



UNITED ARAB EMIRATES
MINISTRY OF ENERGY & INFRASTRUCTURE

UAE Hydrogen Leadership Roadmap

4th November 2021

Hydrogen Landscape and UAE Competitive Advantage



Low carbon hydrogen expected to be a 400+ billion-dollar business in 2050 and a key measure to combat climate change



Hydrogen will further enable the diversification of the UAE economy through the expansion in existing industries and growth of new industries



The UAE is well positioned to be a leader in low carbon hydrogen with natural competitive advantages in both blue and green hydrogen



New alliances are already in place with partners who are excited to be part of the hydrogen future with the UAE and who bring new capabilities and technologies



Hydrogen to play a significant role in the UAE National Energy Strategy 2050 and UAE Net Zero by 2050 Strategic Initiative



The UAE Hydrogen Leadership Roadmap is already being underpinned by National Champions with world-leading low carbon hydrogen projects, pilots, and test cargoes



The UAE with strong financial capabilities and a stable political and regulatory environment for long term investments



The UAE is fostering innovation to enable the global energy transition, providing the right ecosystem for low carbon hydrogen projects

UAE advocates for the development of low carbon hydrogen



Key climate measure

Low carbon hydrogen is needed for net zero with a long-term commitment required



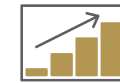
Massive potential

~350 Mtpa global demand and +\$400B market potential by 2050 in 2°C path




International momentum

45 countries with national hydrogen strategies or actively developing them



Improving economics

The UAE well positioned to be a top quartile producer of H₂ through low-cost gas and world leading solar PV



The UAE is well positioned to be a leader in low carbon hydrogen

Low-cost gas will help the UAE to play a leading role in developing and maturing the low carbon hydrogen market

UAE amongst the countries globally with the lowest solar costs for green hydrogen and with available land for solar PV

UAE National Champions are already present across the end-to-end value chain for hydrogen and ammonia

UAE starts from a position of strength, with 7+ projects underway, developments on the ground, and 4 test cargos sold

Existing alliances forged in Japan, South Korea and Europe with key off-takers, infrastructure players and technology leaders and more alliances are to be created

Favorable geographic positioning of the UAE to key future low carbon hydrogen markets in both Asia and Europe

The UAE ranked the fourth best country to live and work in the world and is the highest value nation brand in the Middle East



The UAE is targeting 25% market share of low carbon hydrogen and derivatives in key import markets by 2030 with an initial focus on Japan, South Korea, India, and Europe while in parallel pursuing export opportunities across other markets.

Global leader in hydrogen

UAE with ambition to be a global leader in low carbon hydrogen

25% market share

We will target a 25% market share in key import markets

7+ projects announced

We are well on the way with 7+ projects planned to deliver 0.5 mtpa hydrogen

The UAE is well on its way to champion the development of low carbon hydrogen projects



1

Taziz - Ruwais chemical hub

- 1 mtpa blue ammonia production plant located in the Taziz chemicals hub
- 0.2 mtpa H₂ equivalent capacity



2

Masdar – Demonstration plant

- Green H₂ initially for road transport, then expanding to
- e-kerosene synthesis and ocean shipping
- Demonstration scale



