

## Middle East and Africa

# Ambition in motion as focus shifts from strategy to implementation

The Middle East and Africa (MEA) region has made significant progress over the past year in translating CCS strategies into tangible projects, investments and policy frameworks. This shift reflects growing momentum towards decarbonisation and climate resilience, backed by national commitments, cross-border partnerships, and technological innovation.



**Focus** – The region is prioritising CCS hub development and integrated value chains for domestic decarbonisation and low-carbon exports. Saudi Arabia, Oman, Qatar, UAE, Kuwait, Nigeria, and South Africa are embedding CCS into national strategies, enabling early deployment and exploring cross-border cooperation and international market access.



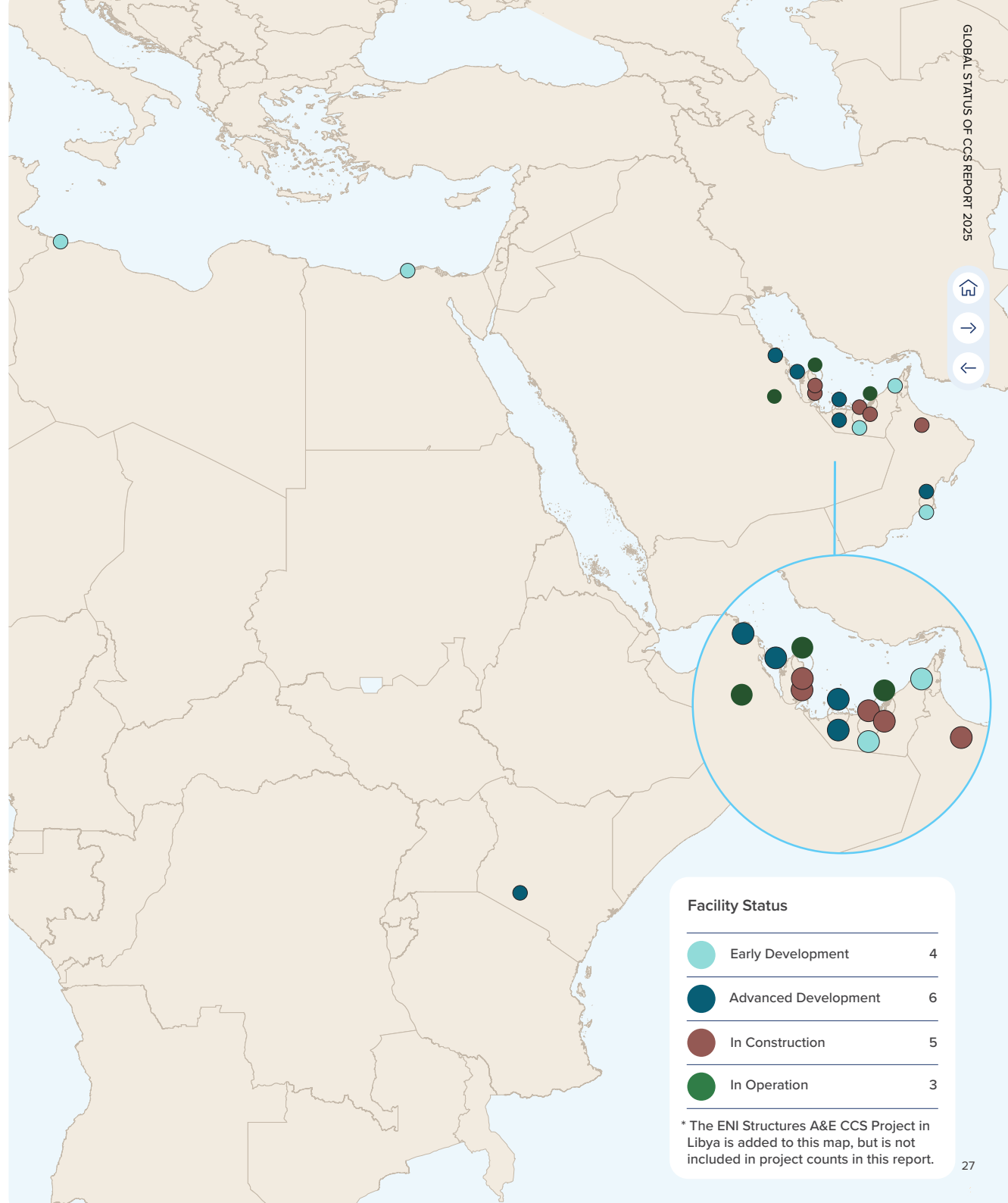
**Drivers** – Key drivers include net zero targets, industrial decarbonisation mandates, and competitiveness under global carbon rules. Public policy shifts, growing private sector engagement, and partnerships with international players – across the US, Europe, and Asia – are accelerating investment and innovation.



