

The background of the slide is a dark, monochromatic photograph of ocean waves. The waves are in motion, creating a textured surface with white foam visible in some areas, though the overall tone is dark and moody.

HYON

A powerhouse on Hydrogen

Company Presentation

Hyon offer complete value chain of renewable power

Hyon offer packages for maritime hydrogen projects

HYON

nel

Hydrogen production
and fueling technologies

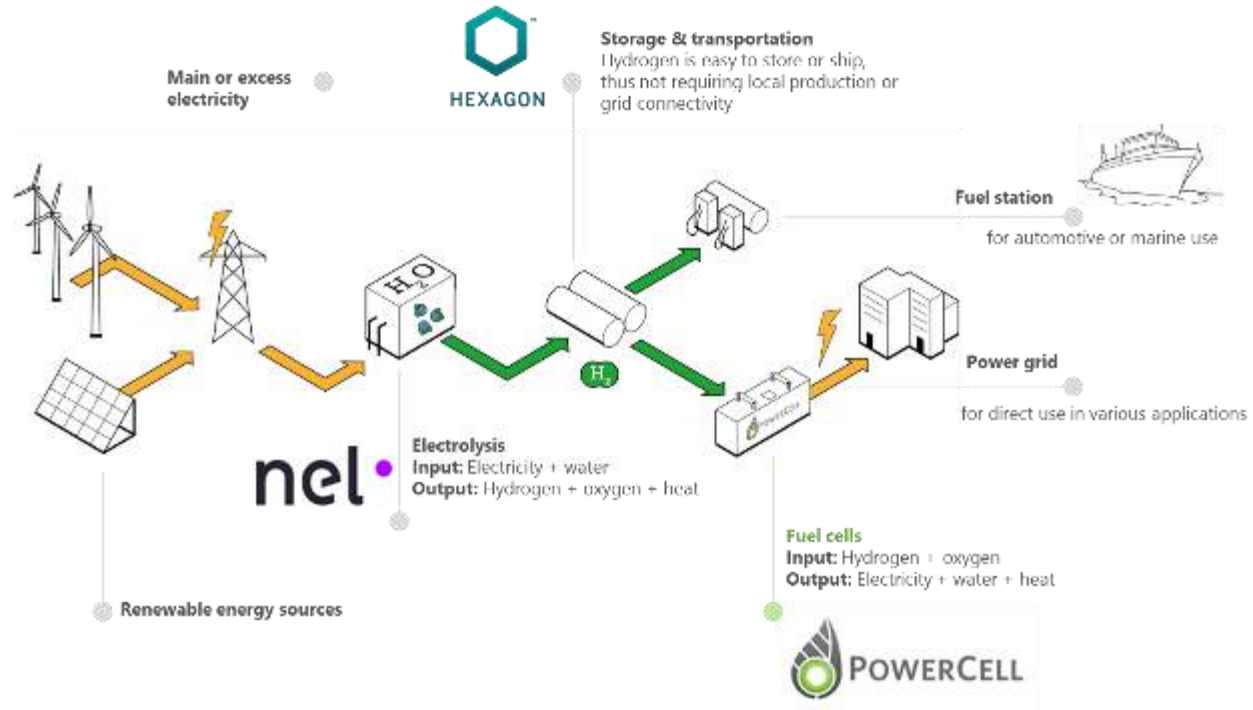


HEXAGON

Composite storage
solutions



Fuel cell technology



Hyon is a one-stop-shopping place for the product portfolio offered by the three owners

Hyon provide marinsation and integration of core products and systems

- Developing complete hydrogen value chain solutions:
Renewable hydrogen production, storage, distribution, dispensing and electricity generation via fuel cells
- Developing integrated power packages for maritime applications
From bunker flange to tank to fuel cell integration
- Qualification and marination of core technology
- ➔ HYON solutions are the world's first to achieve Approval in Principle by DNVGL

