



Transportation of Hydrogen

Presentation by
BIG

Date
29 March 2024

A Member of the Air Products Group

A Climate Tech Company



Company Overview

A Climate Tech Company



A Joint Venture Affiliate



X



1988

1st Supply for
Exclusively Serving
Map Ta Phut



Largest

Capacity & Market Share

Capacity	4,800 TPD
Market Share	45%



7,427 MB

Revenues in
2023



Air Products and Chemicals



PENNSYLVANIA



Founded in

1940

LEADING
Industrial Gas
Company



Understanding,
Integrity and **Passion**

80+ Years of
Experiences

In over **50** countries

BIG Low-Carbon Products & Supply Solutions



Gas Pipeline



Bulk Delivery



On-site
Generated Gas



Compressed Gas /
Packaged Gas



Mobile Service

SUSTAINABILITY = GROWTH



.....

Sustainability
is at the heart
of our business
and growth.

.....

BIG – A Climate Tech Company



**Carbon
Captures**



**Hydrogen
Economy**



**Sustainable
Offerings**



**Carbon
Management
Platform**



Bio Circular Green

Towards Net Zero 2050

World-Leading Investment in **Real Projects**

\$15B to drive the **Energy Transition & Sustainability**



15 Billion USD

Already committed & being executed
to come on-stream before 2027



Alberta
Blue Hydrogen
Net Zero-Carbon



California
SAF Production
Facility



Louisiana
Blue Hydrogen
Low-Carbon



Neom
Green Hydrogen
Zero-Carbon



New York
Carbon-free
Liquid Hydrogen



Arizona
Green Hydrogen
For Mobility

>45 Million USD

Thailand execution on Climate Technology
to support country's net zero target



Rayong
Low Carbon Air
Separation



Pattaya
Hydrogen for
Mobility



Bangkok
Sustainable Water
Treatment

Transportation of Hydrogen

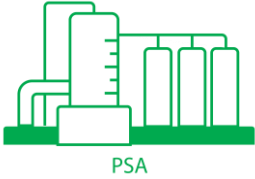


Hydrogen Value Chain

Pressure Swing Adsorption (PSA)

