



Strengthening MENA Supply Chains for Clean Energy

Building robust and resilient supply chains will shield MENA economies from external shocks and support sustainable economic growth

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Executive Summary

Supply Chain Risks

The global transition to clean energy is shifting the global reliance from hydrocarbons to critical minerals and technologies, sharpening the focus on the supply chains needed to source critical minerals and manufacture clean energy technologies, and emphasising the need to diversify suppliers and build resilience against external shocks.

Energy security depends on reliable, affordable access to energy sourced from diversified suppliers. However, rising demand for clean energy technologies has exposed the risks tied to the geographic concentration of critical minerals resources, and refining and manufacturing processes.

Minerals such as copper, lithium, nickel, cobalt and rare earth elements (REEs) are essential for clean energy systems. Deposits are located in multiple regions around the world; however, production and refining operations remain concentrated in just a few countries. Australia leads lithium production; Chile is the top producer of copper; and the Democratic Republic of Congo dominates cobalt production. China, however, has emerged as the primary refiner of these minerals.

Indeed, China dominates every stage and process in the global clean energy supply chain, posing risks associated with a heavy reliance on a single supplier, and underscoring the need for diversification.



Opportunities: Resource Development and Localisation

The Middle East and North Africa (MENA) region is resource rich. It has dominated oil and gas production and also has the opportunity to play a pivotal role in clean energy systems. The region boasts vast reserves of critical minerals, precious metals, and industrial materials, specifically in Saudi Arabia, Jordan, the United Arab Emirates (UAE), Oman, and Egypt. As demand for metals, REEs, and other critical materials surges, these resources offer strategic opportunities for localisation, industrial diversification, supply chain strengthening, and sustainable economic growth.

Through value chain integration and investing in local industries to produce and export/re-export critical materials and components, MENA countries can enhance the resilience of clean energy supply chains and grow their role in global supply chains. This will not only strengthen said supply chains but also accelerate the energy transition within the region and increase the region's economic resilience in a low-carbon future.

Clean Energy Components and Imports

On par with global trends, the MENA region has a high reliance on China for clean energy components.

Solar Photovoltaic (PV): Total imports of panels (also known as modules) to the MENA region were valued at \$2.5 billion in 2023. This is equivalent to 4% of global imports. MENA countries rely heavily on China for solar PV panels and cells.

Wind Power: Though less developed than the solar industry in MENA countries, import value is on an upward trajectory, with China the dominant supplier, accounting for 78% of the region's turbine import value.

Electric Vehicles (EVs): Total EV imports to MENA increased 1.5 times in 2023 to reach a total value of \$2.9 billion, representing 2% of the world's imports. China leads among suppliers with a 70% market share. EV sales in MENA will continue to grow, driven by the development of local EV manufacturing capacity in the countries of the Gulf Cooperation Council (GCC), as well as Morocco, as part of economic diversification plans.

Lithium Cells and Batteries: Non-GCC MENA countries rely heavily on China, while Saudi Arabia and the UAE exhibit greater diversification of suppliers, with the USA a key supplier in addition to China.

Electrolysers: In electrolyser imports, partnerships differ. Morocco collaborates with European Union member states, specifically, Italy, Germany, Portugal, France, and Belgium, with less focus on China. China is, however, a key partner of GCC nations, including Saudi Arabia, Oman, and the UAE.

Next Steps

MENA's ability to integrate into, and lead segments of, the global supply chain will depend on adequate policies, substantial investments, robust public-private partnerships, and targeted capacity building. Policy recommendations for strengthening supply chains and partnerships:

- Diversifying supply sources
- Developing local and regional manufacturing
- Establishing free trade zone and re-export hubs
- Strengthening trade agreements
- Investing in innovation



Section 1 | Introduction

The increasing investments in and adoption of policies favourable towards clean energy systems are sharpening the global focus on clean energy supply chains, and the need to diversify suppliers and build resilience against external shocks.

Building robust and secure supply chains is pivotal for the energy transition amid growing global power competition, geopolitical risks, and potential trade restrictions. Recent disruptions such as Russia's invasion of Ukraine and the Covid-19 pandemic have exposed the fragility of global supply chains in general, and clean energy supply chains specifically, causing significant project delays, incurring massive costs and hindering national plans for the energy transition.

The need to reduce domestic demand for fossil fuels is a primary factor driving the deployment of clean energy projects in MENA countries. While there are disparities in the scale and pace of these projects across the region, together they are leading to the development of significant trade markets in clean energy components.



In renewable energy, governments have pledged ambitious targets, ranging from 15% of power generation in Kuwait to 50% in Saudi Arabia. The MENA region is expected to add 62 GW of renewable energy capacity by 2028 compared to the 2022 baseline, according to a 2023 analysis published by the International Energy Agency (IEA). A total of 85% of the added capacity is forecast to be driven by solar photovoltaics (PV).ⁱ



Additionally, several Gulf Cooperation Council (GCC) countries have set hydrogen production targets – Saudi Arabia aims to produce 650 metric tonnes of hydrogen and 1.2 million tonnes of ammonia per day by 2025 while Abu Dhabi National Oil Company (ADNOC) in the United Arab Emirates (UAE) aims to produce 1 million tonnes per day of green hydrogen by 2030.ⁱⁱ The electric vehicle (EV) market is also gaining momentum, with Saudi Arabia expecting EVs to constitute 30% of new light-duty vehicles sales by 2030 and more than 60% by 2035.ⁱⁱⁱ Meanwhile, the UAE is targeting a 50% share of all vehicles being electric by 2050.^{iv}

Clean energy supply chains create new opportunities for many MENA countries. Robust and resilient supply chains are pivotal for ensuring the long-term sustainability of clean energy projects. Diversification of suppliers and the establishment of local and regional manufacturing hubs help to mitigate risks associated with geopolitical instability and global market fluctuations. Investments in local capacity building and innovation can further enhance supply chain sustainability, enabling MENA countries to contribute significantly to the global fight against climate change. Efficient logistics and local manufacturing capabilities optimise the use of local and regional resources, reducing carbon emissions associated with transportation and minimising broader environmental impacts. Several MENA countries, such as Morocco, the UAE, and Saudi Arabia, have the ability to capitalise on their abundant and affordable renewable resources, strategic geographic location, and existing trade partnerships, to foster economic growth, create jobs, and attract foreign direct investment (FDI).



However, the establishment of clean energy supply chains creates new risks and vulnerabilities that are different to those associated with fossil fuel supply chains. To build secure clean energy supply chains, assessing the resources, trade partnerships, and volumes across all clean energy components is essential.

This paper explores the MENA region's domestic resources, and dynamics of trade, in major clean energy components: solar PV panels and cells, wind turbines, EVs, and electrolysers. The assessment includes deep dives into the region's six leading countries in clean energy projects: Morocco, Egypt, Jordan, Saudi Arabia, the UAE, and Oman.



Efficient logistics and local manufacturing capabilities optimise the use of local and regional resources, reducing carbon emissions and broader environmental impacts.



This paper is the first in the Think Supply Chains series.

Disclaimer: the data presented in this report have been sourced from publicly available information on TradeMap, a platform for trade statistics and analysis. The paper does not independently verify the data provided by the platform, and the figures are subject to limitations inherent in data collection and reporting processes.



Section 2 | Glimpse into Global Clean Energy Supply Chains

The transition to clean energy systems is shifting global dependency from hydrocarbons to minerals and technologies. Securing this transition requires reliable and diversified access to critical materials, and sustainable, affordable manufacturing processes.

Ensuring secure supplies of critical materials – such as copper, lithium, nickel, cobalt and REEs – is vital for the manufacturing of clean energy technologies.

While these resources are located in many regions around the world, production and refining operations are concentrated in just a few countries. Australia is the leading producer of lithium; Chile the top producer of copper; the Democratic Republic of Congo (DRC) the leader in cobalt while China has emerged as the dominant player in refining these minerals, turning raw output into useable material for clean technology manufacturing.^v China's dominance is attributed to its large refining and processing capacity, and investments in, and acquisitions of, mines overseas.

Energy security depends on reliable, affordable access to energy sources and diverse suppliers. As demand for clean energy technologies rises, the risks of relying on a few countries for critical minerals and manufacturing processes increase in number and severity. China's dominance of every stage of the global clean energy supply chain – from rare-earth materials to solar PVs, to batteries, and other technologies – poses a strategic vulnerability to the energy transition and underscores the need for the regions of the world to diversify suppliers.

Emerging producers such as Australia and Indonesia are leveraging their natural deposits of nickel and lithium in response to the increased demand for critical minerals. The USA, Europe, and the GCC countries, among others, are taking steps to localise clean energy production, but remain significantly behind China. With increasing demand for clean energy components, the race to secure sustainable and reliable supply chains is more urgent than ever.

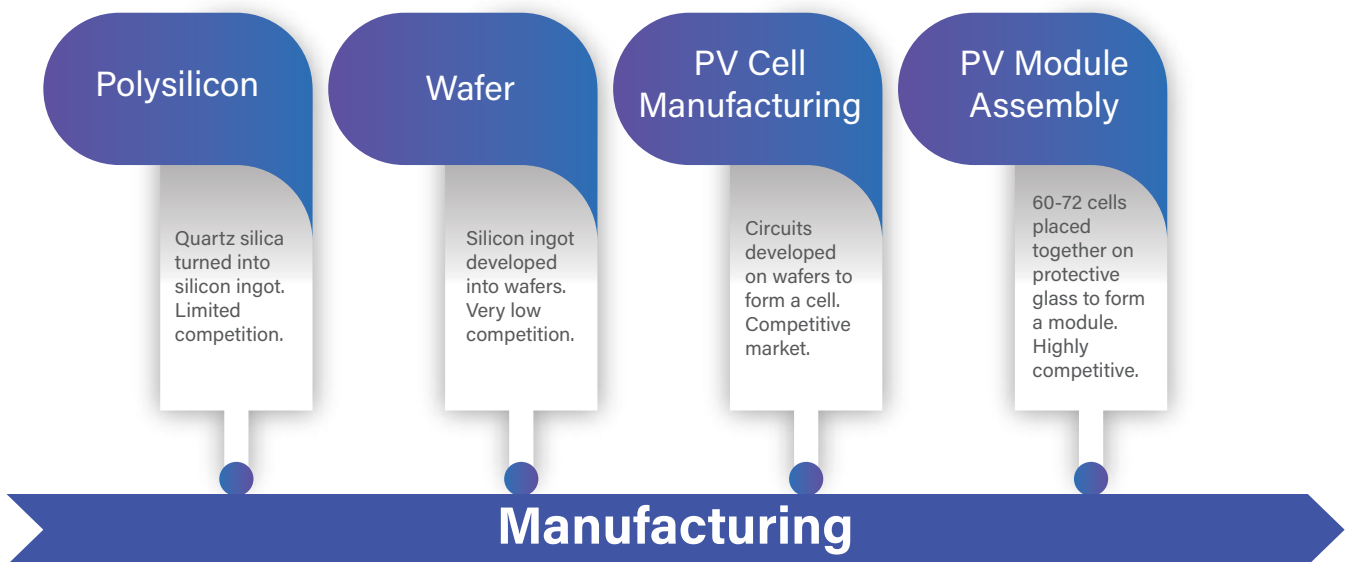




With solar PV forecast to contribute 30% of the global electricity generation by 2050,^{vi} PV components are central to the power sector’s energy transition. China dominates all the manufacturing stages of solar panels (also known as modules) globally, with a market share of more than 80%, according to the IEA’s 2022 “Special Report on Solar PV Global Supply Chains.”^{vii} The manufacturing process (see Figure 1) includes the production of silicon and wafers, and an assembly phase. The former is a market of very low to limited competition, the latter is highly competitive. Currently, China dominates 97% of global wafer production and 85% of global cell production.^{viii}

The USA is expanding its domestic solar panel manufacturing, yet it remains heavily dependent on China for silicon and wafers. The low cost of Chinese-made panels presents a hurdle in other countries to ramping up production.

