Siemens Energy Hydrogen & Powerfuels

DENA: Powerfuels In North America
May 5th 2021

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Who we are
The leading pureplay energy company

Our offering

Products
Solutions
Services

Along the value chain

Generation
Transmission
Storage

Broad technology portfolio

From
Conventional
to Renewables

Siemens Energy AG

Gas and Power ("GP")

- Generation
  - Central
  - Distributed
- Industrial Applications
- Transmission
- New Energy

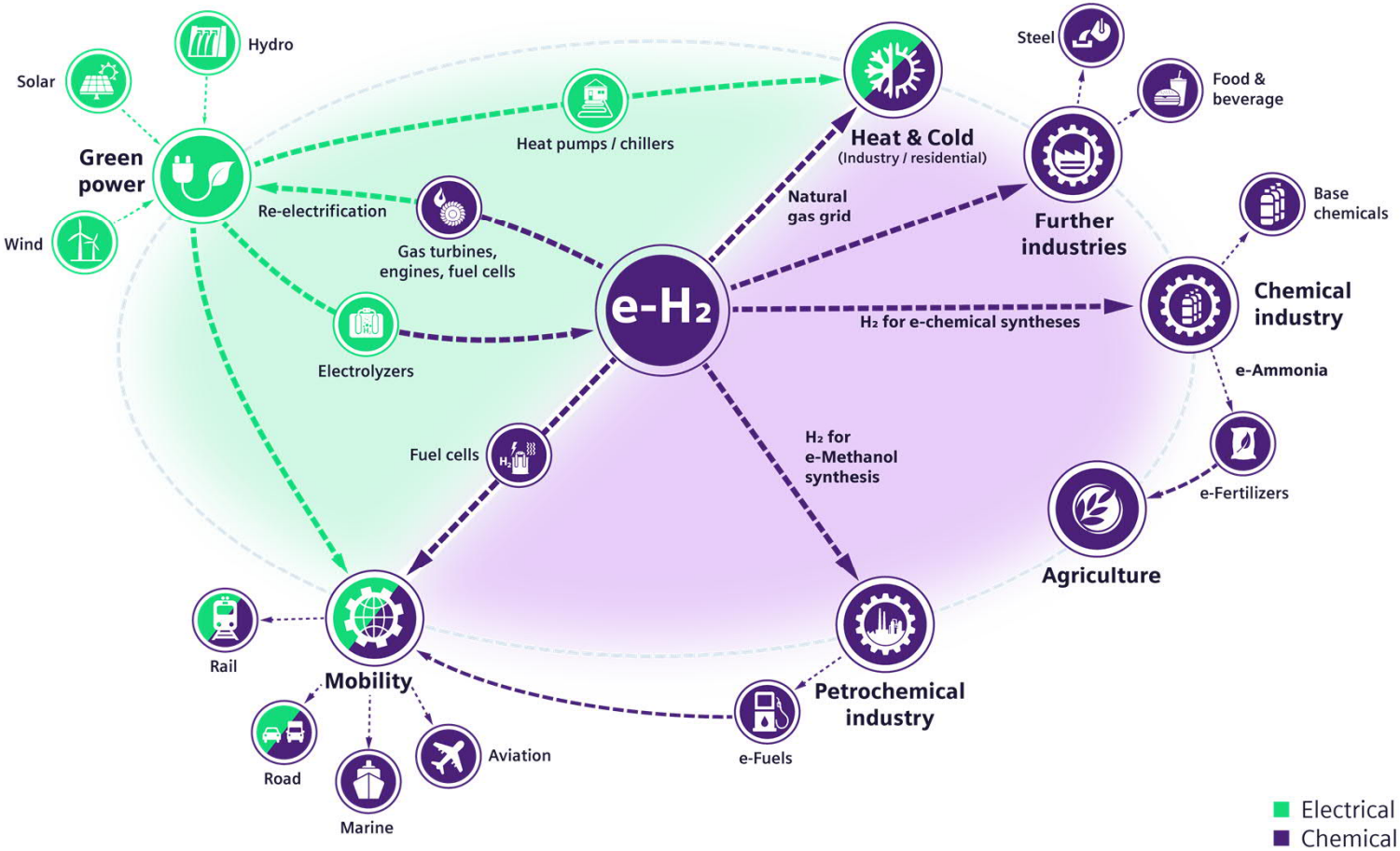
Siemens Gamesa Renewable Energy ("SGRE")

67% owned

- Onshore
- Offshore

e-H2 *is* electrification.

