Ramping up for the commercial hydrogen refuelling station market

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Adapted version for hand-out with explanatory text
Nel is already a pioneer within hydrogen with a long history. We have delivered the largest electrolyser plants that have ever existed (several plants exceeding 100 MW), as well as the first public hydrogen fueling station (Reykjavik), and first power-to-gas system (Utsira).
Vast fueling station experience

28 HRS in 8 countries since 2003

Statoil and Norsk Hydro both developed hydrogen fueling stations. Nel owns today all the hydrogen technology from these companies. Combined with the knowledge & experience from H2 Logic, Nel is today truly one of the world leading fueling station providers.
50% of Danish population have less than 15 km to nearest fueling station

In Denmark, Nel has through partnerships with Air Liquide, Strandmøllen and OK created the world’s first country wide fueling station network, also gaining knowledge on the pros and cons of on-site vs centralized electrolysis.
Norway is next up

20 stations by 2020

Realised through a Joint Venture with Praxair and Uno-X

Based on our experiences from Denmark, centralized electrolysis will be the preferred option for most stations for the hydrogen network which will be built in Norway, through the Joint Venture «Uno-X Hydrogen»
Utilizing excess solar power from an energy positive office building to produce hydrogen at the station.

First station, however, will feature on-site hydrogen production, as a demonstration case utilizing locally available excess power.
Hands-on experience

More than 10 years of operation of fueling stations

Nothing beats real experience. We have built and operated publicly available fueling stations since 2003, and learnt many lessons, all implemented in the design and operational procedures of our next generation hydrogen fueling stations.
In many cases, we have been involved all from the «idea-phase» until first fueling of a vehicle. This helps us understand what is needed on all levels to establish a station network, also how to make the process efficient.
People enjoy working in Nel. We have many, diverse and skilled people in our teams in Norway and Denmark. They love working with hydrogen, and are proud of their jobs. We have strict quality procedures, and we
24/7 monitoring of all stations

>98% availability

We have a 24h monitoring of our stations, and are able to perform preventive measures and maintenance to ensure the customers always get hydrogen when they arrive at our stations.
Hydrogen fueling stations must offer equal to, or better performance than conventional fueling stations.

And - always work!

Up until now, hydrogen fueling stations have been in a demonstration phase. That phase is over now, and it is time for the technology to perform as good, or preferably better than conventional stations.
NEW INNOVATIONS

New and efficient cooling technology

We have developed a new cooling system, which ensures a quick refueling whilst eliminating the need for a heat exchanger in the dispenser.
Throughout the years we have accumulated lots of in-house competence within all necessary disciplines for designing a hydrogen fueling station and understanding all the processes at a fundamental level.
Simplicity.

We believe in simplicity in everything we do.

Scandinavian culture and design embraces principles of purity and simplicity. So do we when we design our technology. It should be simple to use, hassle-free, and always work.
Our next generation fueling station embodies all our experiences from designing, building and operating several tens of other fueling stations. It is a product which will take hydrogen fueling from the demonstration phase to the commercial phase.
With its small footprint and high capacity, the CAR-200 makes integration in existing refuelling stations easy, and enables the owner to make a profit from selling hydrogen as a fuel.
We have also slimmed the dispenser module, down to a third of conventional fueling dispensers. Due to the efficient cooling system, it can also be placed up to 50 meters from the station/CAR-200 unit.
An important step forward in our development is our modular approach. We believe this is the way forward, in order to allow for greater flexibility for the customers with regard to capacity and future upgrades.
Nel recently invested in a new factory which at full capacity will produce 300 stations per year, or enough to accommodate for 200,000 new FCEVs annually. The first CAR-200 will come off the new production line in 2017.
Hydrogen must and will be renewable.

One of the critical elements for the success of hydrogen is the continued build-up of renewables globally. Our future fuel must be renewable, and also will be, since hydrogen works perfectly as an energy vector which balances out the variations of renewable energy.
Unparalleled efficiency

from 3.8 kWh/Nm³

In Nel, we have the most energy efficient electrolysers in the world. They were developed to produce massive amounts of hydrogen from renewable energy. Our solutions enable low-cost and efficient hydrogen production from solar and wind energy.
Well kept secrets

The reason for the high efficiency is a well kept secret. It is a non-patented active layer which we coat our electrodes with.
New developments...

The Rotolyzer®

We are continuing to develop new innovations within electrolysis. The RotoLyzer is based on a rotating cell stack, which results in a number of advantages - a combination of best worlds, both alkaline and PEM.
Synergies across the Nel-group

Providing entire fueling networks with renewable hydrogen fuel

With benchmark fueling and electrolysis technologies in-house, along with decades of experience, we are able to supply entire fueling networks. If you have a renewable energy source, we take care of the rest.
Summary:

1. Hydrogen is (finally!) available as a fuel today
2. Nel has been involved throughout the entire industrial hydrogen history
3. Extensive experience & continuous technology improvements within production, fueling and solutions
4. Ready, and scaling up to enable hydrogen as a globally available fuel within the coming decade
number one by nature

FUN FACT: Color taken from the emission spectrum of hydrogen, wavelength: 410 nm