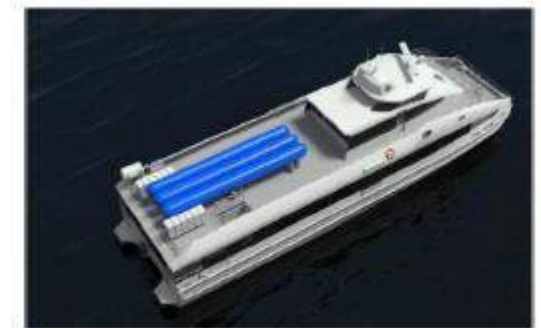
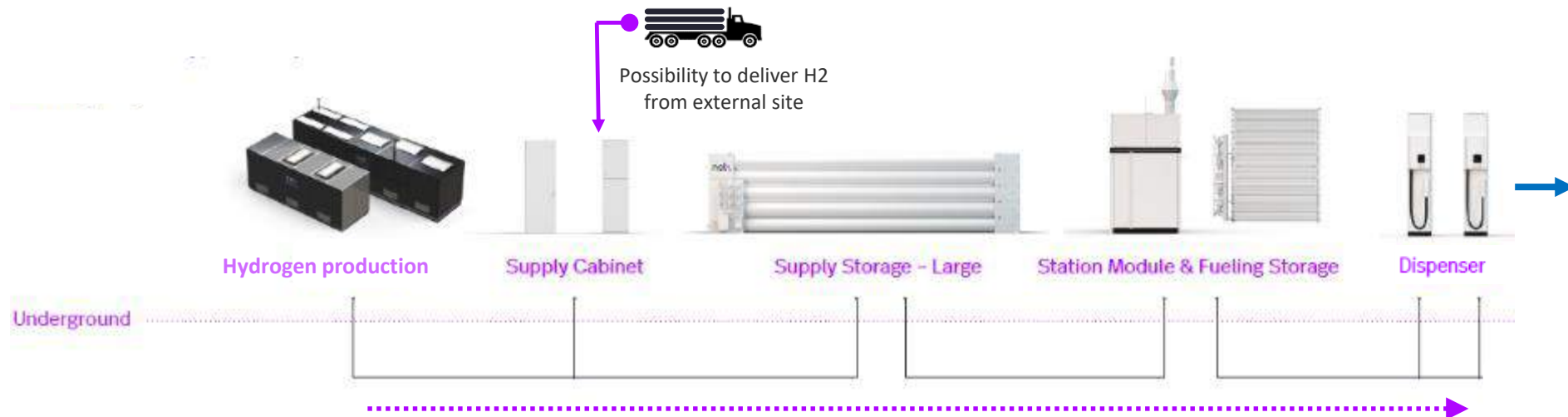
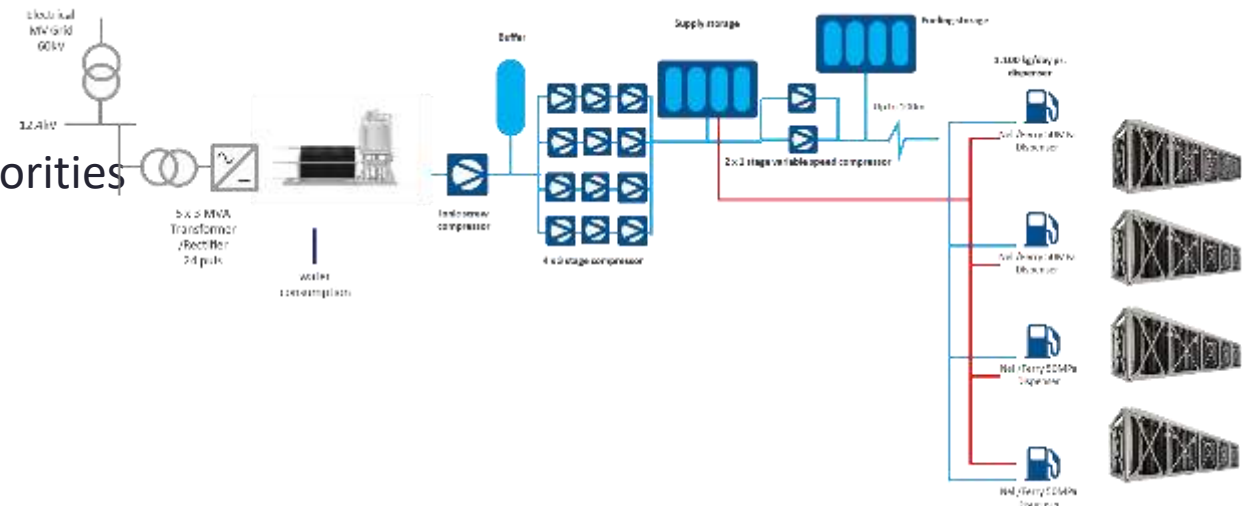


