

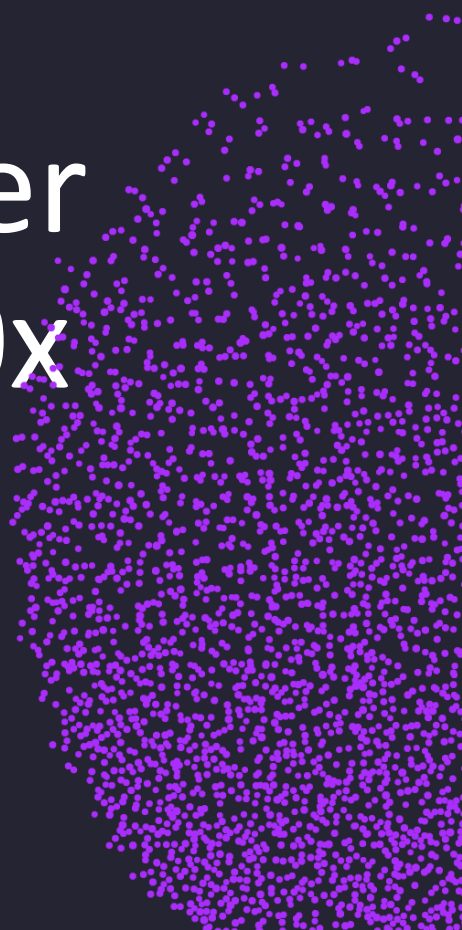
Scaling up electrolyser manufacturing by 10x

causes and effects

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Nel Hydrogen today

- Pure play hydrogen technology company listed on the Oslo Stock Exchange (NEL.OSE) w/~23,000 shareholders
- Manufacturing facilities in Norway, Denmark and U.S. & global sales network
- World's largest electrolyzer manufacturer, with >3500 units delivered in 80+ countries since 1927
- World leading manufacturer of hydrogen fueling stations, with ~50 H2Station® solutions delivered to 9 countries



ALKALINE AND PEM ELECTROLYZERS

Converting water and electricity to hydrogen and oxygen – for industry, mobility and energy purposes



HYDROGEN FUELING STATIONS

Hydrogen fueling stations capable of fueling any kind of vehicle. World's most compact – simple to integrate with other fuels & standardized

Pure hydrogen player

Optimized global supply chain – Listed on the Oslo Stock Exchange – 300 employees



PEM electrolyzers
Wallingford, CT, USA

Since 23 Years
2,700+ systems delivered

Production capacity:
>40 MW/year



Alkaline electrolyzers
Notodden/Herøya, Norway

Since 90 years
800+ systems delivered

Production capacity:
40 MW/year
→ 360 MW/year (> 1 GW/year)



H₂ refuelling stations
Herning, Denmark

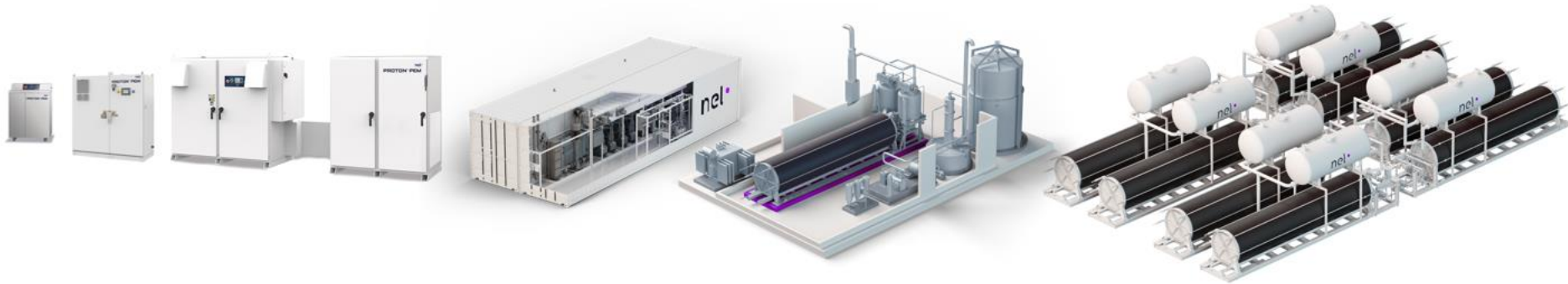
Since 16 years
50+ stations delivered

Production capacity:
300 HRS/year

Electrolysers and fueling stations from Nel

PEM and alkaline electrolyzers from Nel – all relevant sizes and technologies

- Alkaline electrolyzers since 1927 and PEM electrolyzers since 1996
- Scalable design from < 1 to >8.000 kg/day production capacity – able to deliver 100+ MW systems
- Designed for high volume manufacturing to achieve large scale plants with fossil price parity



