Oman's Green Hydrogen Journey Update

Berlin Energy Transition Dialogues

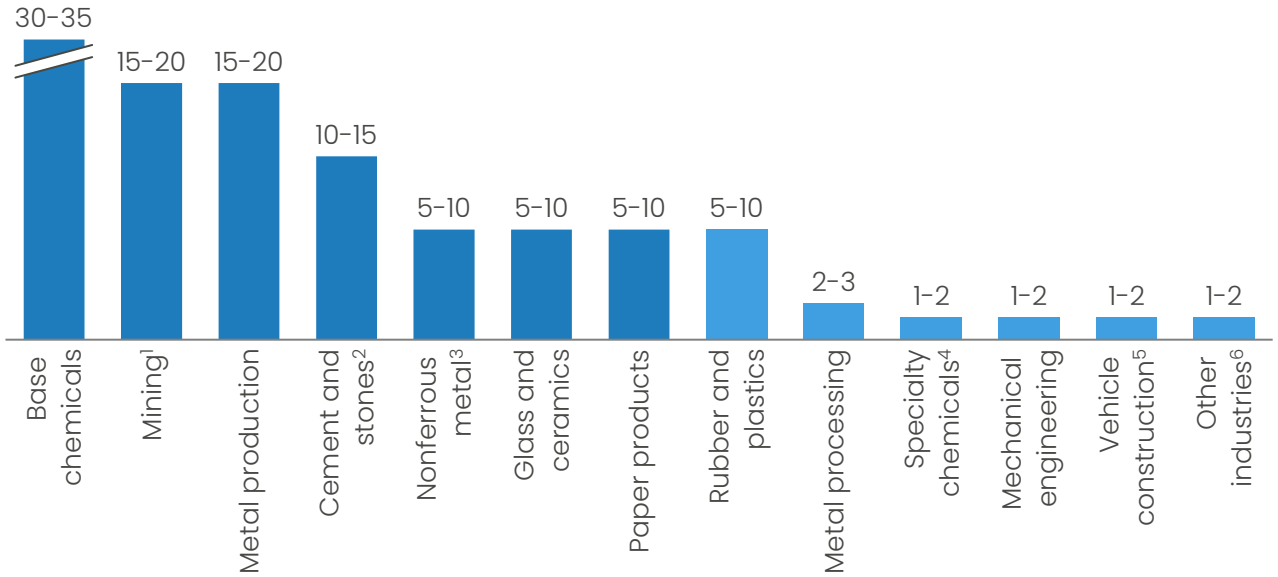
March 2024

Beyond H2: The global industrial landscape will change as new centers of low-cost, low-carbon energy emerge

Oman, and more broadly the GCC, have a unique opportunity to localize new industries

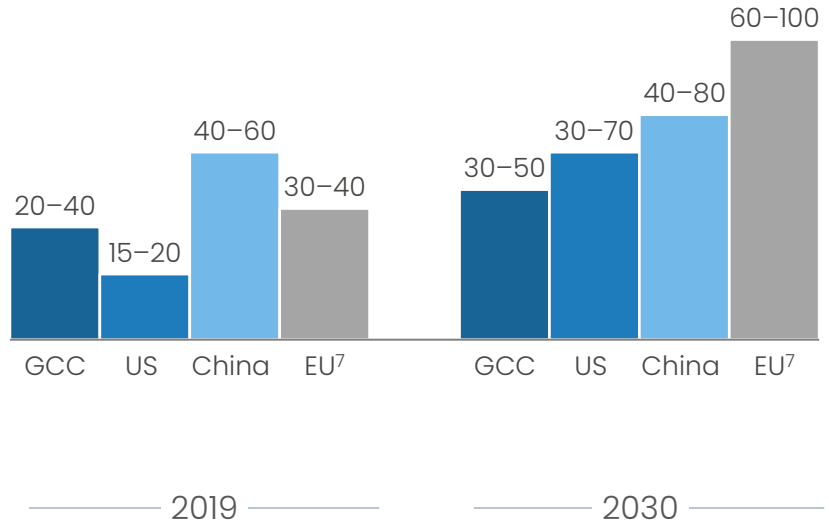
Heaviest electricity users most likely to relocate to most competitive regions for energy supplies

Energy intensity (2019-2020, energy feedstock costs as percentage of revenue)



Regions have access to energy at vastly different costs

Average observed and expected electricity prices ($/MWh)



1. Coal, stones, earth, and other 2. Processing of stones and earth 3. Includes foundries 4. Includes pharmaceuticals 5. Includes battery production 6. E.g., extraction of crude oil and natural gas, food, tobacco, textiles, wood, printed matter 7. Electricity costs in Germany used for EU estimates
Note: Specific energy intensity depends on company size and tariff. Energy price ranges based on external scenarios and wholesale-price experts
Source: Destatis; Energiebilanzen; Refinitiv Eikon; Aurora Energy Research; Rystad; Nymex; Enerdata; International Center for Energy; International Energy Agency; Team analysis

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The green economy will provide key benefits to Oman

