The development of Critical Minerals and the Energy Transition in IMEC: Sustainability and Opportunities

By Arby Kane

Introduction

The global energy transition is increasing demand for critical minerals. The MENA region holds significant reserves of these resources and has traditionally been known for its oil and gas. However, this dynamic is evolving, as countries across the region, including Saudi Arabia, are increasingly turning toward the development of their mineral potential. In the Middle East, Saudi Arabia stands out for its critical mineral reserves and its efforts to advance the sector through international partnerships. The Kingdom's Western Arabian Shield contains substantial deposits of precious metals such as gold and silver, along with key industrial minerals including aluminum, iron, copper, zinc, manganese, and chromium.

With estimated mineral resources exceeding $1.3 trillion, Saudi Arabia aims to catalyze private-sector investments in ongoing exploration zones and in new, environmentally sound extraction techniques. Already, Saudi mining giant Ma'aden is actively exploring untapped critical mineral reserves.

Jordan is also seeking to expand the exploitation of its mineral wealth, with the goal of becoming a key regional and global supplier of vital components for renewable energy systems, such as solar panels and wind turbines.

Turkey is advancing its strategy to develop its mineral resources, with a particular focus on rare earth elements essential for advanced magnets and batteries.

Mauritania is already one of the leading producers of iron ore and gold in Africa and the MENA region, with vast mining potential. The country remains relatively stable within the Sahel region and shows strong indications of additional reserves of cobalt,

lithium, nickel, and other critical minerals. The Islamic Republic of Mauritania enjoys significant mining potential, with more than 900 mineral occurrences, including iron ore, copper, gold, silver, phosphates, quartz, diamond, chromium, manganese, lead, zinc, platinum group metals, rare earths, gypsum, black sands, salts, and peat.

Mining in North Africa is rich in deposits of gold, copper, iron ore, zinc, and other heavy mineral sands. Mining activity in Egypt, in particular, is experiencing rapid growth, with -more than 15 gold mining projects currently underway, alongside developments in Algeria, Morocco, and Sudan. This highlights the growing role of these countries in the regional and global mining sector.

Most Gulf countries are in the early stages of development, with approximately 66% of their objectives still in the planning phase. While copper remains a primary focus for Saudi Arabia, the UAE, and Oman, lithium is the only mineral targeted by every Gulf player, confirming its status as the battery metal of choice and a strategic component of post-oil economic diversification.

For the transition to the mining sector, many countries in the MENA region have built substantial wealth from fossil fuels and still depend heavily on them. In North Africa, both Morocco and Tunisia have leveraged their phosphate reserves. Economic and energy profiles vary across the region, as do fossil fuel reserves and production levels, but most MENA countries are now seeking to develop renewable energy sectors alongside the expansion of their mineral resources and Green energy.

Government officials in several countries are increasingly positioning renewable energy as critical to addressing energy deficits, advancing economic and social development, and maintaining relevance in the global energy market amid long-term declines in oil and gas demand.

The India-Middle East-Europe Economic Corridor (IMEC) is emerging as a strategic framework linking energy, infrastructure, and supply chains, with profound geopolitical implications. A key aspect of its geopolitical dimension includes facilitating closer collaboration between Israel and Saudi Arabia, a move that gains added significance in light of China's diplomatic efforts in the region, particularly between Iran and Saudi Arabia. In this context, the development of strategic mining projects and mining mineral supply chains could become a central pillar of IMEC in Saudi Arabia. It includes leveraging infrastructure development to promote economic diversification and stability, particularly within Saudi Arabia's Vision 2030 framework, which seeks to reduce its oil dependency.