Photo: GKP7H2/Brødrene Aa

- Develop complete solutions for clients
- Develop integrated system and arrangement for maritime applications, aligned with class and authorities

- Bunkering
- Tank
- Fuel
- Fuel Cell
- Ventilation
- Inerting
- Balance-of-plant systems:
 - Process air
 - Fuel
 - Power electronics
 - Power supply to BOP
 - Control system
 - Fire extinction
 - Water outlet from FC
 - Exhaust



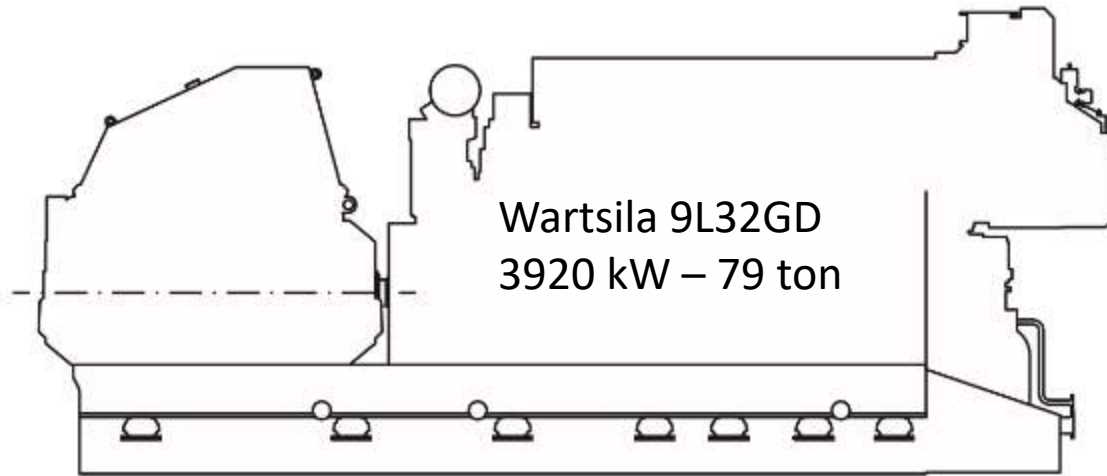
- Qualification and Marinization of Core Technology



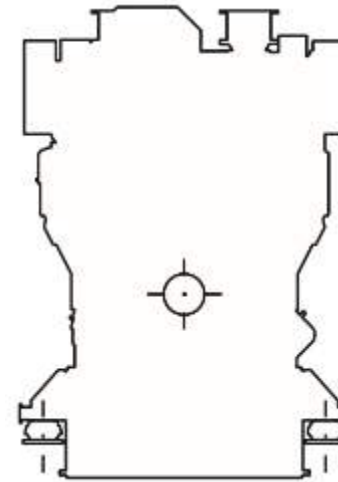
PowerCell/Hyon designs are smaller and lighter than marine gen-sets

Medium size gen-set ca. 3600-3900kW

HYON



Wartsila 9L32GD
3920 kW – 79 ton



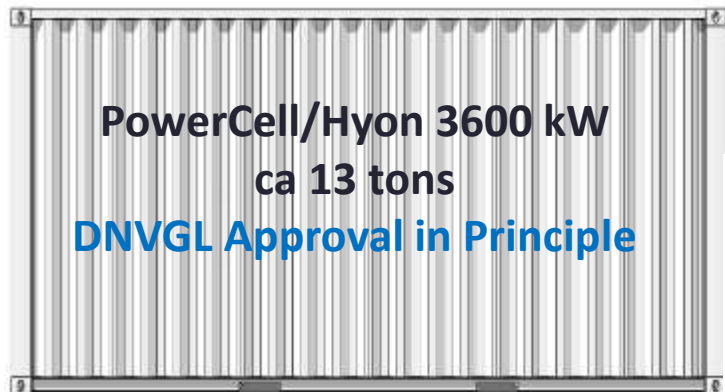
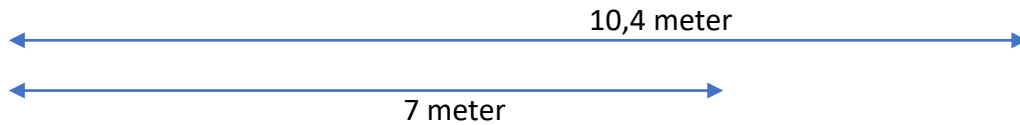
35 kW/m³