Figure 1. Solar panel/module manufacturing process.



Similarly, in the wind energy industry, China dominates turbine production alongside critical materials for manufacturing wind generators.

As the deployment of wind and solar PV energy projects increases, these sectors are increasingly vulnerable to disruption risks from geopolitical developments, bottlenecks in supply chains, export restrictions, or under-supplied markets.

The battery market is also at risk of material shortages and price volatility due to rising demand coupled with a heavy geographical concentration of production and refining. According to IEA data, as of 2022, China produced 70% of the global supply of lithium-ion batteries, used in off-grid or hybrid solar PV systems and in EVs, and processed the majority of key minerals such as cobalt (approx. 68%), nickel (approx. 60%) and lithium (approx. 58%).^{ix} By 2050 lithium demand is expected to increase by ten fold due to the increased deployment of battery energy storage systems and EVs;^x however, over 75% of critical minerals – such as lithium, cobalt, and nickel – will be produced by only a few countries, including Australia, Chile, and Indonesia^{xi} Indonesia is expanding its capacity to refine nickel.^{xii}



Since China controls 70% of the lithium-ion battery market, in addition to 80% of mining for graphite, it also dominates EV production. Europe currently controls 25% of EV manufacturing overall, and the USA is ramping up domestic EV production; however, both rely heavily on battery imports.^{xiii}

In the green hydrogen market, the state of play is different, with Europe leading the field in electrolyser manufacturing as of 2022, according to the IEA.^{xiv} There is an opportunity for further diversification of the supply chain; however, globally, the scale of electrolysers needs to be significantly increased and costs halved to make green hydrogen cost-effective. There is also a risk of China catching up as it is already a major manufacturer of key hydrogen components.

Section 3 | Deep Dive into MENA Clean Energy Supply Chains

3.1 Unveiling MENA's Critical Minerals Potential

The mineral reserves of the MENA region are vast and offer strategic opportunities for localisation to support economic diversification and sustainable growth of their economies. Saudi Arabia, Jordan, the UAE, Oman, and Egypt, specifically, have large deposits of critical minerals, precious metals, and REEs that are subject to growing global demand. Saudi Arabia, for instance, holds critical metals like copper, zinc, iron, aluminium, manganese, and chromium. It also holds 25% of the world's tantalum reserves, an essential metal within high-tech industries like electronics and aerospace^{xv}



Indeed, the mineral-rich countries in the region are increasingly leveraging their minerals resources to achieve economic diversification. Saudi Arabia's plan to increase its mining sector's GDP contribution from \$17 billion to \$75 billion by 2035 exemplifies this ambition.^{xvi} Similarly, Jordan is leveraging its vast reserves of phosphate, silica sand, and other valuable materials to significantly increase the contribution of the mining sector to the country's GDP and exports. Mining currently contributes \$1.4 billion to Jordan's total exports and 2.2 of its GDP.^{xvii}

Meanwhile, Oman, alongside the UAE – whose own minerals and metals industry is expected to reach \$10 billion by 2025 –^{xviii} have been successful in attracting foreign investment to support the expansion of industrial mineral production, further highlighting the region's growing importance in the global minerals market. The Sultanate has become the world's largest exporter by weight of gypsum – a key mineral for the construction sector.^{xix}



The mineral reserves of the MENA region are vast and offer strategic opportunities for localisation to support economic diversification and strengthen global supply chains.



As a result of significant investments in mining infrastructure, partnerships with international stakeholders, and policy reforms to attract foreign investment, MENA countries are emerging as key players in the global critical minerals market. As the energy transition accelerates, the region's ability to supply the resources needed to strengthen global supply chains for critical technologies will play an important role in meeting global climate goals.

For a breakdown of mineral reserves and production by country, refer to ANNEX I.

3.2 Green Links: Advancing Clean Energy Trade In MENA

The MENA region mirrors global trends with a high reliance on China for solar PV panels and cells, as well as EVs – where China holds a 70% market share. The wind industry is less prominent than the solar industry in MENA countries; yet the value of imports of wind generating sets is on an upward trajectory, with China holding a 78% share of the total. The GCC countries, specifically Saudi Arabia and the UAE, showcase greater diversification of suppliers than non-GCC countries, and the USA is a dominant player in addition to China.



3.2.1 Electric Vehicles: The Future of Transport

Summary of findings

The region’s EV market is on a rapid growth trajectory, with a compound annual growth rate (CAGR) of 23% expected until 2029.^{xx} By 2028, the market is projected to reach \$7.65 billion, growing further to \$9.42 billion by 2029.

Market growth is being driven by government incentives and the development of local manufacturing capacity under national economic diversification blueprints in countries such as the GCC and Morocco. Elsewhere, notably in Jordan and Lebanon, the need to reduce fuel import bills is also a factor.

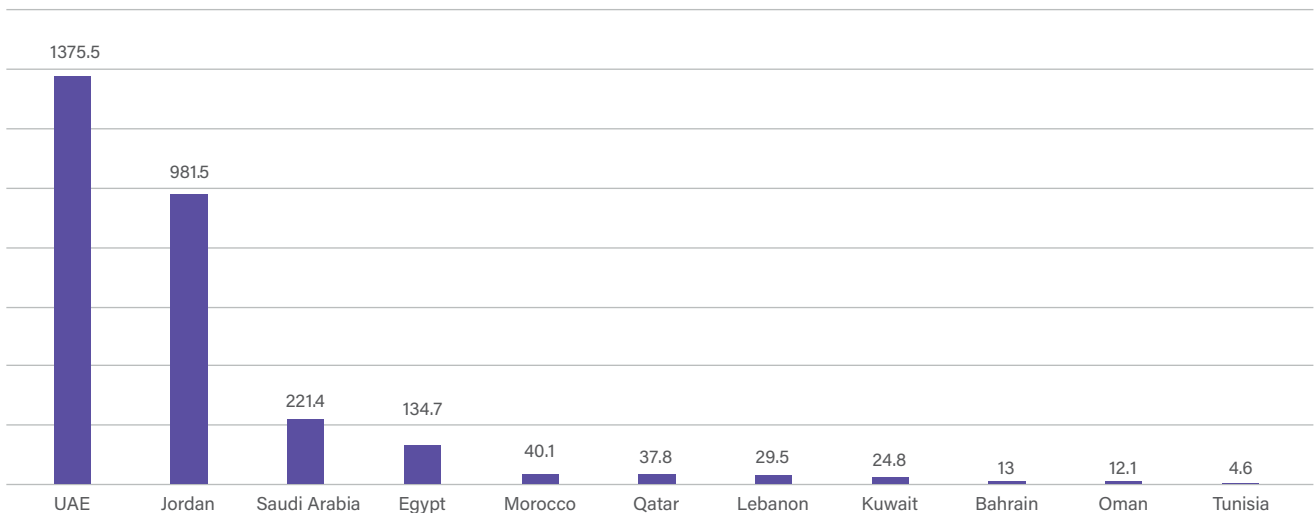
China dominates the region’s EV imports, holding 70% of the market share, due to its strong trade relationships and affordable vehicles. However, Morocco and the UAE’s export strengths showcase the region’s growing role in EV production and trade, highlighting their potential to utilise geographic advantages as gateways to Europe, Africa, and the Middle East.

Key trends

1. EV exports to MENA are accelerating

- The total value of EVs exports to MENA countries increased 1.5 times in 2023 on the previous year, reaching a value of some \$2.9 billion – equivalent to 2% of the value of global imports. The growth rate of EV imports by value averaged 165% between 2019 and 2023.

Figure 2. Total value of imports of EVs to MENA by country, 2023 (in million USD)



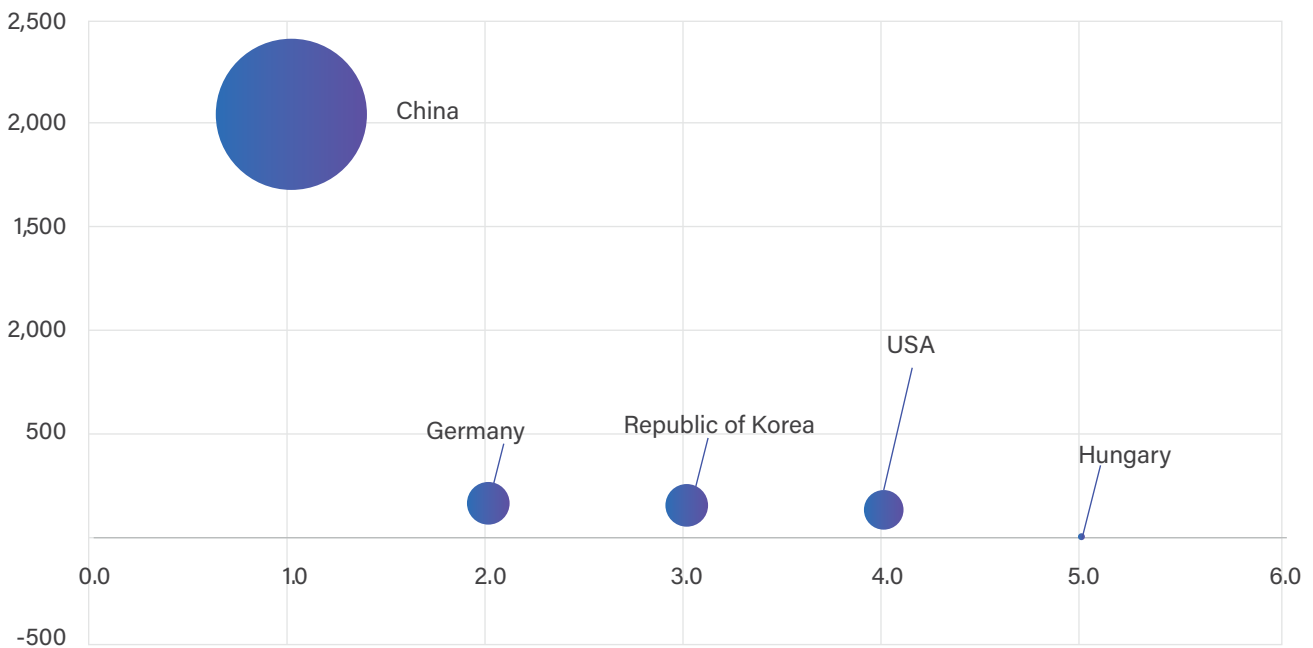
The top three importers of EVs in the region are the UAE, Jordan, and Saudi Arabia, as of 2023. Despite significant progress in the EV market, Jordan has witnessed a rollback in government incentives. In November 2024, the Jordanian Cabinet decided to halve the tax on EVs to between 20% and 27.5%, depending on car value, until end of December 2024. The unstable EV policy and the tax level will add a burden on consumers and EV importers.



