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Middle East Energy Transition: Decarbonization Strategies and Business Opportunities for Japanese Companies

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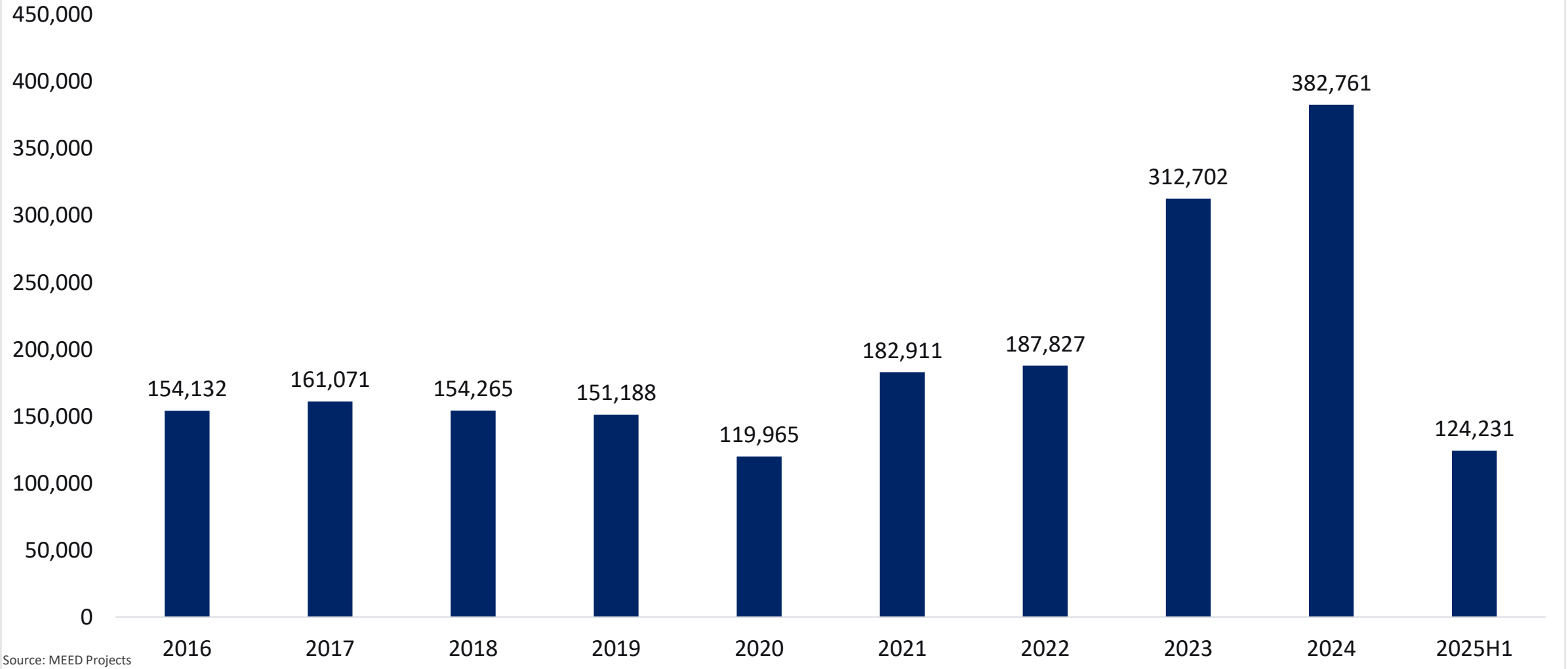
Frankfurt, August 4, 2025

State of Play

Latest Market Performance

Spurred by Saudi Arabia and the UAE, the projects market hit a record high of $382bn in 2024 boosted by high power, water, construction and oil and gas spending. However, 2025 does not seem to be able to maintain that momentum mainly due to a collapse in new contracts in Saudi Arabia

Value of MENA contracts awarded 2016-24 ($m)

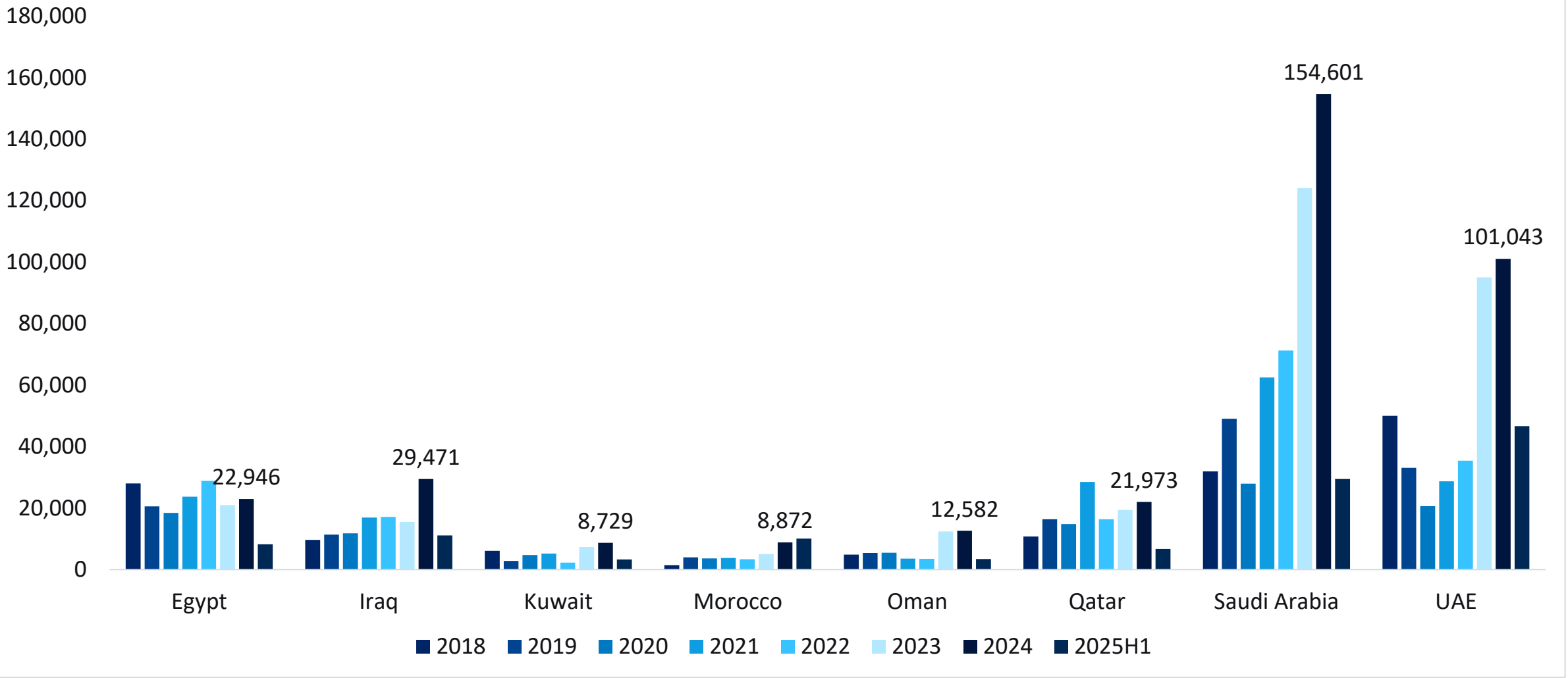


Source: MEED Projects

2025 H1 Performance

We can see that the Saudi market has seen the biggest slowdown this year on the back of a pause on giga projects spending a reprioritization of event-drive projects like the Expo and World Cup