Sector Coupling is a key lever for decarbonization of end-use sectors



Silyzer 300 – Full Module Array
The next paradigm in PEM electrolysis

Silyzer 300
Full module array
(24 modules) …

… and close-up of 6
modules (Linz plant)

SIEMENS energy

17.5 MW
plant power demand

>75.5%
plant efficiency

24 modules
to build a full module array

335 kg
hydrogen per hour

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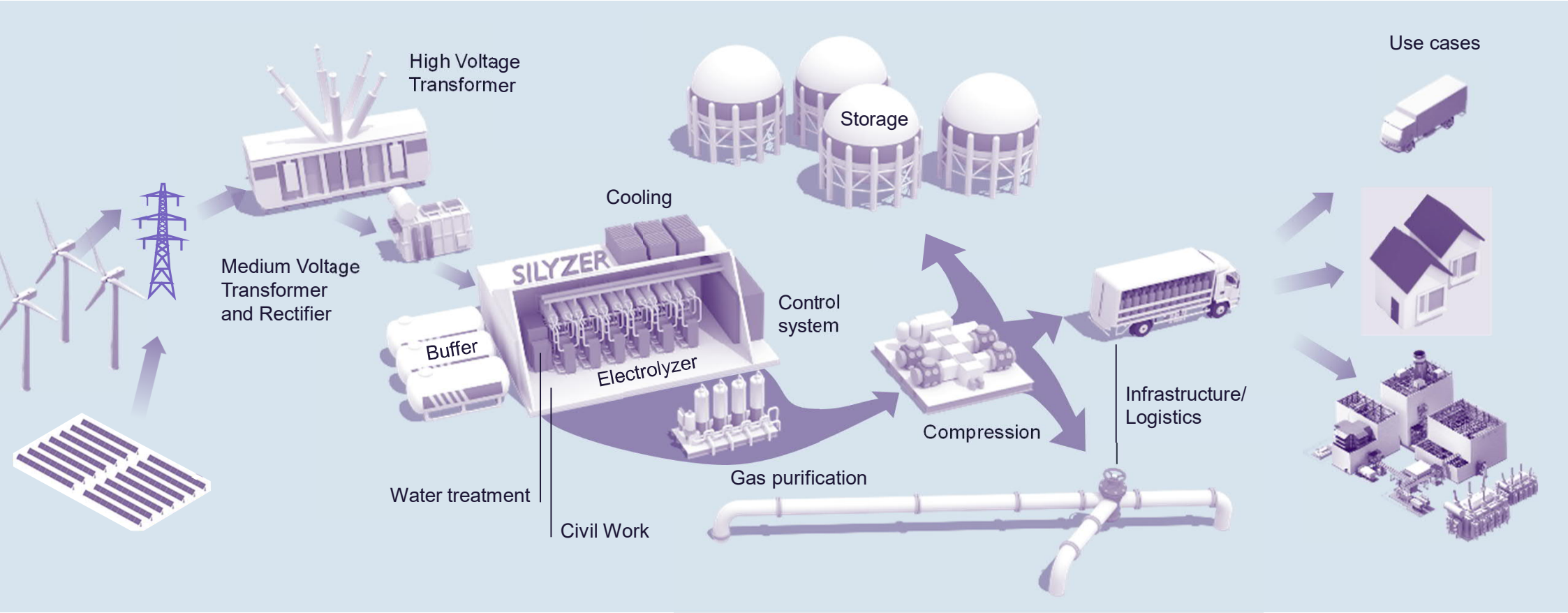
e-Hydrogen production

More than just electrolyzers.