2. Chinese exports of EVs to MENA outstrip those of other countries

- China has the largest share of the MENA EV market at 70%. This highlights China's prominent role in MENA's supply chain, its strong trade relationship with the region, and its strong position in the global EV market, based partly on the affordability of its vehicles.

Figure 3. Suppliers' share of MENA EV imports by value, 2023 (in million USD)



Note: Bubble size correlates with export volume, emphasising the relative weight of each country in MENA's import market. X axis shows the total import value in million USD in 2023; Y axis shows the share of imports.

- Germany is the second-largest exporter, with exports of \$172 million – a much smaller volume value than China. This indicates Germany's significant but smaller footprint in MENA markets.
- South Korea and the USA are third and fourth, with market shares of 5.6% and 4.8%, respectively. Hungary is in the top 5 exporters to MENA, but its market share is less than 1% and its export value is only some \$2 million.
- The average distance between supplier and importer is 5,824 km.

3. Investment in local manufacturing capacities is growing

- GCC countries, specifically the UAE, Saudi Arabia, and Qatar are investing in EV manufacturing across the value chain, including low-carbon steel production, and assembly.
- Saudi Arabia's own EV brand CEER, supported by the Public Investment Fund, is expected to launch its first EV in 2025. Meanwhile, Qatar Investment Authority has invested around \$1 billion in battery manufacturer SK On Co; Oman has invested in US EV manufacturer Our Next Energy; and Abu Dhabi Ports has supported EV manufacturer NWTN in launching a local assembly plant.



4. The UAE, Morocco, and Jordan lead EV exports

- The UAE followed by Morocco are the top exporters of EVs in the region. The value of the UAE's exports reached \$214.54 million, highlighting its significant export capacity, potentially due to its diversified economy and strategic trade position. Morocco's strong export performance compared to other MENA countries at \$197.07 million is due to its established car industry. Jordan ranks third, with \$19.85 million – significantly less than the UAE and Morocco, which suggests a smaller, more niche EV export economy.
- The UAE focuses on markets within or around the region, including Africa, while Morocco primarily caters to European markets. This highlights each country's geographic trade influence: Morocco as a gateway to Europe and the UAE as a hub for the Middle East and Africa.
- The bulk of Morocco and the UAE's exports flow to diverse countries – this suggests there is high potential to utilise their strategic locations and strong trade connections to increase exports of EVs.
- France is Morocco's largest individual export destination, followed by Italy, Germany, and Türkiye. The UAE's top export destinations by value are Jordan, Armenia, Djibouti, and a lower share to the USA.

Figure 4. Total value of EV Exports from MENA by country, 2023 (in million USD)

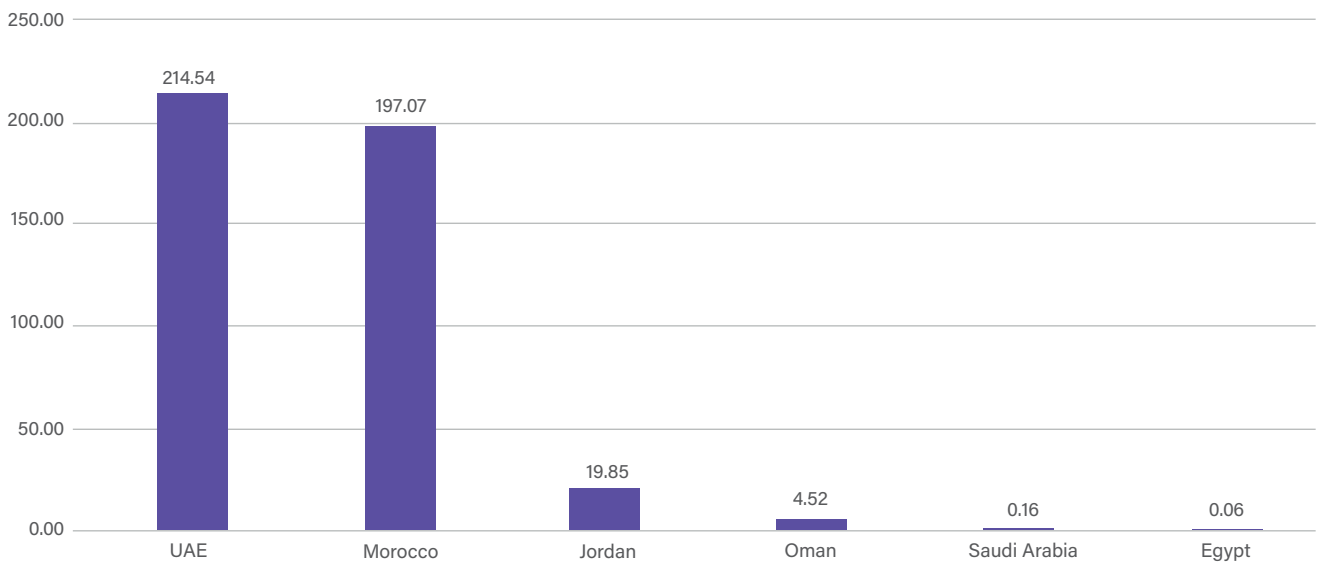
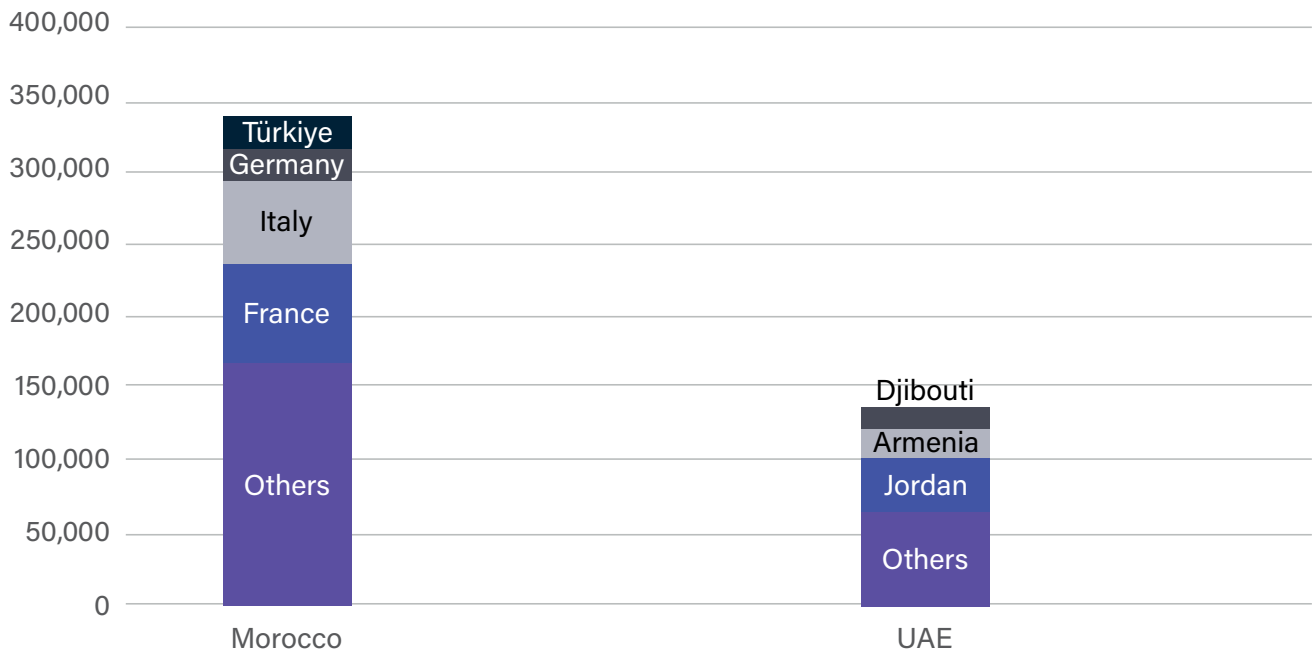




Figure 5. Top destinations for exports of EVs from MENA, 2023 (in thousand USD)



3.2.2 Solar PV: Powering the Electricity Sector

Summary of findings

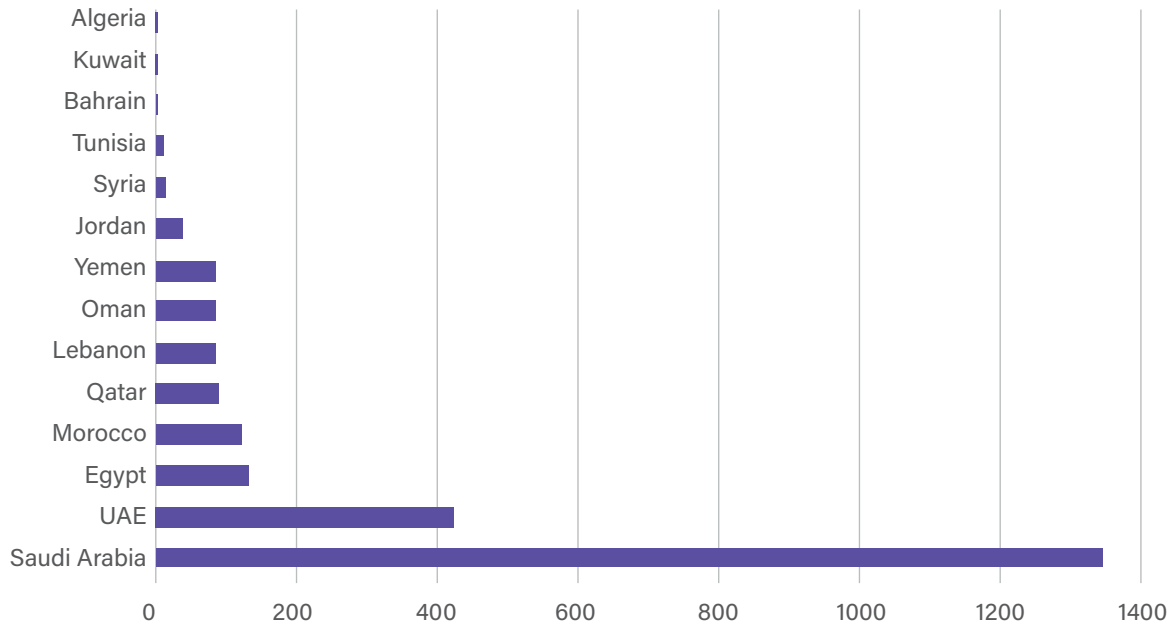
Solar PV: The MENA region is highly dependent on a single market supplier of solar PV panels: China. This could pose risks if there are changes in China’s export policies, or supply chain disruptions. The total value of solar PV panel imports to MENA rose 57% in 2023, reaching \$2.5 billion (4% of global imports). The total value of exports is relatively small, at \$259 million (0.4% of global exports), with Jordan and the UAE leading exports.

