

Assessment of Potential for a Low-Carbon Hydrogen Economy in the EBRD Region

UNECE GERE & EGCES Session

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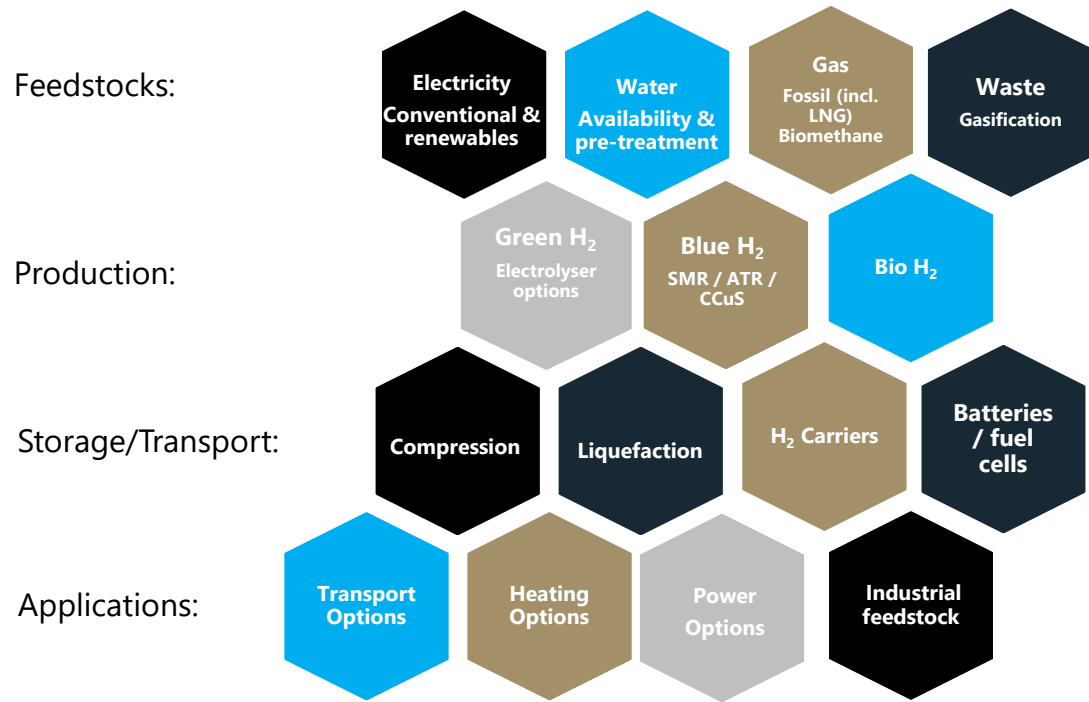
European Bank
for Reconstruction and Development



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The complexity of the Hydrogen Economy

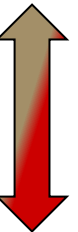
Hydrogen enables solutions both cross-sector (power, heat, transport & industrial) and cross-vector (power, gas, fossil, renewables).
 Clients want to know what's the best business case for them



Underpinned by governmental drivers and policies

- To identify & define solutions for their H₂ opportunity clients typically require the following:
 - Business case / Options / Market study**
 - Pre-feasibility / concept study**
 - Conceptual design / Pre-FEED / FEED**
 - Design and Build / EPC**
 - O&M**
- Solution requires mix of skills and experience
 - Electrical, process, civil, environmental, regulations, mechanical

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Assessment of Potential for a Low-Carbon Hydrogen Economy in the EBRD Region: Demand, Supply and Regulatory Analysis

- Geographic coverage
 - **SEMED Region:** Egypt, Jordan, Lebanon, Morocco and Tunisia
 - **Caucasus Region:** Georgia, Armenia and Azerbaijan
 - **Eastern Europe:** Ukraine, Moldova and Belarus
 - **Western Balkans:** Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia
 - **Central Asia:** Kazakhstan and Uzbekistan