From kW- to multi-MW industrial size hydrogen production plants

Secured location for low-cost alkaline electrolyzer manufacturing at Herøya, Norway

Alkaline electrolyzer manufacturing plant with possibility to grow beyond 1 GW/year



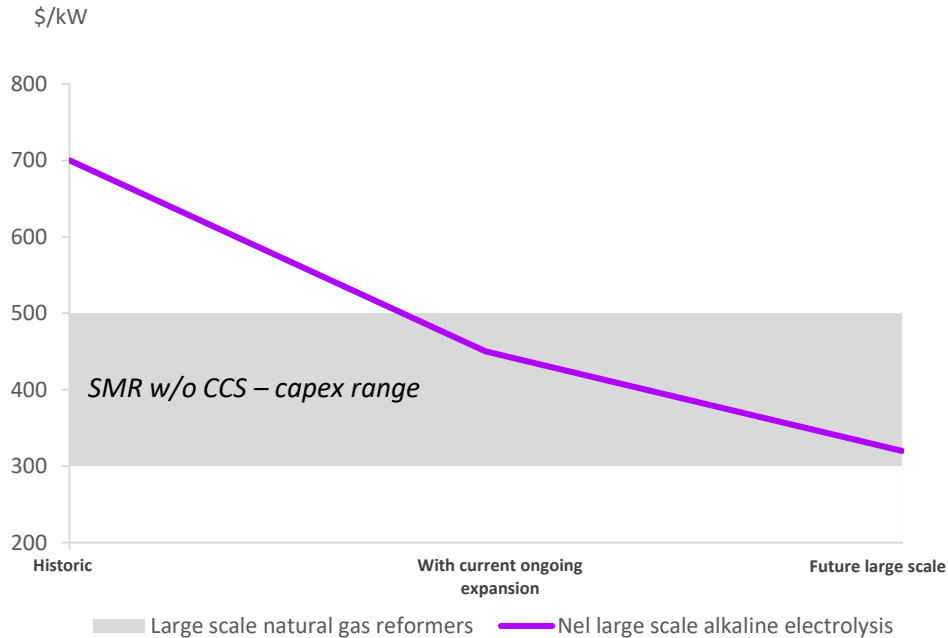
The new manufacturing facilities are located in Herøya Industrial Park, in a 15,000m² building in one of the largest industry parks in Norway



Possible set-up for 3 production lines at the Herøya facilities

Electrolyzers reaching same capex levels as large scale steam methane reformers

CAPEX of electrolyzers set to reach parity with SMR by 2020 & drop below in foreseeable future



- SMR – “steam methane reforming” is dominating hydrogen production today, using natural gas and steam
- Nel is establishing a new manufacturing plant targeting a >40% cost reduction
 - Expect to see further reduction in capex with increased production volume, and further size scaling of products
- Nel foresees capex to drop below SMR over time
- Electrolysis expected to be the preferred production method if **opex (i.e. power prices) are low enough (or at parity) with the alternative production methods**

Large-scale H2Station production facility in Denmark

Annual nameplate production capacity of up to 300 H2Stations

- First production line in the world for hydrogen stations
- Serial production according to lean principles represents significant improvements in existing production efficiency
 - Hydrogen compression, cooling and gas control assembled onto one skid
 - Allows both CE- and UL-certified stations off the line
- H2Stations for Europe, US and Asia running on same production line (70MPa and 35MPa fueling option)