Value of MENA contracts awarded 2018-25H1 by country ($m)

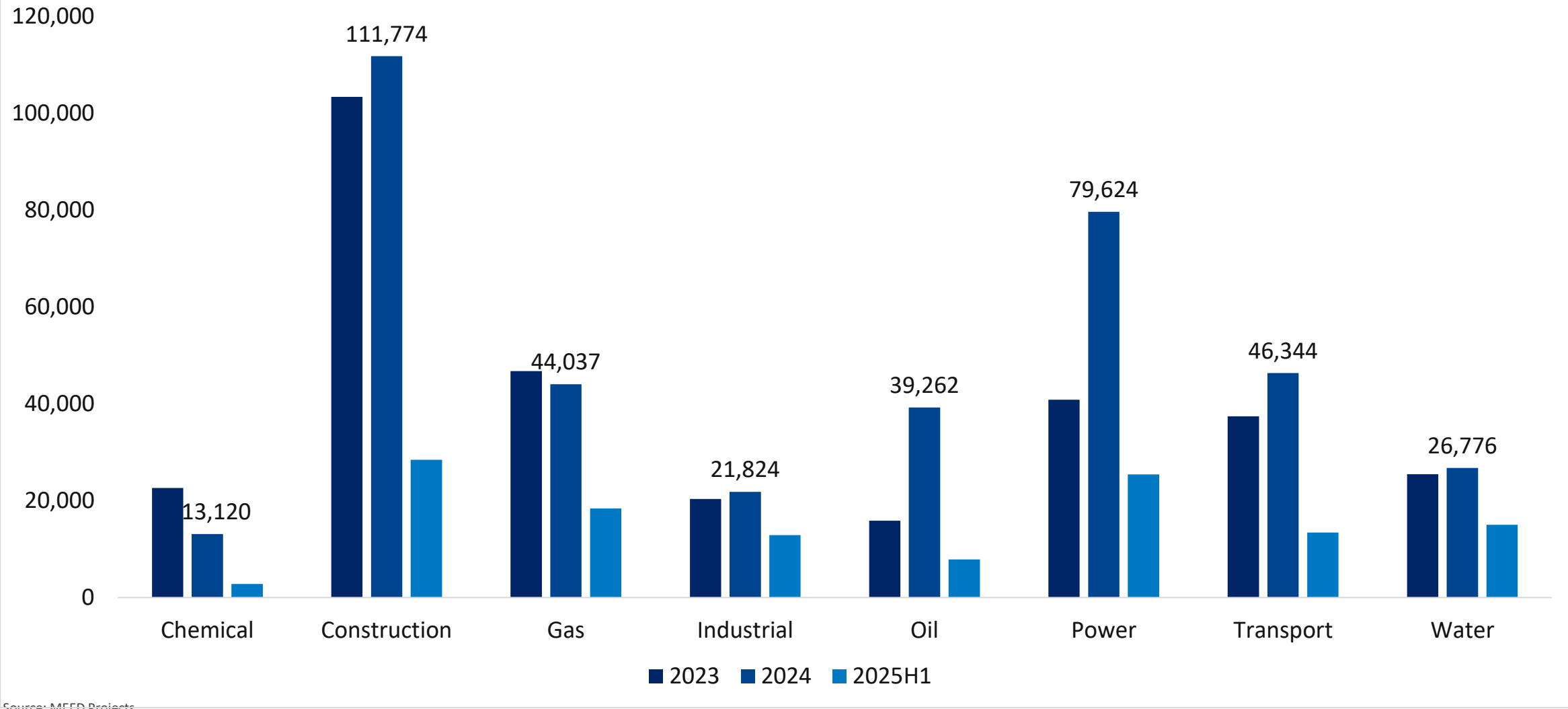


Source: MEED Projects

2025 Sector Performance H1

The slowdown in spending has impacted all sectors, with most market segments on a pro rata basis unlikely to match last year's totals

Value of MENA contracts awarded by sector, 2023-25H1 ($m)



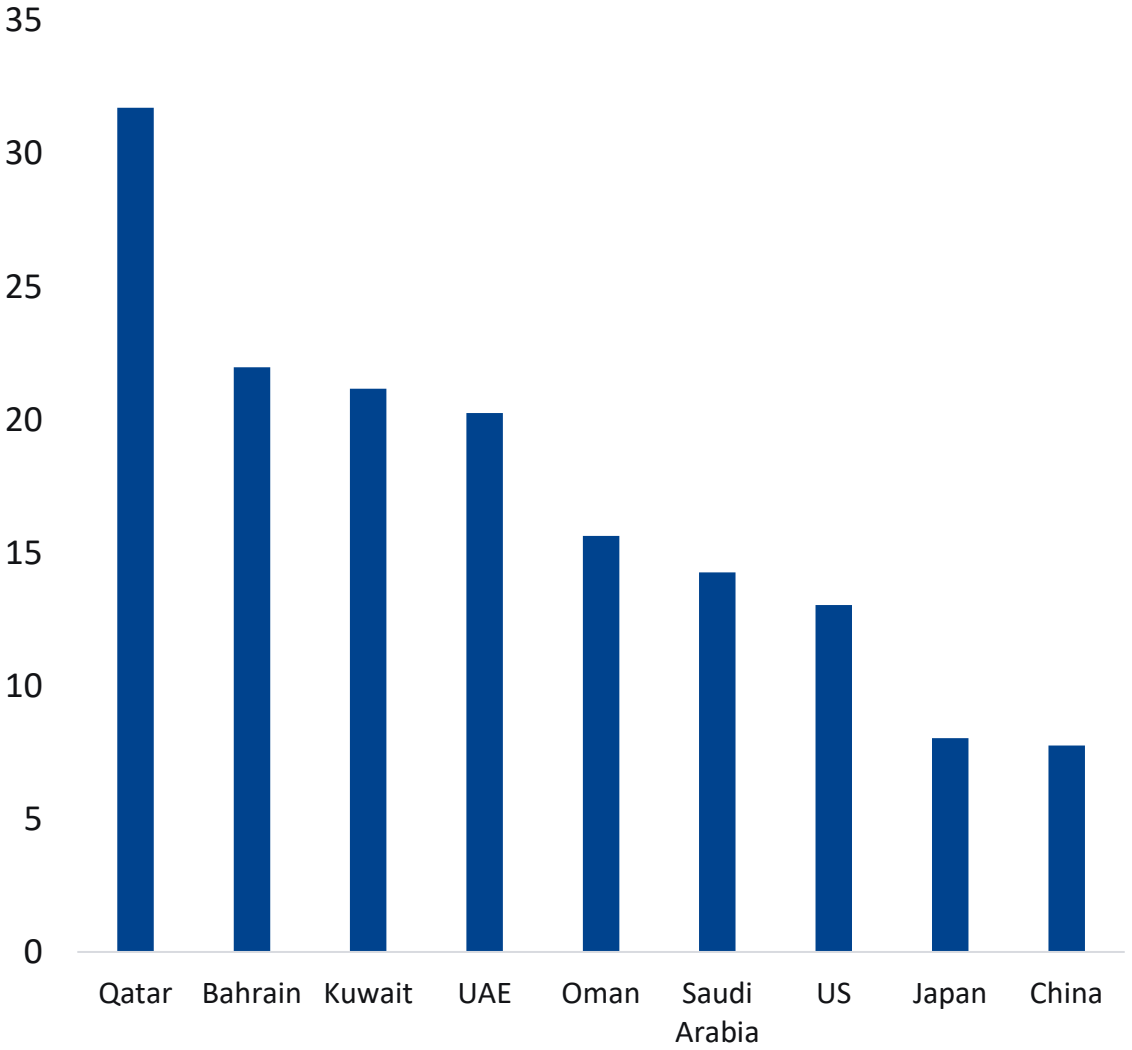
Source: MEED Projects

Decarbonisation strategies and drivers

The Challenge

On a relative scale, the MENA region has comparatively lower total emissions, but on a per capita basis is one of the highest on Earth. This excludes the emissions created from the main oil producers' exported hydrocarbons

Carbon dioxide emissions per capita (tonnes), 2023



Source: World Bank, MEED

WHY?

