Hydrogenics Selected References

Fueling Stations
In a nutshell

- Global provider of
  - On-site hydrogen water electrolysers
  - Energy Storage systems
  - H₂ fueling stations
  - Fuel cells systems
- Since over 60 years
- 125 employees
- Listed on NASDAQ (HYGS) and TSX (HYG)
- Own R&D and product development
- Over 1,800 projects deployed in >100 countries
Final Skid & Container Integration

Skid/System Assembly

Welding area (certified)

Oxygen cleaning

Production Hall
The Smart Energy Grid – Hydrogen to build bridges

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The diagram illustrates the comparison of energy systems, focusing on current tools, advantages, disadvantages, and H₂ link synergies. It highlights the use of natural gas for heat storage and dependency on CO₂ emissions, while gasoline for transport struggles with portability and CO₂ emissions. Electricity is the power source with storage and H₂ clean conversion as its advantages.
Hydrogenics’ Electrolysis-based Fueling Station Expertise
Our product added value (1/2)

• **Compact** solution leading to **limited footprint**

  - Standardized and **cost effective** solutions available in modules of 22, 32, 65, 130kg/day and larger

• **Extendable** and **modular** capacities for future upgrades of the station

• **One control system** for the complete fueling station and remote communication possibility

• **Emission-free** hydrogen production (no pollution, no greenhouse gases)

• **Fully automated** operation, robust design and high reliability leading to reduced and simple maintenance

• **Pressurized electrolyser** reducing demand on the compression system

130 kg/day fueling station
Our product added value (2/2)

- **High Efficiency**: < 65kWh/kg (350bar) or 68kWh (700bar) per kg H₂ produced

- Compliant to all major international standards (CE, GOST, US NRTL)

- Designed to hydrogen fueling station directives: TC197 WG11 and ISO TS20100 (fueling station guidelines); SAE J2601 (refueling protocol); SAEJ 2719 (fuel specifications)

- Following **SAE J2601** fueling protocol according to requirements

- **Low maintenance** due to limited moving parts (no electrolyte pump)

- Fuel cell grade hydrogen (up to **99.999%**)

- Smart management of vehicle filling sequences

765 kg/day fueling station
Hamburg, Germany

780kg/day, 350/700 bar dispensing

Located in the center of Hamburg in front of “Der Spiegel” newspaper offices, the station is the biggest worldwide, capable to refill busses and passenger cars. The station has 120Nm³/h electrolyzers, 430kg 45bar storage and 250kg 830bar storage and follows the SAEJ 2601 refueling protocol.
Stuttgart, Germany

130kg/day, 700 bar dispensing

Located at the EnBW’s offices in Stuttgart, this station provides clean hydrogen to passenger cars. The station has a 60Nm³/h electrolyser, 215kg 45bar storage, 830bar high pressure storage and follows the SAEJ 2601 refueling protocol.
Located at one of the warehouse of Colruyt, one of the biggest Belgian retail company, the station is refueling a fleet of forklifts. Additionally, it can also refuel other vehicles. The station has a 30Nm³/h electrolyser, 40kg storage and a -20°C chiller to meet the customer’s SAEJ 2601 refueling sequence.
Istanbul, Turkey

65kg/day, 220/350bar dispensing

Located at historic site of the Golden Horn at the Bosphorus, the station can refuel boats at 220bar and vehicles at 350bar. The station has a 30Nm³/h electrolyser, 135kg storage and a -20°C chiller to meet the customer’s SAEJ 2601 refueling sequence.
Oslo, Norway

260kg/day, 350bar dispensing

The station is part of the CHIC project and is installed at the Ruter bus station near Oslo. Five Van Hool H₂ busses are being operated and can be refueled in the same time as traditional busses. The station has A 120Nm³/h electrolysers and ...kg high pressure storage. A 700bar refueling module can be added in a further stage.
The station can refuel passenger cars and has a 15Nm³/h electrolyser and 40kg storage at 350bar. The complete equipment has been installed on the canopy of the station, reducing drastically the total footprint of the station.
Brügg, Switzerland

130kg/day, 350bar dispensing

The station is part of the CHIC project and is installed at the Postauto bus station near Brügg. Five Daimler Citaro H₂ busses are being operated and can be refueled in the same time as traditional busses. The station has a 60Nm³/h electrolyser and …kg high pressure storage.
Los Angeles, CA, USA
65kg/day, 700 bar dispensing

The station will allow the refueling of busses and passenger cars. The station has a 30Nm³/h electrolyser and 60kg of high pressure storage.
Dunkerque, France

21kg/day, 220bar dispensing

The station was part of the project Althytude where Hythane®, a mix of $\text{H}_2$ and natural gas has been used to fill 2 conventional busses. The fueling station was producing 10Nm$^3$/h of $\text{H}_2$ using a HySTAT® electrolyser. The hydrogen was then compressed at 220 bar, stored and mixed (up to 8%) together with natural gas at the dispenser.
Other Worldwide Fueling Projects

Sydkraft, Malmö, Sweden

CUTE Program, Amsterdam, Netherlands

CUTE Program, Stockholm, Sweden

CUTE Program, Barcelona, Spain

Toyota HQ, California, 2005

DTE, Michigan, 2004
Hydrogenics’ Value Proposition
Hydrogenics’ product added value

- Flexible production (10-100%)
- Fully-automated production
- 10barg (25barg) pressure without compressor
- Compact and highly efficient solution
- Adapted power management
- Robust design and high reliability (many units in operation)
- Reduced and simple maintenance (limited moving parts)
- Hydrogen purity according to requirements (up to 99.999%)
- Compliant to all major international standards
Hydrogenics’ team added value

• Direct contact with the manufacturer
• Dedicated Technology and R&D team
• 60 years of experience and professionalism
• Over 45 fueling stations delivered worldwide
• Safety and reliability is our main concern
• Design, production and startup by Hydrogenics
• Worldwide start-up and After-sales service
• Full maintenance contract possibility
• Recognized by major companies