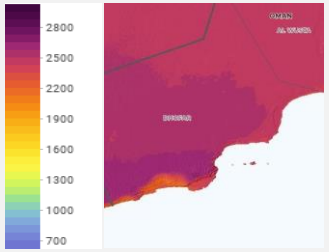
- Economic growth beyond business-as-usual, with localization of new industries
- Diversification away from oil & gas, higher resilience with less exposure to price volatility
- Sustainability with focus on opportunities that help the country decarbonization
- More and higher skilled jobs, in particular in sectors with strong growth potential globally

3 main factors strongly position Oman to seize the energy transition opportunity

Significant renewables potential

Solar PV potential[1]

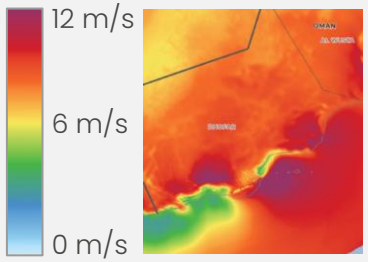
kWh/m²



>2400 kWh/m²

Wind speed

m/s

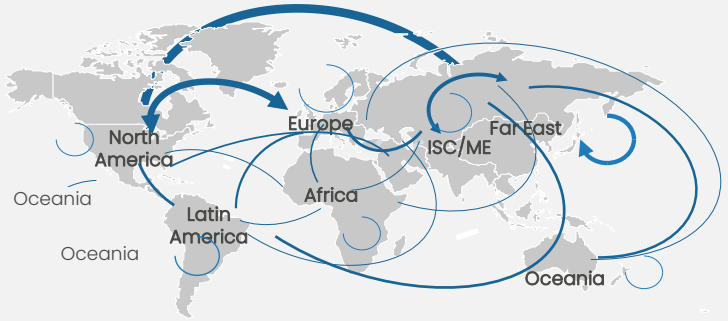


Up to 11 m/s

- 50'000 km² of land with prime natural resources, with
  - Significant solar PV potential, up to 2500 kWh/m² of solar irradiation
  - Significant wind speed and capacity factor reaching 53% in selected areas

Favorable location and geopolitical outlook

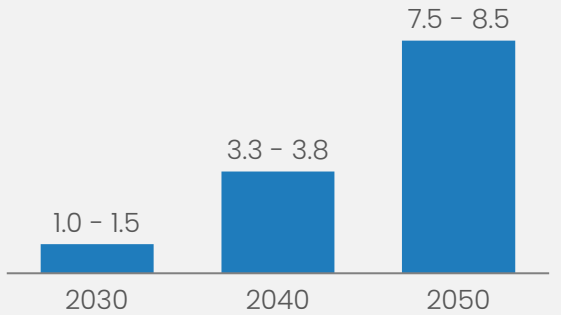
Container Trade route volume in 2019 (M TEU)[4]



- >10% of all global trade passes through the Strait of Hormuz and Bab El-Mandeb
- >40% of global container capacity passes through the Red Sea and Suez Canal
- Positive geopolitical outlook given relationship with all major trade clusters (Europe, US, China)

Ambitious hydrogen program

Green H_2 production ambition for Oman in 2030-2050 (Mtpa)



	2030	2040	2050
Electrolyzer capacity[2] (GW)	8-15	35-40	95-100
Renewables capacity[2,3] (GW)	16-30	65-75	175-185

- 1st bid round for hydrogen projects awarded and 2nd bid round announced
- Oman expected to become among top 10 H_2 exporters by 2030 according to IEA

1. Global Horizontal Irradiation (GHI) 2. Approximate values for Duqm, Oman 3. Includes 25% buffer over Renewables needed for electrolyzers to account for Balance of plant load (which includes NH_3 synthesis loop, Storage tanks for H_2/NH_3, another auxiliary facilities load). Assumption: Sustainable Development Scenario (2°C) 4. Figures do not include intra-zone trades apart from Intra China and Intra Europe
Source: Global solar atlas, Global wind atlas (July '22); IEA; IHS GTA Forecasting May 2020, joebiden.com; Press search; Team analysis

Energy transition can unlock multiple opportunities across industries for Oman

Industrial and technological hub

Oman can provide abundant access to cheap energy, particularly gH_2 and low-cost power

This will become a key input for industries with both flexible and less flexible power demand (e.g., data mining and green steel, respectively)

Mining hub

Mining industry creating a positive feedback loop

- Operations powered by renewable energy
- Resulting minerals used in renewables value chain, increasing deployment

Bunkering & logistics hub

Opportunity for Oman to become a hub for shipping given

- It will be producing hydrogen & derivatives
- It will have ports located along major trade routes

Agricultural hub

Excess electricity and water from gH_2 production leveraged to increase Oman's agricultural output

Clean-powered greenhouses increasing throughout Oman, along with crops and cattle

Tourism hub

Sustainable tourism operations flourishing throughout the country as suppliers decarbonize their operations (e.g., with zero-emission buildings, circular practices) and natural landscapes are preserved

Source: Team analysis

Oman today

Oman tomorrow

Oil & gas

Green Hydrogen

Road to net zero by 2050

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Oman's concrete actions to develop its H_2 economy

50,000 km^2 of land

Land allocated for gH2 production projects

Hydrogen auctions

Clear process, 1st round completed and 2nd open

6 projects awarded

~1010 ktpa of H_2 by 2030 with +38 B$ investments

Oman gH2 Strategy

Provided clarity and direction

Shared infrastructure for gH_2

Concept & timeline approved, infra company incorporated

Oman has ambitious production targets until 2050, with already >1 Mtpa by 2030

Green H_2 production ambition for Oman in 2030-2050 (Mtpa)