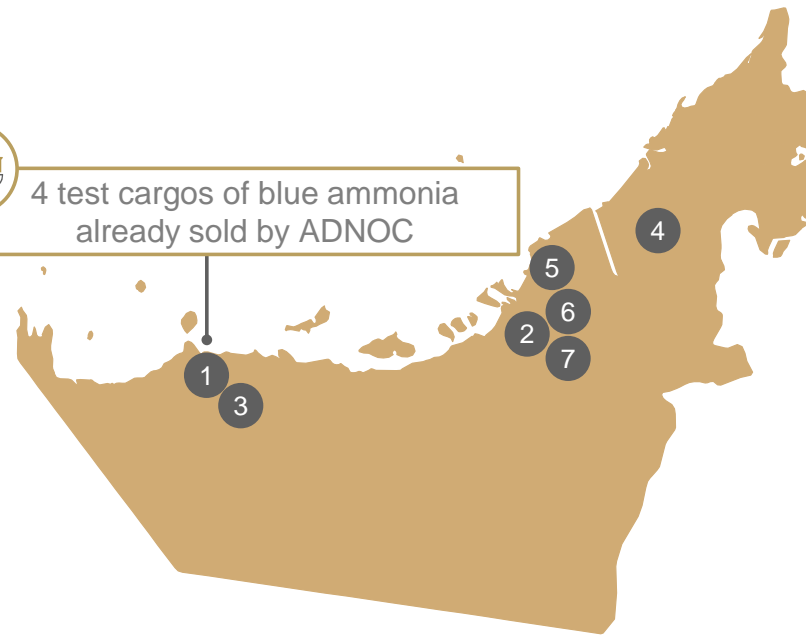
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UAE Hydrogen Hub

- Initial development of 1GW of low carbon hydrogen together with BP as well as pioneering decarbonized air corridors between the UK and UAE
- 0.1-0.2 mtpa H₂ equivalent capacity



4 test cargos of blue ammonia already sold by ADNOC



4



Mohammed bin Rashid Al Maktoum Solar Park

- First solar PV and green hydrogen producing facility in the MENA region
- Demonstration scale

5



Abu Dhabi, Khalifa Industrial Zone

- Final goal of 200kt of ammonia and 40kt of H₂ annual production
- 0.1 mtpa H₂ equivalent capacity

6



TAQA & Abu Dhabi Ports

- Green ammonia project under discussion powered by a 2 GW solar based electrolyzer facility
- 0.1 mtpa H₂ equivalent capacity

7

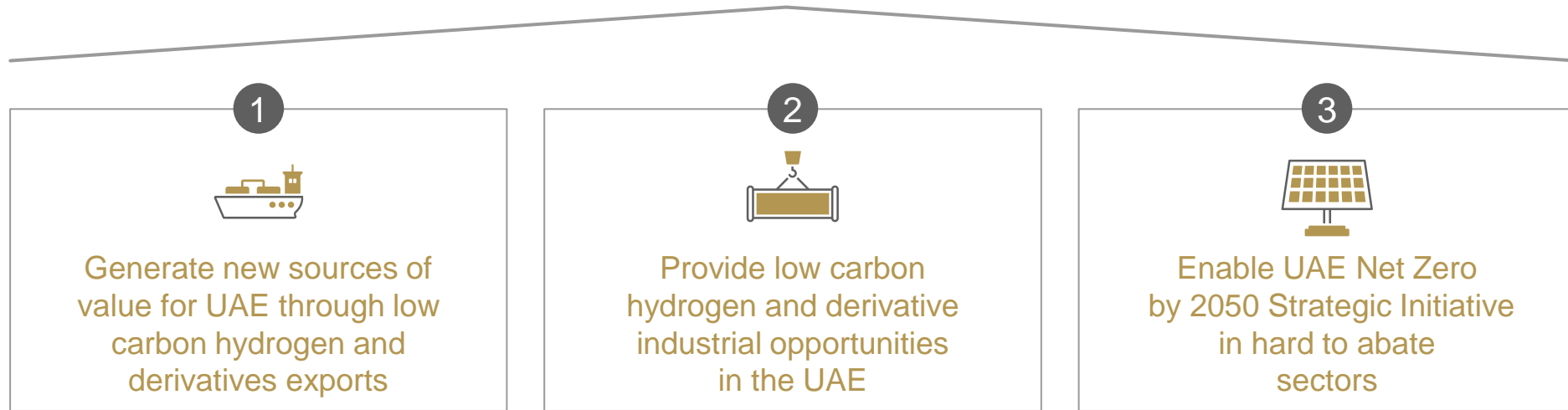


TAQA & Emirates Steel

- MOU for large-scale green hydrogen project enabling the first green steel produced in the MENA region