The GCC states' high carbon-intensity position today is a result of legacy issues and geographical realities:

1. Cheap power production encourages intensive energy use
2. Desalination historically energy-intensive
3. Extreme heat requires massive power during summer for cooling
4. Heavy industries based on cheap power like aluminium, cement and steel
5. Strong economic and population growth
6. Increased oil production
7. Car culture
8. Energy-inefficient buildings
9. Environmental issues considered threat to oil revenue and therefore inaction on climate control

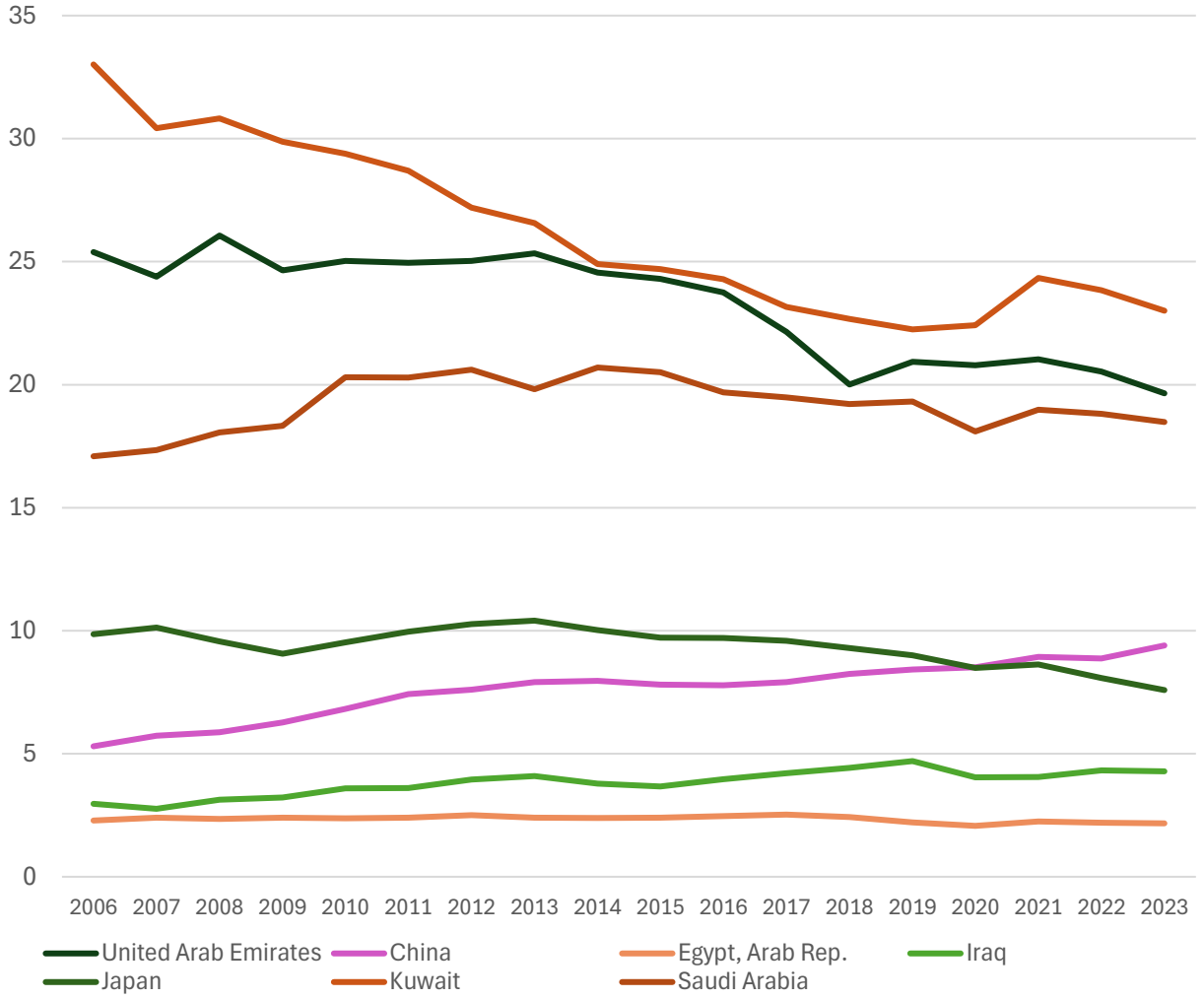
Action

Since the mid-2000s there has been a reversal in the region's policies toward global warming. Today the GCC and North African states have all set net-zero targets and taking active roles in global climate talks culminating in the hosting of COPs 27 and 28 in Egypt and the UAE

Actions 2005-25

1. Move from oil-fired to gas-fired power production
2. Increase in electricity and tariffs and reduction in subsidies
3. Market rates for gasoline
4. Adoption of less-energy intensive RO desalination technology
5. Building codes mandating power conservation
6. Investment in public transportation
7. Development of renewable energy production
8. Policies to encourage energy conservation
9. Setting net zero targets
10. Building out electric charging networks
11. Encouraging green and blue hydrogen development