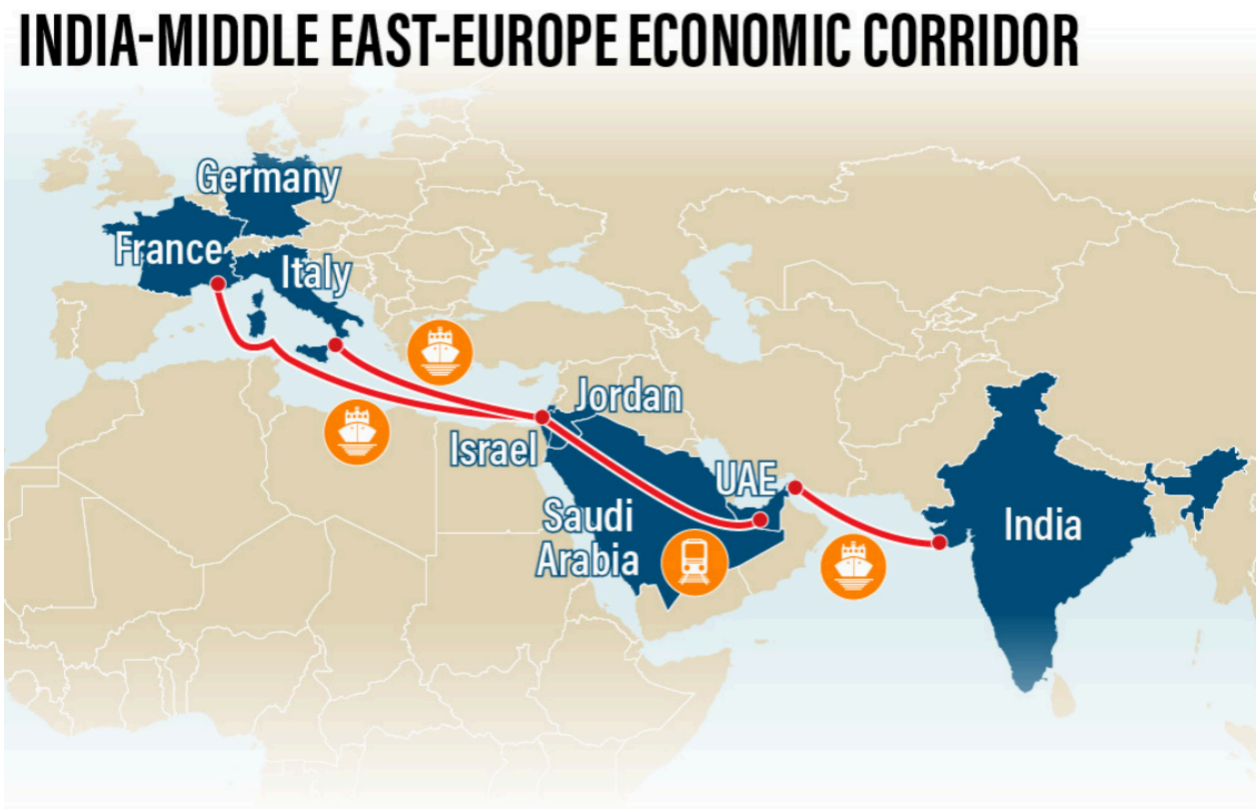

Figure 1 India-Middle East-Europe Economic Corridor

Source:https://www.thenationalnews.com/opinion/comment/2023/09/20/the-corridor-plan-unveiled-at-g20-goes-much-beyond-trade/

1. Sustainable / Green Mining in the MENA region is strategic for IMEC

The transition from oil and gas dependence to sustainable mining development represents a major economic turning point for the MENA region. This shift is expected to drive significant investment flows. In the context of the circular economy, the mining industry can adopt resource optimization strategies that are crucial to the efficient extraction and utilization of raw materials. This involves integrating advanced technologies and innovative techniques to maximise resource recovery, streamline extraction processes, and reduce losses during mining operations. By optimizing resource utilization, the industry can reduce the need for additional extraction, thus easing the pressure on limited resources.

- North Africa Situation

The development of many critical minerals projects in North Africa requires strategic planning and investment. China plays a leading role in this space, supported by strong resources and established relations with these countries, particularly in the development of minerals and metals used in green energy technology, such as manganese, phosphate rock, zinc, and aluminum. Green mining, as mentioned, refers to the responsible extraction of mineral resources that integrates low-carbon, environmentally sound technologies with strong social safeguards and long-term economic benefits for present and future generations.

