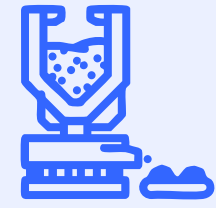


Institute for Energy Economics
and Financial Analysis

MENA's Opportunity to Lead the Green Iron and Steel Transition

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Key Drivers of MENA's Competitiveness



The World's DRI Hub

MENA has one of the world's fastest growing steel industries and is the leading hub for gas-based DRI. DRI capacity is growing; in 2023, MENA accounted for 45% of global DRI production, up 11% from 2021. DRI-EAF steelmaking dominates in MENA, offering lower emissions than traditional coal-based BF-BOF processes, with the flexibility to transition to green hydrogen for further emissions cuts.



Raw Material Access

For other regions the supply of high-grade feedstocks is a barrier to decarbonising via DRI-EAF, but MENA enjoys reliable, expanding availability of iron ore concentrate and pellets. Oman and Bahrain are MENA's main internal suppliers, with pellets also imported from Brazil, Sweden and Canada. Vale, the largest exporter of concentrate and pellet, is expanding local capacity through its mega hubs.



Renewables

MENA is one of the fastest-growing renewable energy markets, holding records for some of the world's cheapest renewable energy due to its unique solar and wind potential. The IEA projects a 96GW capacity increase between 2024 and 2030. Solar projects in the pipeline currently stand at 221GW, while wind projects have a prospective capacity of 183GW.



Green Hydrogen

MENA is emerging as a leading green hydrogen hub, with an announced capacity of 242GW. While green hydrogen projects are progressing slowly and mainly export-focused, significant opportunities exist to redirect them towards domestic use. The deployment of green hydrogen in steelmaking has already begun, with EMSTEEL launching a pilot plant in 2024.

How MENA Can Lead the Steel Transition

Prioritising reduction of Scope 2 emissions

Gradually transitioning from fossil gas to hydrogen

Increasing clean energy investments

Expanding domestic use of green hydrogen

Enhancing collaboration in the green steel value chain

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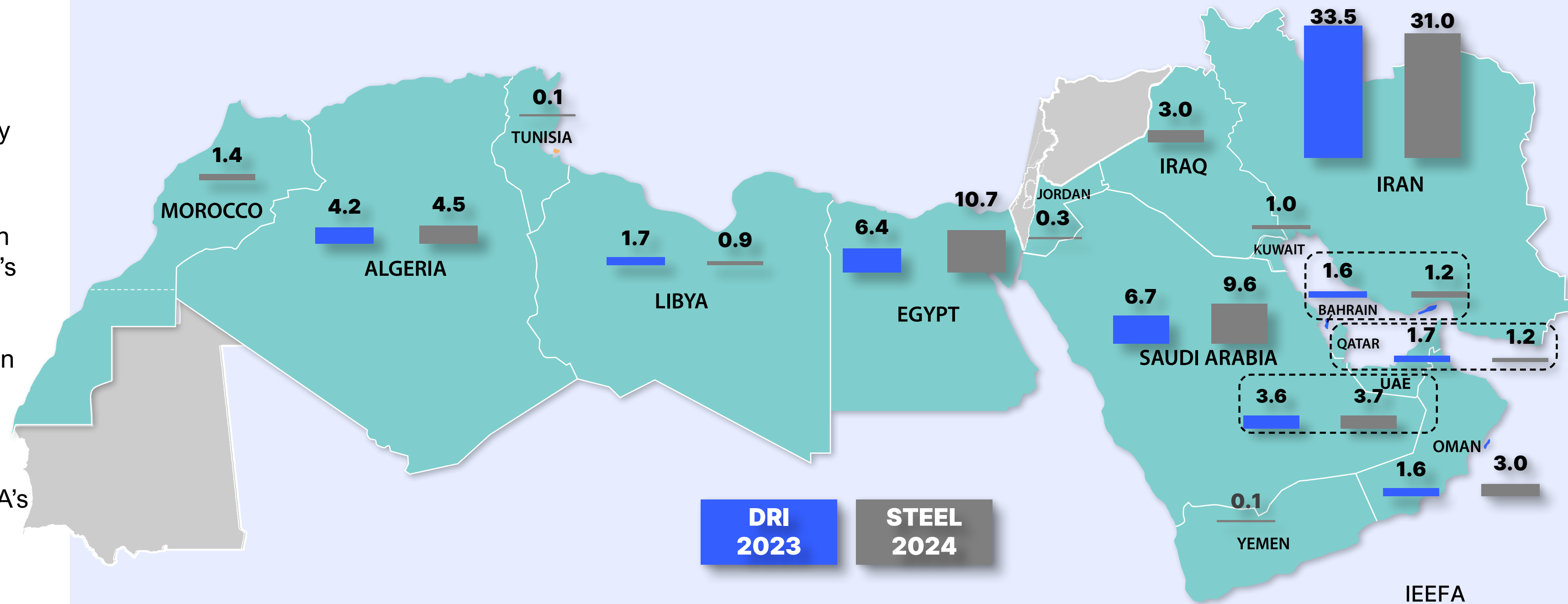