Includes exports mainly to Europe and Asia, and local Omani demand

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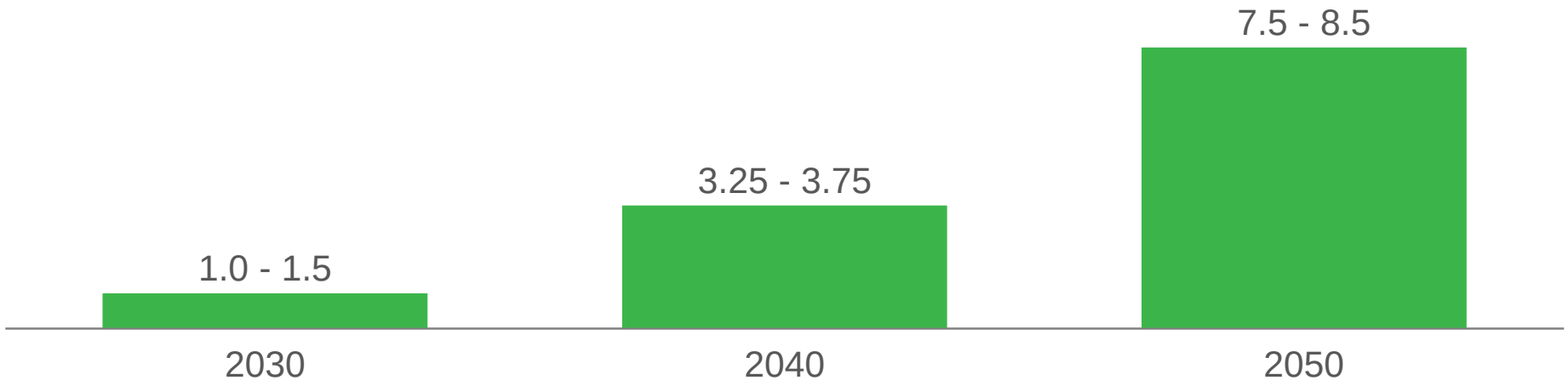

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Renewables capacity[1,2] (GW)	16-30	65-75	175-185

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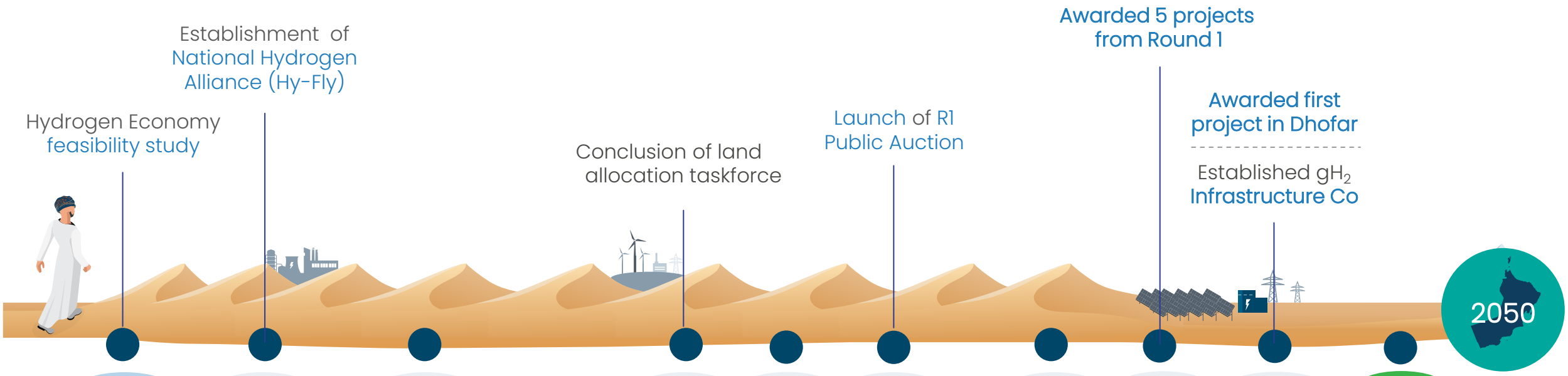
Our path forward with a major achievement by Q2 2024



Royal Directives for Hydrogen
- Set the required strategy, policies and legal framework
- Allocate lands for gH_2
- Establish a Directorate General for Clean Energy & Hydrogen
- Establish a company to develop the Hydrogen sector

Creation of Directorate General for Renewable Energy & Hydrogen in MEM

Oman Hydrogen strategy announced

Official **launch of Hydrogen Oman**

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Royal decree RD 10/23 issued (governing the gH_2 sector)

Signed commercial terms sheets with 6 legacy initiatives

2nd bid round projects expected to be awarded

Clear sector structure and multiple roles needed to drive gH2 ecosystem in Oman, with Hydrom as central orchestrator