BIG

By Product of
Petrochemical



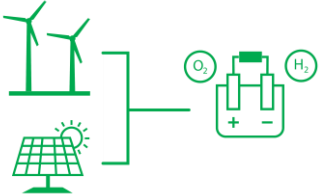
PSA

Low Carbon H₂

Green H₂

Grey H₂

Electrolysis



Fuel-based Production

- Methane Reforming
- Coal Gasification
- Biomass Gasification



1

H₂

HYDROGEN

Compressed H₂

Ammonia

Liquid H₂

Methycyclohexane

Methyl hydride

General Products



Industry



Mobility



Energy Storage



Electricity Production

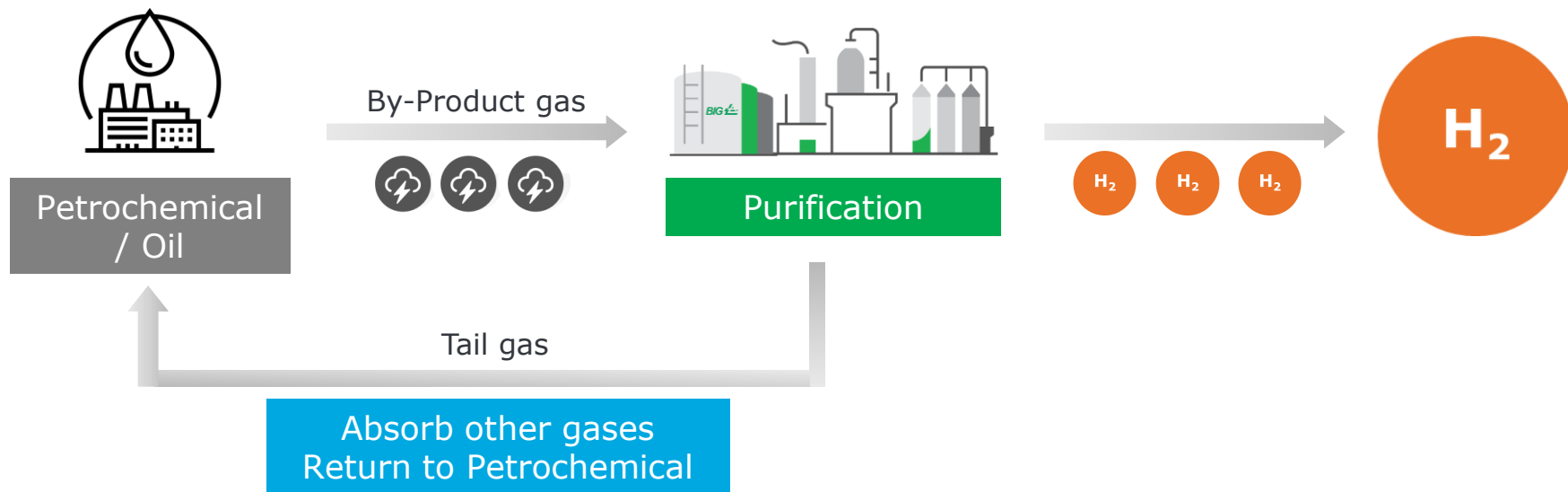
Fuel Cell

Direct Burn

Gas Turbine



BIG's Pressure Swing Adsorption For Low-carbon Hydrogen





150 or 175 barg



Compress



30 barg

PSA

BIG H₂ Transportation



BIG H₂ Production
(Map Ta Phut Complex)



Infinite
Innovation



GREEN Hydrogen



NEOM Green Hydrogen Complex, Saudi Arabia

World's Largest Green Hydrogen Project - \$8.4 Billion Investment



#1

World's largest
green Hydrogen
project



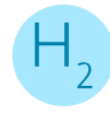
~4 GW

Renewable power
from onshore solar,
wind and storage
used to operate
production facility



100%

Green energy

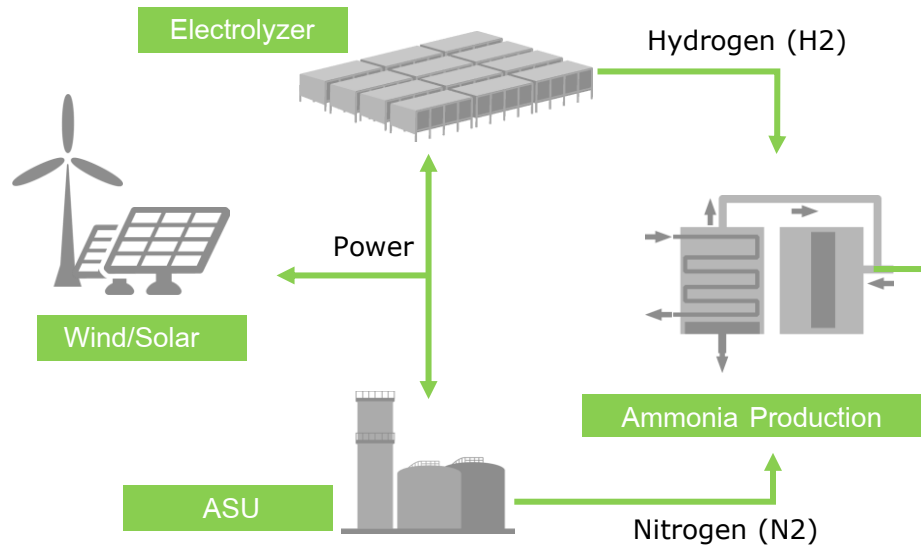


up to 600

Tonnes of carbon-free
hydrogen produced
per day

A Climate Tech Company

Hydrogen Production at NEOM



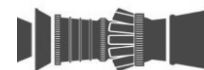
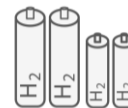
Hydrogen Demand