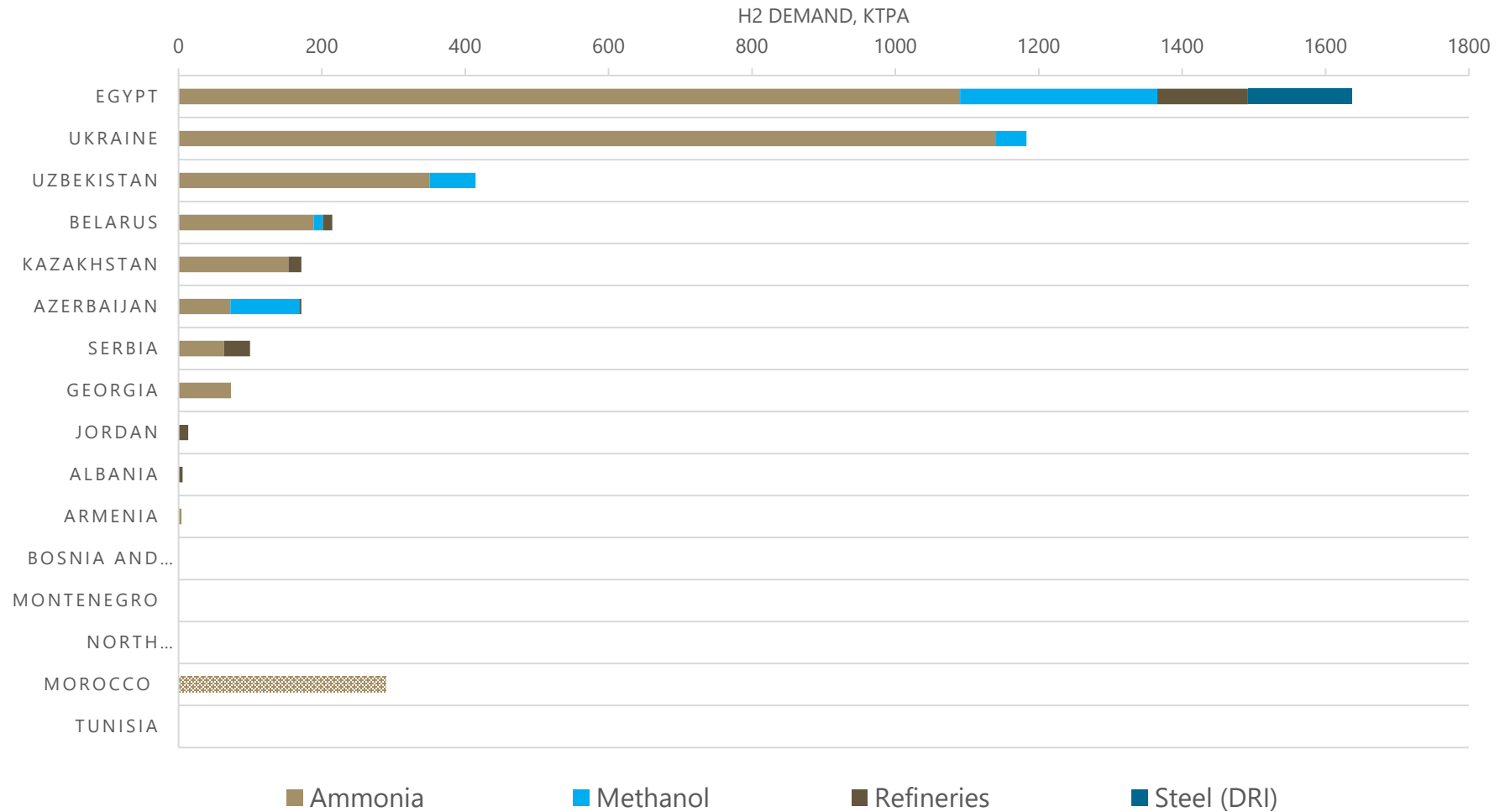
Focus

- **Production** of green/blue hydrogen: scale, locations, economics
- **Demand** for hydrogen: existing and prospective installations across the main economic well as export
- **Transportation** and **storage**
- **Main regulatory changes** needed to support the development of hydrogen supply chains
- Develop individual project **case studies** (pre-feasibility)