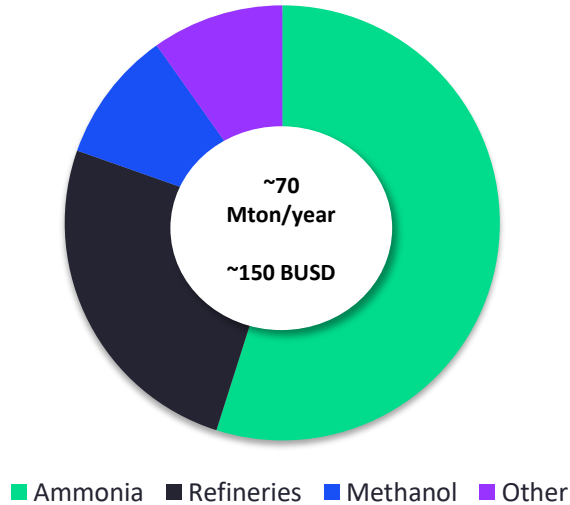
The H2 opportunity

Vast opportunities in a growing market

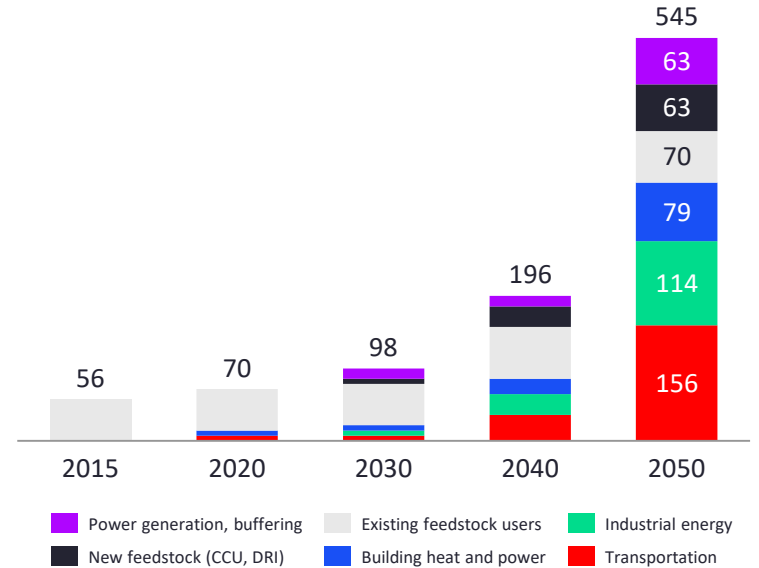
The H2 opportunity

Water electrolysis accounts for around 1% of today's market – which is set to grow by 10x by 2050

Today's global hydrogen market, by end-use:



Global energy demand supplied with Hydrogen (mill tons)¹⁾



The hydrogen opportunity is also an opportunity for renewables

The H2 opportunity

‘This translates into around 4-16 terawatts (TW) of solar and wind generation capacity to be deployed to produce renewable hydrogen and hydrogen-based products in 2050’

HYDROGEN: A RENEWABLE ENERGY PERSPECTIVE, 2019



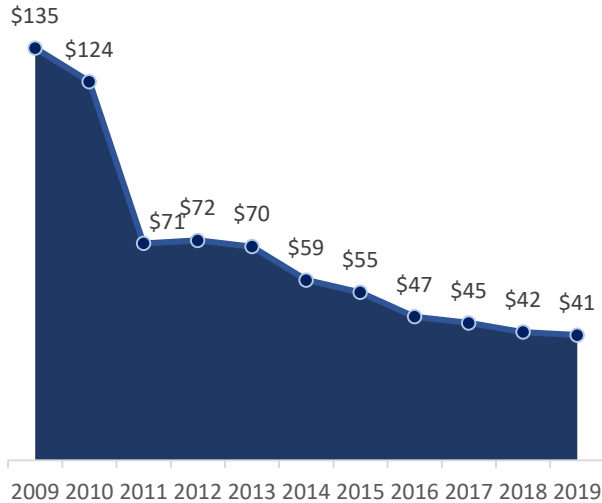
Rapidly decreasing cost of renewables is the main driver for the success of green hydrogen