	Policies & regulations	Strategy, masterplan & ICV	Auction	gH2 project development	Shared infrastructure	Logistics	Demand
Role	• Design policies and regulations for gH2 industry	• Develop national gH2 strategy • Delineate lands dedicated for gH2 development	• Manage auction process of gH2 blocks • Award blocks to gH2 developers and oversee implementation	• Finance and develop gH2 projects incl. RE generation, gH2, & derivative production	• Develop shared infra, incl. electricity transmission, water and H2 pipelines, desal.)	• Provide logistics, incl. transport and other enabling infra for the gH2 sector and developers	• Support offtake agreements for gH2 developers in Oman, incl. negotiating with gH2 demand aggregators
Involved entities	وزارة الطاقة والمعادن Ministry of Energy and Minerals	hydrom	hydrom	OQ + int'l developers	• Infrastructure providers • National champions	Public Authority for Special Economic Zones and Free Zones; اسياد ASYAD; Duqm	hydrom
Hydrom role	Advise	Lead	Lead	Coordinate	Incubate and then coordinate	Coordinate	Incubate

Hydrom as orchestrator of the gH2 sector, with the goal to maximize value creation for Oman through Oman take and In-Country Value

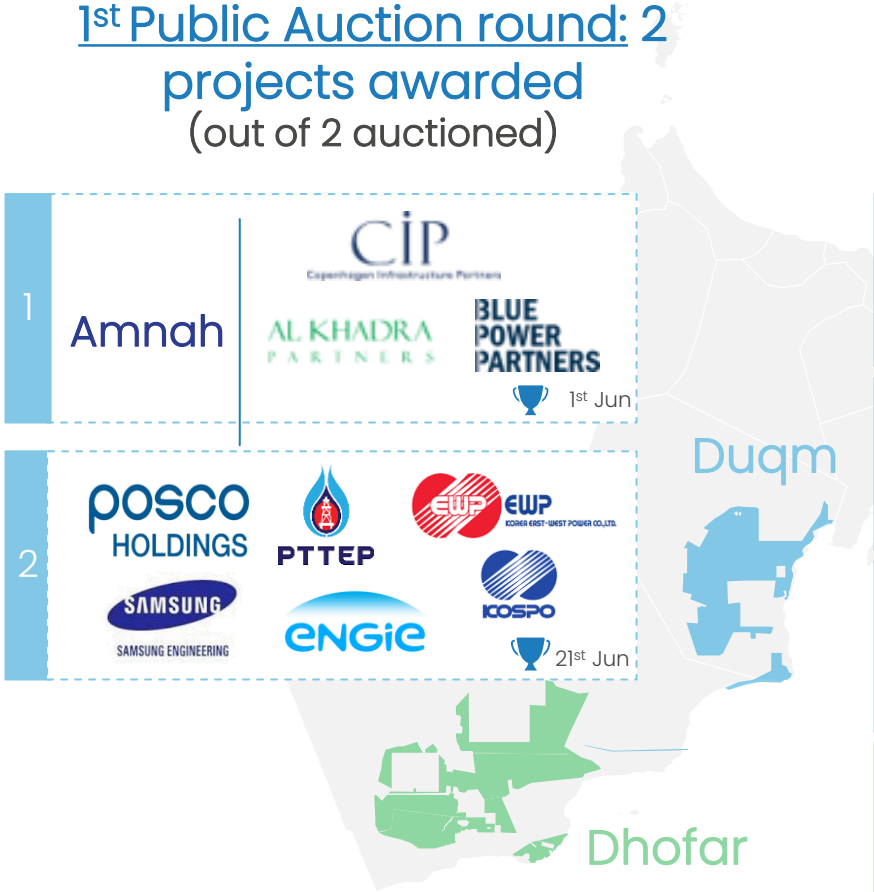
6 projects in the Duqm and Salalah regions awarded in 2023, already positioning Oman as one of the world's leading gH_2 hubs

$38 Bn
Investment

25.8 GW
Renewables' capacity

1010 ktpa
H_2 production

1st Public Auction round: 2 projects awarded
(out of 2 auctioned)