**Progress** – The first regional CCUS hub is emerging in Saudi Arabia; DAC and modular capture pilots are underway in Saudi Arabia, UAE, and Kenya; and legal frameworks are being established in the UAE and Oman. Kuwait, Nigeria, and South Africa are progressing on storage assessments, pilot projects, and core policy tools to support scale-up.



**Challenges** – CCS faces key challenges in MEA, including the absence of regulatory frameworks for transport and storage, high upfront costs and limited access to finance. Most technologies remain at the demonstration stage, and underdeveloped carbon markets further limit commercial viability.



\* The ENI Structures A&E CCS Project in Libya is added to this map, but is not included in project counts in this report.





CycloneCC Industrial Demonstration Unit, UAE, image courtesy Carbon Clean.

One of the most notable developments in the MEA region is the emergence of its first CCUS hubs, with supporting infrastructure currently under planning in Saudi Arabia and Oman. On Saudi Arabia's eastern coast, the Jubail CCS hub is advancing, and is expected to capture up to 9 Mtpa of CO<sub>2</sub> by 2028 in collaboration with Aramco, SLB and Linde (SLB, 2024). On the western coast, a CCU hub is being developed in Yanbu Industrial City. In its initial phase, the Yanbu CCU hub aims to capture and utilise 2 Mtpa of CO<sub>2</sub> to produce green methanol, low-carbon urea, and other products (Arab News, 2024).

Oman is also making significant strides, with OQGN actively planning a national CO<sub>2</sub> transportation network to connect emission sources with storage and utilisation sites, aligned with the country's Net Zero 2050 strategy. Key initiatives include the development of underground CO<sub>2</sub> storage projects in collaboration with Shell, a CO<sub>2</sub> pipeline for enhanced oil recovery (EOR) in partnership with Oxy Oman, and the Blue Horizons low-carbon ammonia project, currently in its pre-FEED stage, with Shell, OQ, and PDO as partners (Zawya, 2025b).

Additionally, Oman LNG has unveiled a national decarbonisation strategy featuring two CCUS project pathways: a partial CO<sub>2</sub> export option that would deliver captured CO<sub>2</sub> from the Acid Gas Removal Unit to industries in Sur Industrial City, and a full CO<sub>2</sub> export option involving geological storage in upstream wells. The strategy also includes a study to establish a hydrogen hub in Sur that would explore CO<sub>2</sub> capture and utilisation to produce green ammonia, synthetic natural gas, and e-methanol (Oman Observer, 2024).

QatarEnergy has already deployed 2.2 Mtpa of CCS capacity, with plans to scale to 7-9 Mtpa by 2030 and over 11 Mtpa by 2035. CCS is integrated into the country's LNG operations capturing CO<sub>2</sub> from acid gas enrichment and compressing it for injection in the Ras Laffan Industrial City. Since inception, over 7.5 million tonnes of CO<sub>2</sub> have been captured and stored. A CO<sub>2</sub> export project is nearing completion and will deliver captured CO<sub>2</sub> from LNG facilities to Dukhan for EOR.

A new FEED project involving 10 LNG trains aims to capture over 4 Mtpa of CO<sub>2</sub>, with six wells to be drilled for reinjection. QatarEnergy is also pursuing future CCS initiatives that include:

- Integrating CCS with existing LNG trains.
- Capturing CO<sub>2</sub> for blue ammonia production.
- Capturing CO<sub>2</sub> from new gas processing facilities.
- Capturing post-combustion emissions from gas-fired turbines and power plants.
- Building CO<sub>2</sub> transport pipeline infrastructure to support large-scale deployment across the value chain (Qatar Energy, 2023).