NH₃ Cracking



H₂

H₂ Market

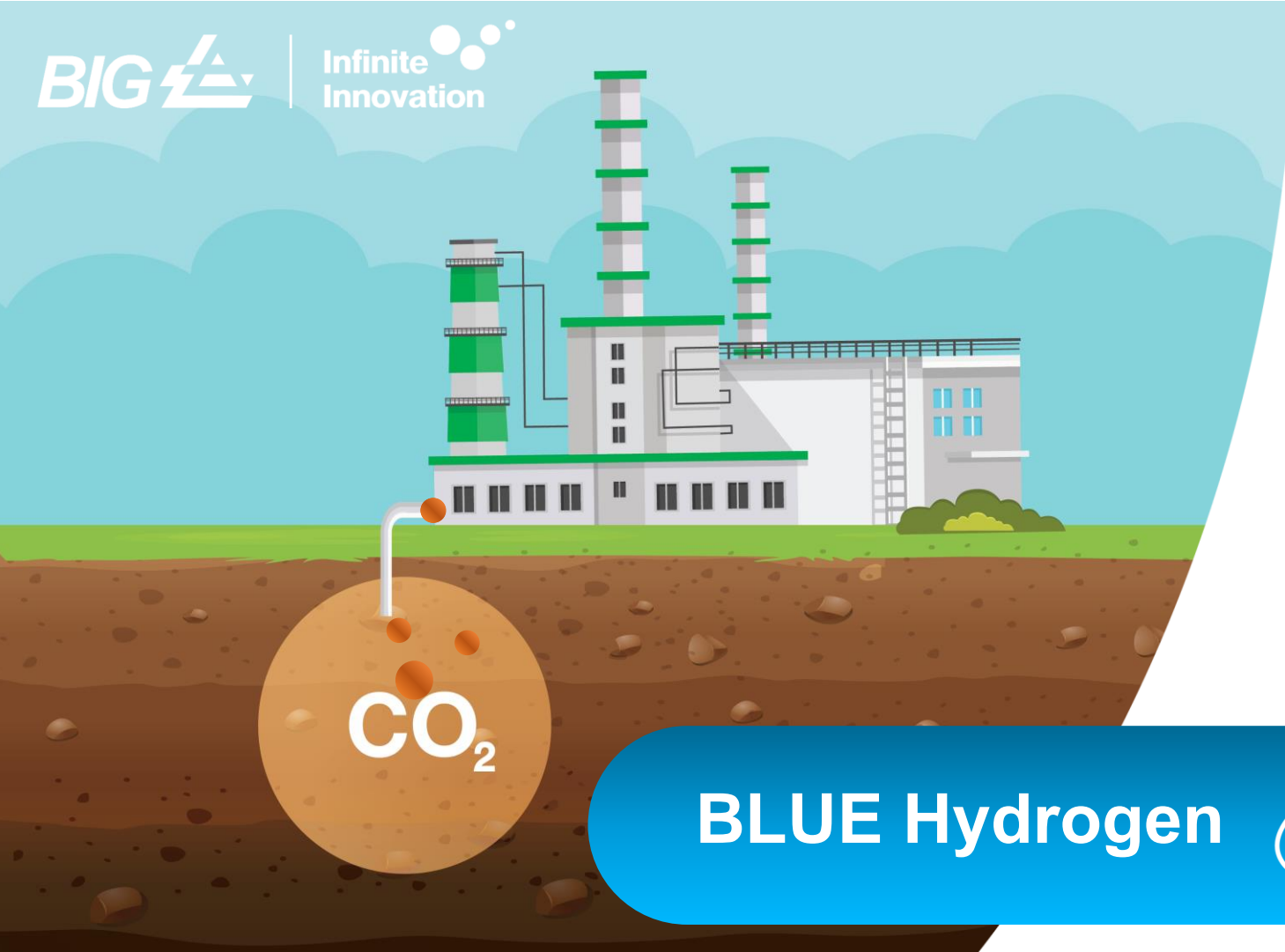


AIR
PRODUCTS

“NEOM Project”



Infinite
Innovation



BLUE Hydrogen



Net Zero Hydrogen Energy Complex, Canada

The Transformative \$1.6 Billion Hydrogen Facility in Alberta



35
tonnes per day Hydrogen
liquification facility



2050
to put Canada on a path to
achieving net-zero, grow the
economy, and reduce
emissions



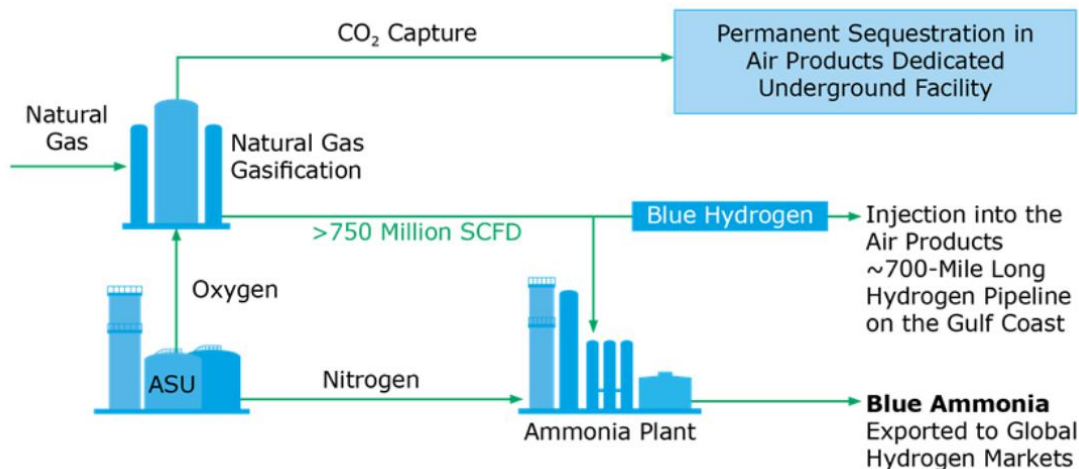
>90%
CO₂ generated to be
captured safely stored
underground

Blue Hydrogen/Ammonia Project - Louisiana, US

650,000 Ton per Year Blue Hydrogen Capacity



Announcing Landmark \$4.5 Billion
Blue Hydrogen Clean Energy Complex
In Eastern Louisiana