DRI and Crude Steel Production (Mt/y)

The Middle East and North Africa (MENA) is the world's leading hub for gas-based direct reduced iron (DRI) production. In 2023, the region produced an impressive **61 million tonnes (Mt)** of DRI, equal to 45% of global production, an 11% increase compared to 2021. Capacity continues to rise, with DRI-electric arc furnace (EAF) technology being the dominant route.

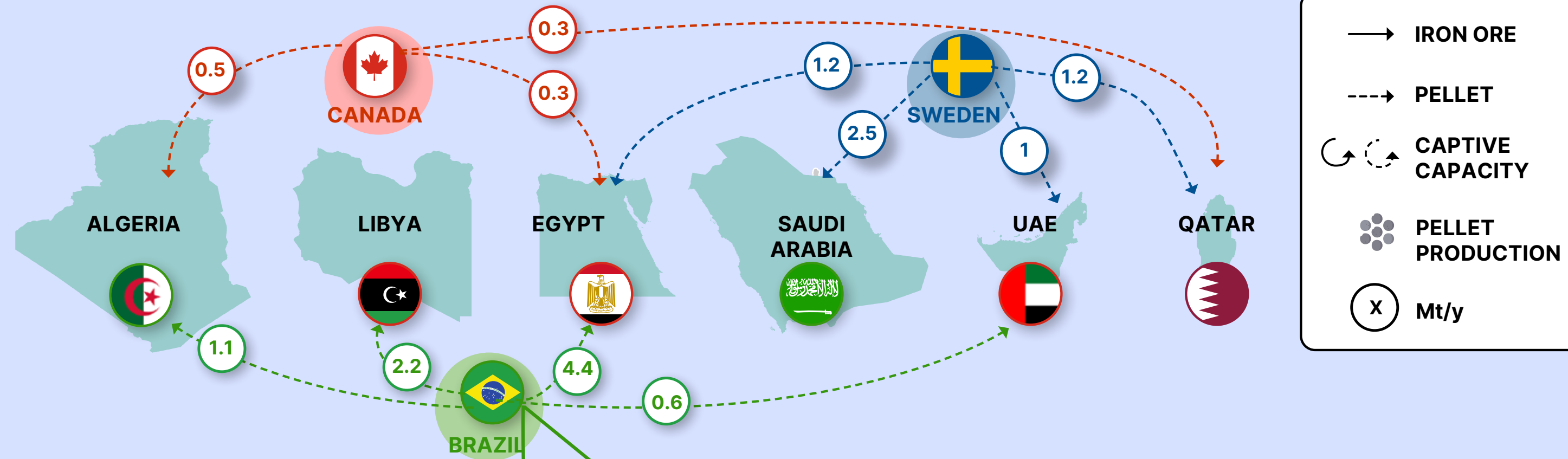
Iran leads as the largest producer of both DRI and steel in MENA, followed by Saudi Arabia and Egypt. As the world's top producer of gas-based DRI, Iran has also developed its own direct reduction (DR) technology, **PERED**, which accounted for 3.2% of global shaft furnace DRI capacity in 2023.

