Hydrogen Technology Innovations

Industry
Transport
Energy
Empowering generations with clean energy forever is the vision of Nel Hydrogen.

Our technology allows people and businesses to make everyday use of hydrogen, the most abundant element in the universe.

The World’s Hydrogen Enabler

Nel Hydrogen is a global, dedicated hydrogen company, delivering optimal solutions to produce, store and distribute hydrogen from renewable energy. We serve industries, energy and gas companies with leading hydrogen technology.

Since 1927 Nel Hydrogen has proudly developed and continually improved hydrogen plants. Our proven hydrogen solutions cover the entire value chain – from hydrogen production to intermediate energy storage and manufacturing of hydrogen fueling stations, providing all fuel cell electric vehicles with the same fast fueling and long range as conventional vehicles today.

The global community demands zero emission solutions. Nel Hydrogen is positioned to build complete, cutting edge hydrogen infrastructure – unlocking the potential of renewables.
NEL HYDROGEN ELECTROLYSERS

A3880

M200

A150
Unrivaled Electrolyser Performance

With more than 3,500 reliable, cost efficient electrolysers installed around the globe, Nel Hydrogen is the recognized industry leader of Alkaline and PEM water electrolysis. Our water electrolysers make a superior choice for Industry, Transport and Power-to-X applications. Multiple, scalable, flexible, modular product ranges are set to meet any customer requirement.

While our A Series electrolysers utilize an Atmospheric Alkaline method for splitting water, our M, C, H and S Series electrolysers utilize Proton® PEM technology to produce pressurized, high volume, ultra-high purity hydrogen on-site. With efficiency in mind, these state-of-the-art systems sense demand and automatically adjust production accordingly.

Our units come in a variety of sizes and configurations to match any customer application. In addition, both the A and M Series units can be containerized for easy deployment and setup. For larger applications, A or M Series units can be grouped together to share balance of plant saving both capital and operational expenses.

The world’s most energy efficient electrolysers, the A Series features a cell stack power consumption as low as 3.8 kWh/Nm$^3$ of hydrogen gas produced, up to 2.2 MW per stack. A Series electrolysers can produce up to 3,880 Nm$^3$/h of hydrogen or just over 8 ton per day. This robust system can be containerized, offering one of the world’s smallest footprints for high capacity electrolyser plants at 200 barg.

With minimal maintenance and siting requirements, M Series electrolysers can produce up to 4,000 Nm$^3$/h of hydrogen gas at 99.9998% purity on-demand. Featuring a scalable modular design that can be containerized, these systems offer solutions that are well-suited for a variety of industrial, fueling and renewable energy applications.
In some situations, customers may not have the plant space available to house a large scale electrolyser. At other times customers may want to configure an electrolyser for easy installation. That is where containerization can help. Most A Series and all M Series units can be delivered and sited in free standing containers for maximum flexibility.

The C Series electrolysers are ideal for a variety of industrial applications. Producing up to 30 Nm$^3$/h of hydrogen gas at 99.9998% purity, these units replace the need for hydrogen tube trailers or liquid hydrogen storage. They can be containerized, offering facilities flexible siting and reduced operational safety risks associated with delivered hydrogen.

H Series electrolysers offer turnkey solutions for small-scale applications requiring up to 6 Nm$^3$/h of hydrogen gas at 99.9995% purity. These units make a minimal impact to facility floor space, are easy to maintain and can be installed within hours.

Producing high purity hydrogen of 99.9995% at up to 1.05 Nm$^3$/h, S Series electrolysers replace the need for pressurized hydrogen cylinders in a variety of industrial processes. Each unit is low maintenance, compact, quiet, and can be installed within hours virtually anywhere in a facility.
The Benchmark of Hydrogen Fueling

Presenting the highest reported availability in the world and being the first to comply with the latest standards for refueling, our solutions for hydrogen production and fueling are becoming the benchmark for the industry.

From the first dispenser to establishing complete nationwide fueling networks, Nel Hydrogen is ready for delivery.

The H2Station® is the newest generation hydrogen fueling station for all types and sizes of fuel cell vehicles. It offers fast fueling with the world’s most compact footprint. Its design is based on years of R&D and operational experience, and is renowned for providing high fueling reliability. It is the world’s first UL listed and CE marked hydrogen fueling station module, allowing for easy local authority approval.