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In the UAE, ADNOC has completed its first CO<sub>2</sub> injection and received DNV certification for its geological storage site, both major milestones toward CCS deployment (DNV, 2024). Kuwait has demonstrated early success with its CO<sub>2</sub>-EOR pilot project, jointly executed by Shell and Kuwait Oil Company (The Business, 2025). Nigeria finalised its National CO<sub>2</sub> Storage Atlas in partnership with the World Bank and the International Finance Corporation (IFC), providing a detailed assessment of geological storage potential and facilitating informed investment and regulation (IFC, 2025). South Africa, supported by international donors and the IEA, is progressing with its national CO<sub>2</sub> storage assessments, positioning itself for early-stage deployment (World Bank, 2024).

## Policy

Governments across the MEA region are beginning to institutionalise CCUS within national policies. The UAE's Federal Decree Law No. (11) of 2024 marks a significant milestone by formally recognising CCUS as a core mitigation strategy to achieve national climate neutrality. The law mandates emissions reporting and introduces enforcement mechanisms, including fines of up to AED 2 million for non-compliance. It also lays the foundation for a national carbon credit registry and empowers the Ministry of Climate Change and Environment to issue detailed regulations on CCUS standards and implementation.

Taking effect in May 2025, the law effectively transforms CCUS from an optional pathway into a regulated obligation for industrial emitters (UAE Government, 2024). Similarly, Abu Dhabi has established an MRV framework, which allows for standardised emissions accounting and integration of CCUS in its climate reporting, including its third Nationally Determined Contribution (Abu Dhabi Environment Agency, 2024).

In December 2024, Oman launched the Oman Net Zero Centre under the Ministry of Energy and Minerals as the national body overseeing decarbonisation efforts. The Centre is responsible for defining and regularly updating the 2050 net zero strategy, coordinating project implementation, including energy efficiency and CCS, and providing technical guidance to public and private stakeholders. It operates under a steering committee chaired by the Minister and includes key government entities. The Centre also manages low-carbon product certifications, supports carbon trading mechanisms, builds institutional capacity, and promotes investment to localise sustainable technologies (Foreign Ministry of Oman, 2024).

These developments are crucial for ensuring accountability, attracting investment, and enabling emissions crediting. They also provide the foundation for evolving into mandatory frameworks as CCS deployment scales.



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## Key drivers and enablers of CCS in MEA

### MEA Drivers

Net-zero commitments or NDC targets requiring deep industrial decarbonisation

Exposure to trade risks under international carbon pricing (e.g. EU CBAM)

Ensuring market access for carbon-exposed exports (e.g. ammonia, steel, fertilisers)

Developing low-carbon export vectors (e.g. ammonia, SAF, derivatives)

Limited mitigation alternatives for hard-to-abate sectors (e.g. cement, refining, petrochemicals, steel)

Unlocking value from CO<sub>2</sub> storage capacity (regional CO<sub>2</sub> hub, cross-border storage services)

Positioning for global clean energy value chains (hydrogen, SAF, green shipping fuels)

Building domestic low-carbon industrial ecosystems (foreign direct investment, technology transfer, workforce localisation)

Scaling domestic low-carbon tech manufacturing (innovation, localisation)

### Country

### Enablers

#### Saudi Arabia

- CCE framework
- 44 Mtpa CCS target by 2035
- Aramco CCS target of 14 Mtpa by 2035
- Strong Aramco & MoE support for CCUS hubs (Jubail, Yanbu)
- R&D and pilots: DAC, CO<sub>2</sub> mineralisation
- CCS in national power decarbonisation (CCS-ready gas plants)
- Regional voluntary carbon market launched
- Co-lead: CEM CCUS, MI CDR Mission and CMC

#### UAE

- 10 Mtpa ADNOC CCS target by 2030
- 43.5 Mtpa National CCS target
- CCS codified in Federal Climate Law No. 11 as mitigation technology
- Mandated national carbon registry
- EAD-led MRV programme
- DNV-certified CO<sub>2</sub> storage site
- CCS legally creditable (Law No. 67, Art. 10)
- Planned Cap-and-trade system, Carbon Contracts for Difference (CCfDs) and CO<sub>2</sub> transport & storage regulations