The region accounts for less than 4% of global steel production. However, according to the **Organisation for Economic Co-operation and Development (OECD)**, MENA's steelmaking capacity grew by 25.6% between 2018 and 2023 – the highest growth rate globally. The OECD also projects an increase of between 12.1% and 19.2% by 2026, reinforcing MENA's pivotal role in the future of steel production.

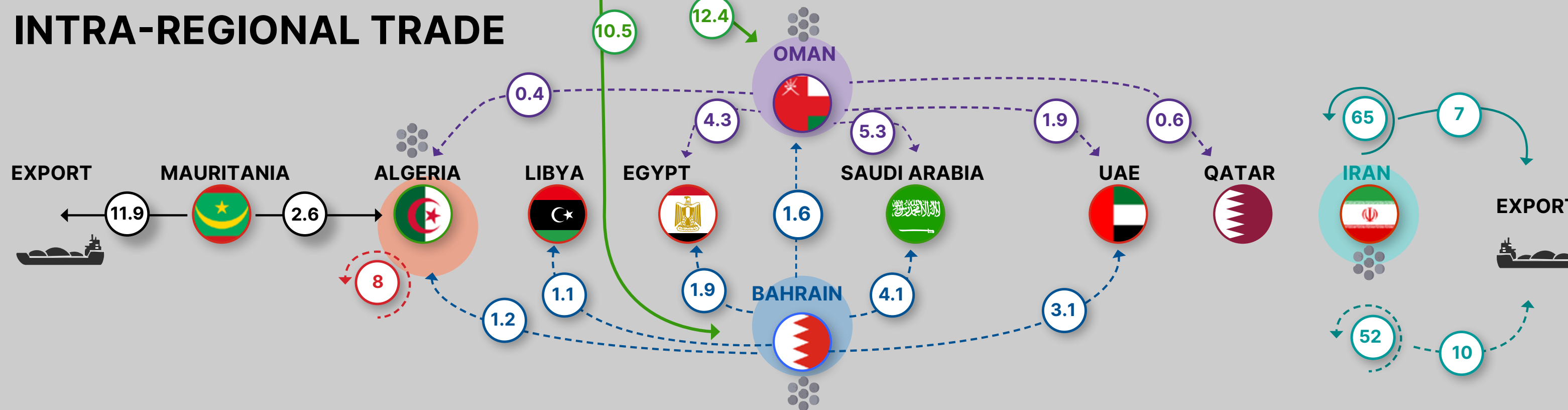


Sources: [Worldsteel](#); [Midrex](#); [Arab Iron and Steel Union](#).
 Note: The boundaries on this map are for illustrative purposes only and do not imply official endorsement or recognition.

MAJOR EXTERNAL SUPPLY



INTRA-REGIONAL TRADE



Sources: [TradeMap](#); [Steeliran.org](#).

Note: Figures above 0.3Mt/y from 2023 or 2024 are included based on availability.

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Iron Ore and Pellet Production and Trade (Mt/y)

A key challenge in transitioning to DRI is securing high-grade iron ore pellets to feed DR plants. MENA producers have an established, reliable supply chain for DR-grade pellets, a significant advantage in the shift towards low-emissions steelmaking.

Iran is the largest producer and consumer of iron ore concentrate and pellets, achieving self-sufficiency without the need for imports. In recent years, the country has also become a **major exporter**, shipping almost all its excess production to China.

MENA's main pellet producers are Oman and Bahrain, relying primarily on imported concentrate from Brazil. **Bahrain Steel** operates an 11Mt pelletising plant, while **Vale** runs a 9Mt facility in Oman. Pellets produced in these countries are mainly consumed within MENA, with Saudi Arabia, UAE, Qatar, Egypt, Libya and Algeria being the key buyers.

Tosyali Algeria has a captive iron ore **concentrate** and **pellet** capacity that primarily supports its own steelmaking operations. The company doubled its capacity to 8Mt in 2024.

Brazil is the largest supplier of iron ore pellets to the MENA region, while Sweden and Canada also provide pellets. Additionally, Vale aims to expand capacity in the area via **mega hubs** in UAE, Oman and Saudi Arabia.

