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The Hydrogen Ambitions of the Gulf States

Achieving Economic Diversification while Maintaining Power

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The countries of the Gulf Cooperation Council (GCC) are mapping out agendas to kickstart a hydrogen economy. Especially Saudi Arabia, Oman, and the United Arab Emirates (UAE) are pursuing ambitious plans to supply Europe and Asia-Pacific with the carbon-friendly fuel. Numerous declarations of intent have been signed, and the first large-scale projects are under way. For the Gulf countries, hydrogen is not only a means of diversification. Since the hydrogen economy blends into the institutional and fiscal framework of the petroleum industry, it is primarily a chance for the GCC economies to maintain current economic and political power structures. While hydrogen from the Gulf is an effective tool for climate change mitigation, Germany and Europe are faced with trade-offs and open questions.

Saudi Arabia, Kuwait, Bahrain, Qatar, the UAE, and Oman — the six countries of the GCC — are home to about one-third of the world's oil reserves and about one-fifth of the planet's natural gas reserves. Now, the Gulf states have unveiled ambitious plans for a hydrogen economy. High solar yields and abundant land provide excellent conditions to produce green hydrogen (from renewable electricity). Equally, natural gas reserves and geology offer opportunities for blue hydrogen (produced from natural gas with carbon capture). Abundant funding, direct decision-making, and existing infrastructure make the GCC economies excellent hydrogen first-movers. However, hydrogen offers more than mere diversification for the Gulf countries: It allows them to maintain economic and political power even in a decarbonised world.

Hydrogen policy in the Arab Gulf states

In October 2021, Saudi Arabia's Minister of Energy, Abdulaziz bin Salman al-Saud, announced the goal of becoming the world's largest hydrogen producer. A formalised hydrogen strategy does not exist; however, the country's hydrogen policy is closely linked to Vision 2030, which was published in 2016. The vision assumes a holistic transformation of Saudi Arabia and is considered a key project of Crown Prince Mohammed bin Salman (MBS). Although Vision 2030

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does not explicitly mention hydrogen, its strategic goals demand significant increases in domestic value creation, non-oil exports, renewable energy, and the natural gas industry. Also the Circular Carbon Economy — a concept co-developed by Saudi actors and adopted by the G20 during Saudi Arabia's presidency — relates to (blue) hydrogen. The framework encompasses the four Rs ("reduce, reuse, recycle, remove"), which translate into energy efficiency, carbon-neutral power generation, natural carbon reduction, and — most importantly — extensive carbon capture. The captured CO_2 can be used by the industry (if demand for CO_2 as a raw material can be established) or by injection into oil reservoirs for tertiary oil production (so-called CO_2 flooding).

Also Oman's Vision 2040 does not explicitly mention hydrogen but calls for a general "diversification of energy sources". A national hydrogen strategy was announced in February 2020 and is expected soon. EJAAD, a collaboration platform between the Ministry of Oil, the Ministry of Research, and the state-owned oil company, is leading this effort. In August 2021, Oman founded the "Hy-Fly Alliance", which brings together government agencies, the oil and gas sector, education and research institutions, and the ports of Sohar and Duqm in a joint platform. At the same time, hydrogen divisions were set up in several ministries, as well as a state-owned hydrogen company named Hydrogen Development Oman.

The UAE announced at the COP26 summit in November 2021 that it was working on a "Hydrogen Roadmap", which aims at establishing the country as a leader in hydrogen. The UAE intends to create new value chains for the export of low-carbon hydrogen and its derivatives, as well as the hydrogen-based production of steel and jet fuel. To this end, a clear regulatory framework with suitable policies, standards, and certifications is planned. The roadmap has not yet been published, but the UAE has already set a target of 25 per cent of the global hydrogen market. The hydrogen agenda is also linked to the Energy Strategy 2050, which was adopted in 2017 and aims to increase the share of clean energy in primary energy consumption to 25—50 per cent by 2050. The UAE's Nationally Determined Contributions (NDCs), which were updated in December 2020, refer to hydrogen as the "energy carrier of the future".

Qatar's approach is the opposite. The gas-rich emirate has no plans for a policy framework or measures to increase domestic hydrogen production. Instead, Qatar relies on its position as the world's leading exporter of liquefied natural gas (LNG); the country's strategy is to export LNG and let importers produce blue hydrogen abroad. It continues to develop relationships with importers for this purpose. Hydrogen itself is also reflected in Qatar's NDCs, which cite it as a means to fulfil the contributions.

Kuwait has not yet adopted a national hydrogen strategy, but the government-related think-tank KFAS presented a white paper for a strategy in January 2021. Its points overlap with the overarching Vision 2035 "New Kuwait". The white paper suggests promoting carbon capture, renewable energy, and both green and blue hydrogen production. It also advocates for the domestic use of hydrogen and intensified cooperation with other GCC countries. Although the white paper focusses on blue hydrogen, green hydrogen is more realistic, as Kuwait is a net importer of natural gas.

Bahrain's approach to hydrogen has been hesitant. Although feasibility studies for a domestic hydrogen economy were commissioned in November 2020, the government said it only wanted to observe developments. It was not until the Industrial Strategy 2022—2026 got published in January 2022 that the production of green and blue hydrogen was declared a goal.

Key players in the hydrogen development plans

National energy ministries are at the forefront of shaping the path towards a hydrogen economy. Under the umbrella of national strategies, the ministries take the lead in striking international agreements.