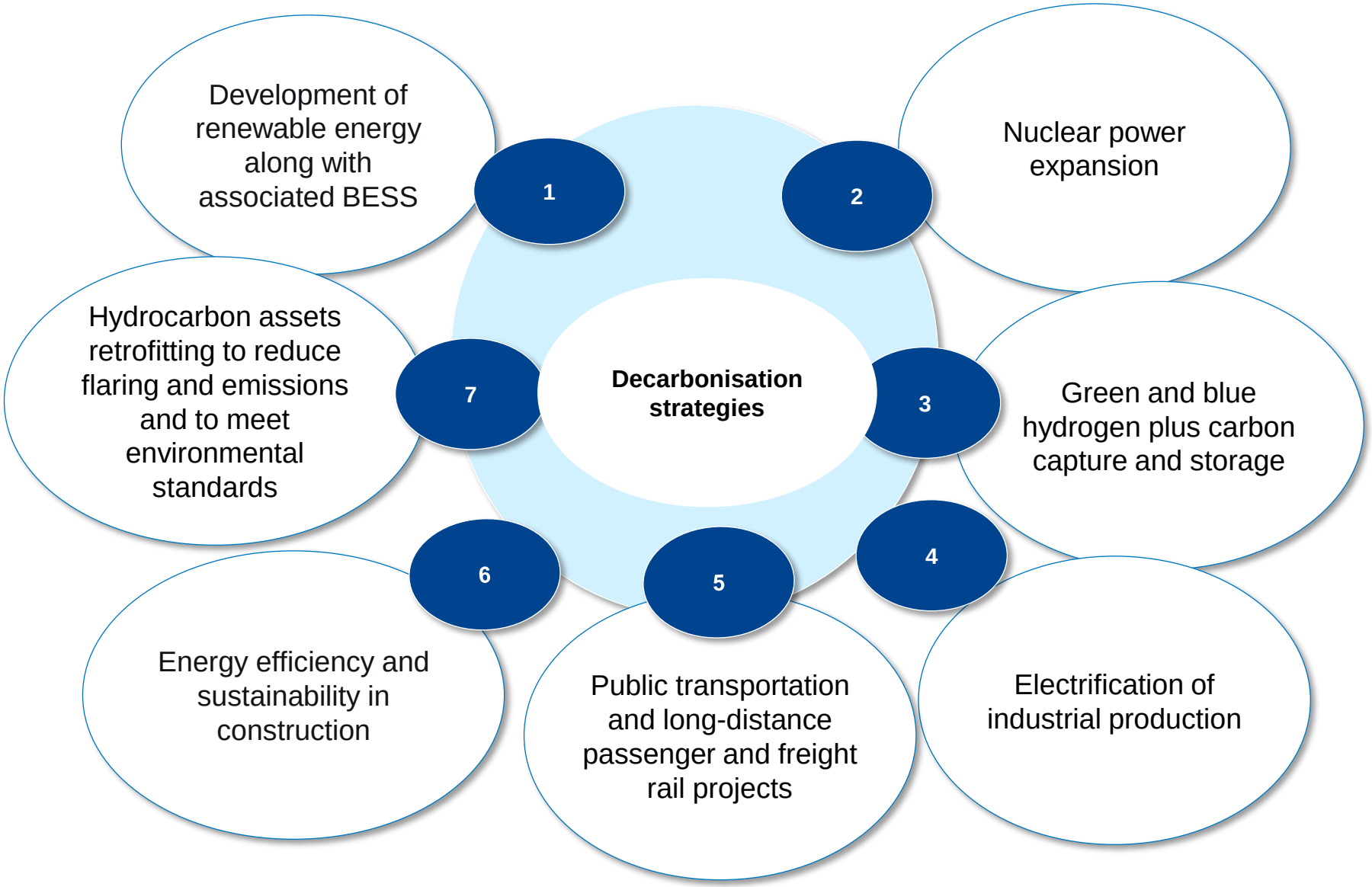
Annual carbon dioxide emissions per capita (tonnes), 2006-23



Source: World Bank, MEED

Decarbonisation Strategies and Drivers

There are a number of intertwined factors behind the MENA region's decarbonization strategies



Source: MEED Projects

Renewables

MENA Renewables Forecast

Almost all MENA states have now set renewable energy targets ranging between 10% and 52% by 2030. To achieve these numbers more than $150bn needs to be spend over the next 5 years, the largest of which will be in Saudi Arabia

Mena cumulative installed capacity (GW), 2023 (actual) and 2030 (projected)

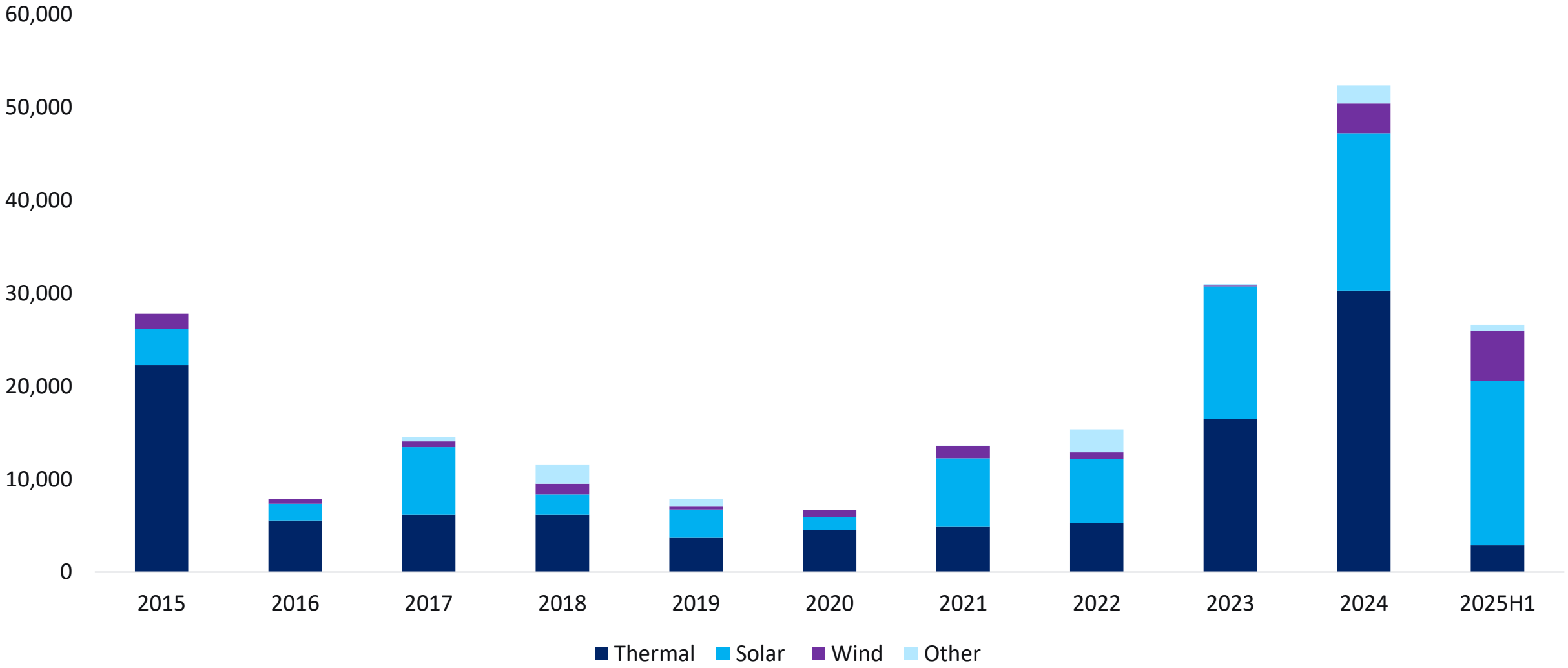
Country	Installed capacity (GW) 2023	Forecast installed capacity (GW) 2030	Renewable energy target as a % of total energy mix	Implied renewables installed capacity, 2030 (GW)	Installed renewables capacity (GW) 2023	Implied new renewable capacity required 2023-30 (GW)
Algeria	25.3	34.1	27% by 2030	9.2	0.6	8.6
Bahrain	9.9	10.7	10% by 2035	1.1	0.06	1.04
Egypt	60.1	71.1	42% by 2030	29.9	6.7	23.2
Iraq	31.8	60.6	12% by 2030	7.3	1.8	5.5
Jordan	7.1	8.0	25% by 2030	2.0	2.6	-0.6
Kuwait	20.3	28.5	30% by 2030	8.6	0.1	8.5
Lebanon	4.1	5.8	15% by 2030	0.9	1.3	0.4
Libya	11.2	18.0	22% by 2030	4.0	-	4
Morocco	11.2	17.2	52% by 2030	8.9	4.6	4.3
Oman	11.6	15.3	16% by 2025	2.4	0.7	1.7
Qatar	11.4	19.9	20% by 2030	4.0	0.8	3.2
Saudi Arabia	91.7	151.7	50% by 2030	75.9	3	72.9
Tunisia	6.9	8.0	30% by 2030	2.4	0.8	1.6
UAE	43.7	67.8	50% by 2050	33.9	10.2	23.7
Total	**346.3**	**516.6**		**190.3**	**33.2**	**157.1**

