mutual agreement rather than competitive tendering. This reflects the region's current conditions: limited multi-supplier competition, weak institutional enforcement and low inter-state trust. PPAs require moderate trust and can be established with limited infrastructure, and they also accommodate the political management of pricing and volumes that characterise energy trade in the region.

The current Israel-Egypt gas relationship illustrates this model well. Following an initial 2019 agreement to supply 7 billion cubic metres (bcm) per year for ten years, a 2025 extension expanded this to 8.7 bcm per annum until 2040, with new cofinanced infrastructure and a reported price adjustment of roughly 14.8% [34; 35]. Israel now accounts for approximately 15–20% of Egypt's domestic gas consumption [36], and the agreement includes a take-or-pay structure that transfers demand risk to the buyer while providing revenue certainty to the supplier. This contract functions not only as a commercial instrument, but also as a stabilising mechanism within a broader strategic relationship, a template directly applicable to electricity trade.

More sophisticated market structures, marginal pricing, pay-as-bid auctions, and real-time market coupling require multiple trusted suppliers, reliable interconnected infrastructure and strong institutional enforcement. These conditions do not yet exist across the IMEC corridor. However, Norway-UK electricity trade via the North Sea Link (a 1.4 GW HVDC interconnector), operating through auction-based market coupling, illustrates how bilateral infrastructure underpinned by regulatory trust can evolve into dynamic markets. For the Middle East, this remains a medium- to long-term horizon.

7. Barriers

7.1 Structural Barriers

Three principal structural barriers constrain electricity trade. First, energy subsidies and administered tariffs distort price signals across the region, reducing incentives for cross-border transactions on transparent terms and creating politically sensitive import conditions even where system-level gains are clear [37]. Second, monopolistic, state-owned utilities, embedded within national power structures and shielded from competitive market pressures, are resistant to the open-access arrangements required by cross-border trade [38]. Third, significant differences in grid standards and high-voltage capacity between potential trading partners limit the range of viable connections in the near term. Voltages and industrial standards vary country by country, adding costs for investors and deterring cross-border investment.

7.2 Political Barriers

Political barriers remain the most significant constraint. The unresolved Palestinian question continues to deter Arab states from pursuing visible cooperation with Israel, especially in energy, a domain where joint infrastructure carries high political salience. The Pan Arab Electricity Market (PAEM) requires consensus among Arab League members [39], and few countries wish to break with long-standing allegiances by moving unilaterally.

The absence of institutional links compounds this. Data sharing between countries across the region is minimal; there is no common regulatory authority and long-distance infrastructure remains inherently vulnerable to sabotage and disruption by conflict. These risks act as a deterrent to large-scale investment. That said, these barriers are neither static nor insurmountable. The 2025 extension of the Israel-Egypt gas deal, agreed upon despite ongoing conflict, demonstrates that economic imperatives can override political constraints under the right conditions [21]. Rising energy demand and the pressure of technological transition are the true drivers of cooperation in the region. As the paper notes, in 1945 it would have been inconceivable to imagine the European Coal and Steel Community, and by 1990 it would have been inconceivable to imagine the EU's single market. History shapes but does not dictate what can be achieved.

8. Recommended Pathways and Sequencing

Given the political, regulatory and security constraints characterising the region, a single comprehensive multilateral design is not a realistic near-term objective. Instead, a four-phase roadmap, grounded in bilateral first steps that evolve into coordinated corridors, reflects the institutional realities of a region where bilateral cooperation is significantly easier to establish than multilateral market integration.

Phase 1 (2025–2030): Bilateral HVDC Interconnections and PPAs

The immediate priority is establishing bilateral interconnections using HVDC technology, complemented by long-term PPAs with terms agreed upon at the outset. HVDC enables electricity exchange without full grid synchronisation, preserving national autonomy and isolating technical and political risks, which are critical in a low-trust environment. The most promising early candidate is Israel-Jordan: an energy relationship already exists (natural gas, water), geopolitical friction is comparatively limited and both governments have signalled readiness. The Prosperity Project MoU, under which Jordan would supply Israel with 600 MW of solar-generated electricity in exchange for desalinated water, financed by Abu Dhabi's MASDAR, provides a concrete template [40]. While stalled following the Gaza conflict, Israeli officials indicate it may resume.