#### Qatar

- QatarEnergy CCS target of 11 Mtpa by 2035
- QatarEnergy CCS roadmap
- CCS required by Qatar Environment and Energy Commission Qatar
- Financial Centre's tokenised carbon market ecosystem Low-carbon
- Hydrogen development

#### Oman

- Planned CCS legal and regulatory framework
- Oman Net Zero Centre
- CO<sub>2</sub> transport infrastructure planning
- Low-carbon hydrogen development

#### Egypt

- Development of CO<sub>2</sub> storage hubs
- Cross-border CO<sub>2</sub> storage
- Proximity to Europe and the Eastern Mediterranean
- Access to Suez Canal infrastructure and port facilities
- Development of storage-linked carbon credit systems

#### Nigeria

- Climate Change Act (2021) and Petroleum Industry Act (2021) provide legal CCS foundation
- Nigeria Energy Transition Plan (ETP) includes CCS as a key mitigation tool
- IFC-supported CO<sub>2</sub> Storage Atlas and diagnostic assessments (2023–2025)
- Identification of 15 potential CCS projects; pilot designs (20 ktpa) under consideration
- Institutional partnerships with UNDP, SEforALL for MRV and capacity building
- Due diligence protocols under development to align with ICVCM/VCMI integrity standards

#### Kenya

- National CCS assessment for Kenya Rift underway (basalt storage potential)
- DAC pilot projects targeting mineral storage
- Climate Change (Carbon Markets) Regulations (2024) codify industrial emissions reductions, enabling CCS as non-land carbon project
- Private sector mobilisation through KEPSA–WBG carbon market guidance for enterprises
- World Bank and IFC building local carbon market infrastructure to mobilise private climate capital

#### South Africa

- Climate Change Act (2024) sets carbon budgets and mitigation plans that allow CCS integration
- Council for Geoscience (CGS) leading site mapping and storage readiness in Mpumalanga
- World Bank-funded pilot storage project launching 2025 with regulatory support
- SACCCS under SANEDI driving national CCS capacity and coordination
- Article 6 carbon credits permitted against carbon tax liabilities

## Cross-border

Cross-border collaborations are increasingly viewed as necessary for enabling economies of scale and reducing costs. Saudi Arabia has initiated discussions with Greece to export captured CO<sub>2</sub>, while Egypt is exploring similar arrangements with Greece and Cyprus (Greek City Times, 2025), (Egypt Government, 2025). These bilateral initiatives are focused on shared infrastructure, shipping logistics, and storage potential.

Oman's MoU with Gasunie outlines a potential CO<sub>2</sub> and hydrogen corridor connecting the Gulf Cooperation Council (GCC) to European demand centres (Oman Sustainability Week, 2025). Delivering such a corridor will require investment in CO<sub>2</sub> liquefaction, maritime transport, MRV systems, and regulatory alignment with EU carbon accounting frameworks. It also necessitates domestic readiness: Oman must accelerate the development of certified storage sites, carbon registries, and cross-border policy interoperability to operationalise its export ambitions.

On the commercial side, ADNOC has taken a 35% equity stake in ExxonMobil's Texas hydrogen and CCS project, marking a strategic entry into global low-carbon energy value chains (ADNOC, 2024a). ADNOC has also signed a partnership with Malaysia's Petronas to explore offshore CO<sub>2</sub> storage, further solidifying its international CCS footprint (ADNOC, 2024b). Most recently, ADNOC's investment arm XRG agreed to explore a joint venture with Occidental's 1PointFive on the Stratos DAC facility in Texas, one of the world's largest, targeting 500,000 tpa of CO<sub>2</sub> removal (Oxy, 2025).

This signals ADNOC's expanding role in global carbon removal infrastructure and DAC deployment. In parallel, Aramco Ventures has backed Germany's largest DAC demonstration project through seed investment in Ucano, supporting the scale-up of European carbon removal technologies and positioning Saudi Arabia within emerging CDR markets (Aramco Ventures, 2025).