Source: IRENA (2023), and GlobalData (2030)

Renewables Capex

The last 3 years have seen a greater investment in renewable energy projects than the previous 20 years put together. There has been a surge in solar power contracts in particular as it bids to become the default power technology of choice

Value of MENA power generation contracts by type 2015-2025H1 ($m)

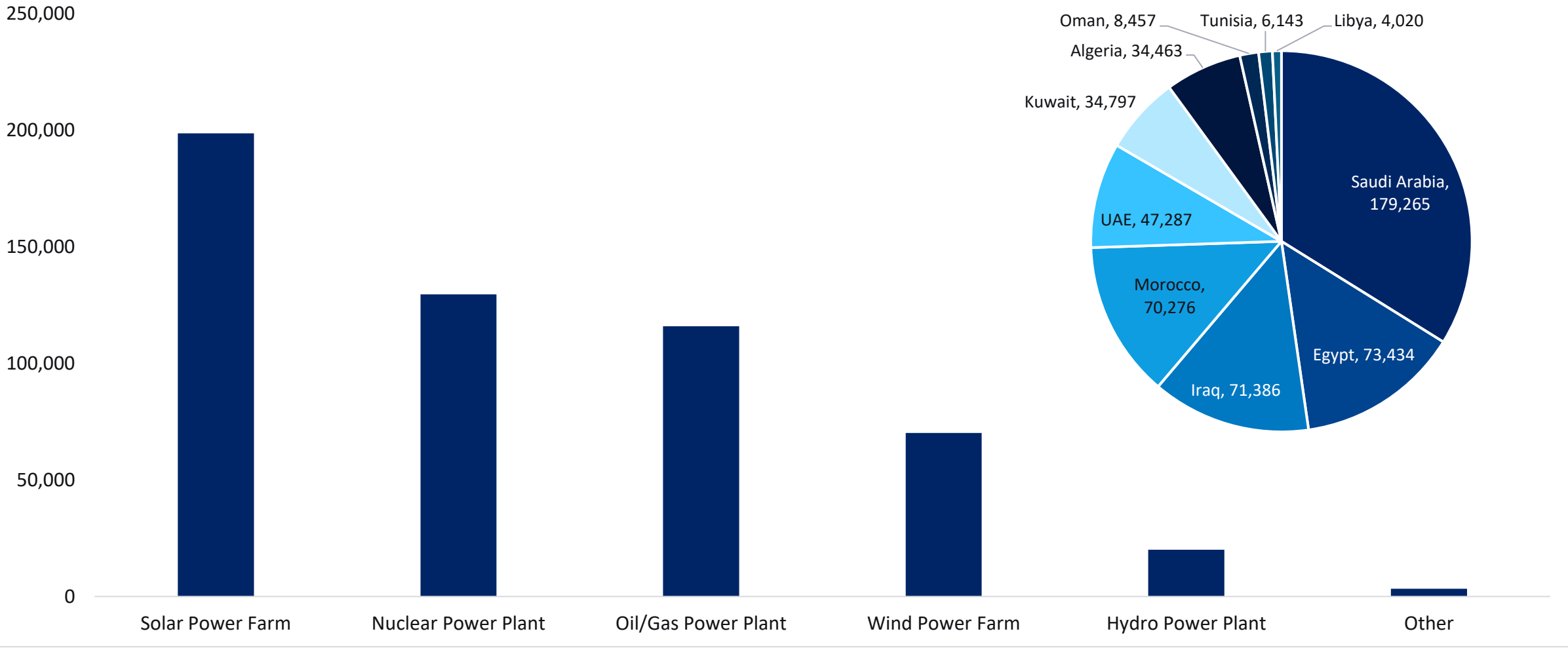


Source: MEED Projects

The Challenge

For the first time the value of solar power projects now exceeds that of thermal facilities. Falling costs , improving efficiencies and the addition of BESS technologies make renewables more attractive than ever before

Value of active MENA power projects by type and country ($m)



Source: MEED Projects

Active renewables projects

There are more than $200bn worth of active renewable energy projects across the MENA region today, concentrated primarily in Saudi Arabia, the UAE, Egypt and Morocco

MENA selected planned or under construction renewable energy projects

Project	Country	Estimated cost ($m)	Status
KA-CARE - Nuclear Power Reactor: 2800MW Package 1	Saudi Arabia	6,000	Main Contract Bid
EWEC/Masdar - Abu Dhabi Solar PV IPP 5200 MW and BESS	UAE	6,000	Contract Awarded
Scatec - Sohag Wind Farm 5 GW	Egypt	5,700	Study
RAK Municipality - Ras Al Khaimah Pumped Storage Hydro Power Plant 5000 MW	UAE	5,000	Study
EETC/NREA - Wind Farm 3 GW	Egypt	3,600	Study
MoE, Iraq - Solar Power Plant 3000MW and Battery Energy Storage System 500MWh	Iraq	3,500	Study
SPPC - Al Sadawi 2 Solar IPP 3000MW	Saudi Arabia	3,000	Main Contract Bid
EETC - South Hurghada Wind Farm 2 GW	Egypt	3,000	Study
ENOWA - Renewable Energy Programme Phase 1: Solar & Wind Power Plant 3,000MW	Saudi Arabia	3,000	Main Contract PQ
Nawwar Renew/SPPC - Ar-Rass II Solar PV Power Plant 2000MW	Saudi Arabia	2,880	Under Construction
SPPC - Renewable Energy Program 5: Al Sadawi 1 Solar IPP 2000MW	Saudi Arabia	2,400	Contract Awarded
ENOWA - Gayal Wind Farm 1200MW	Saudi Arabia	2,400	Bid Evaluation
DEWA - MBRM Solar Park: Phase 7: Solar PV IPP (1600 MWAC) with BESS (1000 MW)	UAE	2,200	Main Contract PQ
MOEE - Hydropower Power Plant in Attaqa 2400MW	Egypt	2,080	FEED
SPPC - Haden 2 Solar IPP 2000MW	Saudi Arabia	2,000	Main Contract Bid
PIF - Muwayh 2 Solar IPP 2000MW	Saudi Arabia	2,000	Main Contract Bid
AD Ports/TAQA - Green Ammonia Plant: Solar Power Plant 2000 MW	UAE	2,000	Study
MoE, Iraq - Solar IPP Power Plant 1000 MW in Najaf	Iraq	2,000	Contract Awarded
Red Sea Global - Amaala: Utilities Package	Saudi Arabia	2,000	Under Construction
QatarEnergy - Dukhan Solar PV Plant 2000 MW	Qatar	2,000	FEED
EETC/NREA - Wind Power Plant 2000 MW Development	Egypt	2,000	Study
SPPC - Humaij Solar IPP 3000MW	Saudi Arabia	3,000	Contract Awarded
SPPC - Bisha Solar IPP 3000MW	Saudi Arabia	3,000	Contract Awarded

Source: MEED Projects

Nuclear Power

Nuclear Power

- With renewable energy capacity becoming more dominant in the supply mix, some countries are turning to nuclear energy as the provider of baseload requirements.
- Abu Dhabi has shown that excess nuclear power generated can also be used to power data centres and has also been used to electrify much of Adnoc's oil and gas production processes
- At the same time, it enables states to more easily reach their net zero goals
- Saudi Arabia has been looking at nuclear energy for some years and has been in talks with Korean, Chinese, Russian and French technology providers over its plans. It has also been negotiating with Washington over the export licences for nuclear equipment.

