



TOWARDS CARBON NEUTRALITY

RIETI / EU-Japan Center for Industrial Cooperation

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THIS DOCUMENT IS **INTERNAL**

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AL Hydrogen Energy World Business Line

**HYDROGEN
ENERGY**

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Air Liquide: A world leader in gases & services for Industry & Health



~**64,500**
EMPLOYEES



PRESENT IN
78 COUNTRIES



MORE THAN
3.8 MILLION
CUSTOMERS &
PATIENTS



REVENUE
€20.5bn



NET PROFIT
(GROUP SHARE)
€2.4bn



INVESTMENT
DECISIONS
€3.2bn

→ Established in Japan since 1907, with 2000 employees today

Air Liquide commitment to Carbon Neutrality

Setting a clear trajectory

Air Liquide Commitments



Air Liquide

CO₂ emissions **start decreasing** in absolute value

~
2025

-30% Carbon intensity
in kg CO₂/€ EBITDA^(a) vs
2015

2035

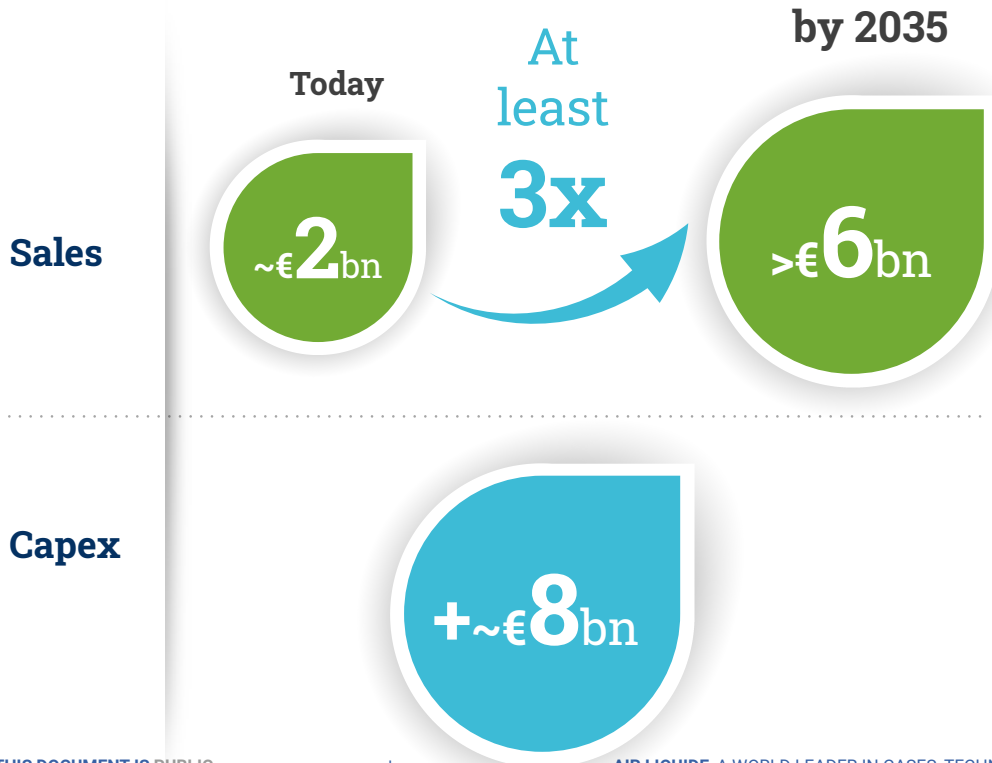
Decrease scope 1 & 2 CO₂eq
emissions in **absolute value**
by **-33%**^(b)

2050

Reach **Carbon Neutrality** before **2050**



HYDROGEN ACTIVITY TO TRIPLE BEFORE 2035



Capturing demand:

- Low Carbon + Renewable H₂ offer
- New H₂ industrial applications
- Carbon Capture as a service
- H₂ mobility

Capturing additional value by decreasing customers CO₂ footprint

Investment in:

- CO₂ Capture plants
- Electrolyzers
- Supply chain for mobility

3 GW^(a)



TARGETING 2 TYPES OF MARKETS WITH SYNERGIES

INDUSTRY



With a synergistic approach by basins



MOBILITY



Electrolysis
Denmark
1.2 MW



Electrolysis
Bécancour, QC
1x 20MW



Large scale electrolysis
(In Devt.) H2V France
200 MW



CCU + Low-Carbon H₂
France
1 CO₂ Capture "Cryocap"