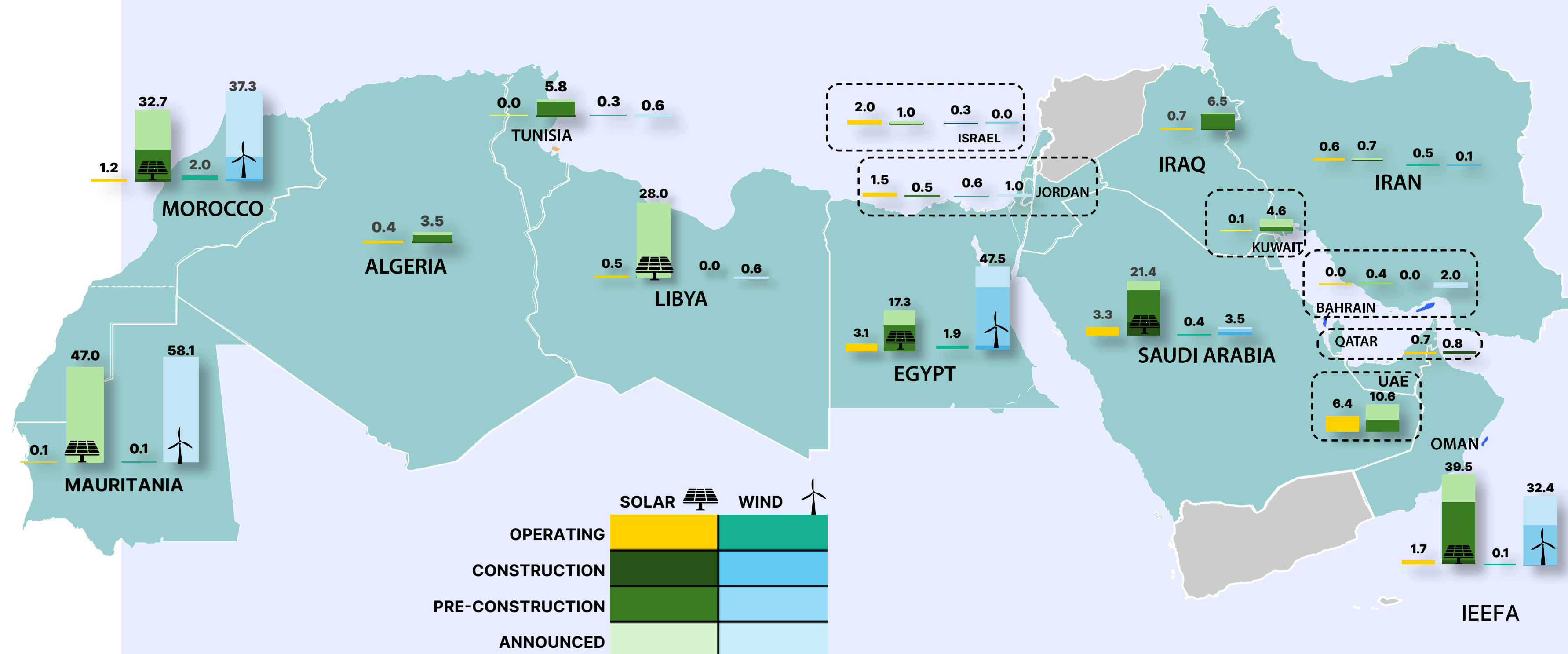
Solar and Wind Capacity (GW)

MENA is one of the world's fastest-growing renewable energy markets, with the [International Energy Agency \(IEA\)](#) projecting a 96 gigawatt (GW) capacity increase between 2024 and 2030.

According to the Global Energy Monitor (GEM), the current operational [solar](#) capacity in the region stands at 23GW, with a prospective capacity of 221GW. This includes 11GW under construction, 82GW in pre-construction, and 128GW in announced projects.