MENA planned, under construction or operational nuclear power projects

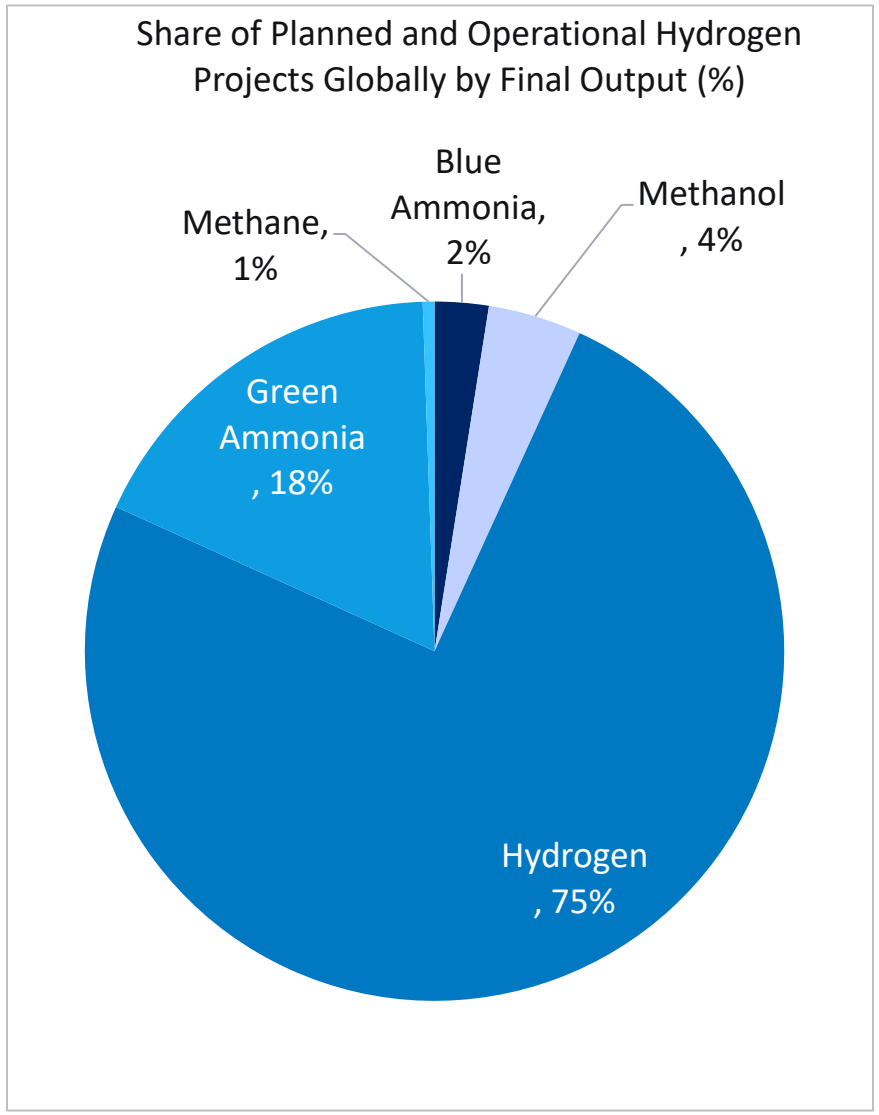
Country	Location	Operator/owner	Capacity	Status	Technology
Egypt	El-Debaa	Rosatom/Nuclear Power Plants Authority (NPPA)	4 x 1,200MW VVER-1200 reactors	Under construction	Russian
Iran	Bushehr	Atomic Energy Organization of Iran	3 x 1,000MW VVER-1000 reactors	One completed, two under construction	Russian
Saudi Arabia	Duwaiheen	Duwaiheen Nuclear Energy Company	TBD but 2 X 1,000-1,600 MW reactors	Planned	TBD
UAE	Barakah	Nawah Energy Company/Emirates Nuclear Energy Company (ENEC)	4 X 1,400MW APR-1400 reactors	Operational	Korean
UAE	Barakah	Nawah Energy Company/Emirates Nuclear Energy Company (ENEC)	TBD – likely 4 X 1,000MW reactors	Planned	TBD