Some countries, notably Morocco and the UAE, are investing in local assembly to reduce reliance on China. Diversifying suppliers and expanding exports to nearby renewable energy markets could mitigate risks and bolster regional solar PV trade. Although exports to these destinations are of minimal volumes currently, they underscore the potential to scale-up presence in these markets in the future, depending on the pace of adoption of the export markets.

Solar PV cells: MENA’s import market for PV cells is growing rapidly – 70% in 2023, far outpacing the global annual growth rate of 5%. Jordan leads as the top importer (54%), followed by the UAE (19%) and Egypt (14%). However, regional exports of PV cells are insignificant, with 2023 exports valued at only \$3 million, marking a 69% year-on-year decline.



Figure 6. Total value of solar PV panel imports to MENA, by country, 2023 (in million USD)



Key trends – PV panels

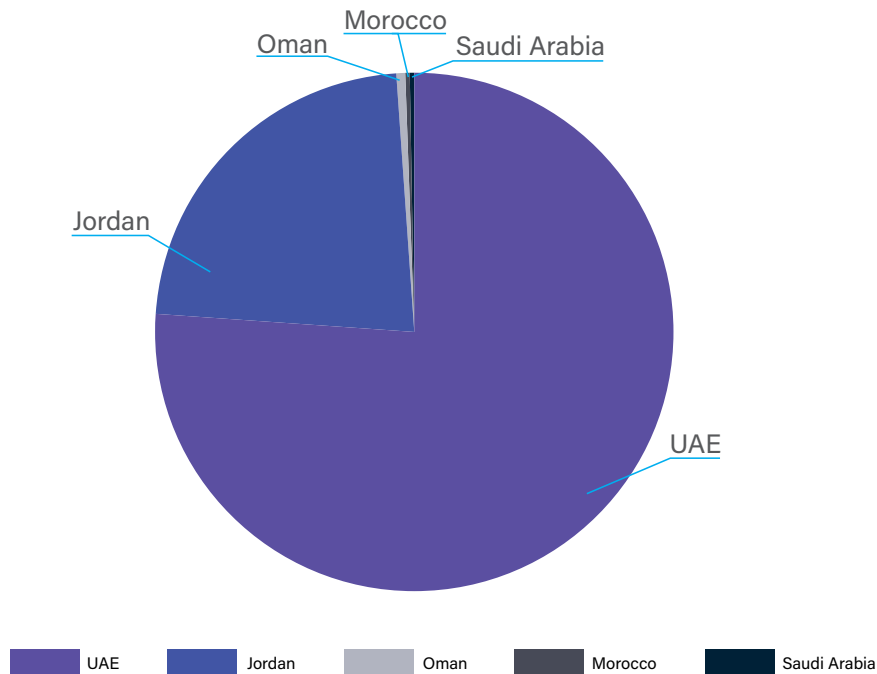
1. Saudi Arabia, UAE, and Jordan lead panels trade

- The total value of solar PV panel imports to MENA countries increased by 57% to \$2.5 billion – equivalent to 4% of the value of total global imports – in 2023. Saudi Arabia and the UAE were the top importers of solar PV modules in the region.
- Exports, including re-exports of solar PV panels from MENA countries were valued at \$259 million in 2022, equivalent to 0.4% of the world’s exports. Jordan and the UAE were the top exporters.





Figure 7. Total solar PV exports from MENA by country share, 2022



Country-specific trends

Morocco

- Morocco is the fourth-largest importer of solar PV panels, with the bulk (96%) coming from China. Morocco also sources PV panels from Jordan, but the latter is losing market share to China – Jordan’s share of Morocco’s total solar PV imports fell from 2% in 2022 to less than 1% in 2023.
- Morocco exports a small but rising number of solar PV panels. The bulk of its exports went to the UAE, France, and Saudi Arabia.

Egypt

- Egypt, among the top three importers of PV panels, saw a 6-fold increase in inbound shipments in 2023. The increase was almost completely sourced from China – which accounted for 99% of total imports in this space. The remaining 1% comes from more than 10 countries, including Asian and EU countries.
- The share of exports in Egypt’s solar PV panel trade is marginal – in 2023 the value of its shipments was \$1 million, and went to one country: Sudan.

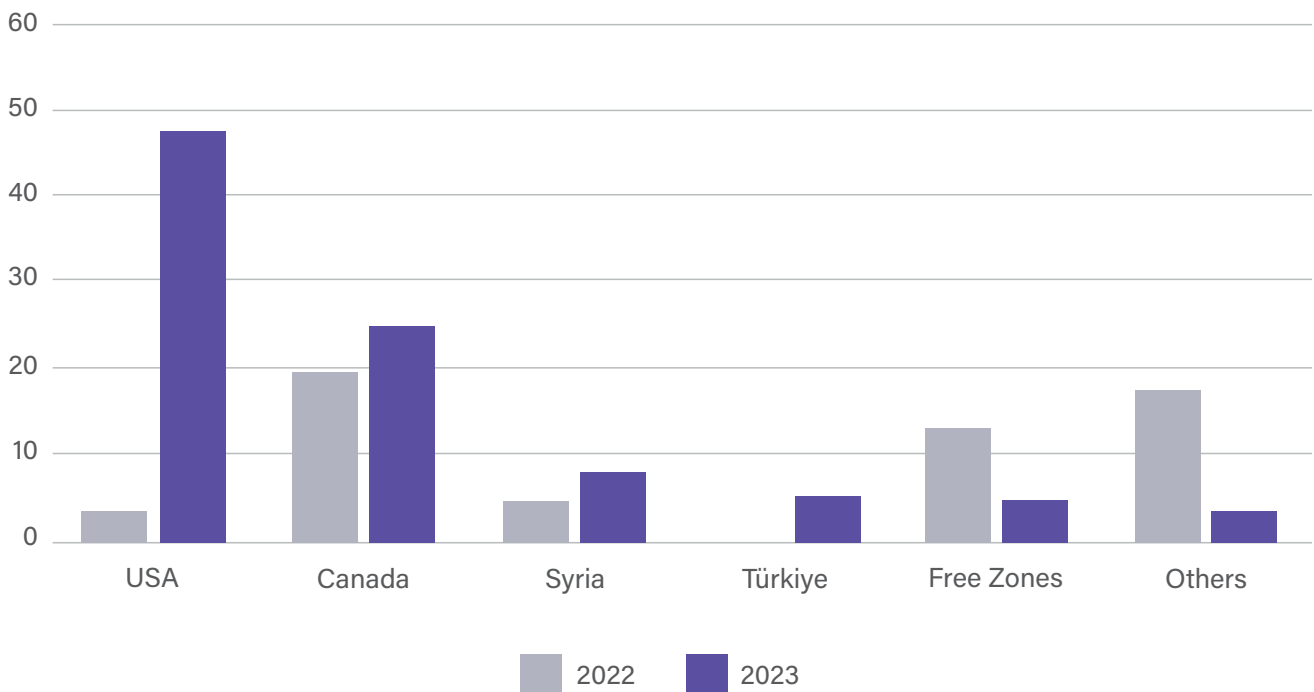
Jordan

- China is also the primary import partner of Jordan in solar PV panels (99%). Jordan has a positive trade balance in solar PV panels, with exports outweighing imports. It recorded a 29% reduction in imports to \$41 million in 2023 and a 61% increase in exports, the result in part of a substantial increase in exports to North America, specifically the USA. This showcases increased production capacity in Jordan and its favourable trade policies.



- Jordan’s exports of solar PV panels to other destinations, notably Syria and Türkiye, are smaller in value – but growing, which is potentially reflective of emerging export relationships. However, Jordan’s exports to Free Zones and other destinations with which it trades in panels experienced a drop from 2022 to 2023, which could suggest Jordan is prioritising certain markets, such as North America.