The H2 opportunity

LCOE of wind and solar has dropped by 70% and 89% during last decade

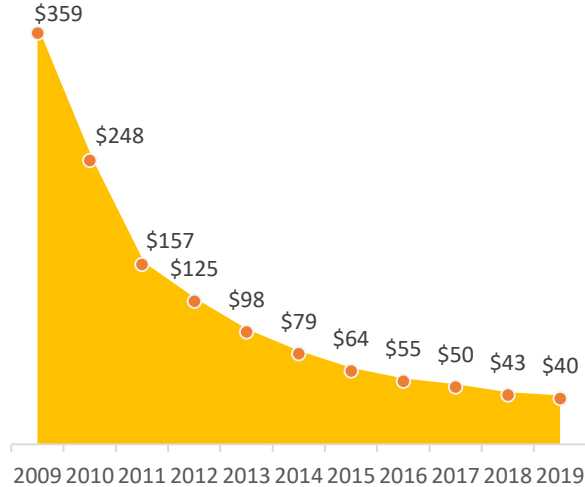
Wind LCOE

Unsubsidised levelized cost of energy (\$/MWh) ²⁾



Solar PV LCOE

Unsubsidised levelized cost of energy (\$/MWh)²⁾

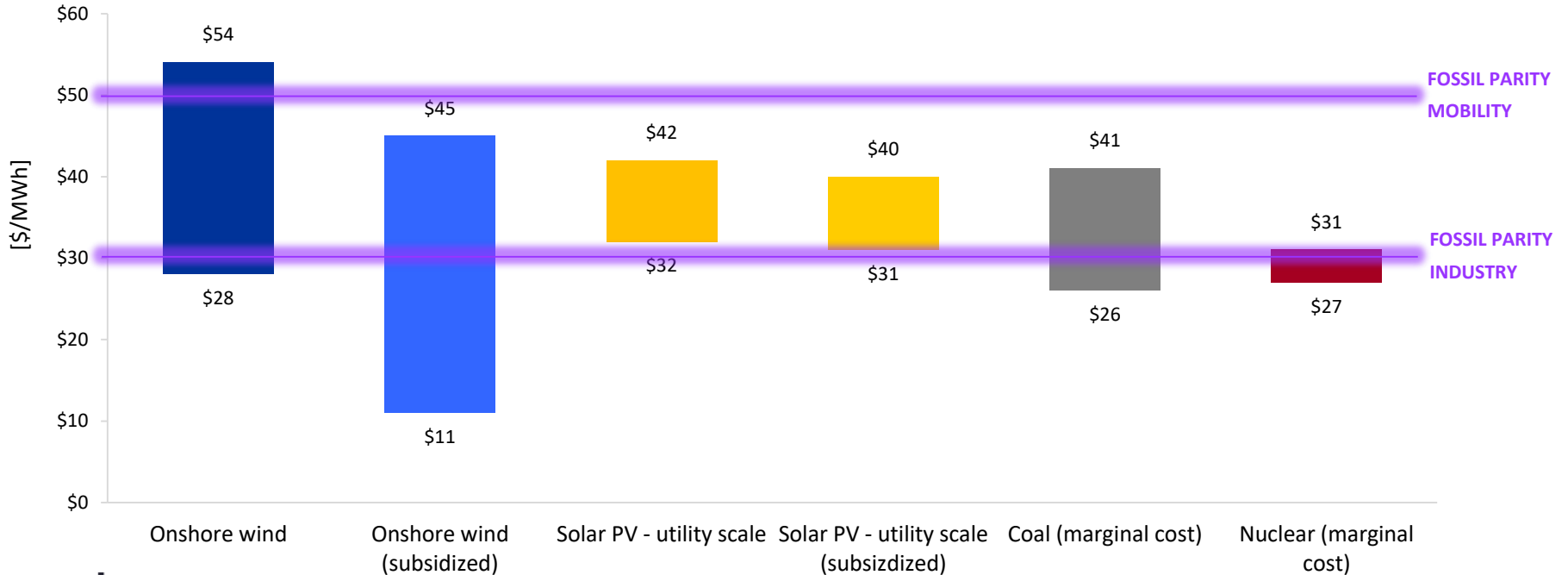


- With falling LCOE¹⁾ of wind and solar, renewable hydrogen follows the same path, as electrical power constitute 70-80% of the total cost of hydrogen
- Record low auction prices for solar PV and wind has seen prices as low as \$17.7/MWh and \$17.86/MWh respectively (as of 2017) ³⁾
- Prices are expected to drop further
 - LCOE for new solar PV plants and onshore wind are expected to fall by 71% and 58% respectively by 2050⁴⁾
- Low electricity prices combined with CAPEX of electrolyzers reaching same levels as large scale steam methane reformers, enables a competitive business case for renewable hydrogen within mobility and industry

