Green Hydrogen Production

Customer Event Steam Turbine and Generators 2023



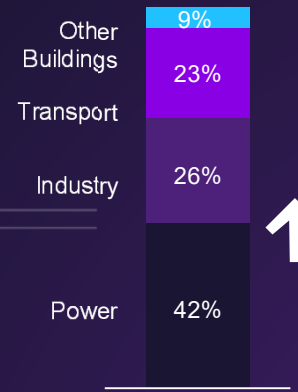
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“Sector Coupling”
Key lever for decarbonization of all end-user sectors

Shares in global CO_2 emissions by sectors

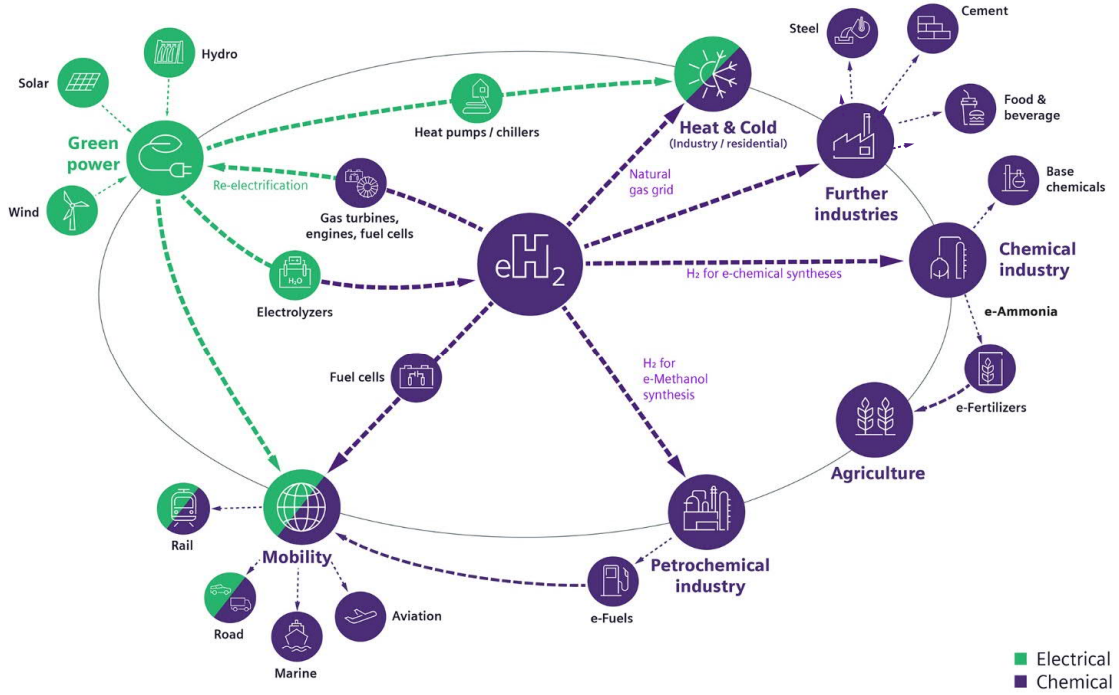
Leverage green electricity in other sectors
Share on CO_2 emissions: 58%
Share of Renewables: 11%



Successful integration of renewables in Power
Share on CO_2 emissions: 42%
Share of Renewables: 27%

Source: 2022 data from IEA and own estimates

The role of hydrogen – A versatile molecule



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Technology expertise in Electrolysis
Our electrolyzer portfolio scales up by factor 10 every 4 – 5 years

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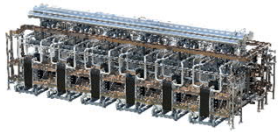
0.1 MW | **1 MW** | **10 MW** | **100+ MW** | **1,000+ MW**

2011
Silyzer 100
Lab-scale demo

2015
Silyzer 200

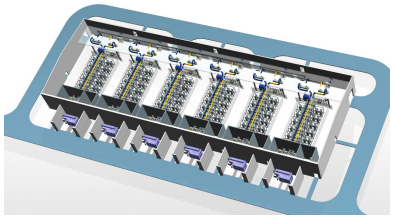


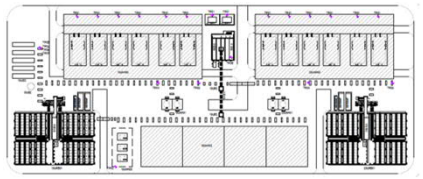
2018
Silyzer 300 => Silyzer Plant





2023
Scaling Silyzer 300 Plant





Next step
Co-Development with partners in **verticals**





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Silyzer 300 production concept