Figure 8. Export destinations for PV panels from Jordan, by value of total PV panels exports, 2022 and 2023 (in million USD)

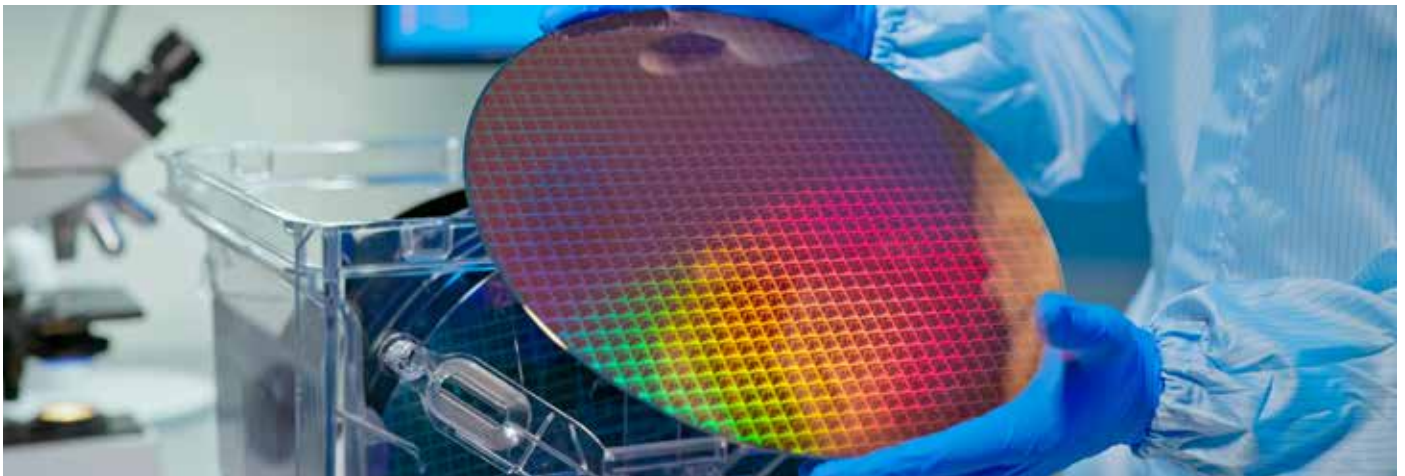
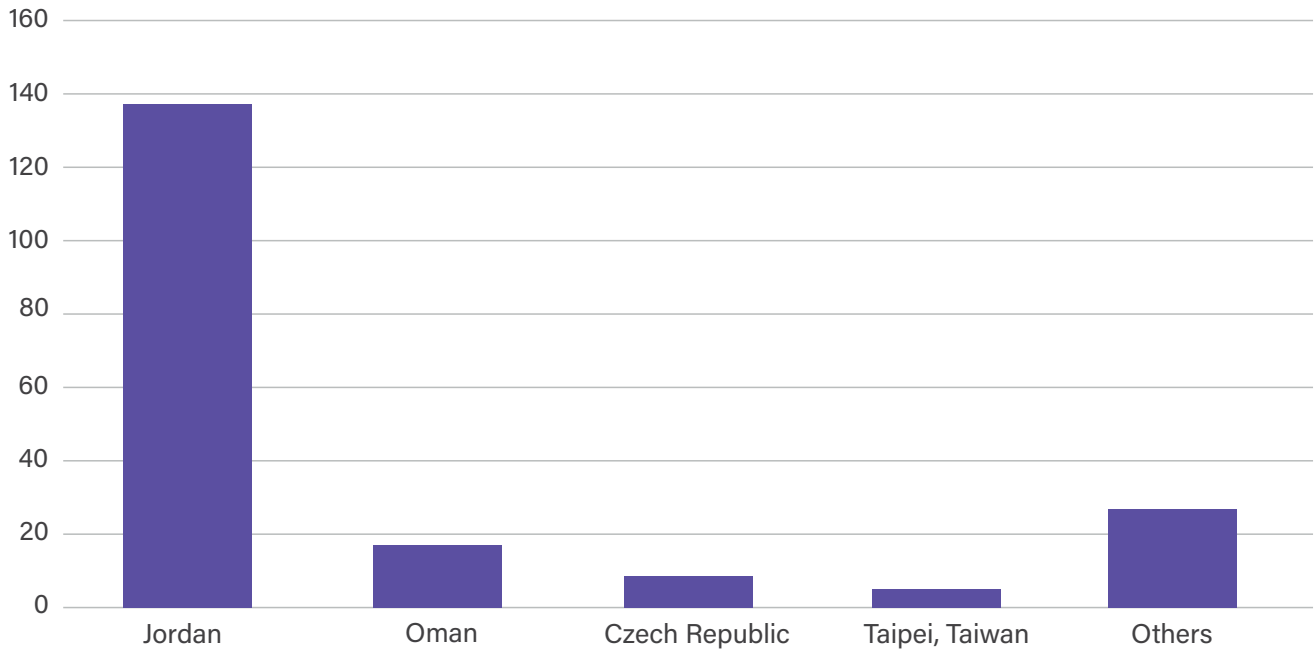


UAE

- The UAE recorded solar PV panel imports valuing \$855 million in total in 2022, 99% of which were from China. Several other countries exported solar PV panels to the UAE with a cumulative share of less than 1%, led by Vietnam, India and Germany.
- The UAE assembles solar PV panels locally; however, it imports most of the necessary components, including solar PV cells, from India, China, Vietnam and the USA.
- Jordan was the primary export destination for UAE solar PV panels in 2022 by a significant margin, with an export value of \$139 million. Its exports to other destinations such as Oman, the Czech Republic, and Taipei were considerably lower. Given the large disparity between Jordan and other destinations, the UAE may have an opportunity to expand its solar PV exports to other regions.



Figure 9. Export destinations for PV panels from the UAE, by value, 2022 (in million USD)



Key trends – PV cells

1. MENA PV cell imports see rapid growth – bucking global trend

- The MENA import market of solar PV cells constitutes just 1.3% of the global market. Yet, imports have increased rapidly – by 70% in 2023 alone to reach \$96 million. This contrasts with a global market annual growth rate of only 5%.
- Within MENA, the key importers of PV cells are Jordan, UAE, and Egypt, while Lebanon, Oman and the remaining MENA countries hold relatively minor shares. Jordan is the leading importer with a share of 54%, followed by the UAE (19%), and Egypt (14%).



Figure 10. Country share of PV cell imports, MENA, 2023

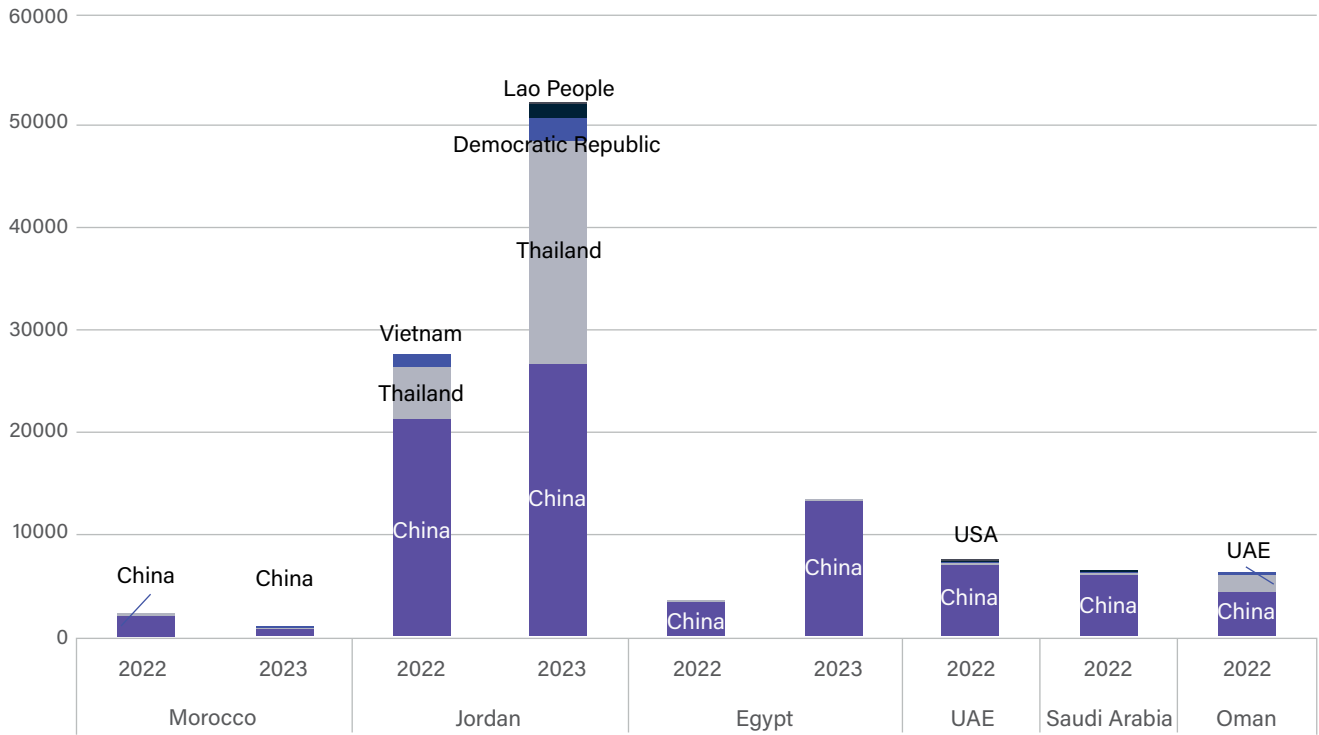


2. In contrast, MENA’s export and re-export values are insignificant.

- In 2023, the region exported \$3 million worth of PV cells – less than 1% of the world’s total exports – marking a 69% decline from the previous year.
- This drop was mainly due to the UAE, which was the leading exporter in MENA in 2022 and whose exports fell from 5.8 million to \$350,000 in 2023. As a result, Jordan became top MENA exporter in 2023, accounting for 82% of regional exports (\$2.4 million), despite its own decrease from \$3.4 million in 2022.
- China is the dominant supplier of PV cells to MENA. It had the largest share of PV cells imports across all countries in 2022 and 2023. Thailand and Vietnam are secondary contributors. Thailand and the Lao People’s Democratic Republic also played a significant role in exports to Jordan in 2023 in particular.
- There was an 89% surge in overall solar PV cell imports to Jordan in 2023. This, coupled with a sharp rise in Thailand’s share from 18.8% to 41.4%, suggests Jordan is seeking to diversify suppliers, though continued monitoring is needed to confirm this trend.
- Meanwhile, Morocco recorded a significant reduction in PV cell imports of 56% in 2023. The decline reduced Morocco’s share of total MENA imports from 4% in 2022 to just 1.8% in 2023.