UAE's Hydrogen Leadership Roadmap - 3 Key Objectives

Ambition: UAE as a global leader in low carbon hydrogen and home to a robust and vibrant low carbon hydrogen ecosystem



Enablers

Provide a clear regulatory framework backed by policies, incentives, standards, certifications, and clear roles among UAE entities

Develop new low carbon hydrogen technology and competencies through value adding partnerships and domestic R&D efforts

Leverage existing and new Government to Government relationships to accelerate growth of domestic ecosystem

Provide land and associated infrastructure resources to support UAE production and develop the domestic ecosystem

Access green financing through the UAE and international capital markets

UAE Net Zero by 2050 Strategic Initiative and UAE National Energy Strategy 2050

Hydrogen a key enabler

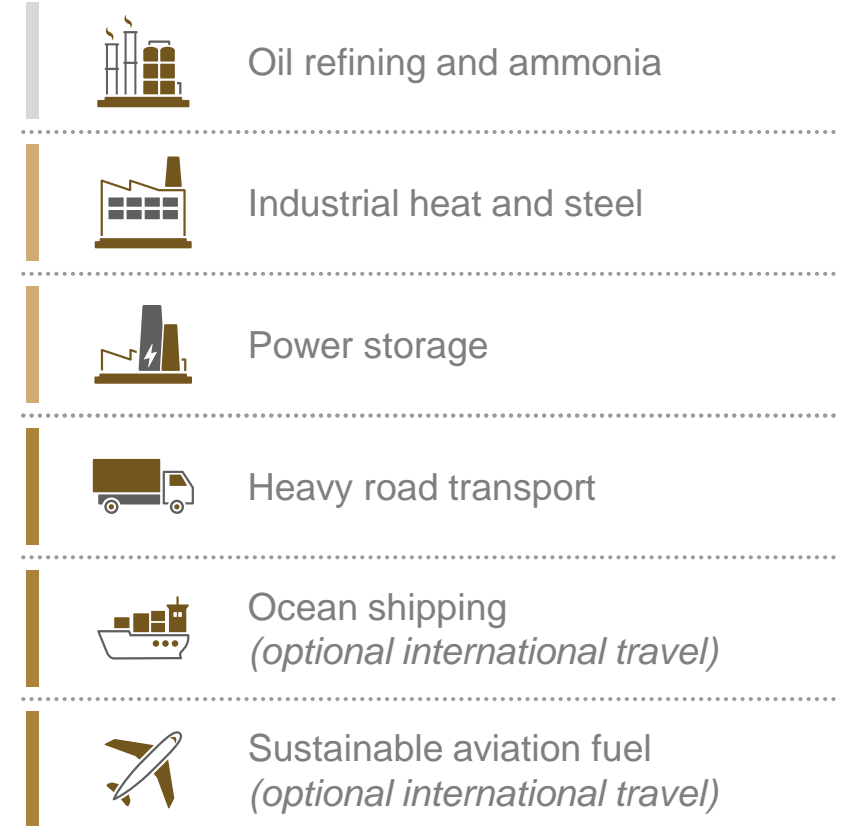
Mtpa H₂ in 2050

4-10



Domestic UAE Hydrogen demand in net-zero 2050

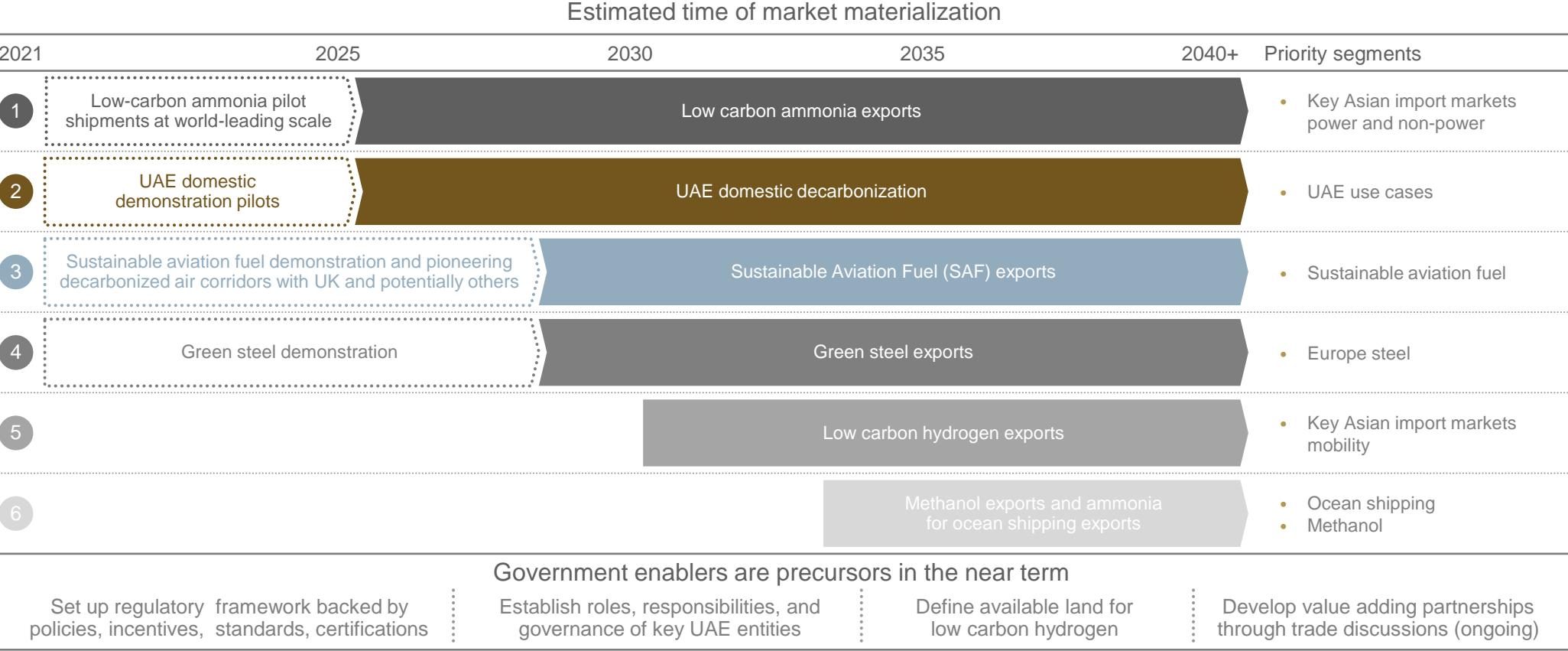
Target applications



Incumbent fuel demand: Grey hydrogen Natural gas Crude-oil based products

Note: Assuming aggressive decarbonization to arrive at net-zero by 2050 – underpinning regulation yet to be defined
Source: IEA World Energy Balances; IEA WEO 2020; GlobalData; Nexant

UAE's Hydrogen Leadership Roadmap to be ramped rapidly with first demonstrations already underway



Partners

Abu Dhabi Hydrogen Alliance



National Hydrogen Technical Committee



Glossary for UAE Hydrogen Leadership Roadmap

Term	Definition
Low carbon hydrogen	Hydrogen produced with low carbon emissions either as blue hydrogen based on fossil fuels and with carbon capture and storage for emitted carbon or green hydrogen produced based on renewable energy with an electrolyzer
National Champions	UAE's National Champions in low carbon hydrogen are the key players in the development of the domestic industry including ADNOC, ADQ, Mubadala, DEWA, Beaa and Masdar
UAE National Energy Strategy 2050	The unified energy strategy in the UAE towards 2050 based on supply and demand targets
UAE Net Zero by 2050 Strategic Initiative	National strategic initiative to reach domestic net-zero emissions by 2050

Thank you

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