Pilot projects should accompany this first phase to demonstrate technical feasibility and build institutional confidence. Economic gains and market integration are secondary objectives at this stage; the priority is demonstrating that cooperation is possible.

Phase 2 (2030–2035): Coordinated Corridors and Limited Market Interaction

Building on pilot experience and momentum, the second phase shifts toward developing coordinated energy corridors. For the GCC, which already has a robust grid, the focus should be on initiating a preliminary electricity market and supporting cross-border trade with common protocols for regional balancing and support. A key target is the creation of a unified governance body, anchored in the IMEC framework, to oversee coordination and dispute resolution. A natural second bilateral link to develop in this phase is Israel-Saudi Arabia, a connection with greater long-term potential that would benefit from the institutional confidence and operating experience accumulated in Phase 1.

Phase 3 (2035–2040): Partial Market Coupling and Structured Multilateral Trade

The third phase transitions from coordination mechanisms to partial market coupling. A harmonised regulatory framework would align participating systems sufficiently to enable multilateral trade while maintaining national control over core energy policy. Transparent pricing mechanisms and coordinated dispatch would improve efficiency across the corridor. This phase also brings the Great Sea Interconnector, linking Israel to Cyprus and Greece, into the broader IMEC corridor, connecting Gulf generation capacity with European demand.

Phase 4 (Post-2040): Long-Term Regional Market Vision

The long-term aspiration is a Middle East electricity market configured around three interlinked sub-regional hubs – the Gulf, the Mashreq and the Eastern Mediterranean – with multiple connections between them and interfaces extending into Europe. This would embed energy security and economic interdependence across the region. Progress is contingent on the successful implementation of the preceding phases and on broader geopolitical stability. Attempting to bypass earlier phases or forcing multilateral integration in an unfavourable political environment would severely impede success.

Egypt and Israel as Dual Gateways

Both Egypt and Israel are credible candidates for inter-network coordinating roles. Egypt already has operational interconnections with Libya, Jordan and Sudan, and the EuroAfrica Interconnector, linking Egypt to the EU via Cyprus and Greece, is due for commissioning before the turn of the decade. However, Egypt's domestic supply imbalance constrains its anchoring role. Israel, meanwhile, is technically well-positioned and has achieved significant bilateral progress. Still, its role as a central player in cross-continental interconnection frameworks depends more on political acceptance than on technical capability. A Gulf-Levant-EU electricity corridor, connecting Saudi generation capacity to European markets via Israel and the Great Sea Interconnector, is the defining strategic opportunity of the IMEC axis.

9. Conclusion

The Middle East's electricity systems are technically more advanced and interconnected than their minimal cross-border trade would suggest. The barriers are primarily political and institutional rather than technical. Yet, recent examples demonstrate that these barriers are surmountable: the 2025 extension of the Israel-Egypt gas deal and Jordan's ongoing interception of Iranian missiles on Israel's behalf, underpinned in part by energy dependencies, illustrate how economic and strategic interdependence shapes political behaviour even in conflict settings.

For Israel, whose natural gas reserves are projected to be depleted within two decades, interconnections are a strategic necessity. For Saudi Arabia, they are the enabling infrastructure for clean energy export ambitions and Vision 2030. For the broader region, they represent the most pragmatic and scalable mechanism available for managing energy security risks while simultaneously creating the interdependencies that support geopolitical stability.

The recommended near-term course of action is to begin bilaterally with Jordan on HVDC technology and a long-term PPA, building on the Prosperity Project architecture, and to develop, in parallel, the institutional foundations for a future Israel-Saudi connection along the IMEC axis. This sequencing manages risk, builds trust and creates a platform for the phased expansion of a regional electricity market that could ultimately connect Gulf solar resources with European demand, stabilise the Levant through economic interdependence and provide Israel with the energy security resilience its trajectory requires.

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