### H2Station

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>STANDARDIZED</th>
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<tr>
<td>Capacity up to 1,500 kg per day</td>
<td>Standardized product design</td>
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<tr>
<td>Maximum capacity 65 kg/h @ 70MPa</td>
<td>based on extensive development</td>
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<tr>
<td>or 120 kg/h @ 35 MPa</td>
<td>and testing</td>
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<th>MANUFACTURING CAPABILITY</th>
<th>DISPENSER</th>
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<td>Lean volume manufacturing capability of up to 300 stations/year</td>
<td>Compact hydrogen dispenser with a footprint of only 0.52m x 0.635m that can be placed right next to gasoline dispensers, 70MPa fueling with SAE J2601-1 v2016 or 35 MPa fueling with SAE J2601-2 with Optifill™</td>
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<th>STORAGE</th>
<th>PLACEMENT</th>
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<td>Hydrogen storage dimensioned to fit any preferred capacity and supply source ranging from on-site production to trucked-in delivery</td>
<td>Modular and flexible placement of H2Station modules at site</td>
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Talk to us about station modules, fueling storage, dispensers and fueling supply.
Station modules only available in galvanized steel.
Leading the Way in Enabling Zero-Emission Transportation

Norway’s largest grocery wholesaler, ASKO, is committed to becoming climate neutral through zero emission transportation. With more than 600 trucks on the road every day, ASKO is also one of the largest transport companies in the country.

Based on a proven track record and reliability, Nel Hydrogen was selected to deliver ASKO’s new solar-powered hydrogen production facility and fueling station solution in Trondheim. The pioneering investment enables ASKO to operate heavy duty fuel cell electric distribution trucks from Scania, as well as 10 forklifts with locally produced renewable hydrogen.

The assigned solar facility will produce energy for Nel’s turnkey AC150 containerized electrolyser which has a production capacity of more than 300 kg of hydrogen per day. The H2Station has been installed with three separate dispensers, two dispensers at 350 barg dedicated for forklifts and trucks, and one dispenser at 700 barg dedicated to cars.

The Color of Hydrogen

On the hydrogen emission spectrum we find the color purple, with a wavelength of 410 nm. Nel is the color of hydrogen.
Are You Next?

Hydrogen Business Development

Moving into hydrogen implies new territory and many opportunities. Investing in renewable hydrogen infrastructure requires solid solutions for operation, maintenance, ownership and financing. We realize technological advancement takes place in a wider context in which we can give advice, facilitate and play different roles.

Committed to the success of every customer, Nel Hydrogen has valuable experience across categories, covering most aspects of hydrogen entrepreneurship.

Nel Hydrogen has delivered more than 40 fueling stations in 10 countries, many which today are used on a daily basis for fueling of fuel cell electric vehicles from the major international car manufacturers. We build hydrogen production facilities of all sizes and configurations. Our biggest hydrogen plants to date: 135 MW. Challenge us, and we will be happy to discuss what solutions will fit your needs.

Markets We Serve
Pioneering Renewable Hydrogen for Nearly a Century

1927 - Building of the first small electrolyser installation at Norsk Hydro at Notodden, Norway. Testing for pure hydrogen for fertilizer production.

1929 - World’s largest installation of water electrolyzers at Rjukan, Norway. Increasing over time to 3 plants and 440 electrolyzers, exceeding 60,000 Nm$^3$/h. Sourced by hydro power.

1953 - Creation of a second large-scale hydro powered electrolyser plant for supplying hydrogen for ammonia production in Glomfjord, Norway.

1974 - Our renowned electrolyser technology made available for other companies and other industries.

1988 - The world’s first electrolyser supplier to provide non-asbestos alkaline electrolyzers.

2003 - Nel opens the world’s first publicly available hydrogen fueling station in Reykjavik, Iceland.

2004 - The world’s first Power-to-Power demonstration project at the island of Utsira, Norway, enabling power to 10 households from stored hydrogen produced by excess wind power.

2014 - Nel becomes the first 100% dedicated hydrogen company listed on the Oslo Stock Exchange.

2015 - Nel acquires H2 Logic A/S, adding world leading hydrogen fueling technology to the product portfolio.

2016 - Initiates construction of the world’s largest manufacturing plant for hydrogen fueling stations, with a capacity of 300 units per year.

2017 - Nel acquires Proton Energy Systems, Inc., adding world leading PEM electrolysis technology to the product portfolio, becoming the world’s largest electrolyser company.

More than 90 years of hydrogen innovation.
And we are just at the beginning.

$H_2$ is $\infty$