CCS + Low-Carbon H₂
(In Devt.) Antwerp / Benelux
CO₂ Capture



H₂ reduction in steelmaking
Germany



Supply Chain
US West Coast
H₂ Liquefier



Supply Chain
(In Devt.) Norway
Liquid H₂ for ships



H₂ Stations for Consumers
Japan, Korea,
Germany, US



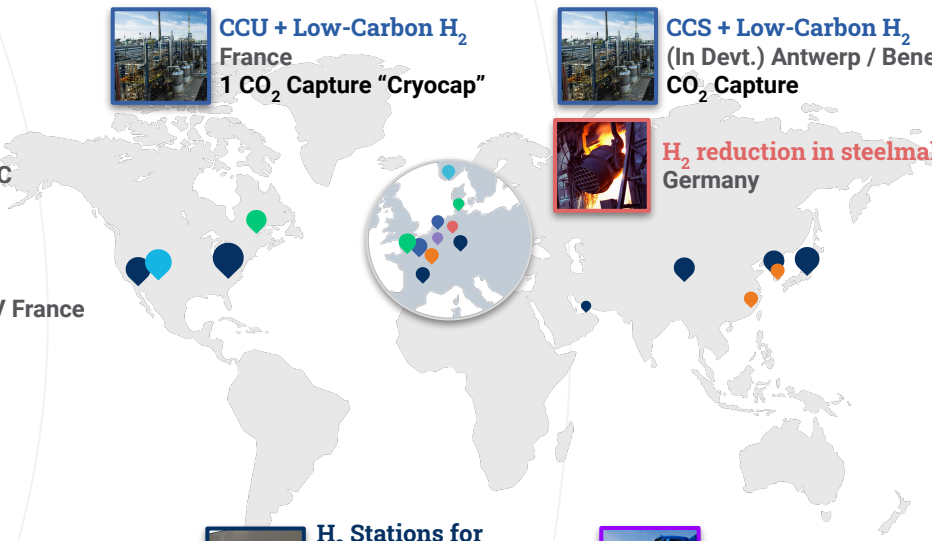
H₂ Forklifts
US+EUROPE



H₂ Network for trucks
France / Benelux / China



H₂ Bus & Taxi fleets
France / China / Korea





Air Liquide

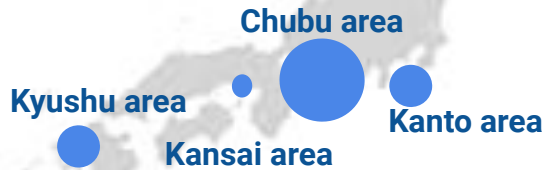
A key H2 mobility enabler in Japan

Leading Infrastructure player in Japan Hydrogen Mobility Consortium (with Eneos, Iwatani)

- > 13 H2 stations in operation by end of 2020
 - 4 HRS started in 2020 + 4 new launched
 - Demonstration of self-refueling starting in October
- > 13 additional stations to be constructed by 2022



Active deployment of a large scale Liquid Hydrogen supply chain



Main Mobility Projects under Development by Air Liquide in Europe



- ❑ Different type of ecosystems under development
- ❑ Aggregation of users' demand per ecosystem
- ❑ Connecting eco-systems for massification and deployment risk mitigation

Key areas of market failure that should be addressed by EU & Japan along the H2 mobility value chain

- Support the **mass production** of key technologies for the development of the H2 value chain to reach cost reduction targets: Fuel Cells, Electrolysis, Liquefaction, Storages
- Support **large scale** PtG projects (100+ MW electrolysis projects) & **Clean H2 Import** projects
- **Capture and sequestration of CO2**, scale-up and regulatory issues related to sequestration
- Support the development of the **Liquid H2** supply chain (technology scale-up and regulation)
- Support the **deployment of usages**:
 - **Mobility**:
 - Support the development of the H2 retail infrastructure
 - Support the initiation of large Fleet projects
 - **Industry**:
 - Develop regulations and support tools to enable the use of low carbon and renewable H2 in the industry, so that it becomes the reference

=> Foster a systemic approach by providing a complete set of policies and support mechanisms **addressing supply and demand at the same time** is essential



Q/A Session

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24 June 2021
AL WBL H2E - E. Penforinis

Towards Carbon neutral by 2050