Figure 11. Value of PV cell imports to MENA countries by supplier, 2022 and 2023 (in thousand USD)





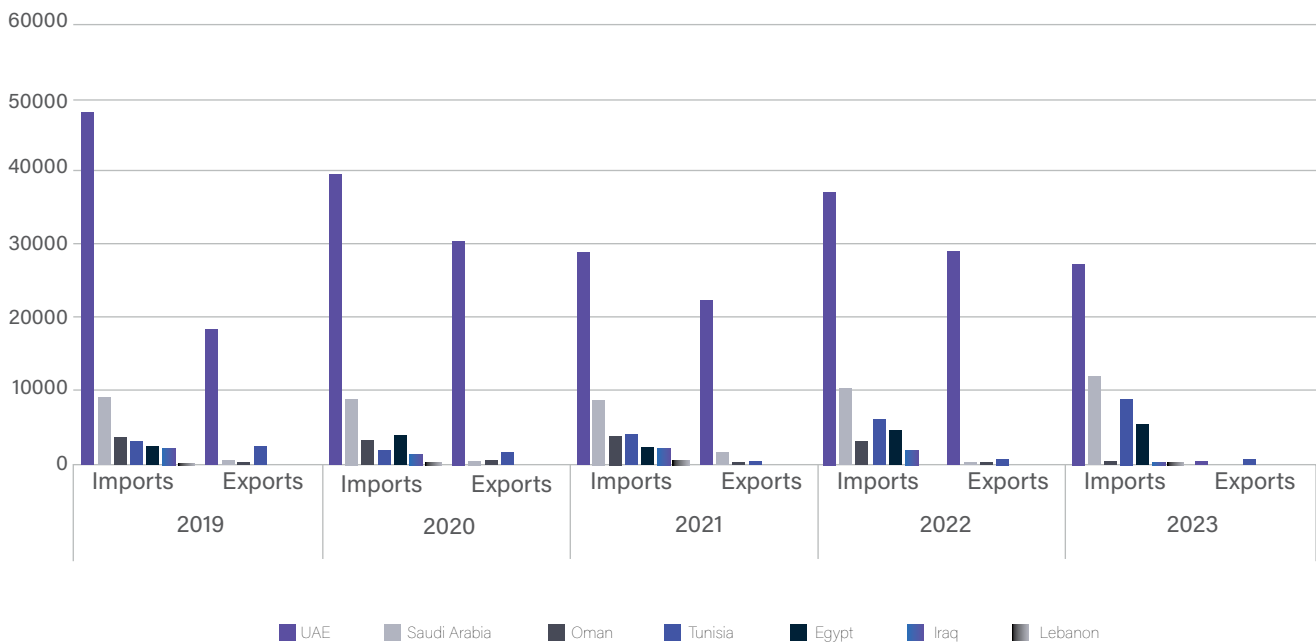
3.2.3 Lithium: Essential Mineral for Clean Systems

Summary of findings

MENA’s lithium market reflects broader regional supply chain dynamics, with the GCC countries leading in diversification of supply and value of trade. While the region, non-GCC countries in particular, relies heavily on China for lithium, Saudi Arabia and the UAE have shown greater diversification of suppliers – with the USA being a significant contributor. Notably, Jordan has the lowest reliance on Chinese imports among the countries analysed, although this is slowly increasing.

Overall, MENA’s lithium import market is growing, but exports and re-exports remain limited. To reduce supply risks, the region could benefit from further diversification of suppliers and enhancing regional collaboration.

Figure 12. Total trade volumes of lithium cells and batteries in MENA, by country, 2019–23 (in million USD)



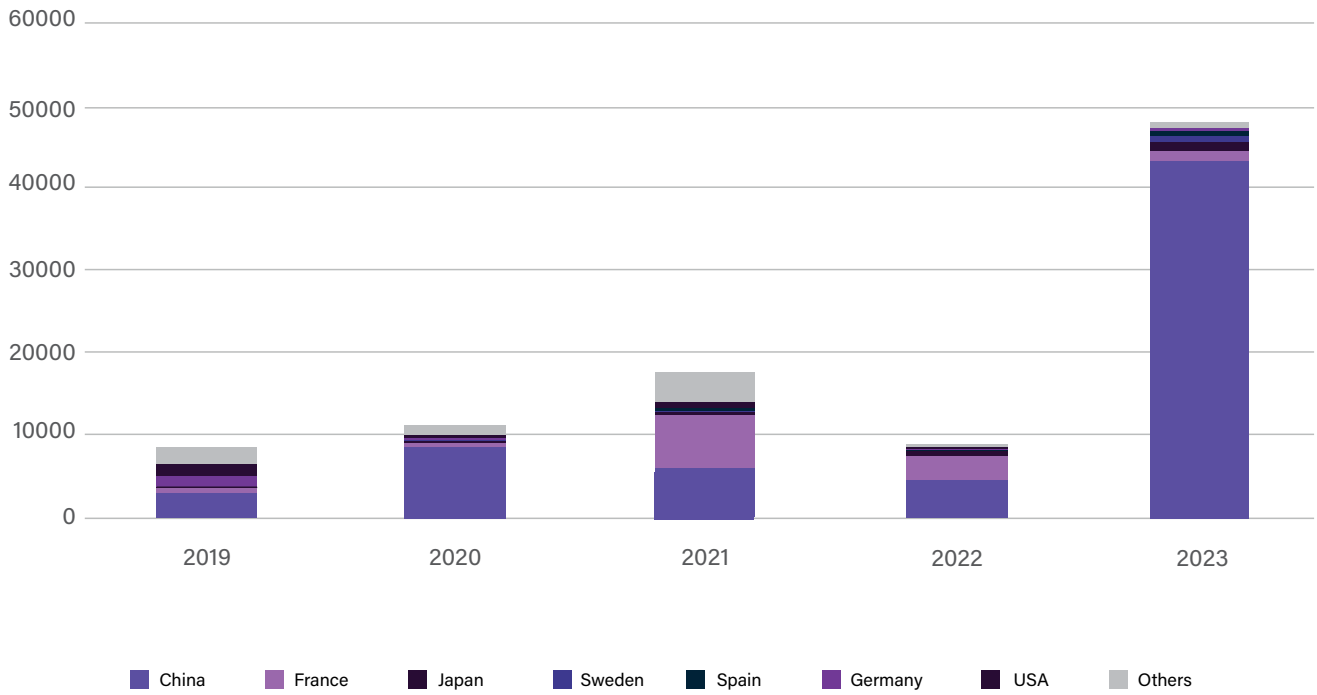
Key trends

1. The MENA region has shown steady growth in lithium cell and battery imports from 2019 to 2023.

- Saudi Arabia and the UAE have the highest trade by value in lithium cells and batteries in MENA. The UAE consistently records the highest import and exports across all years, significantly outpacing other countries.
- However, exports and re-exports significantly lag imports, indicating a trade imbalance. On average, the annual growth rate of lithium imports in MENA is 2.2%. Exports and re-exports average only 0.8%.
- There is limited trade activity in Tunisia, Egypt, Iraq and Lebanon, reflecting the smaller role of non-GCC MENA in regional trade. However, these countries display higher value than many other regional countries outside of the GCC, which have minimal trade.



Figure 13. Lithium cell and battery imports to Morocco, by supplier, 2019-23 (in thousand USD)



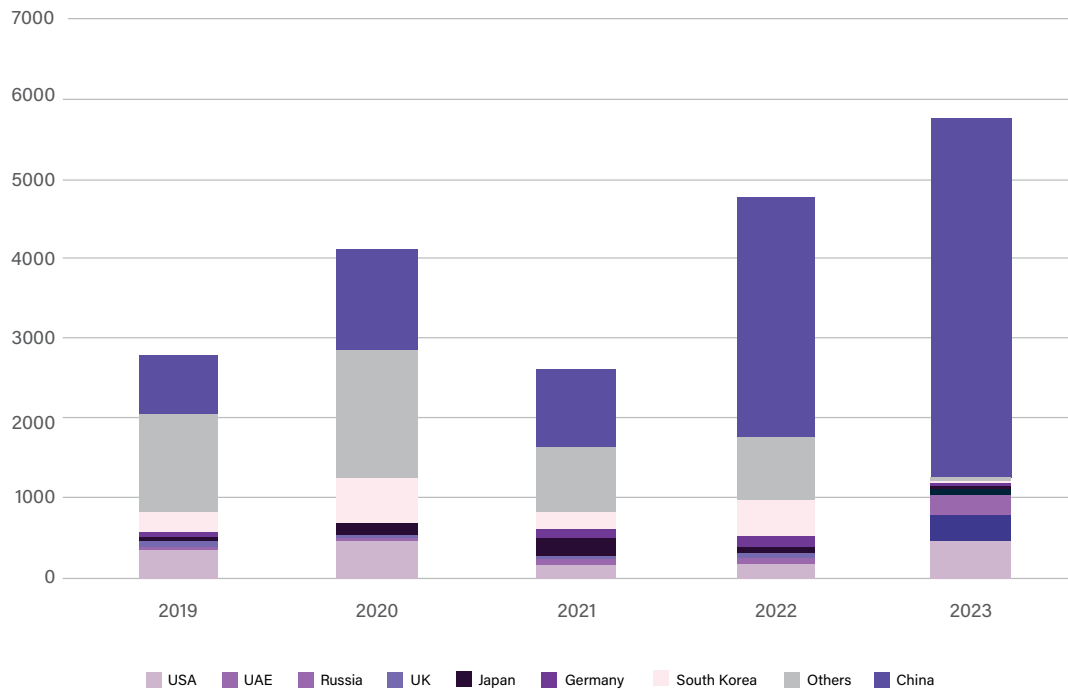
Country breakdown

Morocco

- Morocco’s imports surged by 422% in 2023, rebounding sharply after a dip in 2022.
- China leads among suppliers, accounting for 90% of Morocco’s lithium-ion batteries in 2023.
- Other contributors, such as Spain and Sweden, recorded significant increases in trade with Morocco in 2023. In 2021, France showed a noticeable increase in its contribution to Morocco’s lithium imports, though this was not sustained in subsequent years. France, Germany, and the USA have maintained relatively stable contributions.



Figure 14. Lithium cell and battery imports to Egypt, by supplier, 2019–23 (in thousand USD)

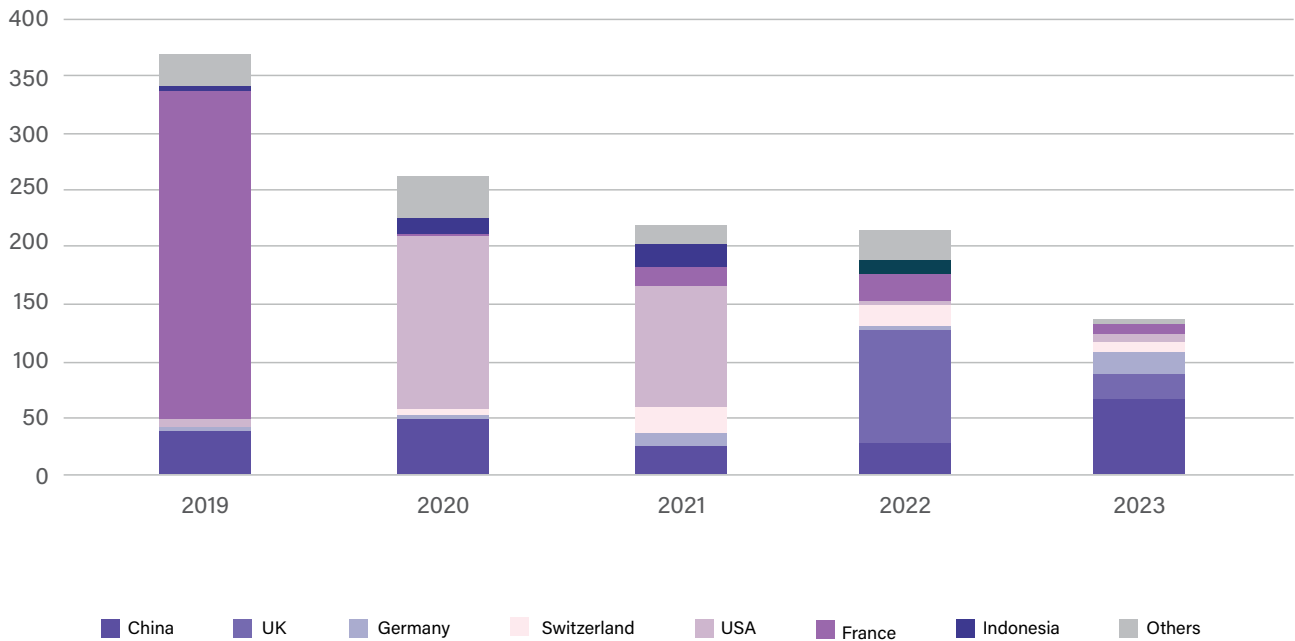


Egypt

- Egypt’s lithium cell and batteries imports reflect China’s growing dominance, with its market share rising from 25% in 2019 to 77% in 2023.
- The value of total imports reached \$5.8 million in 2023, marking steady growth.
- The market shares of Germany and South Korea dropped markedly in 2023 on the previous year.
- Meanwhile imports from the USA, UAE and Russia recorded upward trends in lithium trade with Egypt, which could enhance supply chain resilience in the future. However, imports from other countries fell, reflecting a growing concentration of suppliers.