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Silyzer portfolio scales up by factor 10 every 4 – 5 years driven by market demand and co-developed with our customers

Silyzer portfolio roadmap

0.1 MW

2011

Silyzer 100
Lab scale demo
~20 kOH[1],
~30 t of H_2

1 MW

2015

Silyzer 200
~130 kOH[1]
~1700 t of H_2

World's largest Power-to-Gas plants with PEM electrolyzers in 2015 and 2017 built by Siemens Energy!

10 MW

2018

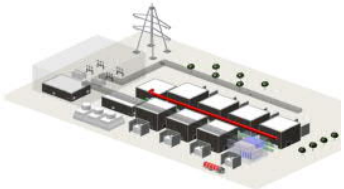
Silyzer 300

Biggest PEM cell in the world built by Siemens Energy!

100 MW

2023+

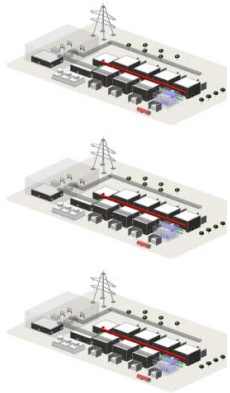
Next generation
Under development



1,000 MW

2028+

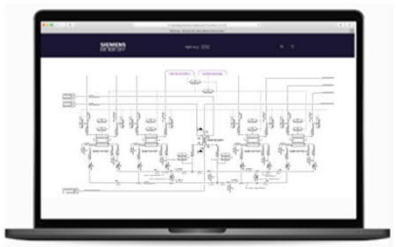
First investigations in cooperation with chemical industry



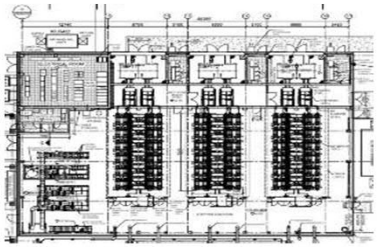
1 1000 accumulated Operating Hours; Data OH & tons as of Oct 2020

Prepared for delivery at Gigawatt scale

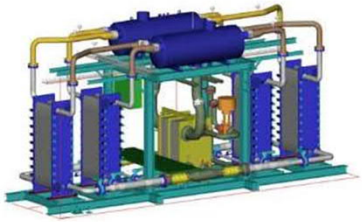
Standardization, Modularization and Manufacturing



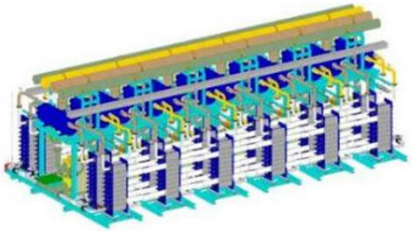
Digital engineering



50 MW plant design based on Silyzer 300



Prefabricated group of 4 modules



Silyzer 300 array system design

- **Standardized plant** design based on **modular** building-blocks
- **Pre-fabricated groups** with pre-defined interfaces
- Integrated **digital engineering** tools

- Ramp-up of manufacturing towards a lean **Gigafactory**
- Flexible **expansion** to **Multi-GW**
- **Automated**, highest-quality Silyzer production

