



Cavendish Hydrogen

„How to successfully implement hydrogen
fueling systems”

Georg Tinkhauser

Agenda

- Overview Cavendish
- Cavendish technology
- Project Bruneck:
 - Technological and regulatory challenges
 - Current status
- Hydrogen fueling market developments

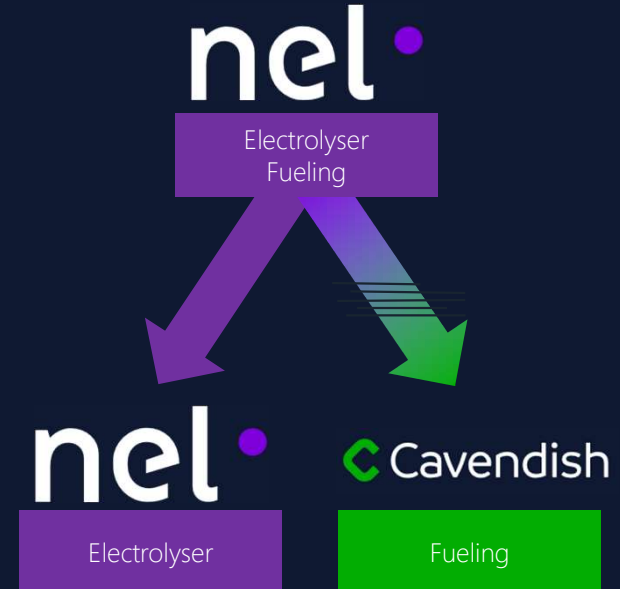
Overview Cavendish

Cavendish Hydrogen

Better focus on hydrogen fueling

- Successful Spin-off of Nel Fueling on 12.06.2024
- Board fully dedicated to hydrogen fueling
- Full focus on next product generation

*Fun fact:
Henry Cavendish
discovered Hydrogen.
What better name could
we have chosen?*



INTRODUCTION TO CAVENDISH HYDROGEN

This is Cavendish Hydrogen 20 years of experience developing fueling solutions

Uniquely positioned to capture the hydrogen opportunity

+20

Years of legacy within
hydrogen fueling

+145

H2Station™ units
sold



One of the largest
hydrogen station
factories globally



Local service hubs
on 3 different
continents

+150

Employees

31

millions EUR
revenue 2024

Geographical presence in key markets



USA South Korea Poland France
Germany Netherlands Canada Italy
Iceland United Kingdom Denmark
Sweden Norway Latvia Belgium

A LEADING PLAYER IN HYDROGEN FUELING EQUIPMENT

Cavendish Hydrogen: Technology Focus

Long history in a young market

- 20 years of experience and learnings accumulated to propel product development and capture market share

Technology protected by patents

- Current technology and innovations are both protected by approximately 75 patents¹ worldwide