Algeria and Morocco have attracted extensive Chinese investment to produce and develop electric vehicle (EV) batteries using local mineral reserves, including lithium, copper, zinc, and phosphate.

Mauritania's mining industry is already well established, with major production of iron, gold, copper, and gypsum. The country also holds significant reserves of other critical minerals, such as uranium, phosphates, zinc, chromium, and rare earth elements.

- Middle East Situation

The critical minerals sector has become highly strategic for many countries in the Middle East, significantly contributing to economic development and diversification, as well as to the transition to clean energy and climate goals. It is also supporting long-term and sustainable economic growth opportunities. Consequently, these minerals are receiving increasing strategic attention from Arab countries, particularly in the Gulf region.

In this context, IMEC is not only a transport route, but also a green industrial corridor. It is expected to carry green energy and minerals while optimizing low-carbon supply chains. Designed to connect India, the Middle East, and Europe, it is expected to support the development and movement of minerals across the region, creating a strategic link and a development corridor.

In 2022, global spending on renewable energy reached approximately $600 billion. The clean energy industry has now become the largest market in terms of capacity and the most demanding for critical minerals.

In the Gulf region, Oman and Saudi Arabia are among the major countries advancing these practices. In Saudi Arabia, aluminum and steel rank 15th in local demand, reflecting growing industrialization and sustainability. Total imports exceeded $2,5 billion in 2025, alongside several significant projects. Demand across many value chains is rising due to economic and industrial growth, supported by mega- and giga-projects, and new local content and localization policies.

In 2023, many Arab countries, notably Egypt, the UAE, and Saudi Arabia, made significant progress in increasing their installed clean energy capacity. These nations are benefiting from the diversification of clean energy sources and have proven mineral reserves that are essential to developing clean energy technologies.

This reflects significant progress toward clean energy, supported by the minerals industry. The presence of these resources offers Arab countries a unique opportunity to create an attractive investment environment. Investments in this sector not only contribute to economic diversification but also enhance revenue growth and foreign investment inflows.

Investment in this sector can come from the local funds and a shift from hydrocarbons to mining, which represents a viable strategy for the future of the mining industry in the Middle East, supporting sustainability and the clean energy transition.

2. Trade, Global Supply Chains, and Local Value Creation

In the coming decades, the Middle East and North Africa region is expected to play a leading role in the global energy transition and international energy supply chains. Many effective plans are already underway, with countries such as Morocco, the UAE, and Jordan spearheading the development of green energy and mineral mining to support value-added production for export, while Egypt and Saudi Arabia are moving in the same direction.

The MENA region continues to face challenges in energy distribution, which has slowed the development of trans-Mediterranean renewable energy interconnections. The corridor is designed to mitigate disruptions to the Suez Canal, responsible for around 12% of global trade, by providing a shorter and more reliable route, thereby enhancing flexibility in the supply of minerals and energy.

Significant investments have been made to support clean energy development and industrial optimization. The $20 billion Morocco-to-UK Xlinks interconnector is a key example of this. In 2024, the Indian state-run electricity grid operator initiated high-level discussions with the UAE, Saudi Arabia, and Oman to develop a 2.5 GW

electricity interconnector across the Arabian Sea, which could supply renewable energy to India, representing a market opportunity for the Gulf countries on a scale comparable to the EU. Dedicated solar and wind power infrastructure, following the Xlinks model, could support the implementation of an interconnection between the Arabian Peninsula and India.

MENA is not yet considered a dominant market for these materials, particularly in North Africa, compared to regions such as Europe and Asia, due to varying levels of industrial development.

Developing the supply chain in MENA could support the region's strategic emergence as a hub for international renewable energy and critical minerals supply chains. The following steps could be considered:

- Create a regional MENA platform for the export of green ammonia and minerals beyond the region.
- Establish dedicated power plants to enable undersea electricity interconnectors and support MENA's manufacturing and supply chains.
- Promote private sector investment in the transition from hydrocarbons to mining and power, particularly in green fertilizer production in Oman, Egypt, Algeria, Tunisia, Jordan, Mauritania, and Sudan.
- Encourage private sector investment in green mining and metals processing in Egypt, Algeria, Tunisia, Jordan, Mauritania, and Morocco.
- Facilitate private sector investment in green industrial manufacturing of inputs and finished goods within existing manufacturing sectors across MENA (e.g., appliance manufacturing in Egypt and pelletization of iron ore in Mauritania).