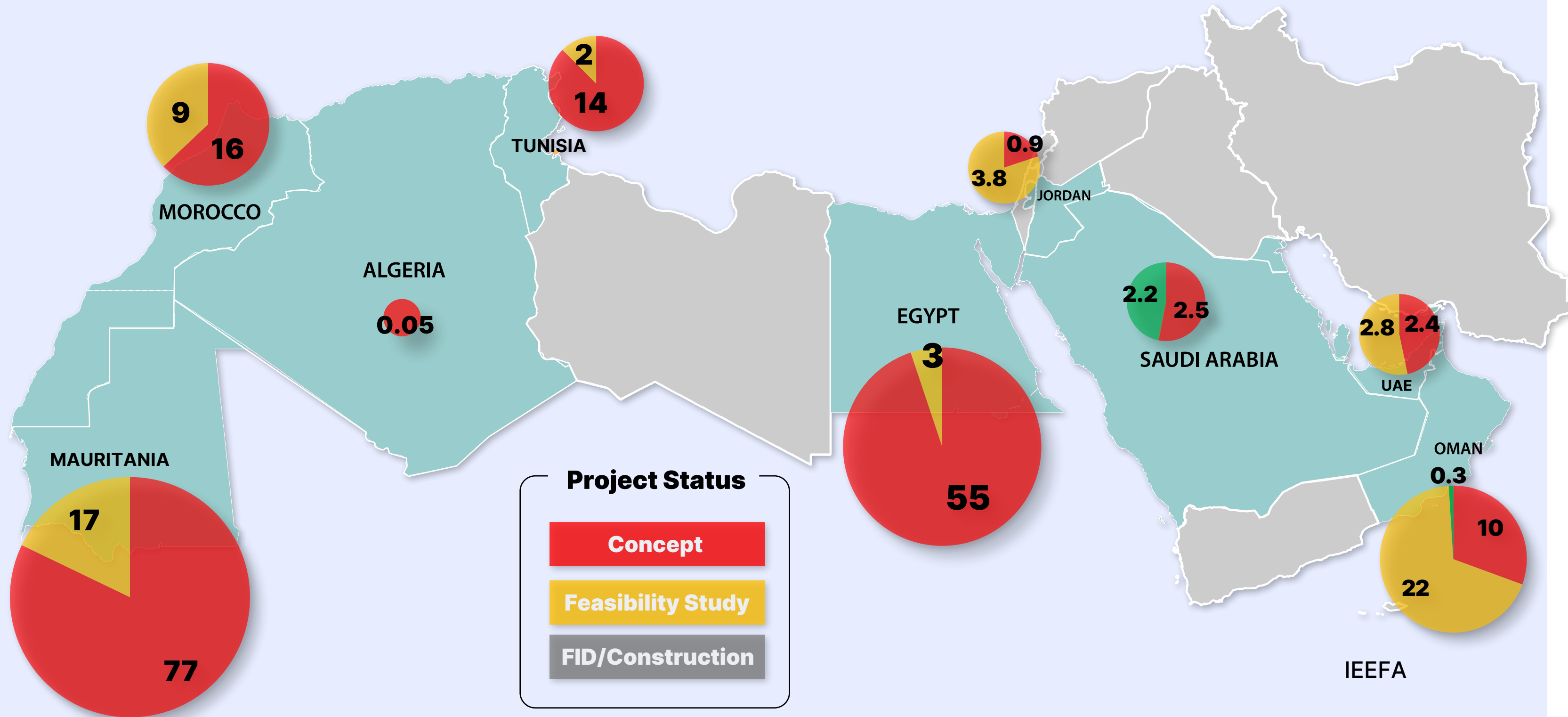
For [wind](#) energy, the region currently has 6GW of installed capacity, with a prospective capacity of 183GW, including 5GW under construction, 63GW in pre-construction, and 115GW in announced projects.

Despite these ambitious targets, [renewable energy penetration](#) in the MENA region remains extremely low at just 3.9%, requiring greater efforts to clean the grid. However, the region holds records for some of the world's cheapest renewable energy, well below the global average, which could help accelerate the transition.



