Green Hydrogen Energy Activities in ADB

29 February 2024

ENE-Energy Transition, Sectors Division, Asian Development Bank
Hydrogen’s role in Net-Zero

- **2021**: No new unabated coal plants approved for development
- **2025**: No new sales of fossil fuel boilers
- **2030**: Universal energy access, All new buildings are zero-carbon-ready, 60% of global car sales are electric, Most new clean technologies in heavy industry demonstrated at scale
- **2035**: Most applications and cooling systems sold are best in class, 50% of heavy truck sales are electric, No new ICE car sales, All industrial electric motor sales are best in class, Overall net-zero emissions electricity in advanced economies
- **2040**: 50% of existing buildings retrofitted to zero-carbon-ready levels, 50% of fuels used in aviation are low-emissions, Around 90% of existing capacity in heavy industries reach end of investment cycle, Net-zero emissions electricity globally
- **2045**: Phase-out of all unabated coal and oil power plants, 50% of heating demand met by heat pumps, Almost 70% of electricity generation globally from solar PV and wind
- **2050**: More than 85% of buildings are zero-carbon-ready, More than 90% of heavy industrial production is low-emissions

Source: IEA

**CO₂ Emissions (Gt)**
- 2020: 35 Gt CO₂
- 2025: 30 Gt CO₂
- 2030: 25 Gt CO₂
- 2035: 20 Gt CO₂
- 2040: 15 Gt CO₂
- 2045: 10 Gt CO₂
- 2050: 5 Gt CO₂

**Key Points**
- **Electricity and heat**
- **Industry**
- **Transport**
- **Buildings**
- **Other**

**Electrification Targets**
- **2035**: 4 Gt CO₂ captured
- **2045**: 435 Mt low-carbon hydrogen, 3,000 GW electrolyzers
- **2050**: 76 Gt CO₂ captured

**Source**: IEA
OneADB Green Hydrogen Engagement

GH Pillars Study launched at Vibrant Gujarat Jan 2024 By CM Gujarat
ISA Green Hydrogen Innovation Centre launched 2023

Marine GH Forum Kuala Lumpur Feb 2023 with Minister of Economy, Malaysia

GH Unleashed Workshop, Gujarat Nov 2023 By CM Gujarat
## ADB Green Hydrogen Entry Opportunities

<table>
<thead>
<tr>
<th>Green hydrogen as a commodity</th>
<th>Green Hydrogen as a component of decarbonizing the Hard to Abate Sectors</th>
<th>Green Hydrogen as a distributed level</th>
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</thead>
<tbody>
<tr>
<td>Large scale renewable energy production including hydrogen valleys/hubs and green ports infrastructure.</td>
<td>Use of green hydrogen in decarbonizing steel, cement and fertiliser production, aviation fuels and marine transport.</td>
<td>Small scale production of green hydrogen from agricultural/municipal waste or be spoke renewable and the related transport and distributed filling infrastructure.</td>
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<tr>
<td>Lending modality includes PBL support to DMCs and PSOD lending to Corporates.</td>
<td>Working with industry organizations at TA level. Lending modality to SOEs and Corporates.</td>
<td>Working with industry organizations at TA level. Lending modality to SOEs, Financial Intermediation or PS loans.</td>
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<td>Lending Size – $ 100-500m</td>
<td>Lending Size – $ 50-100m</td>
<td>Lending Size – $ 1-50m</td>
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<td>Commodity Standard/Price Ill defined with competing fossil commodities.</td>
<td>Use where “no real alternative” exists with energy/process efficiency measures – ADB Corporate Priority.</td>
<td>Driven by specific use cases and off-taker needs. High Development potential for lower cost.</td>
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Hydrogen Ladder 5.0

Unavoidable

A: Fertiliser, Hydrogenation, Methanol, Hydrocracking, Desulphurisation
B: Shipping*, Jet Aviation**, Chemical Feedstock, Steel, Long Duration Grid Balancing
C: Coastal and river vessels, Non-Road Mobile Machinery, Vintage and Muscle Cars**, Biogas Upgrading
D: Long Distance Trucks and Coaches, High-Temperature Industrial Heat, Generators
E: Regional Trucks, Commercial Heating***, Island Grids, Short Duration Grid Balancing
F: Light Aviation, Remote and Rural Trains, Local Ferries, Light trucks, Bulk Power Imports, UPS
G: Metro Trains and Buses, Urban Delivery and Taxis, 2 and 3-Wheelers, Cars, Bulk e-Fuels

Uncompetitive

*As ammonia or methanol  **As e-fuel or PBTL  ***As hybrid system

Source: Liebreich Associates Hydrogen Ladder provides a ready reference for the role of hydrogen, its derivatives and alternate energy sources.
Thank you for your kind attention.

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