50 kW/ton

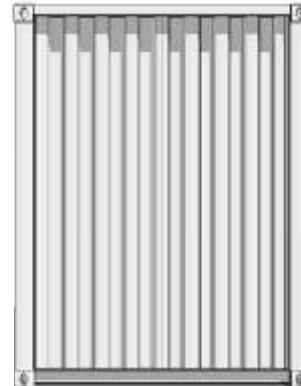
Wartsila 9L32GD
3920 kW @ 60Hz

L x W x H
10.4 x 2.8 x 3.8m

Weight 79 tonnes



PowerCell/Hyon 3600 kW
ca 13 tons
DNVGL Approval in Principle



62 kW/m³

280 kW/ton

PowerCell/Hyon
Containerized fuel cell

3600 kW DC
L x W x H = 7 x 2.6 x
3.2m

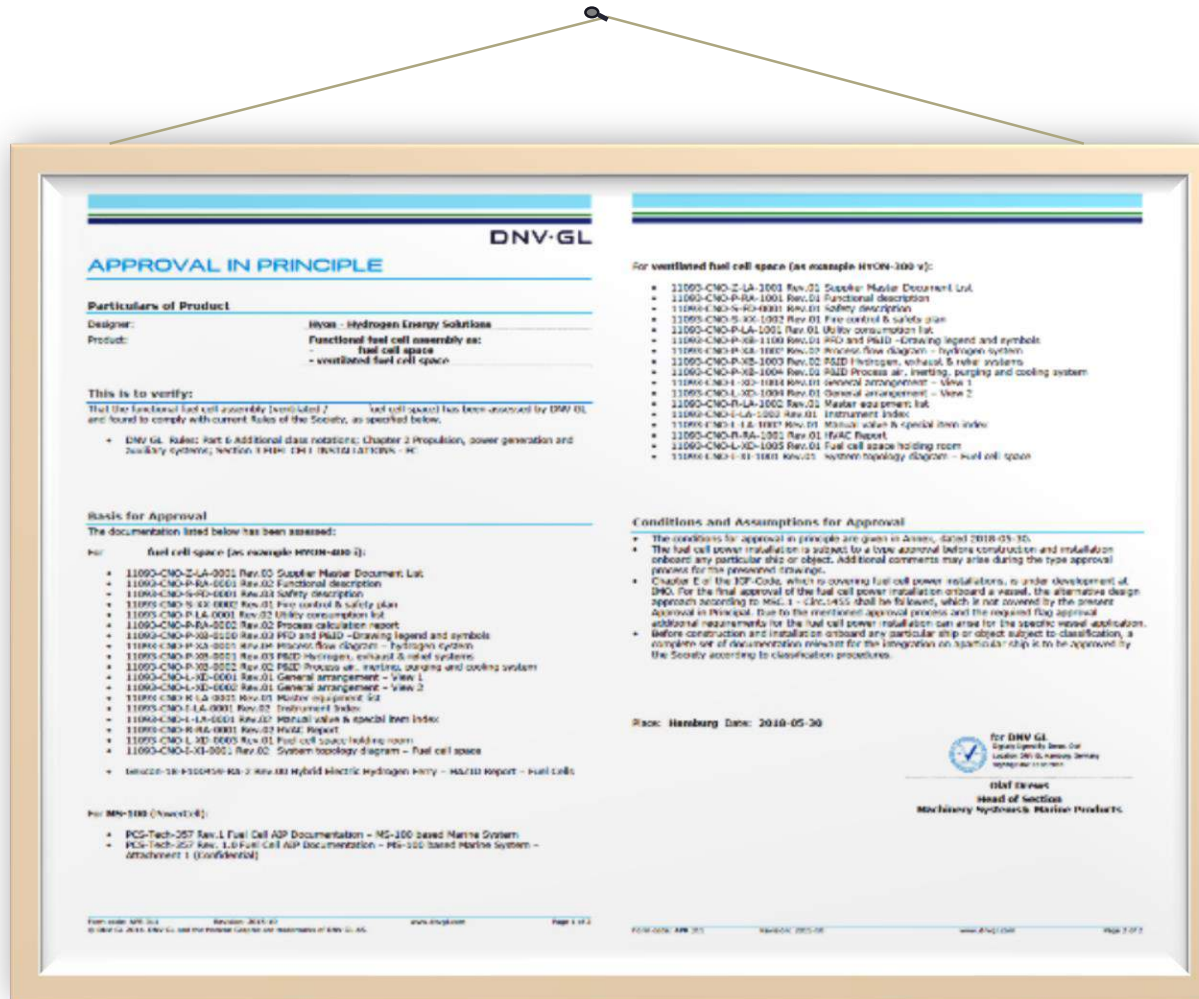
Weight ca. 13 tonnes

Approval-in-Principle from DNV GL of fuel cell space

HYON/PowerCell received approval of our complete machinery space solution in May 2018.