Strong R&D division

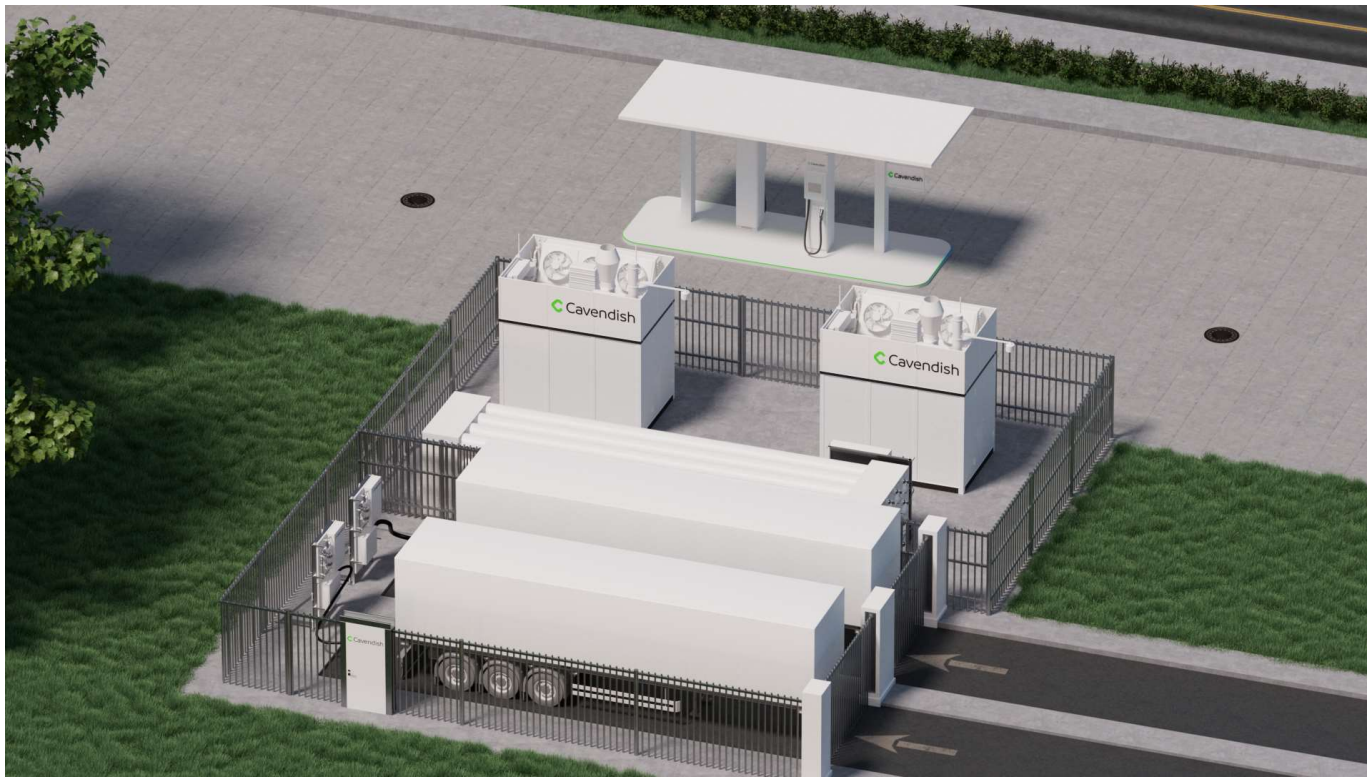
- ~60 research and development professionals globally developing the next generation of fueling solutions



Cavendish technology

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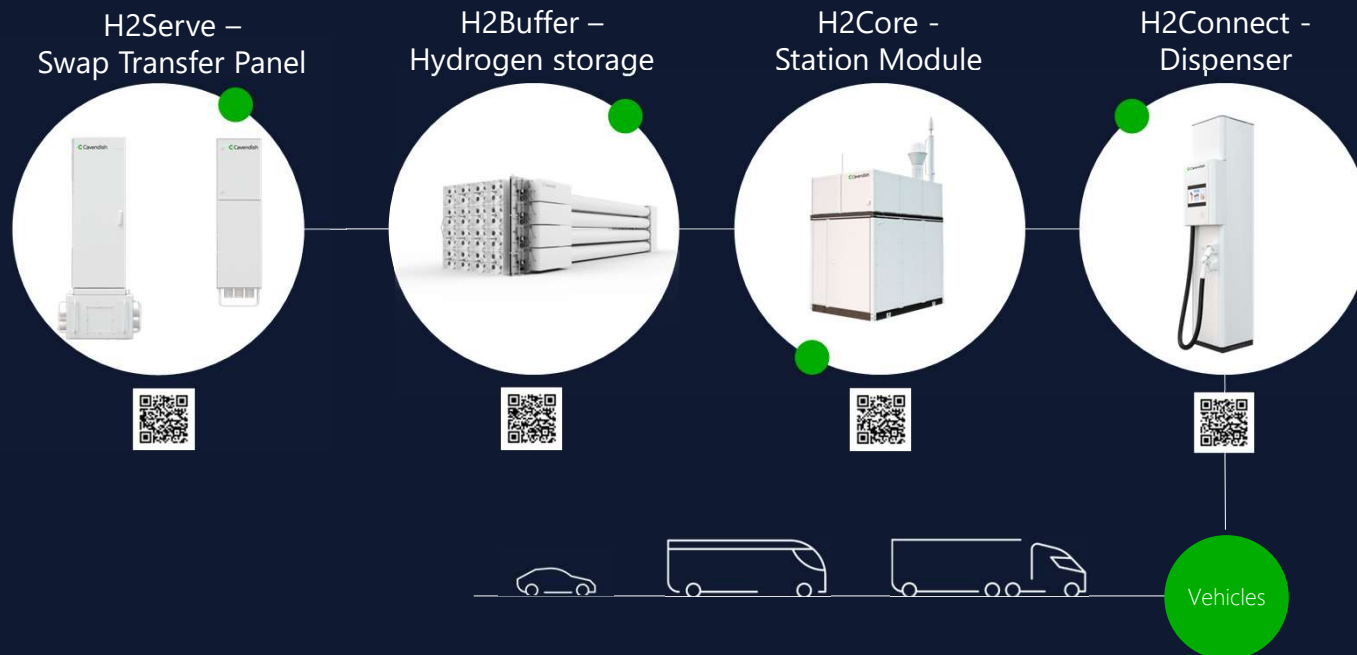
H2Station™ solution