Today's LCOE of wind and solar is outcompeting fossil alternatives

The H2 opportunity

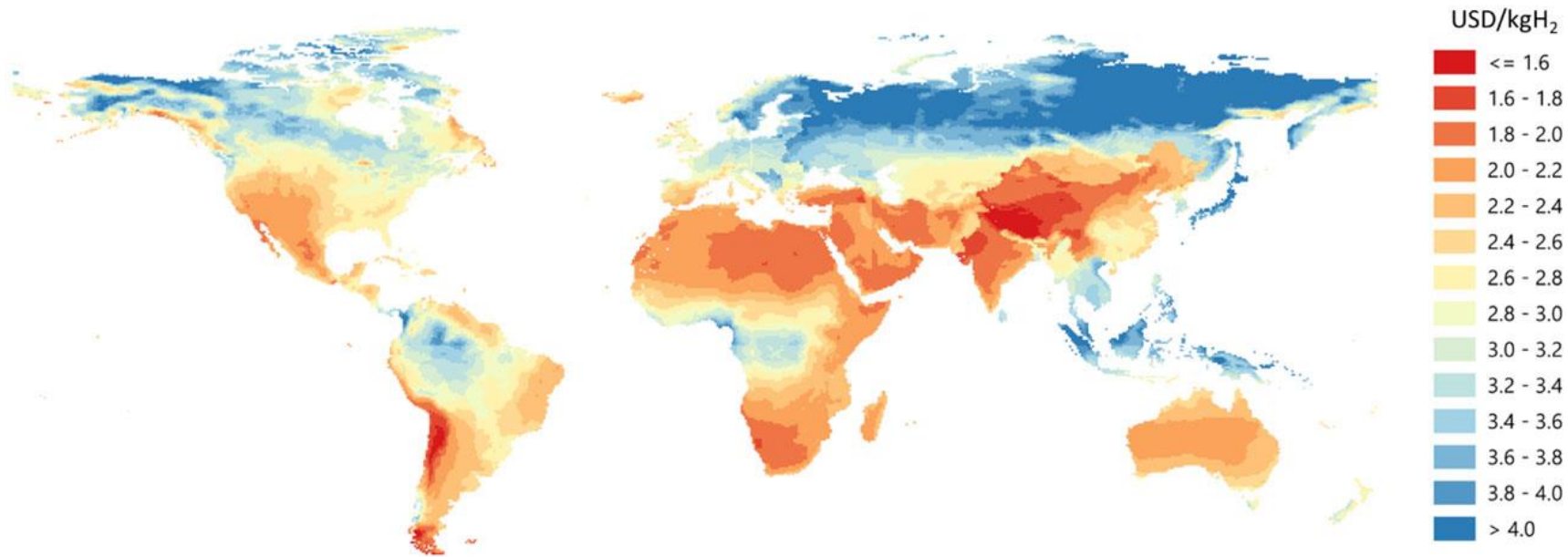
..enabling *fossil parity* for renewable hydrogen in the mobility and industry sector



Combination of solar and wind enables the most competitive green hydrogen

The H2 opportunity

Hydrogen costs from hybrid solar PV and onshore wind systems, according to IEA:



Sectorial integration improves the business case for renewable hydrogen production

ELECTRIC GRID



MOBILITY



INDUSTRY



AQUACULTURE



CENTRAL HEATING GRID



GAS GRID



+++

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Project examples

Hydrogen for trucks in California

Multiple H2Station® for fueling of trucks at Shell fueling facility in California

- Three fueling station sites in the Greater Los Angeles Area
- Fast fueling of both trucks and cars at 70MPa
- Various types of hydrogen supply depending of site