Figure 15. Jordan lithium cells and batteries imports, by supplier, 2019–23 (in thousand USD)



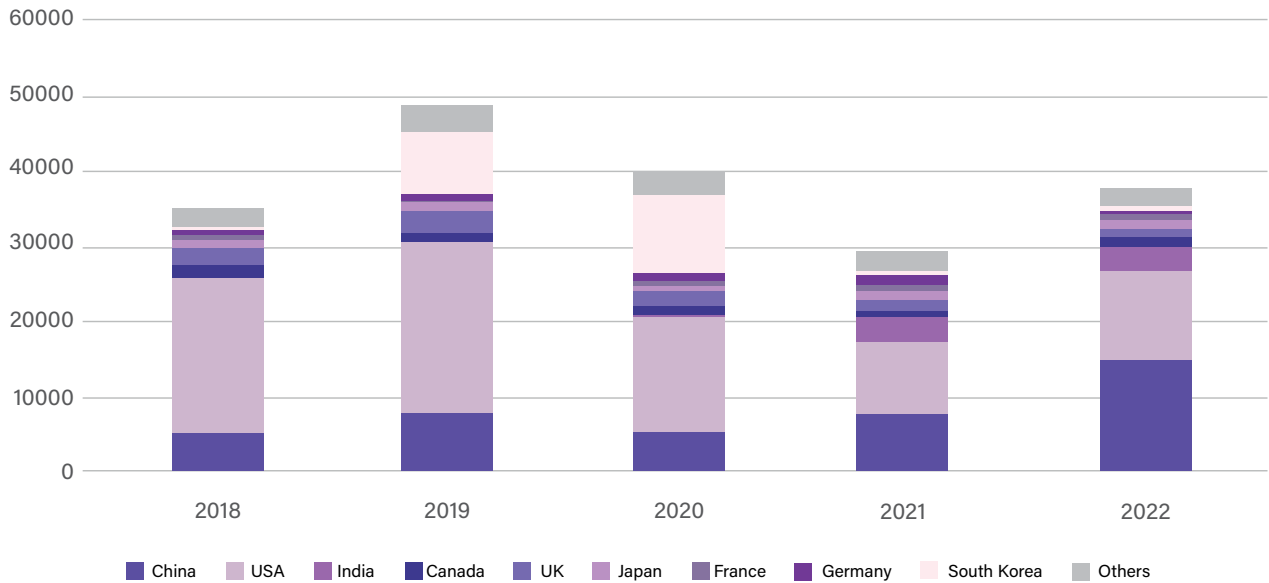
Jordan

- Jordan has the lowest reliance on Chinese imports among the selected countries. Yet, China’s contribution to Jordan’s lithium import market has grown over time, from 10% in 2019 to 48% in 2023.
- The overall value of imports dropped by 33% in 2023 compared to 2022, suggesting potential changes in demand or economic adjustments.
- France was the dominant supplier in 2019, with a 77% share, but its influence has declined. Its share was just 4% in 2023. A similar trend is observed in the role of the USA over time. This indicates a divergence away from these suppliers to China.





Figure 16. UAE lithium cells and batteries imports by supplier, 2018–23 (in thousand USD)

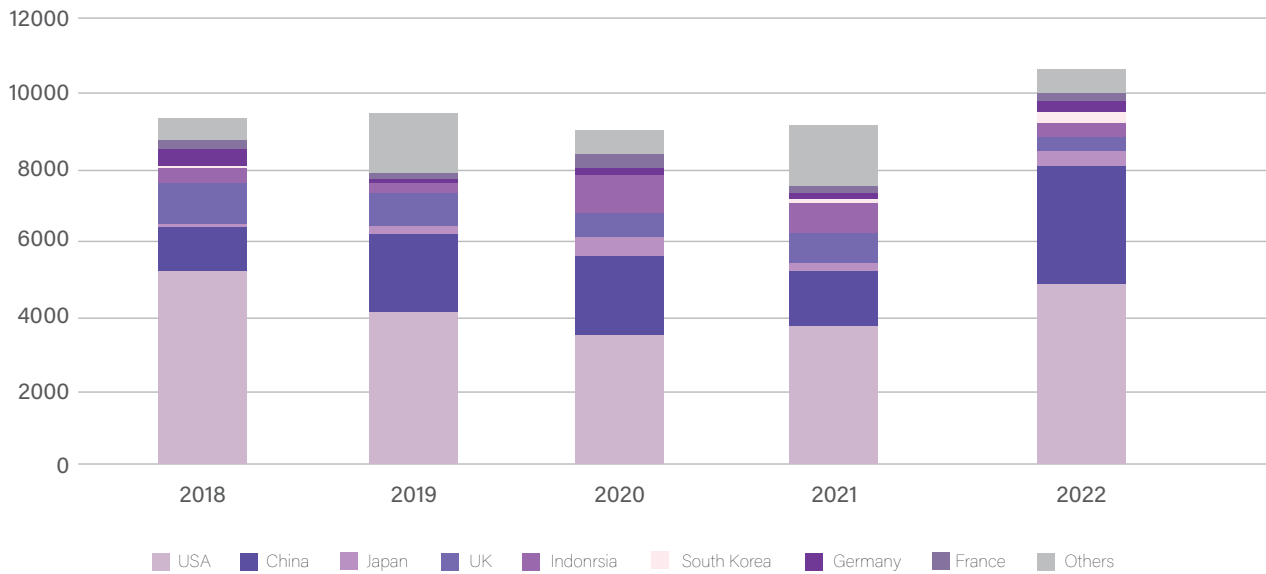


UAE

- The UAE’s lithium market exhibits significant diversification among importers compared to other MENA countries, with the USA and China as leading suppliers.
- The value of its imports reached a high point in 2019, with the USA contributing significantly, though its share has declined gradually from 59% in 2018 to 30% in 2022. China’s share has increased over time, from 15% in 2018 to 40% in 2022. India has had a significant contribution since 2021, averaging 10%.
- The contribution from other countries is insignificant and has remained steady over time. This coupled with increased contributions from South Korea, Japan, and Canada suggest a diversification of import sources, potentially to mitigate dependency risks.



Figure 17. Saudi Arabia lithium cells and batteries imports by supplier, 2018–22 (in thousand USD)



Saudi Arabia

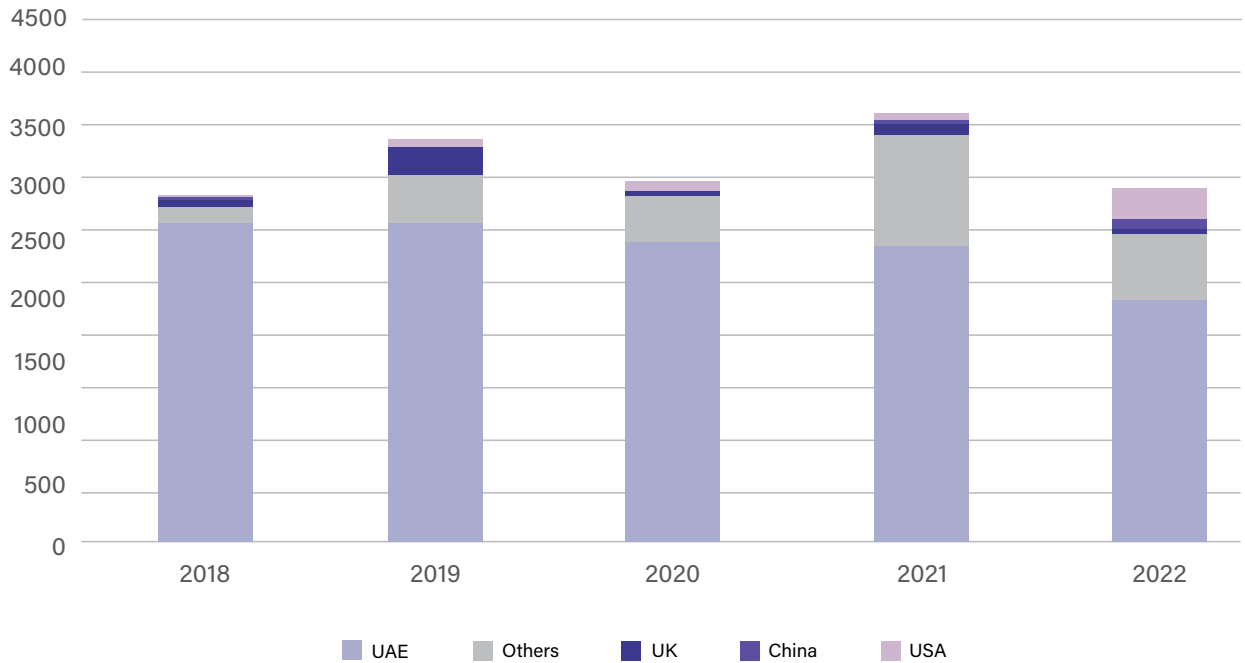
- Like the UAE, Saudi Arabia’s lithium market is marked by significant diversification of suppliers. The USA has the dominant position with a 46% share in 2023, in contrast to other MENA countries where China holds the largest share of imports. China’s share has increased to 30% from 12% in 2018.
- Overall Saudi Arabia’s lithium imports have grown steadily in value from 2018 to 2022.
- Contributions from Japan, South Korea, Germany and France are rising, while the UK and Indonesia saw declines in 2023.
- The presence, and share, of other countries indicates a diversification of suppliers to enhance supply chain resilience.