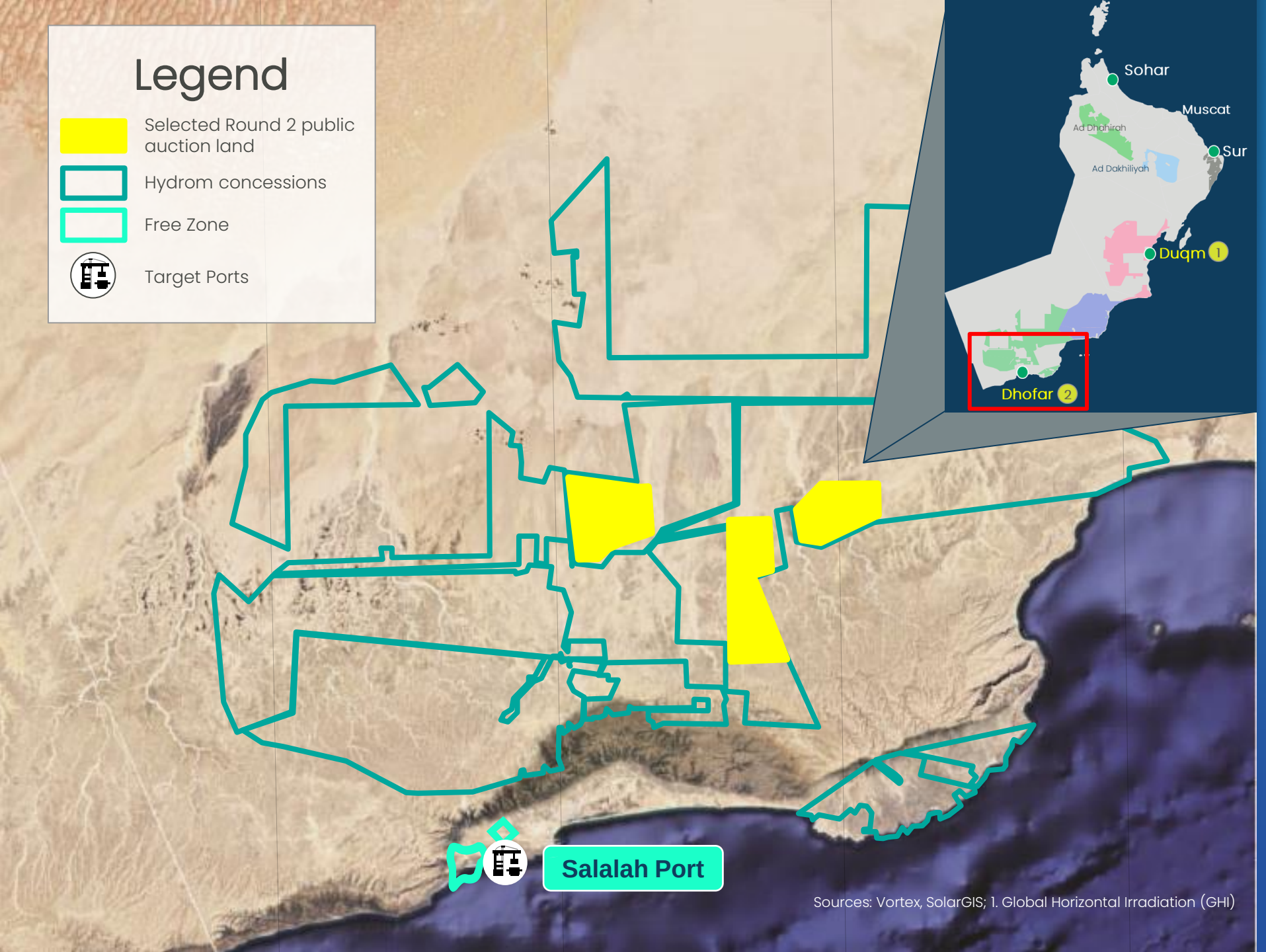


1. Amnah — CIP, Al Khadra Partners, Blue Power Partners — 1st Jun
2. POSCO Holdings, PTTEP, EWP, Kospo, Samsung Engineering, ENGIE — 21st Jun

Legacy Initiative process: 4 projects awarded so far

1. GEO Green Energy Oman; EnerTech Holding Company, InterContinental Energy, OQ, Shell — 1st Jun
2. bp — 1st Jun
3. HYPORT DUQM; DEME, OQ — 21st Jun
4. SalalaH2 — OQ, Marubeni, Samsung C&T, DT — 12th Dec

RES = Renewable Energy Sources; LIs = Legacy Initiatives



In Phase A Round 2

Hydrom will put 3 Blocks up for auction in the Dhofar region

7-9 m/s
Average wind speed range

2350-2450 kWh/m²
Average Solar irradiation[1]

Sources: Vortex, SolarGIS; 1. Global Horizontal Irradiation (GHI)

Round 1 & 2 of auctions has already been a strong success and signal of Omani gH_2 attractiveness for international players

5 continents represented

Applicants coming from all over the world with stronger representation from W. EU, GCC, S/SE Asia, South Korea, and Japan