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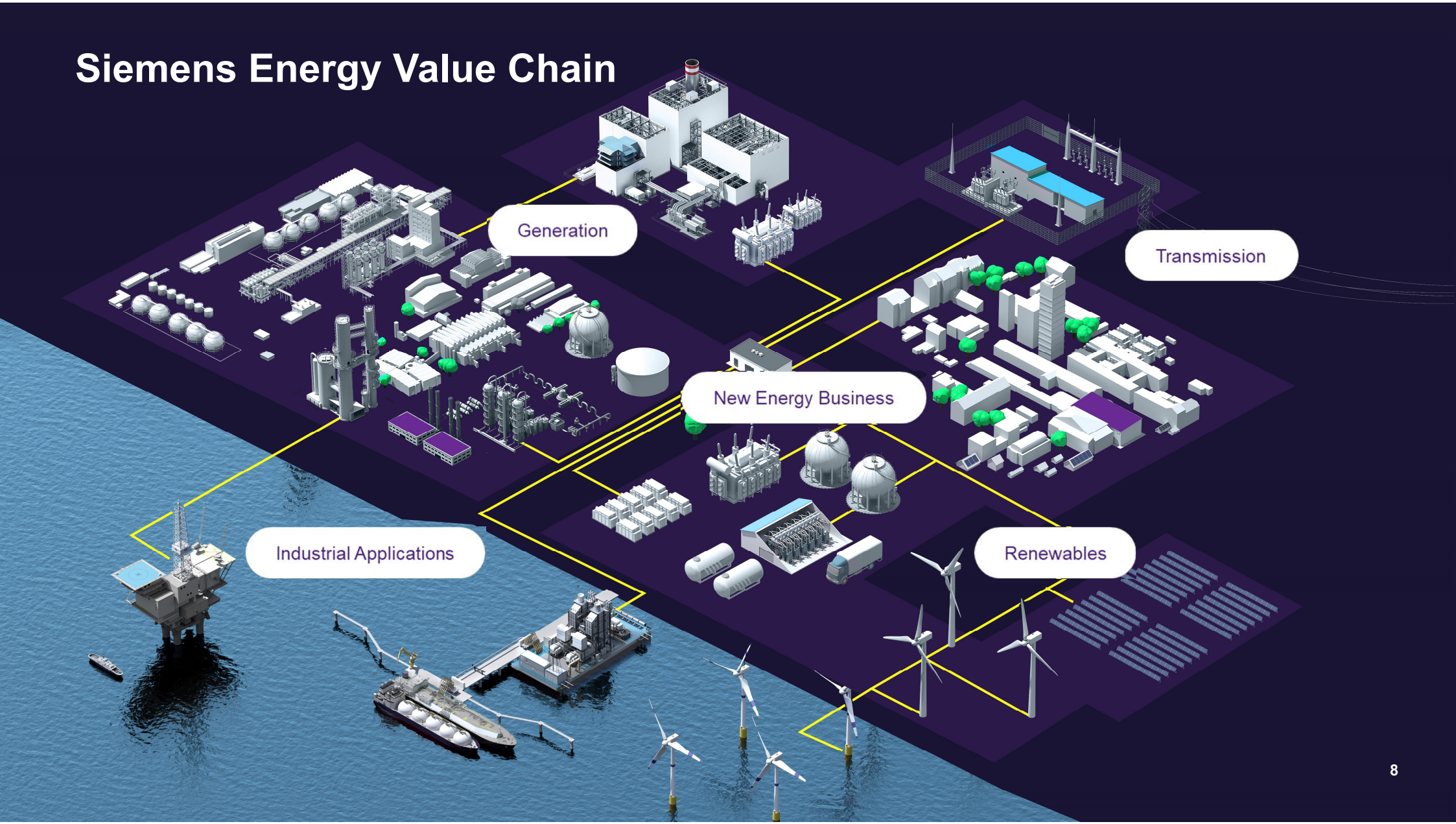