Strategic Outcomes	**The Results and Impacts**
Higher export revenues, generating billions of dollars from green mining and local and international trading	Moving from raw ores to refined products

Job creation across skill levels in MENA, attracting many skilled professionals	Opportunities across technical, managerial, and service sectors
Technology transfer and innovation	Strengthening local R&D and industrial capabilities
Resilient and diversified economies	Reduced dependence on hydrocarbons, in KSA, green mining has become the 3rd pillar of the economy and is expected to rise to the 2nd position by 2030
Competitive position in clean supply chains, with MENA as a key player in mineral supply	Low-carbon materials for global markets

IMEC is highly resource-rich, and moving beyond extraction and basic refining toward value-chain development is key to sustainability. This highlights the importance of ensuring that value addition is embedded in mining policies. The benefits, strategic outcomes, and impacts outlined in this table above summarize the effects on trade and supply chains both globally and within the region.

3. Critical Minerals as a Key Strategic Geopolitical Driver: IMEC-Africa

Strategic positioning around critical minerals is rapidly reshaping global power dynamics, with these resources becoming the backbone of what can be described as the “new energy geopolitics.” As the world transitions away from fossil fuels, control over supply chains for lithium, cobalt, copper, and rare earths is emerging as a key determinant of economic and strategic influence. In this context, the --IMEC has the potential to redefine global connectivity by offering a credible alternative to the Belt and Road Initiative. By fostering diversified, transparent, and sustainability-driven mineral supply chains, IMEC can strengthen South-South cooperation, particularly between Africa, the Middle East, and South Asia, while also reinforcing energy security alliances with Europe.

For African countries, this shift presents a transformative opportunity to move from peripheral suppliers of raw materials to central actors in a rebalanced global system. Rather than exporting unprocessed minerals, African nations can leverage IMEC to integrate into regional and transcontinental value chains, attracting investment in processing, manufacturing, and clean energy infrastructure. This creates opportunities for industrialization, job creation, and technology transfer, while also enhancing bargaining power in global markets. Moreover, by aligning with IMEC's sustainability and governance frameworks, African countries can position themselves as reliable and responsible partners in the energy transition, shaping a new development model that combines resource sovereignty, regional integration, and climate-resilient growth.

Saudi Arabia holds some of the world's most valuable deposits of rare earths elements (REEs). According to its Ministry of Industry and Mineral Resources, the Jabal Sayid deposit, located approximately 350 kilometers northeast of Jeddah, is confirmed to hold one of the most valuable REE reserves globally. It contains an estimated 552,000 tons of heavy rare earths, including dysprosium and terbium, as well as 355,000 tons of light rare earths such as neodymium and praseodymium. In addition, unexplored adjacent deposits could yield even greater supplies, further strengthening Saudi Arabia's strategic position in the MENA region and the global critical minerals market.

-New Perspectives and Green Energy Integration in IMEC

Green energy integration is a cornerstone for aligning mineral development with climate objectives across the IMEC corridor. The concept of *renewable-powered mining hubs* involves co-locating mining operations with large-scale solar, wind, or hybrid renewable systems to reduce dependence on fossil fuels, lower operational costs over time, and significantly cut emissions from extraction and processing activities. This is particularly relevant in sun-rich regions across Africa and the Middle East, where mines can become energy self-sufficient while contributing surplus power to nearby communities. In parallel, the development of hydrogen corridors linking Gulf countries to Europe offers a strategic pathway to decarbonize energy-intensive mineral processing and transport. Green hydrogen, produced using abundant renewable resources in the Gulf, can be exported to Europe via IMEC infrastructure, supporting both clean industry and energy security. Additionally, solar-plus-storage systems for remote mining zones provide a practical, scalable

solution to electrify off-grid operations, replacing costly, polluting diesel generators. Battery storage ensures reliability and continuous operations, even under variable renewable conditions, making mining more resilient, sustainable, and economically viable. Together, these integrated solutions position IMEC as a model for linking mineral extraction with clean energy systems, transforming traditional mining into a driver of the low-carbon transition.