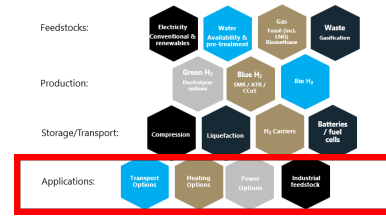
Deliverables

- **Supply, demand, transportation and regulatory analysis**, includes:
 - Analysis of existing and potential hydrogen consumption
 - Analysis of existing and potential hydrogen production
 - Assessment of the transport, distribution and storage of hydrogen
 - Regulatory analysis
- **Pilot case studies:** technical and financial pre-feasibility assessment of potential projects related to e.g. partial or full switch to low-carbon hydrogen of industrial plants; creation of a local hydrogen hub in combination with renewable energy power plants; transportation infrastructure
- **Final workshop:** one for each Region

Current hydrogen demand in EBRD countries based on industrial feedstock



Uses of Hydrogen



Feedstocks

Chemical Production:

- Ammonia
- Methanol
- Synthetic Fuels (Jet, diesel or gasoline)

Oil refining

- Hydro-processing units

Steel Production

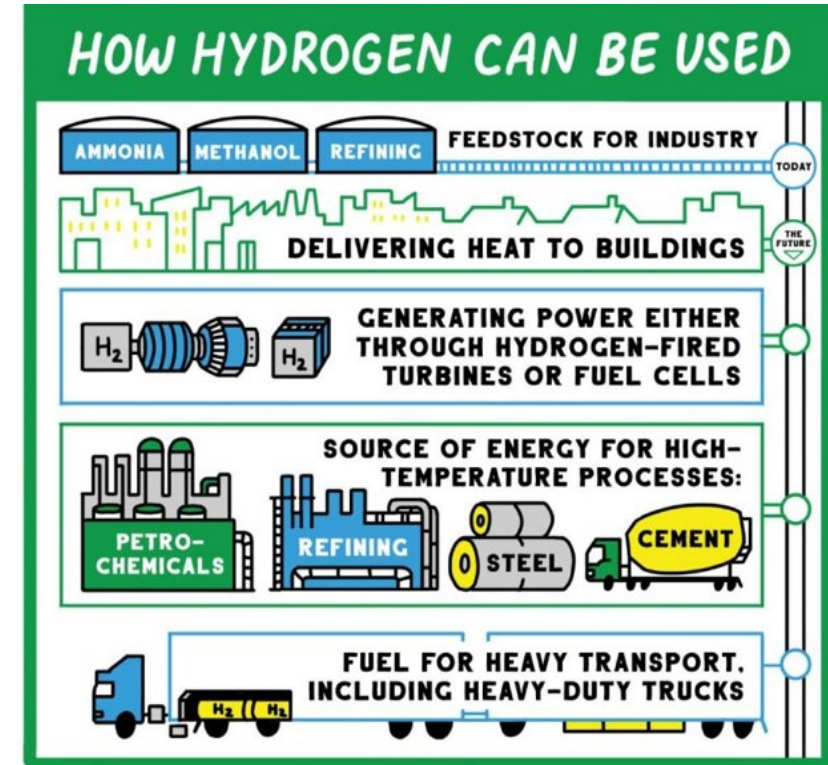
- Reducing gas (DRI process)

Power & Heating

- Fuel in the Power sector (Gas turbines, gas engines or boilers) blended with natural gas or 100%
- Fuel to Process Heaters – across any industry
- Fuel to Residential heaters

Transportation

- Fuel cells in cars, trains & buses
- Aviation
- Maritime fuel (when converted to Ammonia or Methanol)
- Space programs (rocket fuel)



Source: BP Social Media

Case Study Interest

Green Ammonia / Methanol

- Morocco / Egypt
- Ukraine
- Kazakhstan

Iron & Steel

- Ukraine
- Georgia

Transmission / Distribution

- Kazakhstan (Gas)
- Ukraine (Gas)
- Georgia (Electricity)

Mining Vehicles

- Kazakhstan
- Ukraine
- Uzbekistan

H2 Mobility / Ports

- Buses in Western Balkans
- Ports on Black Sea / Caspian Sea Corridor