Hydrogen storage Station modules Dispensers

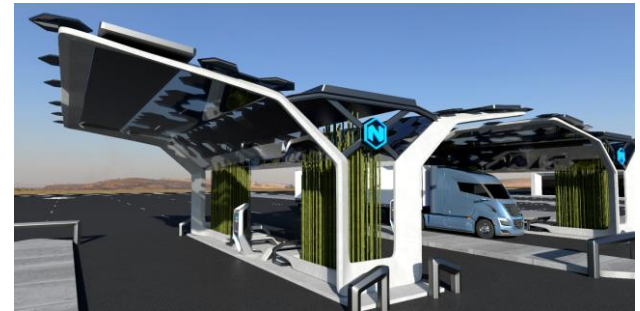


Photos: Toyota, The Sun

Nikola Motor progressing well with the hydrogen truck development

Nel and Nikola = Hydrogen @Scale

- Nel awarded contract as part of Nikola's development of a hydrogen station infrastructure owned and operated by Nikola in the U.S.
 - Multi-billion NOK 1 000 MW electrolyzer and fueling station contract, to be deployed from 2021 – largest electrolyzer contract ever awarded
- Nikola and Nel
 - Nikola producing Fuel Cell Class 8 Trucks at the end of 2022
 - Nikola using Nel technology for 8 tons H₂ / day @ Scale Stations
- Nikola currently has 14,000+ trucks in pre-orders
- Currently developing fueling standard & hardware



Switzerland taking a leading role in Europe for hydrogen trucks

Latest developments

Nel delivering PEM electrolyzers to enable green hydrogen as fuel

- 2 MW Proton PEM electrolyzer as part of new 30 MW framework contract with Hydrospider AG, an affiliated company of H2 Energy AG
 - Represents phase 1 of the 60 – 80 MW needed to supply green hydrogen to the 1600 expected trucks from Hyundai over the coming years
- H2 Energy is working together with partners to establish a nation-wide network of hydrogen stations and hydrogen supply chain in Switzerland
- Switzerland particularly attractive for hydrogen as there is a road tax for trucks of 1 swiss franc per km for trucks – possible with significant opex savings



Hyundai fuel cell electric truck, to be deployed in Switzerland

Next generation green fertilizer manufacturing plants

Landmark project on green fertilizer initiated

- Project for developing next generation green (renewable) ammonia and fertilizer production supported by the PILOT-E program
- Nel role in project: developing next generation alkaline electrolyzer
 - Tailored for large scale hydrogen production for industrial applications w/direct connection to renewables
 - Development targets: lower unit cost, higher level of flexibility, higher pressure, lower footprint, equal efficiency to current Nel electrolyzers
- Ammonia represents >50% of hydrogen market, currently based on fossil sources – significant market opportunity for electrolysis

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Jon André Løkke, CEO in Nel and Tove Andersen, EVP Production in Yara signing the collaboration agreement. Photo: Yara

Developing fossil free steel production in Sweden using green hydrogen

HYBRIT aims to develop fossil free steel production for the future

- Nel has received a purchase order for a 4.5 megawatt alkaline electrolyzer which will be used in a pilot plant for fossil free steel production
- Hybrit Development AB (HYBRIT) is a joint venture owned equally by SSAB, LKAB and Vattenfall
- The steel industry accounts for 7% of global and 10% of Swedish CO₂-emissions
- Pilot plant will operate in Luleå, Sweden from 2021 – 2024, with target of full-scale implementation by 2035
- Steel market opportunity is potentially 3x the size of ammonia



Source: Hybrit Development AB (HYBRIT) is a joint venture owned equally by SSAB, LKAB and Vattenfall

Delivering 3.5 MW electrolyser to ENGIE for a mining truck project

World's largest hydrogen fuel cell electric mining truck to go into operation in 2020

- Nel has received a purchase order for a 3.5 megawatt electrolyser which will be to produce green hydrogen for the world's largest fuel cell electric mining haul truck¹
- Truck will operate at Anglo American's Mogalakwena platinum group mine in South Africa
- Electricity for the hydrogen production will come partly from the grid, and partly from local solar power
- If successful, target is to convert entire fleet at mine to hydrogen, which amounts to an electrolyser capacity of 100 MW at that mine alone



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number one by nature