IMEC is not just a trade corridor. It can become a sustainable critical minerals ecosystem, linking resource-rich regions with industrial and technological hubs to power a secure, inclusive, and low-carbon energy future.

Recommendations

The key recommendations for the sustainable extraction and development of mineral resources in the MENA region and within the IMEC framework are:

- To develop this sector in a sustainable way, environmental, social, and economic risks must be addressed as a priority. This should include workshops and summits to address these issues at a technical level.
- Strengthen the link between mineral development and the energy transition by examining how resources extracted in the MENA region can feed into regional clean energy value chains. This includes developing roadmaps on MENA's role in global supply, while also supporting domestic downstream industries, as well as addressing trade and geopolitical dynamics, including IMEC partnerships with Europe, Sub-Saharan Africa, and Asia.
- Review of current policy landscape for mining across MENA, and promote regional cooperation to build integrated supply chains, local refining capacity, and long-term strategies toward 2050.
- Support economic diversification strategies by promoting value addition and increasing investment in North African mining sectors, particularly in countries such as Mauritania, which has huge mineral potential.
- Address key gaps, including the lack of data, by supporting research and financing initiatives in this field.
- Develop a clear and comprehensive strategic roadmap, including the identification of potential partners, aligned with the broader MENA2050 vision.

- Support artisanal and small-scale mining by improving traceability, access to finance and technology, particularly in Mauritania and across Africa, to strengthen future IMEC supply chains.
- Expand and diversify investment pipelines to improve access to mineral resources for energy development and to support IMEC-related activities.

References

https://www.mei.edu/publications/middle-easts-critical-mineral-resources-key-clean-energy-transition

https://erl.scholasticahq.com/article/123649-india-middle-east-europe-economic-corridor-a-strategic-energy-alternative?attachment_id=245930

https://www.intellinews.com/mauritania-s-thriving-mining-sector-has-potential-to-transform-the-country-s-economy-336302/

https://projectsiq.co.za/mining-in-north-africa.htm

https://www.iiss.org/charting-middle-east/2025/07/the-gulf-states-push-for-critical-minerals/

https://resourcegovernance.org/regions/middle-east-and-north-africa

https://www.asturex.org/wp-content/uploads/2024/04/Mining-overview.-Final.pdf

https://www.sciencedirect.com/science/article/abs/pii/S0301420724006238

https://monitoring.bbc.co.uk/product/b0003zf2

https://www.ecofinagency.com/mining/0104-46572-mauritania-partners-with-world-bank-to-develop-mining-potential#:~:text=The%20Mauritanian%20Ministry%20of%20Mines,might%20underutilize%20its%20mineral%20wealth.&text=The%20U.S.%20added%20uranium%20back,The%20move%20reflects...&text=Tarkwa%20gold%20output%20drops%205,volumes%20from%20pit%20and...&text=Cape%20Verde%20is%20recognized%20as,However%2C%20the%20nation...&text=Subsidies%20cost%20$180M%20in,social%20protection%20and%20market...

https://futureuae.com/ar/Mainpage/Item/9473/green-transformations-drivers-of-increasing-gulf-investments-in-critical-minerals#:~:text=Additionally%2C%20the%20UAE%20is%20forging,revenues%20and%20diversifying%20energy%20sources.

https://mei.edu/publications/menas-emergence-hub-renewable-energy-supply-chains

https://www.csis.org/analysis/new-era-us-saudi-minerals-cooperation

https://www.iiss.org/online-analysis/charting-middle-east/2025/07/the-geopolitics-of-the-gulf-states-push-for-critical-minerals/

https://orfme.org/expert-speak/beyond-oil-saudi-arabias-critical-minerals-strategy-for-a-diversified-economy/

https://www.tni.org/en/publication/critical-raw-minerals-in-morocco

https://www.sfa-oxford.com/lithox/critical-minerals-policy-legislation/all-countries/africa/algeria/