Sources: [Global Solar Power Tracker](#); [Global Wind Power Tracker](#).
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Green Hydrogen Initiatives Capacity (GW)



MENA is rapidly emerging as a key hub for hydrogen production – an essential feedstock for green iron and steelmaking – with numerous large-scale projects already announced. In terms of project distribution, Mauritania accounts for 40% of the announced pipeline, followed by Egypt with 25%. Morocco and Oman have also set ambitious targets, further reinforcing MENA’s role in the global hydrogen landscape. However, only 1% of these projects have reached the final investment decision (FID) or construction phase.

Additionally, green hydrogen projects in MENA are primarily focused on exports, particularly in the form of ammonia or liquified hydrogen, rather than domestic use for producing higher-value materials. While steel has been mentioned as a potential end use in some projects, it is not a focus of big projects.

Emirates Steel Arkan (EMSTEEL) is the only company in the region operating a [green hydrogen pilot plant](#), pioneering the use of green hydrogen as a replacement for fossil gas in steelmaking and showcasing its potential to reduce emissions in the DRI-EAF process.

Sources: [IEA Hydrogen Production Projects Database](#).

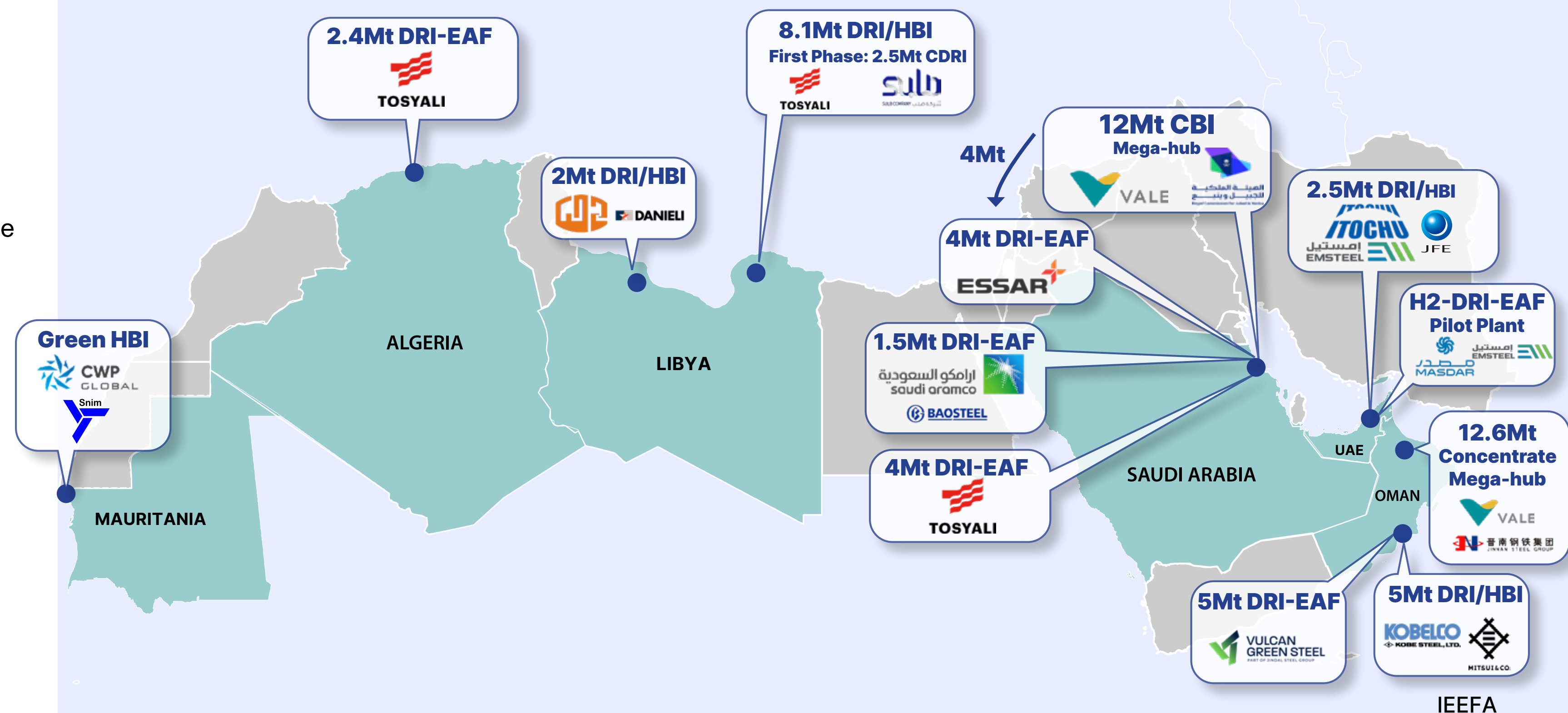
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Low-emissions Iron and Steel Initiatives