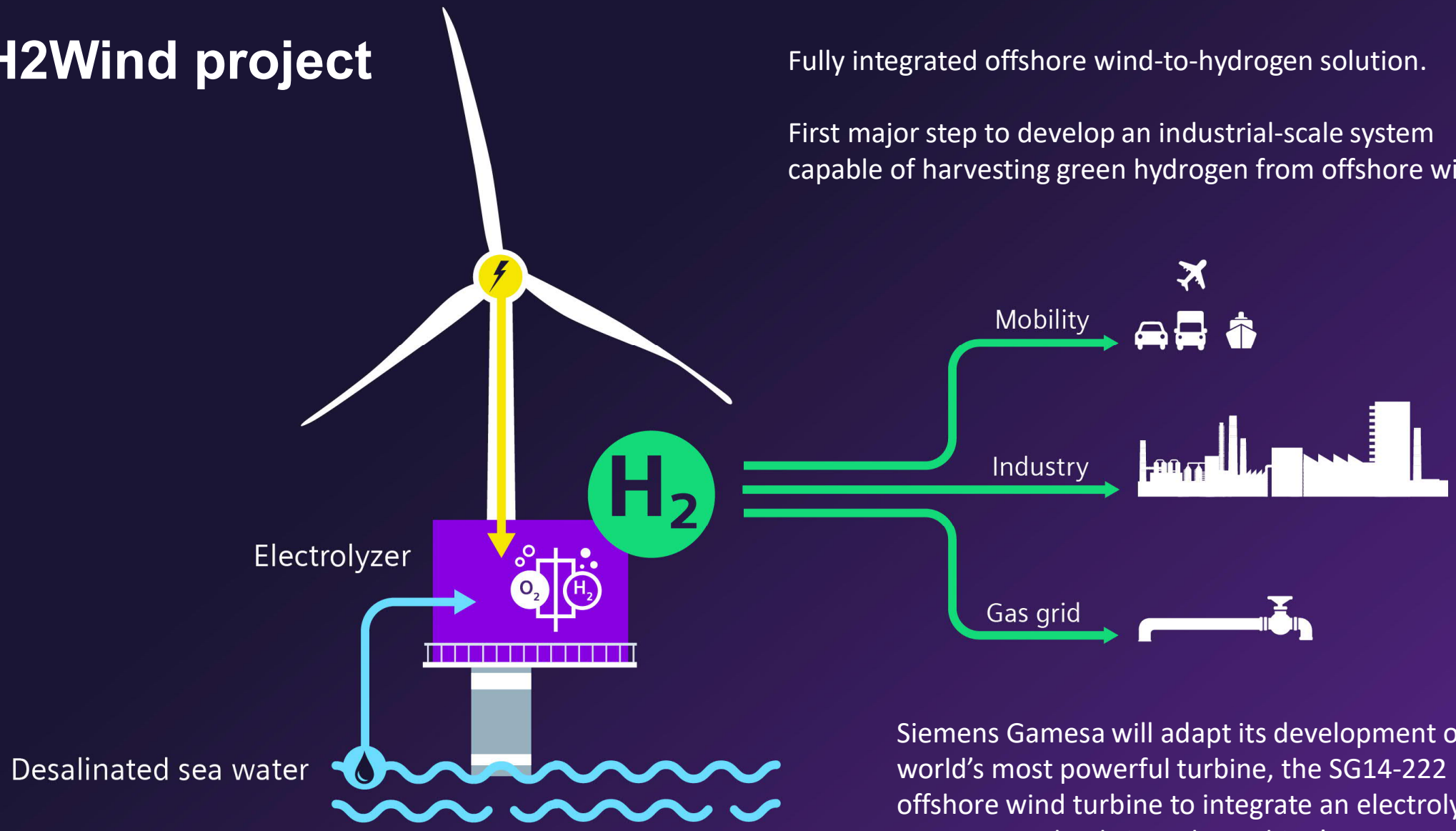
Siemens Energy Value Chain