INTRODUCTION TO CAVENDISH HYDROGEN

Offering fueling equipment and full scope of services from project engineering to operation support services

Supply source



**Design and
Manufacturing**



**Project
Engineering**



**Project
Management**



Installation



Commissioning



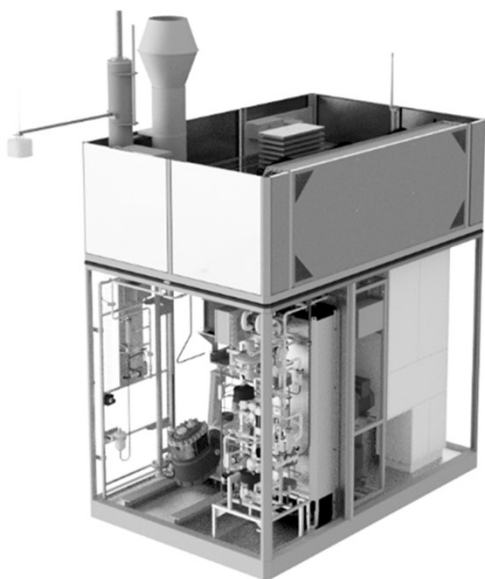
Maintenance



**Operation
Support Services**

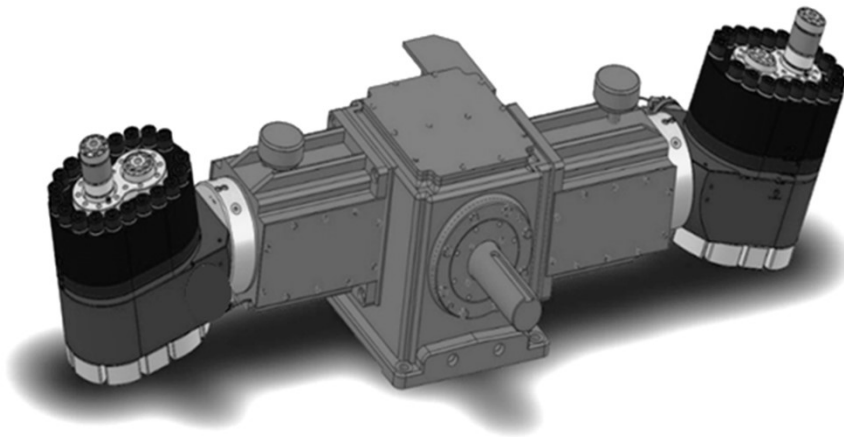
 **Cavendish**

H2Core – product specifications



	HS004	HS-ABB
Ambient temperature	-20 to +40°C	
Storage pressure level	22.5, 45 and 93 MPa	45 MPa
Fueling Nozzle	-H35: 35 MPa, Normal Flow -H70: 70 MPa, Normal Flow	-H35: 35 MPa, High Flow
Capacity with Inlet Pressure @20 Mpa	50 kg/h & 1.1 kWh/kg	102 kg/h & 1.2 kWh/kg
Inlet pressure range	3 - 20* MPa <small>*can be increased by using a pressure regulator</small>	3 - 45 MPa
Flowmeter / Accuracy	Coriolis mass flow meter /OIML Accuracy Class 2 for EU	