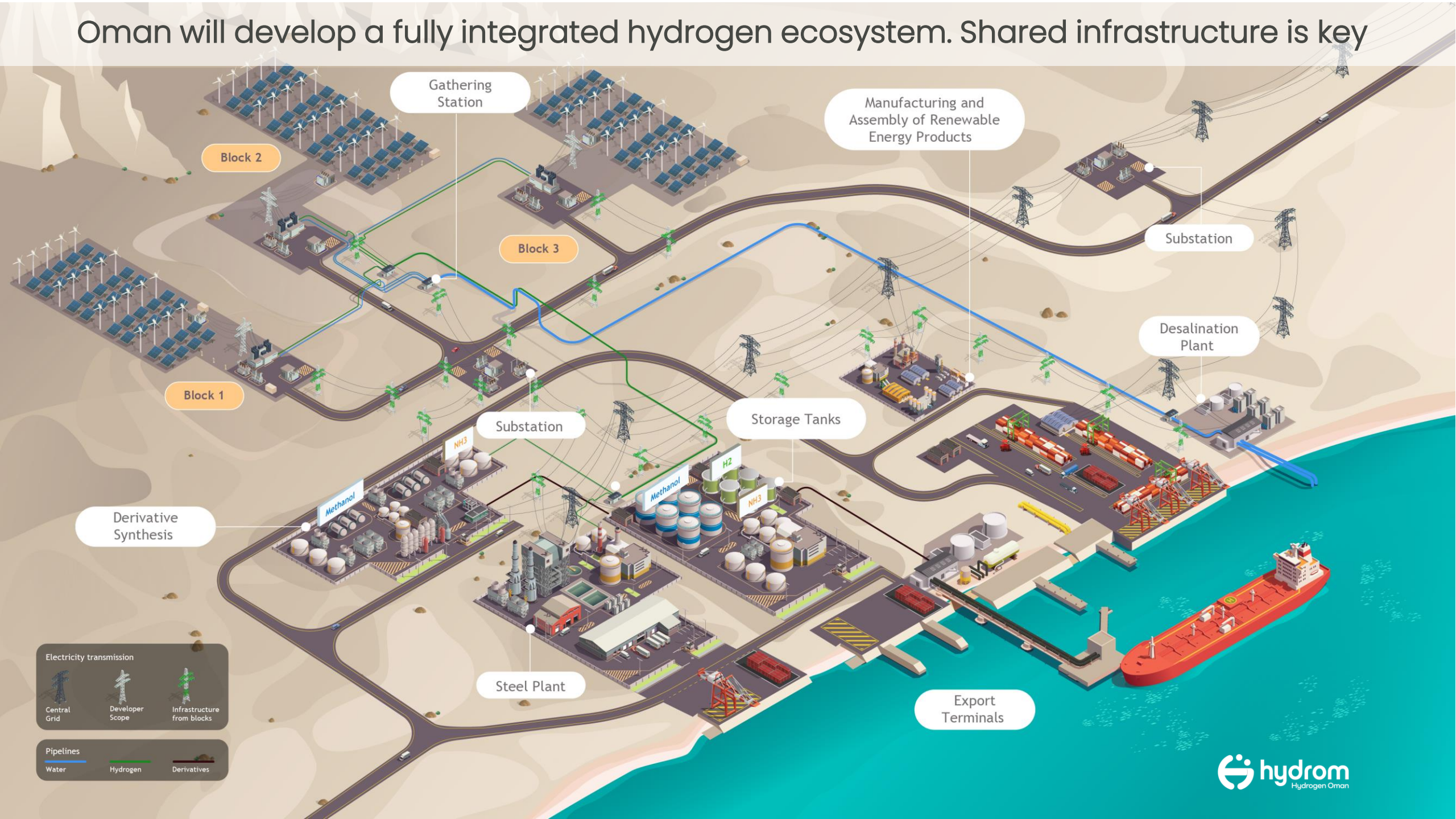
>200 international companies

Registration registrations on the auction platform

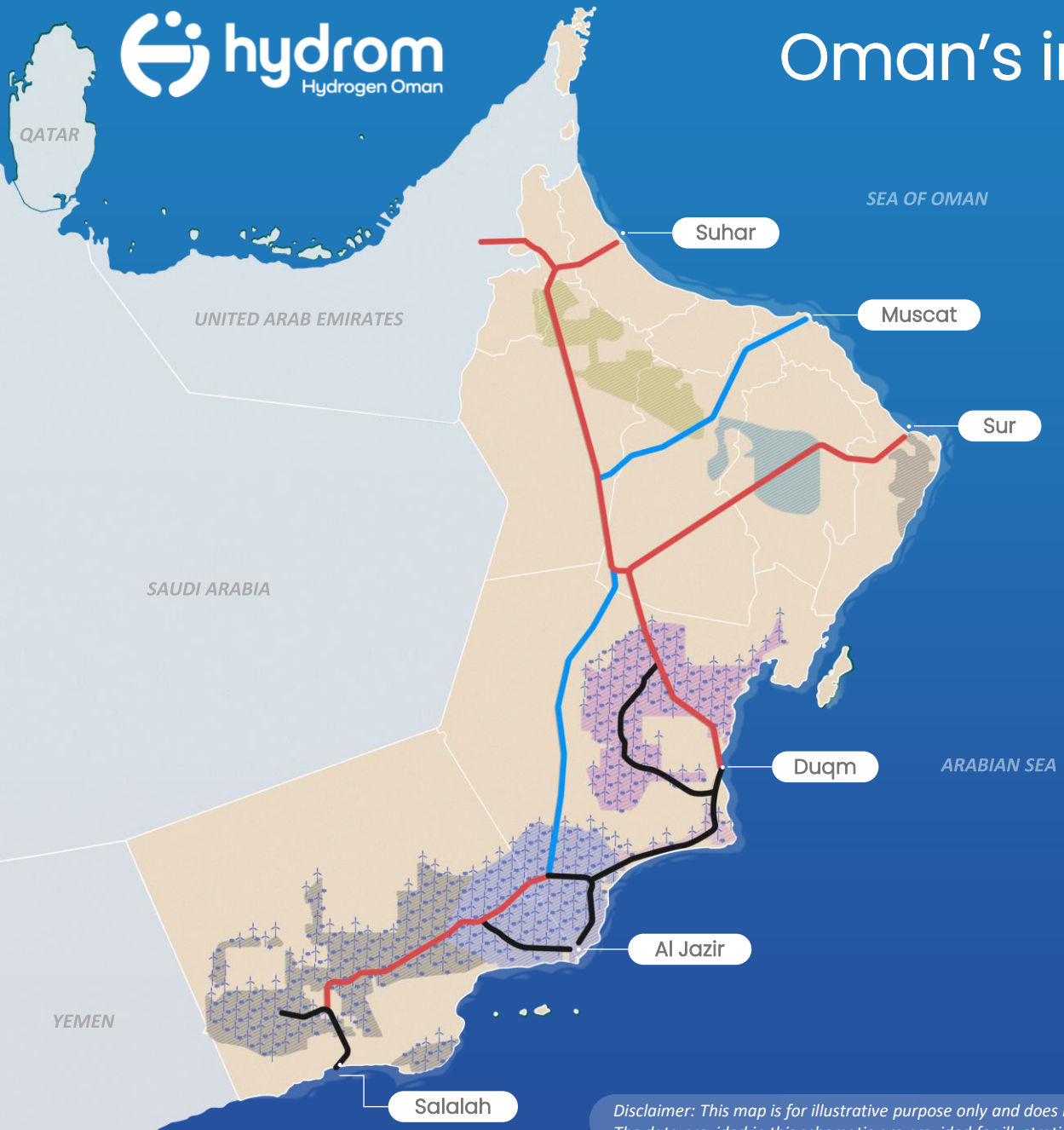
>20 international companies

Requesting to get the access to the Request for Proposal to Round 1

Oman will develop a fully integrated hydrogen ecosystem. Shared infrastructure is key



Oman's integrated hydrogen ecosystem



- Key economic and industrial zones of Oman to be connected via an infrastructure network
- Approximately 2000 km of low carbon Hydrogen pipelines spread across Oman