Hydrogen For Mobility

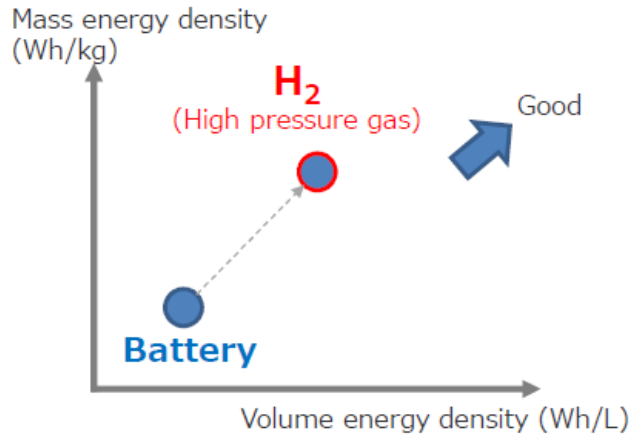


Why Hydrogen ?

High Energy Density & Long Time Storage

Compared to electricity

1. High Energy Density



2. Storage duration



Battery

Short-time (hours ~ days)

Self-discharge

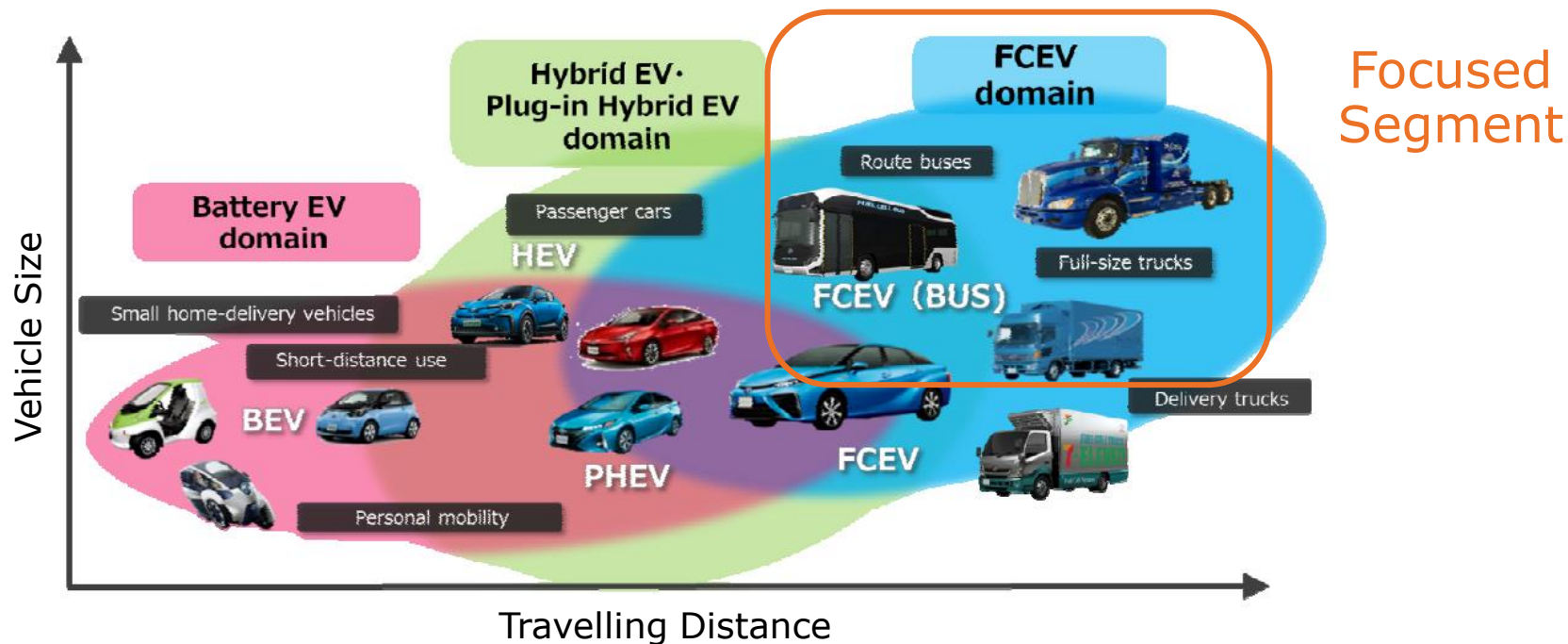


Hydrogen

Long-time (days ~ seasons)

Hydrogen is suitable for large amount & long time storage.

EV Segmentation





Thailand's First Hydrogen Refueling Station
(HRS)



GENERATING
A CLEANER FUTURE

Generating A Cleaner Future
Moving H₂umanity Forward