Patented compressor developed in-house



- Compressor designed entirely for hydrogen fueling
- 100% contamination free diaphragm compression – physical separation of gas and hydraulics
- Designed for dynamic operation
 - Start up under pressure avoiding hydrogen venting
 - Capability of repeated start-stop operation
 - Variable speed and pressure ratio for high capacity
 - Low outlet gas temperature achieving high efficiency
 - Flexible optimization of power draw versus capacity
- Long maintenance intervals
 - Major wear parts can be exchanged in few hours
- Validated technology and performance from years of testing

Project Bruneck

Cavendish first H2 station in Italy HRS Bruneck

- Client: Alperia
- Commissioning: 2025
- Olympics 2026
- Equipment:
 - 2 station modules
 - 2x 350bar heavy duty
 - 1x 700bar light duty
 - Storage system



Cavendish first H2 station in Italy HRS Bruneck



Cavendish first H2 station in Italy HRS Bruneck



Main challenges- Italian regulation

- Fire and safety regulation not hydrogen specific
E.g. 5m meter walls, 12m distance between dispensers
- Metrology approval (Measuring system) through ministry
- Italian permit to work system

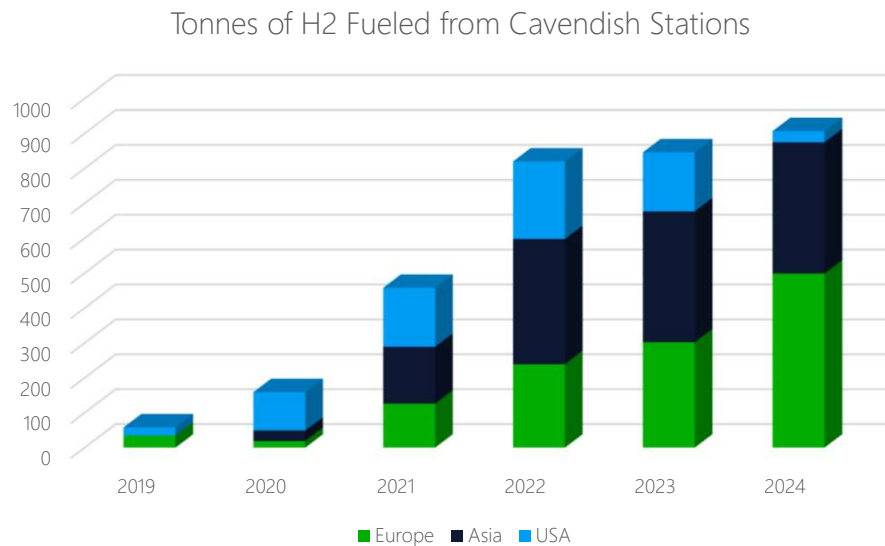
Hydrogen fueling market developments

Evolution of Hydrogen vehicles at Cavendish stations



A LEADING PLAYER IN HYDROGEN FUELING EQUIPMENT

Hydrogen fueled worldwide with Cavendish equipment



- More than 907,000 kg H₂ dispensed at Cavendish stations in 2024
- Strong growth in Europe compensates for lower volumes in the USA
- Growth mainly driven by heavy duty fueling

Global FCEV Market Development



- Introduction of the 3rd Gen Fuel Cell System – planned rollout 2026
- Plans to introduce hydrogen trucks to Southern California-based Toyota North American Parts Center fleet
- Investments in hydrogen infrastructure to benefit trucking fleets and consumers
- Partnership with BMW