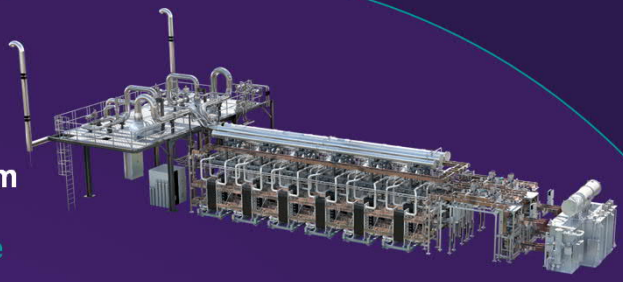
Electrolyzer reference plant
- Pre-engineered basic design
- Integrated solution with strong partner approach
- Turn-key possible

Electrolysis System
- Minimize on-site installation
- Maximum of standardization by defined interfaces
- Build to print pre-engineered

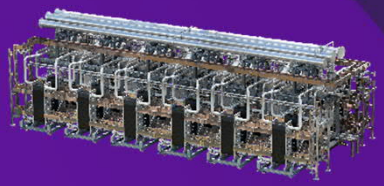
Localized decentral packaging
- High quality by pre-assembling
- Transportable units
- Strong local content

Cost efficient central stack factory
- High level of Automatization
- Large quantities and strong supply chain management
- Strong partner relation of key components











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Projects completed or in implementation based on Silyzer 300
Scale-up is already happening

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6 MW | **8.5 MW** | **17.5 MW** | **50 MW** | **50 MW** | **70 MW** | **200 MW**



H2Future Linz

- Green hydrogen for the steel making process
- Our partners: VERBUND, voestalpine, Austrian Power Grid (APG), TNO, K1-MET



Wunsiedel

- Green hydrogen for industry, grid services and mobility
- Our partners: Siemens AG, WUNH2, SWW Wunsiedel GmbH



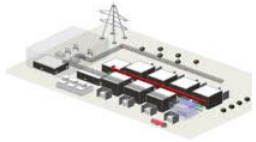
Oberhausen

- Green hydrogen for Air Liquide pipeline infrastructure
- Our partner: Air Liquide



e-Methanol Kassø

- Green hydrogen for CO_2-neutral shipping at large-scale
- Our partner: European Energy



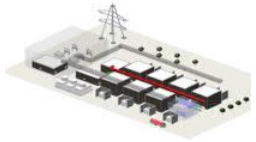
Chemical Company

- Hydrogen for chemical site



FlagshipONE

- Green hydrogen for CO_2-neutral shipping at large-scale
- Our partner: Ørsted

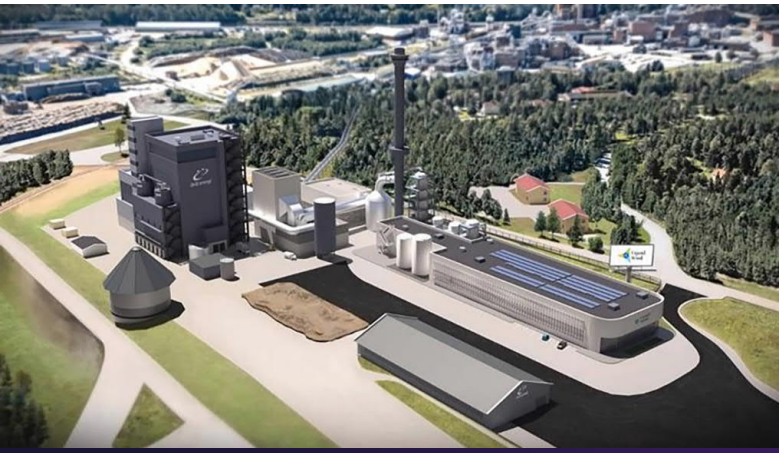


NormandHy

- Renewable electricity
- Engineering and Long Lead Started
- Our Partner: Air Liquide

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FlagshipONE
Largest commercial product plant for CO_2 neutral e-Methanol for marine use

Project

- Customer: FlagshipONE
- Investor: Ørsted
- Country: Sweden
- Installation: expected 2025
- Product: Silyzer 300

Use cases

Hydrogen for e-Methanol
Decarbonize the world's shipping industry

Challenge

- Europe's largest commercial e-Methanol product facility
- Blueprint: Liquid Wind plans 10 facilities by 2030
- FlagshipTWO electrolyzers capacity of 140 MW planned

Solutions

- 4x PEM Silyzer 300
- Plant wide electrification and automation system, digitalization solutions (digital twins), power distribution and compressor systems
- E-Methanol from hydrogen and biogenic carbon dioxide

70 MW
power demand based on Silyzer 300

50.000 tons
of e-Methanol per year from 2025

10 more plants
by 2030

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Contact

Global Technical Support

We have the Knowledge, the Know-How and the Team master Operational Challenges during entire Project Lifecycle!



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