H2Wind project

Fully integrated offshore wind-to-hydrogen solution.

First major step to develop an industrial-scale system capable of harvesting green hydrogen from offshore wind.



Siemens Gamesa will adapt its development of the world's most powerful turbine, the SG14-222 DD offshore wind turbine to integrate an electrolysis system seamlessly into the turbine's operations.

From Flue Gas to Electro-Fuel: FlagshipOne (Örnsköldsvik/Sweden)

Liquid Wind

Renewable Electricity
70 MW/475 GWh/y

Flue Gas : CO_2
70 kton/y from BioMass CHP Plant

Electrolyzer
SIEMENS energy

H_2

Carbon Capture
carbon clean

Methanol Reactor
HALDOR TOPSOE
& Process Engineering

CH_3OH
eMethanol 50 kton/y

MAERSK

O_2

H_2O

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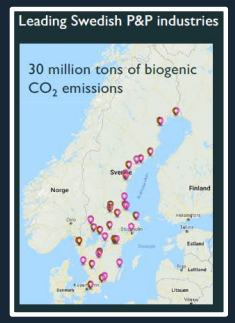
Electrification
Automation / Instrumentation
Digital Twin / Digitalization

EPC-M
Worley
energy | chemicals | resources



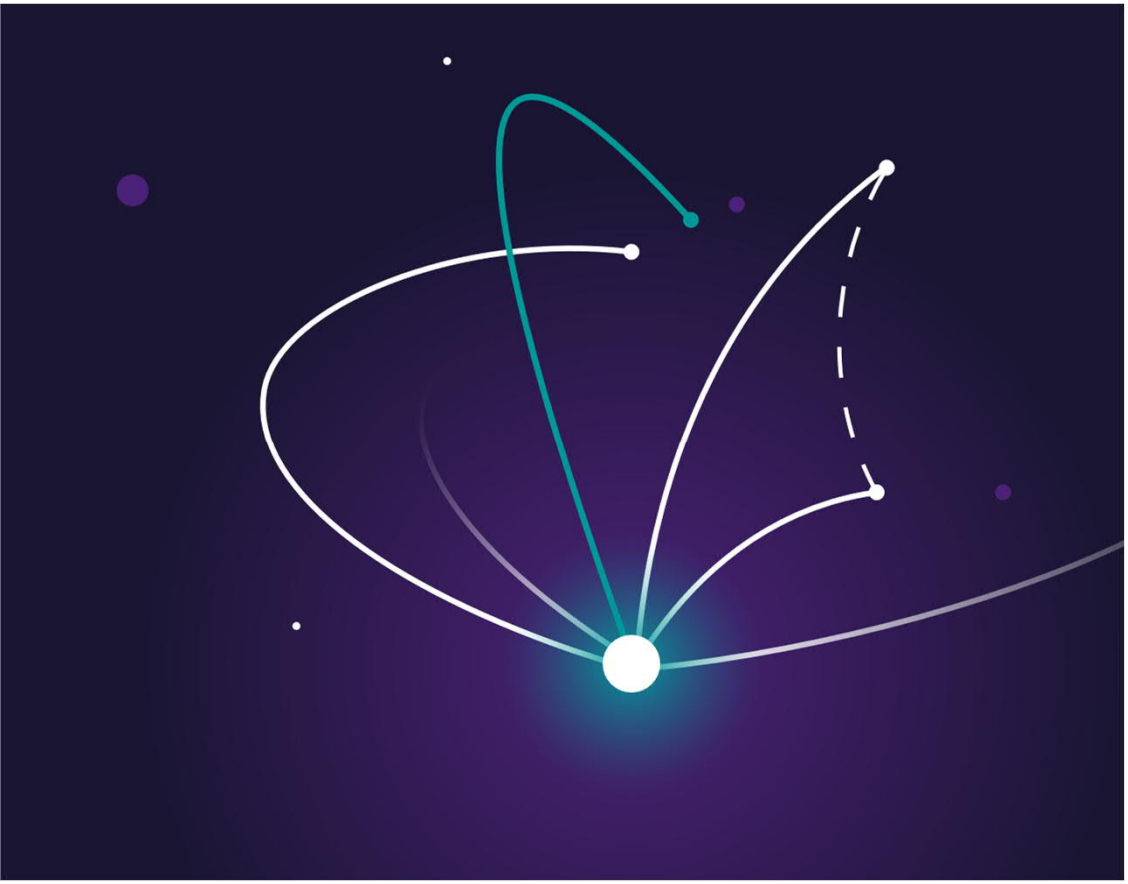
- ✓ Proven Technology
- ✓ Upcycling waste CO_2 into valuable resource
- ✓ Prevents new carbon emissions
- ✓ Carbon Neutral fuel
- ✓ Easy to adopt and store
- ✓ Enables more sustainable industry
- ✓ State of the Art Technology and Engineering (Digital Twin, Simulation, Analytics, AI, etc.)

Haru Oni – Hydrogen based supply chain of renewable energy from Chile to Europe

https://www.siemens-energy.com/global/en/offerings/renewable-energy/hydrogen-solutions/haru-oni.html

https://newsroom.porsche.com/en/2020/company/porsche-siemens-energy-pilot-project-chile-research-development-synthetic-fuels-efuels-23021.html

Contact



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