- Spurring localization of key industries and forward connected industries in existing and new industrial zones

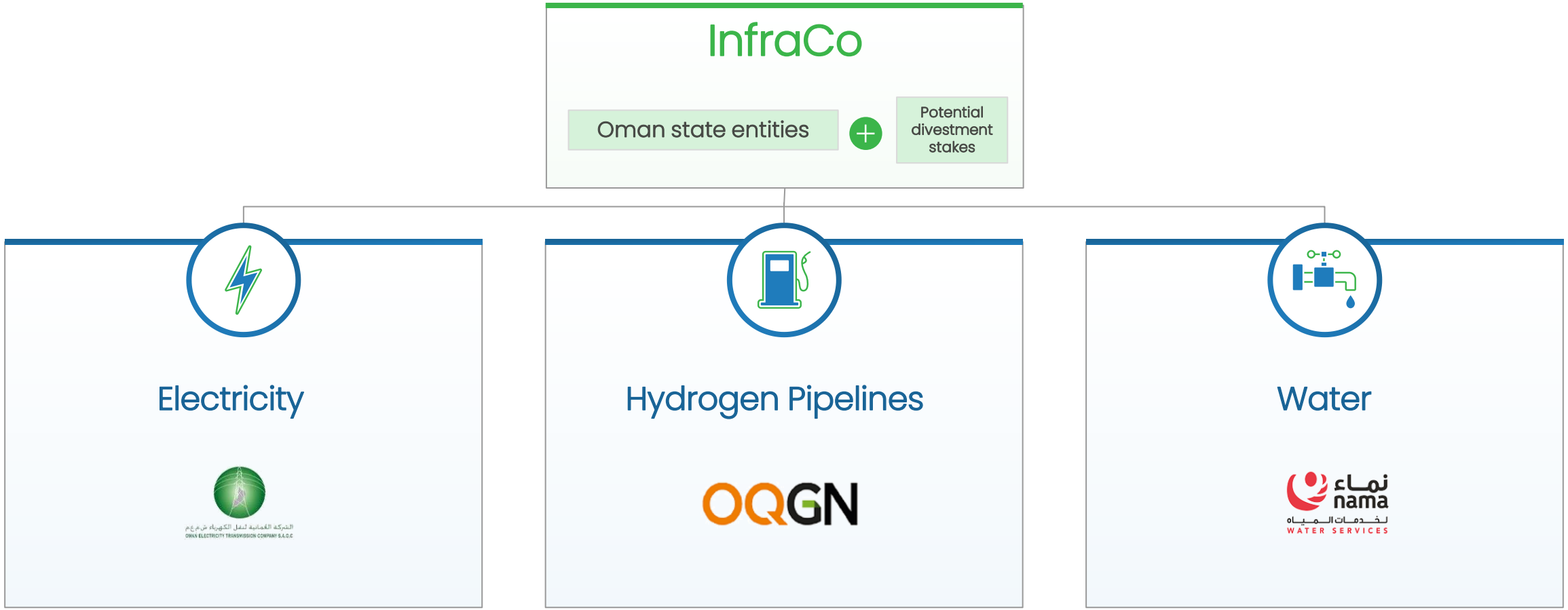
2030 | 2040 | 2050

Green Hydrogen Hub | Wind and Solar plants

Disclaimer: This map is for illustrative purpose only and does not necessarily accurately reflect international borders.
The data provided in this schematic are provided for illustration purposes only. Hydrom is not responsible for the misuse or misinterpretation of the data.