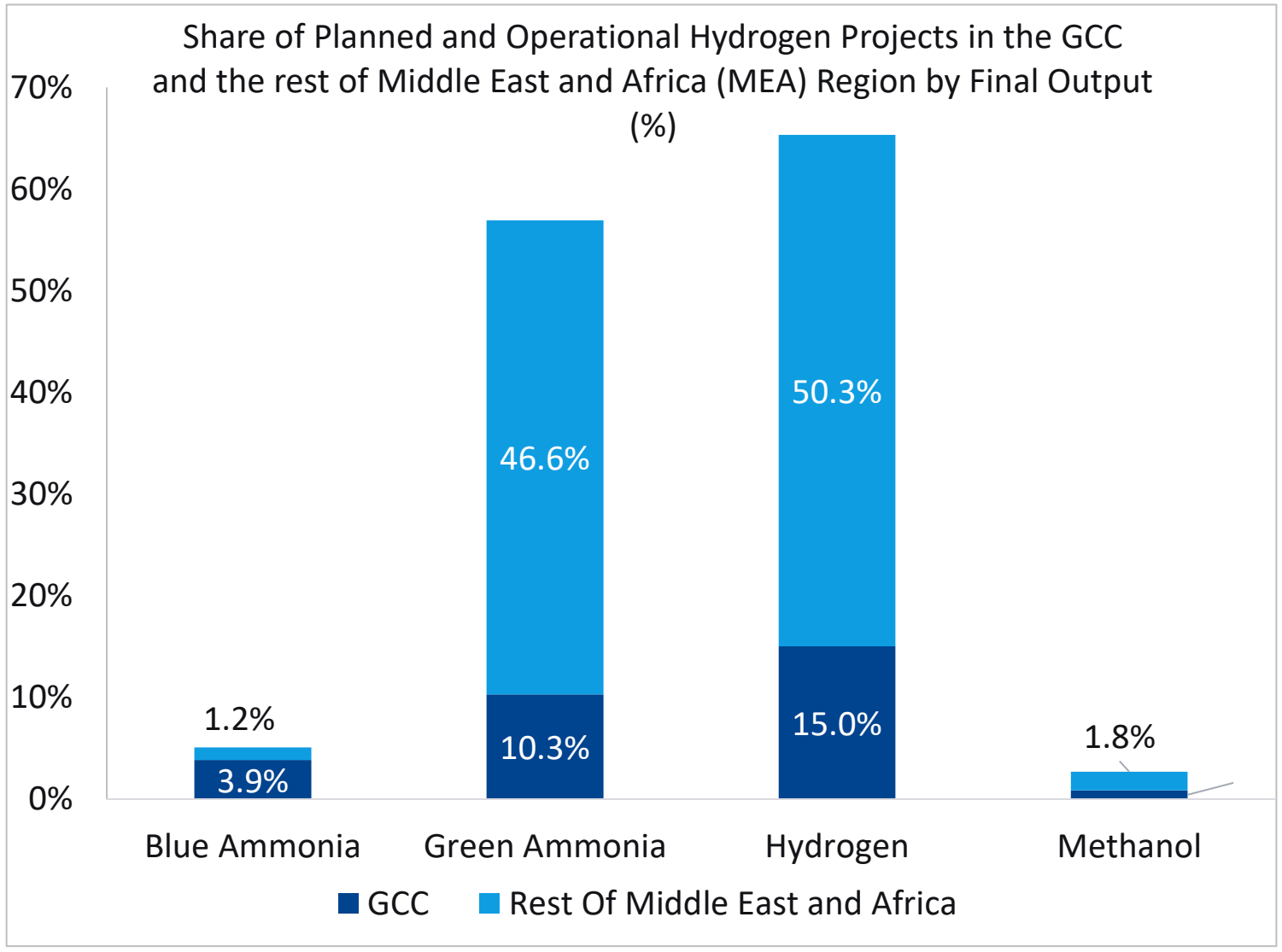
Source: MEED Projects

Green and Blue Hydrogen

Active and Pipeline Hydrogen Projects Market by Output

The entire Middle East and Africa (MEA) region currently holds 9.7% of global active and pipeline hydrogen projects. The GCC holds almost 34 per cent of the total planned and active hydrogen projects of the entire MEA region.





MEA= Middle East and Africa; Source: GlobalData

Strategy and policy updates

Tax incentives, land and infrastructure allocation and government support are being developed to support Mena countries' hydrogen strategies

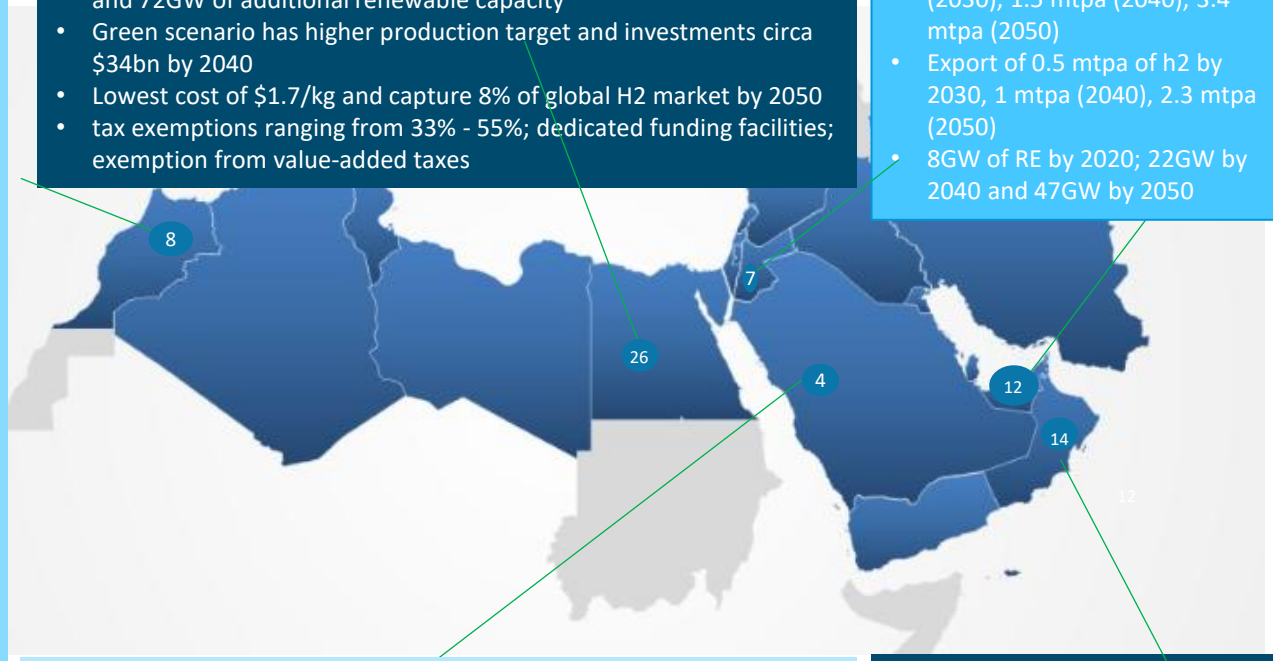
Morocco
National Hydrogen Commission (2019) ; Green hydrogen roadmap (2021); royal support (2022); multi-sectoral Green H2 Maroc (2021) domestic industries and export focus

Proximity to Europe, port infrastructure

Roadmap
- 2020-2030: hydrogen for local green ammonia production and export
- 2030-2040: production and export of green hydrogen green ammonia and synthetic fuels – hydrogen as electricity storage vector and transport fuel
- 2040-2050: global trade, use in domestic industry, residential heating and transport

Egypt
- Clean Hydrogen Strategy (Advisian/EBRD) – Base scenario - at least 1.5 mtpa by 2030 (1.4 mtpa export); 4 mtpa by 2040 (3.75 mtpa export)
- 2040 target to require $24bn investment in 48GW of electrolysis and 72GW of additional renewable capacity
- Green scenario has higher production target and investments circa $34bn by 2040
- Lowest cost of $1.7/kg and capture 8% of global H2 market by 2050
- tax exemptions ranging from 33% - 55%; dedicated funding facilities; exemption from value-added taxes

Jordan
- National H2 Strategy completed
- $28bn investment in 2030
- Production of 0.6 mtpa of h2 (2030), 1.5 mtpa (2040), 3.4 mtpa (2050)
- Export of 0.5 mtpa of h2 by 2030, 1 mtpa (2040), 2.3 mtpa (2050)
- 8GW of RE by 2020; 22GW by 2040 and 47GW by 2050



Abu Dhabi (DoE)
- Low-Carbon Hydrogen Public Policy took effect in January 2024
- Masdar Green Hydrogen and Adnoc designated as the competent companies to partner with private investors that plan to establish low-carbon hydrogen projects in Abu Dhabi.
- Industry open to "domestic and/or foreign private sector entities that participate in the finance, design, construction, ownership, operation and maintenance of production, conversion, transmission, distribution and/or storage facilities, and trading and supply activities
- Early-stage regulation to ensure access to clean energy and water, public safety, security and other key technical standard.
- Covers the entire low-carbon hydrogen ecosystem including enabling hydrogen valleys, where different low-carbon hydrogen production technologies can be collocated to drive system-wide cost optimisation, including sharing of infrastructure and facilities.

UAE H2 strategy
•1.4 million tonnes per annum (mtpa) by 2031 (consisting of 1 mtpa of green hydrogen and 0.4 mtpa of blue hydrogen)
•7.5 mtpa by 2040,
•15 mtpa by 2050
•local demand of low-carbon hydrogen to reach 2.7 mtpa by 2031