As the steel sector moves towards decarbonisation, MENA is well positioned to become a leader in green iron and steel production. Its established gas-based DRI-EAF infrastructure, combined with growing investment in low-emissions technologies, provides a competitive advantage in the evolving green steel market.

By accelerating the construction of announced projects, the region can seize this once-in-a-generation opportunity to supply green iron and steel to key markets such as the EU and Asia. While companies such as Vulcan Green Steel and Essar are looking to produce steel in the area via integrated steel plants, others are eyeing the green iron market to supply low-emissions feedstock for steelmakers around the globe.

Within the Middle East, Saudi Arabia, Oman and the UAE are at the forefront of these developments, while Algeria, Libya, and Mauritania are leading the way in North Africa. Meanwhile, Vale, a key supplier of iron ore pellets and concentrate, aims to strengthen its presence in the Middle East through its [mega hub](#) concept.

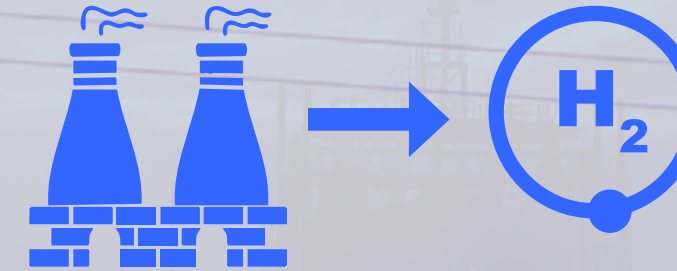


Source: Companies' announcements; [IEEFA](#).
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What Needs to Change



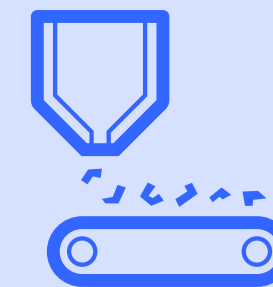
Given the average grid electricity carbon intensity in the MENA region, Scope 2 emissions account for approximately **38% of total emissions in the DRI-EAF** pathway. Given the limited penetration of renewables, reducing Scope 2 emissions should be the top priority for MENA producers, as it is a more immediate and attainable goal.



The next crucial step is a phased transition from **fossil gas to green hydrogen**, systematically reducing Scope 1 emissions in the DRI-EAF route. This shift must be executed progressively to ensure both technical and economic feasibility.



In Middle Eastern countries, for every US dollar invested in fossil fuels, just 20 cents are allocated to **clean energy investments**. Redirecting a greater share of funding towards renewables and low-carbon technologies is essential to accelerate industrial decarbonisation.



Rather than focusing primarily on export, a greater share of green hydrogen must be channelled into local green iron and steel production. Strengthening domestic capacity will reinforce the region's competitive advantages and ensure long-term industrial resilience.

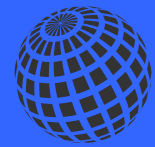


Stronger collaboration between MENA steel producers, key players in the EU, Japan and South Korea, and hydrogen developers is critical to scaling up capacity and fast-tracking project deployment. This will be instrumental in positioning MENA as a leading hub in the global green iron supply chain.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.

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About the Author



Soroush Basirat is an Energy Finance Analyst with IEEFA Australia, examining the global steel sector with particular focus on green technology transition and the opportunities and barriers for different nations and companies. Soroush analyses the feasibility of green steel solutions and their requirements for the whole value chain.

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