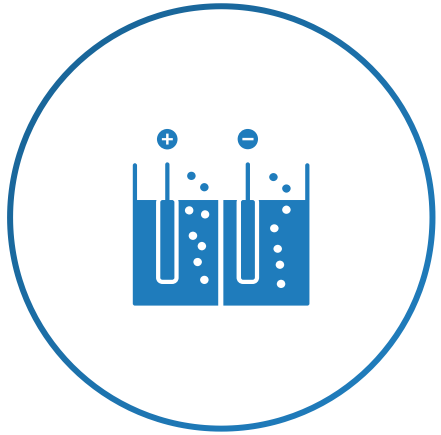
InfraCo. has been established in December 2023 with national champions allocated for each of the three infrastructure packages,

Illustrative



Source: Expert input; team analysis

Three strategic objectives for Hydrom in the next 5 years to fulfill its orchestrator role of the gH2 sector

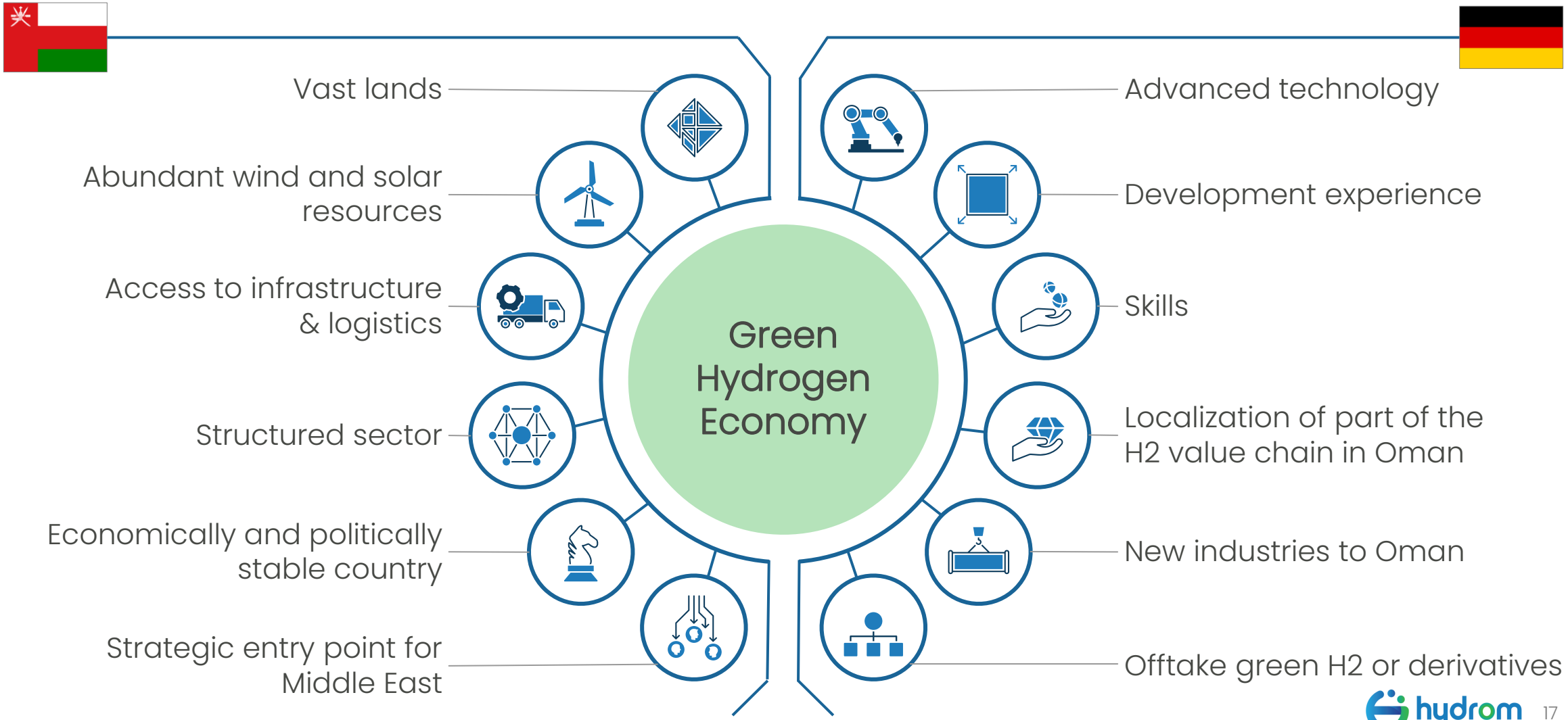


Award blocks to meet production targets and support gH2 projects move forward

Actively support the creation of an enabling ecosystem (shared infrastructure, logistics, capabilities, offtake, technology)

Maximize value creation for Oman through upstream and downstream industries localization

Oman and Germany can have a strategic collaboration to build a green hydrogen economy



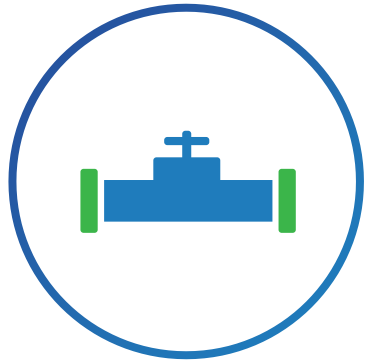
5 potential roles for international players to play in Oman and contribute to the growth of green H_2 economy

H_2 project developers

H_2 financial partners

H_2 equipment providers (OEMs)

H_2 industrial off-takers



Infrastructure developers

Production equipment

Technical skillset

R&D capabilities

Knowledge-based workforce

Oman can become a global sustainability leader

THANK YOU

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Together, we deliver a green, resilient and sustainable future