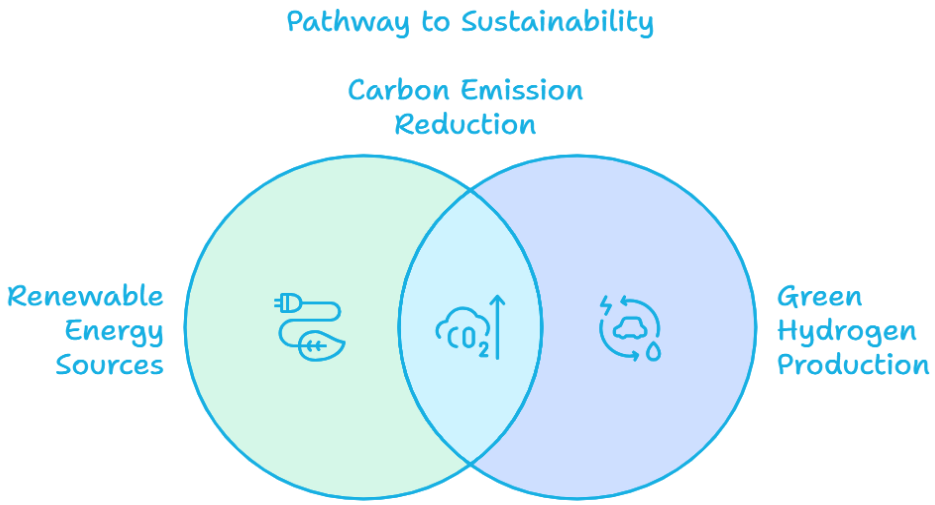
Saudi Arabia
- Official H2 policy under development
- Current focus: gain large market share in blue hydrogen
- Clean hydrogen production target: 2.9 MTPA by 2030,
- 12 MTPA of green H2 and 6 MTPA of blue H2 by 2035
- Clean hydrogen strategy will be contingent on CCUS development

Oman
- Net-zero by 2050 to require $190bn (power, hydrogen, EV, pipelines infra); additional $230bn to unlock hydrogen economy ; private sector to account for 70-80%
- Hydrogen-based steel production (8%)
- full electrification of light vehicles and short-distance heavy vehicles and a transition to hydrogen fuel cells for long-distance heavy vehicles
- Sustainable hydrogen costs need to fall to $2-3kg for it to scale
- 1-1.25MTPA 2030 green H2 production
- 8MTPA of green hydrogen exports by 2050

Source: MEED, government ministries, other secondary sources

Largest Hydrogen Project Markets in the MENA Region

Country	Total Budgeted Value ($m)	Number of Projects
Egypt	112,100	26
Morocco	104,400	8
Oman	72,400	14
Saudi Arabia	24,900	4
Jordan	16,260	5
UAE	13,280	12



- Egypt has the highest number of planned green hydrogen projects. A total of 26 projects, worth $112.1bn hydrogen projects are currently active in the North African nation.
- With an estimated budget of $104.4bn, Morocco holds the second position in this list. This is followed by Oman.
- Out of the total 79 hydrogen projects, only 3 projects are in the construction/development stage. Value-wise this is only $8.9bn, which is 2.6% of total active projects.
- It is now clear that high offtake costs are limiting the development of hydrogen projects in the region. To date only the NEOM complex in Saudi Arabia and the ACME facility in Oman are under construction, while there is also an operational pilot plant in Egypt.
- The recent increase in capex on the NEOM project also highlights the technical challenge of developing projects cost effectively.

Source: MEED Projects

Rail and Metro Projects

MENA Rail and Metro Projects

Rail, metro and LRT networks are now viewed as the optimum means of reducing congestion, taking freight vehicles off the road and reducing aviation and vehicle-based pollution. There are now tens of billions of dollars worth of projects under way in the region to achieve this

MENA selected planned or under construction rail and metro projects

Project	Country	Estimated cost ($m)	Status
Etihad Rail - High Speed Rail	UAE	14,600	Main Contract Bid
MoT, Iraq - The Development Road: Railway Line	Iraq	10,500	Design
RCRC/NCP - Q-Express	Saudi Arabia	10,000	Study
NAT - Cairo Metro Network: Line 4	Egypt	8,300	Under Construction
NAT - High Speed Rail Network	Egypt	7,400	Under Construction
Saudi Arabia Railways - Saudi Landbridge	Saudi Arabia	7,000	Design
ONCF - Kenitra to Marrakech High-Speed Railway	Morocco	6,308	Under Construction
ONCF - Marrakech-Agadir High Speed Railway Line	Morocco	5,600	Study
RTA - Dubai Metro: Blue Line	UAE	5,580	Under Construction
RTA - Dubai Metro: Gold Line	UAE	5,500	Study
RCRC - Riyadh Metro: Line 7	Saudi Arabia	4,000	Main Contract Bid
Saudi Arabia Railways - North South Rail: Civil and Track Works (CTW)	Saudi Arabia	3,600	Under Construction
NAT - Alexandria Metro	Egypt	3,502	Under Construction
MTCIT, Oman - Muscat Metro	Oman	2,600	Study
NIC, Iraq - Baghdad Metro	Iraq	2,500	Design
MoT, Saudi Arabia/Saudi Arabia Railways - Saudi Kuwait High-Speed Railway Line	Saudi Arabia	1,500	Study
MoT, Saudi Arabia/MoTC, Qatar - Riyadh-Doha High-Speed Rail	Saudi Arabia	1,000	Study
Iraq Railways Extension & Modernisation (IREM)	Iraq	970	Design
NAT - Alexandria Raml Tram Rehabilitation	Egypt	780	Under Construction
RCU - Al Ula Tourism Development: Infrastructure: Tramway	Saudi Arabia	453	Bid Evaluation

Source: MEED Projects

Battery Energy Storage Systems (BESS)

Battery Energy Storage Systems (BESS)

BESS comprises rechargeable batteries that can store and discharge energy from various sources when needed. It is one of the key solutions being considered to address the intermittency of renewable energy sources and many new solar schemes now come with BESS attached by default. Riyadh and Abu Dhabi have the largest battery energy storage system projects pipeline

Project	Country	Value ($	Status
NEOM: Oxagon pilot BESS - 21MW	Saudi Arabia	25	Main Contract PQ
SEC - Madaya BESS 500MW/2,000MWh	Saudi Arabia	300	Execution
SEC - Najran BESS 500MW/2,000MWh	Saudi Arabia	300	Execution
SEC - Khamis Mushait BESS 500MW/2,000MWh	Saudi Arabia	300	Execution
SEC - Jouf BESS 500MW/2,000MWH BESS	Saudi Arabia	600	Execution
SEC -Rabigh BESS 500MW/2,000MWh	Saudi Arabia	600	Execution
SEC - Al-Qaysumah BESS 500MW/2,000MWh	Saudi Arabia	600	Execution
SEC - Riyadh BESS 500MW/2,000MWh	Saudi Arabia	600	Execution
SEC - Dawadmi BESS 500MW/2,000MWh	Saudi Arabia	600	Execution
SPPC - Battery Energy Storage System 8GW ISP	Saudi Arabia	8,000	FEED
SPPC - BESS ISP Group 1 Al-Muwayh, Haden, Al-Khushaybi, Al-Kahafa)	Saudi Arabia	1,600	Main Contract Bid
DEWA - MBRM Solar Park Phase 7, BESS 1,000MW	UAE	1,000	Main Contract PQ
EWEC - BESS IPP 400MW	UAE	350	Bid Evaluation
DEWA - BESS 1,500MW	UAE	1,500	Study
Masdar round-the-clock solar PV and BESS - 19GWh BESS	UAE	2,500	EPCs selected

- Costs coming down drastically*
- BESS GCC pipeline within 55GWh estimated rated capacity
- SEC's 500MW Bisha plant came online this year
- Operational 1,300MWh BESS in Red Sea
- SPPC's first BESS ISP with have a 15-year SSA
- BESS key in boosting grid resilience and spinning reserves
- Procured in combination with renewable plants or independently

* Some experts predict the prices could drop to as low as $50/kWh-$25/kWh and, at best, to as low as $10/kWh by the end of the decade, subject to extrapolating current battery learning rates of about 25% for every doubling of capacity. Source: MEED

Q&A

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