- New generation of XCIENT Fuel Cell Class 8 HDT was presented at the ACT Expo 2025 in California
- New Hydrogen Fuel cell plant in Ulsan
- Collaboration with GM – MoU to jointly develop FCEV



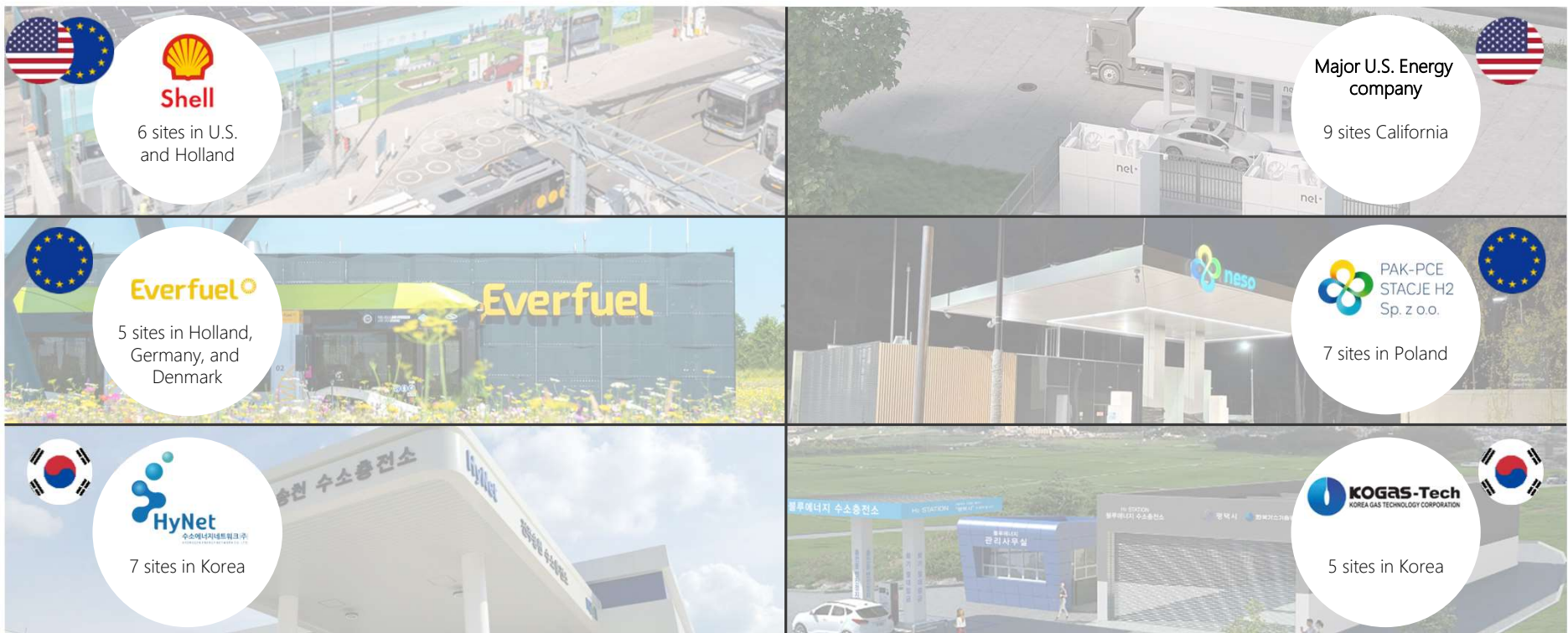
Setting a new standard for fueling
heavy-duty vehicles
- with reliable fueling solutions

Q&A

References

A LEADING PLAYER IN HYDROGEN FUELING EQUIPMENT

Cavendish Hydrogen offers a clear value proposition to a strong base of blue-chip customers



H2STATION™ REFERENCES

Heinenoord, Netherlands

- H2Station™ for Everfuel in Heinenoord, Netherlands
- Two H2Station™ for fueling of two buses simultaneously
- 100% redundancy – One H2Station™ can support the entire bus fleet (24 buses)
- Hydrogen supply based on trailer swap
- Operational since 2022