## Leadership

Several countries are demonstrating leadership in the deployment of emerging technologies. Aramco and Siemens Energy have piloted Saudi Arabia's first DAC unit in Dhahran, highlighting the country's ambition to lead in carbon removal (Reuters, 2025). In the UAE, Fertiglobe deployed Carbon Clean's CycloneCC modular capture unit at TA'ZIZ, capturing 10 tonnes per day of CO<sub>2</sub> to decarbonise ammonia production (Zawya, 2025a).

Aramco has acquired a 50% stake in the Blue Hydrogen Industrial Gases Company (BHIG) in Jubail, in partnership with Air Products Qudra. BHIG aims to supply hydrogen – including blue hydrogen produced from natural gas with CO<sub>2</sub> capture and storage – in coordination with Aramco's CCS activities, supporting large-scale low-carbon hydrogen production in Jubail Industrial City (Aramco, 2025).

The Omani start-up 44.01 continues to push the frontier of carbon mineralisation, implementing peridotite-based storage, and has received additional funding to demonstrate its mineralisation technology (ADNOC, 2024c; Oman Sustainability week, 2025). These examples illustrate how MEA countries are integrating CCS with low-carbon fuels like hydrogen, ammonia, and sustainable aviation fuel (SAF), reinforcing their roles in both regional decarbonisation and global clean fuel exports.



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## Government-to-government cross-border collaboration

From	To	Focus	Category
Saudi Arabia	Greece	CO <sub>2</sub> export & storage	Storage
Saudi Arabia	France	CCUS in hard-to-abate sectors (cement, aviation, marine, petrochemicals)	CCUS / Industrial Decarb
Egypt	Greece	CO <sub>2</sub> export & shared infrastructure	Storage
Egypt	Cyprus	CO <sub>2</sub> export & storage	Storage
Egypt	UAE	Industrial Transition Accelerator (ITA)	CCUS Industrial Decarbonisation
Oman	Netherlands	Hydrogen & CO <sub>2</sub> corridor	Policy/Infrastructure
Oman	Türkiye	Carbon capture cooperation	CCS
Oman	Japan	Industrial decarbonisation, tech transfer, CCUS pilots	CCUS, Industry, Japan

## Business-to-business cross-border collaboration

From	To	Country	Focus	Category
OQGN (Oman)	Gasunie (Netherlands)	Netherlands	Carbon capture technologies	Policy/Tech
ADNOC (UAE)	ExxonMobil (USA)	US	Low-carbon H <sub>2</sub> & CCS	Hydrogen / CCS
ADNOC (UAE)	Petronas (MY)	Malaysia	Offshore CO <sub>2</sub> storage	Storage
ADNOC (UAE)	Occidental (USA)	US	DAC JV – Stratos facility	Direct Air Capture
Aramco Ventures (KSA)	Ucano (Germany)	Germany	DAC technology scale-up	Direct Air Capture
Oman LNG (Oman)	Kanadevia (Japan)	Japan	Methanation pilot with CCU & green H <sub>2</sub>	Power to X / CCU

## Opportunities

The MEA region possesses several unique opportunities to lead in global CCS deployment. Vast and underutilised geological storage potential exists in countries like Saudi Arabia, the UAE, Nigeria, Mozambique, Egypt, and South Africa, providing a critical asset base for regional hubs. As the global demand for low-carbon products and carbon credits grows, MEA countries can leverage CCS to ensure market access and export competitiveness, particularly in sectors facing border adjustment mechanisms such as the EU CBAM.

Technologically, the region is well-positioned to become a first mover in areas such as DAC, mineralisation, and modular capture systems. Kenya's Octavia Carbon, for example, is advancing DAC pilots that integrate geothermal energy, presenting a blueprint for clean energy coupling in African contexts (Empower Africa, 2024).

Similarly, Saudi Arabia's NEOM project is exploring mineralised concrete using technologies like CarbonCure, demonstrating new CCS applications in the built environment (Gas World, 2024).

Private sector involvement is also expanding, with national oil companies, industrial players, and start-ups showing growing interest in CCS as a climate and business solution.

Furthermore, cross-border interest from Europe and Asia – including countries seeking to import CO<sub>2</sub> or invest in low-carbon hydrogen – presents new partnership models for MEA exporters. These trends position the region to become not just a deployment zone, but also a global CCS hub.