Oman

- Oman’s lithium imports highlight the UAE’s dominant role in supplying lithium, diverging from the usual dominance of China or the USA elsewhere in the region. While the USA’s share grew to 8.5% in 2022, China’s share was relatively low at 2.5%.
- Oman’s lithium market is less diversified than other MENA countries.



Figure 18. Oman lithium cells and batteries imports by supplier, 2018–22 (in thousand USD)



3.2.4 Wind-Power: A Growing Industry

Summary of findings

MENA’s wind industry is less developed compared to solar power, but the region has seen a significant rise in wind turbine imports. While MENA’s share of the global market remains small (4.7%), the trend is upward, with Saudi Arabia, Egypt, and Morocco leading imports.

China dominates the market, accounting for 78% of total imports, particularly in countries like Lebanon (95%), Egypt, Jordan, and Saudi Arabia (99%).

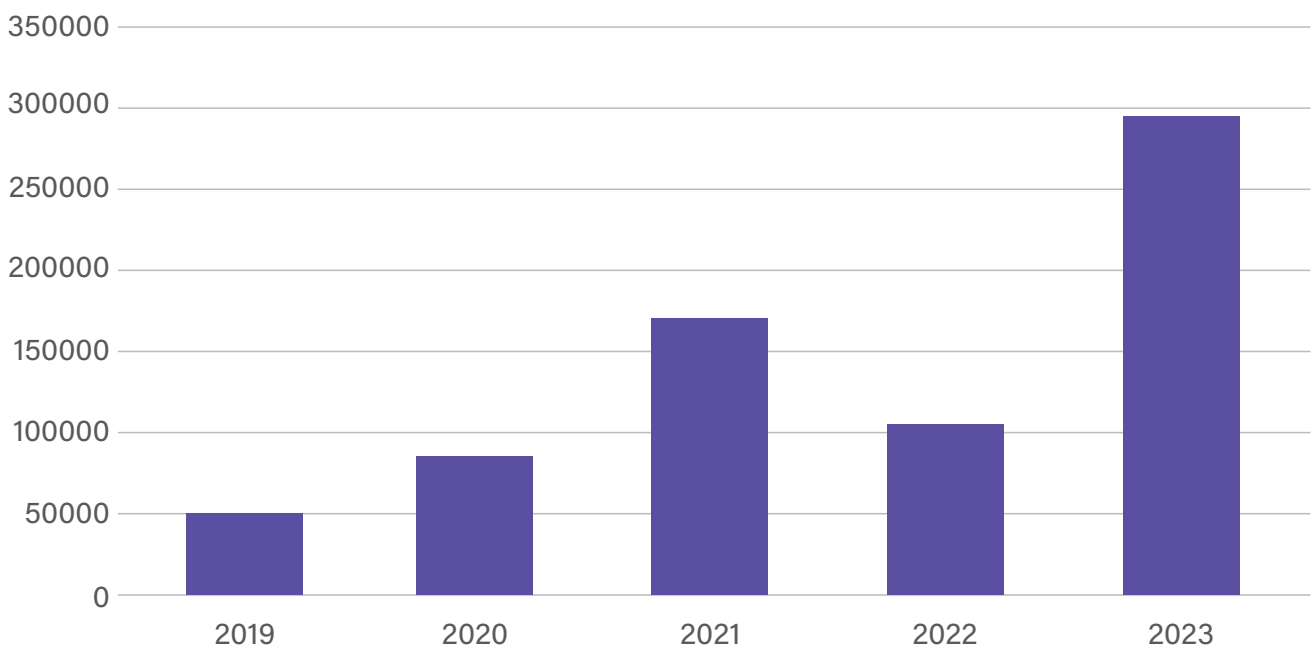
Key trends

1. Imports are on an upward trajectory

- Imports of wind turbines tripled in value in 2023. The region’s share of the global import market is just 4.7%, however, with Saudi Arabia, Egypt, and Morocco leading imports.
- China dominates wind imports in MENA, with a share of 78% of total value. Its share is particularly pronounced in Lebanon (95%), and Egypt, Jordan, and Saudi Arabia (99%).



Figure 19. Total value of wind turbines imports to MENA, 2019–23 (in thousand USD)





3.2.5 Electrolysers: Green Hydrogen Ambitions

MENA countries are forming strong trade ties for electrolyser imports, but with a focus on a limited number of suppliers. This situation presents both supply chain risks and opportunities for diversification of suppliers or local production.

Key trends

1. EU and China are the top exporters of electrolysers to MENA

- Morocco has forged a strong import partnership with EU member states, specifically, Italy, Germany, Portugal, France, and Belgium, with lesser focus on China.
- China is, however, a key partner of the Arab Gulf states of Saudi Arabia, Oman, and the UAE. The UAE is also partners with Asian players, India, Japan, China, and South Korea.



By supporting the domestic production and export/
re-export of critical materials and components,
MENA countries can bolster the resilience of
clean energy supply chains.





Section 4 | The Way Ahead and Next Steps

The energy transition is a critical challenge and an enormous opportunity for MENA countries. The region's heavy reliance on a few suppliers, particularly China, poses significant challenges to the security and robustness of its clean energy supply chains.

By supporting the development of local industries, and promoting local manufacturing, to produce and export/re-export critical materials and components, MENA countries can bolster the resilience of clean energy supply chains and carve out a greater role in global supply chains. Efforts to integrate into, and lead segments of, the global supply chain will not only accelerate the energy transition within the region but strengthen its economic resilience in a low-carbon future.

Success will depend on adequate policies, substantial investments, robust public-private partnerships, and targeted capacity building.



Policy Recommendations for Strengthening Supply Chains and Partnerships

- **Diversify supply sources:** Reduce reliance on single suppliers for core clean energy components. This requires fostering relationships with multiple suppliers and investing in alternative technologies and local manufacturing.
- **Develop local and regional manufacturing:** Incentivise local production of core clean energy components to create jobs and reduce import reliance. Tools such as tax benefits, subsidies, and streamlined regulations can help build a robust manufacturing base for solar panels and energy storage systems, among others.
- **Establish free trade zones and re-export hubs:** Continue to leverage the region's strategic location at the crossroads of Europe, Asia, and Africa. MENA countries can act as hubs for importing raw materials, assembling components, and re-exporting value-added products to international markets. Free trade zones, advanced logistics networks, and trade agreements provide an ideal framework to facilitate this process.
- **Strengthen trade agreements:** Foster partnerships with key global players in the critical minerals and advanced technologies markets to enhance supply chain resilience and inform the development of domestic industries in these sectors. Comprehensive agreements with favourable terms, such as reduced tariffs, streamlined customs processes, and mutual investment opportunities, can enhance MENA's access to global markets.
- **Invest in innovation:** Emphasise research and development for sustainable materials and recycling technologies through cross-border collaborations and partnerships between industry and academia. Innovations to improve the efficiency of technologies and recycling processes not only support environmental sustainability but also enhance supply chain resilience and cost-effectiveness.



Tools such as tax benefits, subsidies, and streamlined regulations can help build a robust manufacturing base for solar panels and energy storage systems.





Annex | MENA's Critical Minerals Reserves - an Overview

Saudi Arabia

Saudi's Western Arabian Shield contains precious metals such as gold and silver in addition to critical industrial metals like copper, zinc, iron, aluminium, manganese, and chromium. Rare earth elements (REEs), such as tantalum are also found here.

Saudi Arabia holds one-fourth of the world's reserves of Tantalum, which is essential for the high-tech industries, like electronics. Niobium, which has multiple industrial applications, including jet engines and rockets, is also present.

Saudi Arabia's mineral resources were valued at around \$1.3 trillion in 2016 but have recently been reassessed to be \$2.5 trillion.^{xxi}

The Kingdom's goal is to increase the mining sector's contribution to GDP from 17 billion to \$75 billion by 2035. Saudi Arabia 69.9 kilotonnes of copper in 2023.^{xxii} It is also home to around 7.3 billion tonnes of phosphate reserves.^{xxiii}

Jordan

Jordan ranks seventh in the world in phosphate reserves and the twelfth in potash reserves. Its southern region is home to large quantities of silica sand, a raw material used in the production of glass, casting sand, optical and crystal glass, and various renewable energy systems.^{xxiv}

The mining sector contributes \$1.4 billion to Jordan's total exports and 2.2 of its GDP. According to a 2019 study Jordan's reserves are estimated as follows:

Basalt: 310 million tonnes
Zircon and REEs: 96,000 tonnes.
Silica sand Billions of tonnes.
Copper: 30 million tonne.
Feldspar: 130 million tonnes.
Kaolin: 11, 944 million tonnes.
Chalk: 5,826 million tonnes.
Bentonite: Over 105 million tonnes.
Dolomite: 162 million tonnes.
Zeolite: 2,037 million tonnes.

Jordan also has reserves of gold, diatomite, and other REEs in the south.^{xxv}

UAE

The UAE's minerals and metals industry is expected to reach \$10 billion by 2025. The country recorded 405 kilotonnes of copper in 2023. It holds deposits of essential minerals, such as limestone, copper, and gypsum.^{xxvi}

The most abundant mineral resource in the UAE is gypsum, with large reserves found in the northern emirates, particularly Ras Al Khaimah. The UAE is a major producer of gypsum, with a production capacity in excess of 12 million tonnes per year as of 2023.^{xxvii}

Oman

Oman is a significant player in the global minerals market.^{xxviii}

Gypsum: The world's largest gypsum exporter by weight, shipping approximately 8.74 million tonnes in 2021, primarily to ASEAN and South/East African countries.

Chromite: Oman has approximately 30 million tonnes of chromite ore, according to the Oman Chromite Company. It exports metallurgical grade chromite ores to meet rising demand from China and amid shortages of ferrochrome worldwide.

Copper: Large-scale copper mining is a strategic priority. Several foreign mining companies are active in Oman, and there are plans for a joint venture with an Australia-based mining firm to construct a copper concentration plant with a production capacity of one million metric tonnes per year.

Other Materials: Surveys indicate Oman has deposits of asbestos, coal, iron ore, lead, manganese, nickel, silver, and zinc.

Key sub-sectors include:

Metallic minerals: copper, chromite, laterite, and manganese.

Industrial minerals and rocks: Limestone, marble, dolomite, gypsum, silica sands and quartzite, clays and shale, coal, olivine, kaoline, salt, and aggregates.

Egypt

Egypt has a copper refining capacity of around 4 kilotonnes per year.^{xxix} The Arabian Nubian Shield in Egypt contains critical raw materials such as aluminium, beryllium, chromium, cobalt, copper, gallium, magnesium, zinc, tantalum, niobium, nickel, manganese and REEs. These materials are widely distributed within the region's igneous and metamorphic rocks.^{xxx}



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