H2STATION™ REFERENCES

Palm Springs, California, US

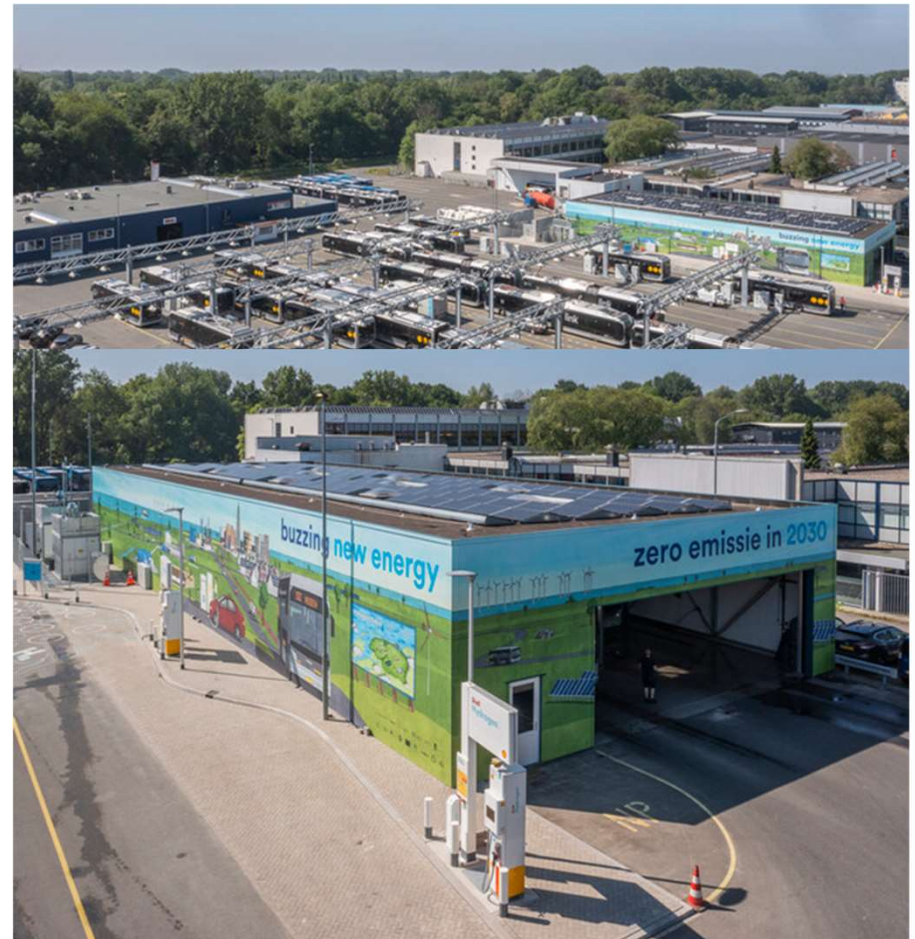
- H2Station™ for SunLine Public Transit Agency in Thousand Palms, California
- Nel turn-key solution
- Onsite Nel PEM-400 electrolyser for hydrogen production up to 900 kg/day
- Two (2) dispensers for fueling of two (2) buses simultaneously
- Capacity for up to 25 hydrogen fuel cell buses per day
- Hydrogen dispensers collocated with CNG bus dispensers
- Operational since 2019



H2STATION™ REFERENCES

Groningen, Netherlands

- H2Station™ for Shell/Qbuzz in Groningen, Netherlands
- Two (2) H2Station™ for fueling of two (2) buses simultaneously
- 100% redundancy – One (1) H2Station™ can support the entire bus fleet (20 buses)
- Hydrogen supply based on trailer swap
- Operational since 2021



H2STATION™ REFERENCES

London, England

- H2Station™ for Transport for London (TfL) in London, England
- Two (2) H2Station™ for fueling of two (2) buses simultaneously
- 100% redundancy – One (1) H2Station™ can support the entire bus fleet (20 buses)
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