## Challenges

Despite this momentum, several challenges remain. A key barrier is the lack of fully developed legal and regulatory frameworks for CO<sub>2</sub> storage, transport, and liability. While progress is being made, particularly in the UAE and Oman, many jurisdictions still lack clarity on permitting, access rights, and long-term stewardship.

High upfront capital expenditure remains a constraint, especially for CO<sub>2</sub> pipelines and storage infrastructure. With limited public finance and carbon pricing signals, projects often struggle to achieve bankability. Scaling CCS from pilot to commercial scale will require de-risking investments through public-private partnerships, concessional finance, and clearer revenue models.

Moreover, most CCS technologies in the region remain at the demonstration stage. Broader commercial deployment will require extensive subsurface validation, robust MRV systems, and transparent standards for carbon crediting. Voluntary carbon markets remain emerging, and without strong governance and trust, credit pricing may not justify the cost of capture.

Institutionally, a clear definition of roles, streamlined approvals, and regional autonomy in implementation are critical to prevent bureaucratic slowdowns.

However, with a foundation of policy support, expanding infrastructure, and an appetite for innovation, CCS is becoming embedded in the MEA region's energy and climate future. The transition from strategy to execution has gained momentum, and while challenges remain – including high capital requirements, policy fragmentation, and infrastructure limitations – the region is well-positioned to scale deployment. Strategic autonomy, international cooperation, and technology leadership will be vital to sustaining this progress and securing MEA's position as a global CCS leader.

## Oman Net Zero Centre

The Oman Net Zero Centre (ONZC) is mandated to prepare and update the national plan for transition to net zero in coordination with relevant entities. Guided by His Majesty Sultan Haitham bin Tariq's commitment to achieving net-zero carbon emissions by 2050, the Centre monitors projects, supports stakeholders, and adopts global best practices and technologies.

CCS is recognised as a critical pillar of Oman's decarbonisation pathway, particularly for hard-to-abate sectors such as oil and gas, refineries, cement, and heavy industry. The Centre advances CCS by facilitating research, enabling regulatory frameworks, and promoting investment in large-scale projects, leveraging Oman's significant geological storage potential.

ONZC is responsible for refreshing Oman's 2050 Net Zero Strategy through a phased approach covering baseline assessments, sectoral roadmaps, and enabling policies and finance. CCS is embedded within these pathways, with milestones and capacity targets integrated into national planning, while the Centre coordinates both pilot and commercial-scale projects and ensures they are supported by appropriate regulatory, monitoring, and financing mechanisms.

The Centre coordinates decarbonisation efforts across sectors through the Oman Net Zero Platform (Meezan), which provides emissions monitoring, forecasting, and reporting. This ensures CCS deployment progresses in parallel with other mitigation measures such as hydrogen and renewables.

ONZC also leads carbon market development, managing certificates, a national registry, and frameworks for trading. By prioritising cost-effective CCS projects and engaging global investors, the Centre attracts finance, fosters technology localisation, and builds domestic expertise, positioning Oman as a regional leader in low-carbon industrial development.

## Saudi Arabia's Jubail CCS Hub

The Jubail CCS Hub stands as one of the most ambitious carbon sequestration projects in the region and globally, aiming to capture and store up to 9 Mtpa by 2028. The initiative is led by Aramco (60% equity), with SLB and Linde as strategic partners (20% each). The shareholder agreement was signed in late 2024, following an initial MoU in 2022 – marking a significant step in the Kingdom's carbon management agenda.

The project aggregates CO<sub>2</sub> from multiple sources: Approximately 6 Mtpa from Aramco's gas processing operations and 3 Mtpa from nearby industrial emitters with transport to onshore saline formations for permanent geological storage. The hub will include dehydration, compression, pipeline infrastructure, and a robust measurement, reporting, and verification (MRV) system aligned with global standards. FEED and site development and early works have been completed and other major EPC packages are being awarded.

Beyond its scale, the project demonstrates a replicable model for shared CCS infrastructure in the region, enabling cross-sector coordination, long-term liability frameworks, and regional leadership in carbon management deployment.