
Air Liquide
H2 Energy
At the heart
of the energy transition
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2019 Key Figures

~67,000
EMPLOYEES

PRESENT IN
80 COUNTRIES

MORE THAN
3.7 MILLION
CUSTOMERS &
PATIENTS

REVENUE
€21.9bn

NET PROFIT
(GROUP SHARE)
€2.24bn

INVESTMENT
DECISIONS
€3.7bn

OXYGEN

NITROGEN

ARGON
AND **RARE**
GASES

HYDROGEN

HELIUM

CARBON DIOXIDE

CARBON
MONOXIDE

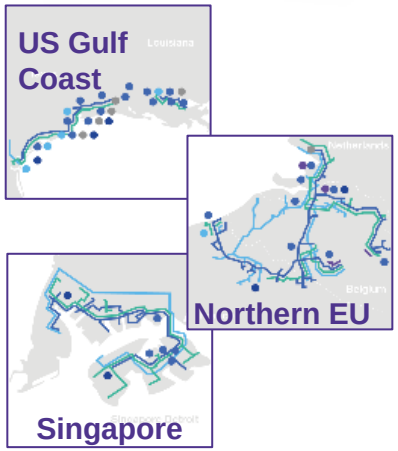
Air Liquide has nearly 50 years of hydrogen development for industries

Production & Supply chain

Production

Supply chain

Distribution Networks



Markets Segments

Process industries

Oil & Gas

Steel, Glass

Electronics

Transportation

Space

Key Figures

14 Bm^3/yr

1,850 km H_2 pipeline

46 large H_2/CO plants

40 electrolyzers in operation

2 B€ sales

Air Liquide Investments in North America

Air Liquide

Air Liquide new investments in North America

Nevada

1st large scale **renewable liquid hydrogen** production plant dedicated to the Hydrogen energy markets

- Investment: **$150M**
- Capacity: **30 tons per day** (40,000 FCEVs in the West Coast)
- Location: **North Las Vegas, Nevada**
- Construction: **Began in 2020; operations & delivery in 2022**

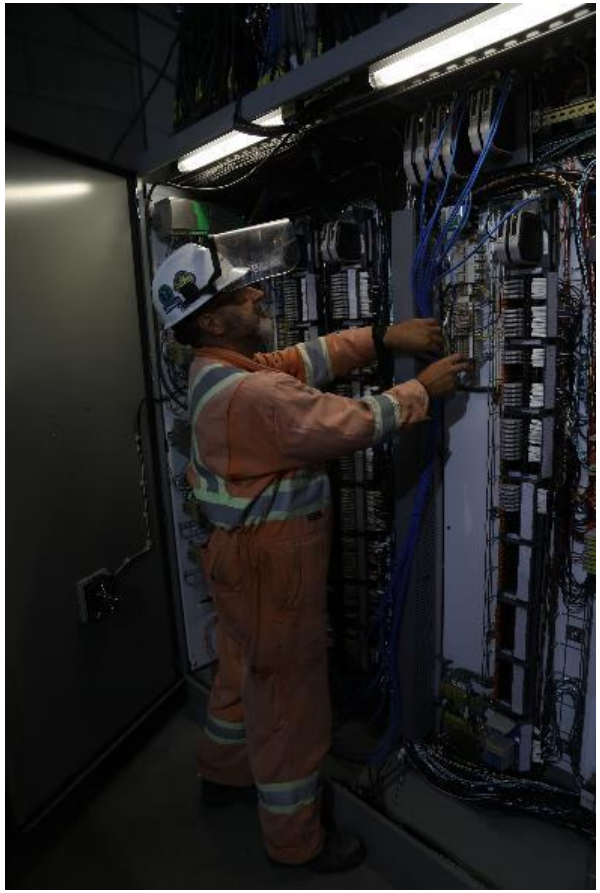
World's Largest PEM Electrolyzer to supply **~100% decarbonized hydrogen** for Canada and the East Coast Markets

- Investment: **$40M** (additional investment to existing site with liquefier)
- Capacity: **>8 tons per day (20 MW PEM electrolyzer)**
- Location: **Bécancour, Québec**
- Construction: **Began in 2019; operations & delivery by year-end**

Bécancour

Nevada Construction

Becancour Site



Becancour Site - Aerial view

Hydrogen for Airport Ground Applications

Air Liquide

Hydrogen supply to an Airport - Demand

LAX: What would a hydrogen based ground fuel infrastructure look like

In a given year, LAX ground operations consume
(Source LAWA: 2000 LAX Operations)

- **25M gallons of diesel**
- 115M gallons of gasoline
- 1700 thousand therms LNG/CNG

Diesel consumption

13%	ground support equipment
4.5%	stationary equipment
8.5%	on airport vehicles
74%	off airport vehicles

This is equivalent to about **35tpd H2**

Hydrogen supply to an Airport - Production

35tpd H2 Production

SMR - similar to our project in NV (30tpd)

Note: this is 1/8th the size of large scale, industrial SMR

Electrolyzer - 80MW - 4X our Quebec project

Onsite or Offsite production?

Hydrogen supply to an Airport - Supply

35tpd H2 Supply

Liquid Delivery - on road

~8 trailer deliveries per day

Gaseous - on road

~ 70 trailer deliveries per day (!)

Gaseous - pipeline

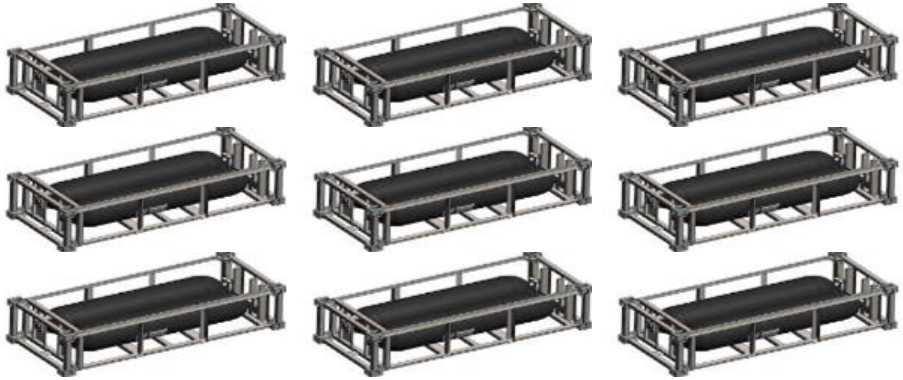
Small offtaker - is there an existing pipeline?

Hydrogen supply to an Airport - Storage

35tpd H2 Consumption x 2-3 days backup
= 70-100 tons of storage

Liquid storage
Sphere(s)

Gaseous storage
HP cylinders



Gaseous - pipeline
No (very limited) storage needed

Hydrogen supply to an Airport - Dispensing

Typical H2 Stations - in the field and in planning

Offroad (warehousing)

Current US:

1 tpd, liquid

4 dispensers

LDV

Current CA: collocated at gasoline stations

0.8 tpd, gaseous and liquid supply, some with onsite production

4 dispensers, 350 and 700 bar

HDV

Planned US: 10+ tpd, liquid supply, some with onsite production

4-8 dispensers

Hydrogen supply to an Airport

The challenge is scale

Production, supply and distribution - proven at scale

Applications - vehicles in service and under development

Dispensing infrastructure - leverage existing

Thank you!

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