The solution is a turn-key fuel cell power solution including:

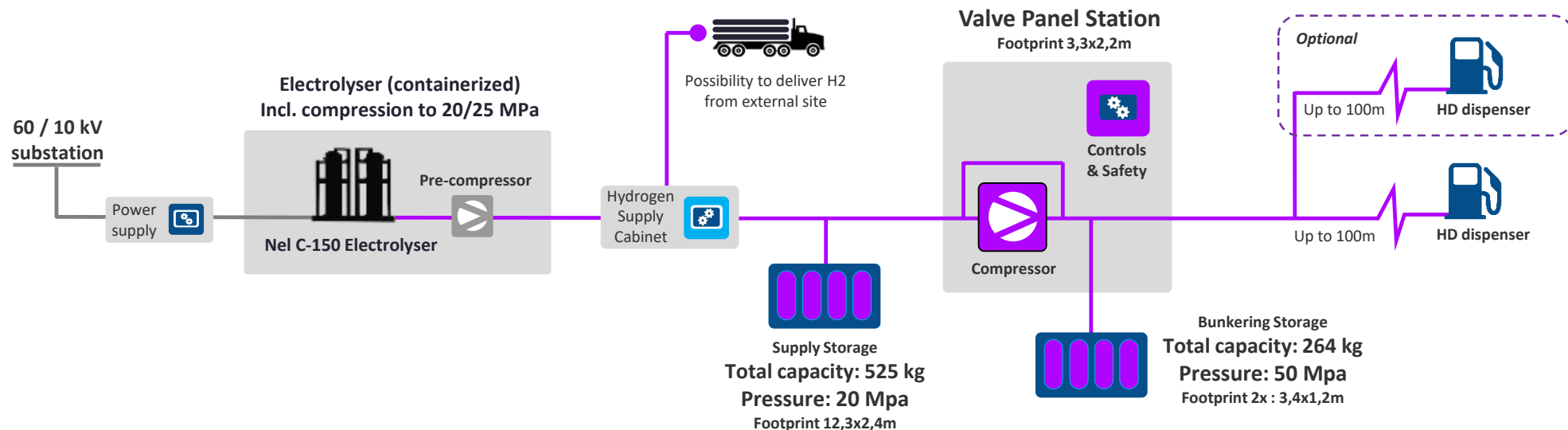
- Safety system
- Fire extinction
- Electro interfaces (may include power electronics)
- Process air
- Hydrogen fuel
- Exhaust
- Cooling
- Water outlet from FC
- Power supply to fuel cell BOP
- Control & monitoring system



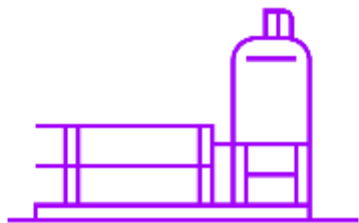
Example bunkering 300kg per day

Capacity and operational scope

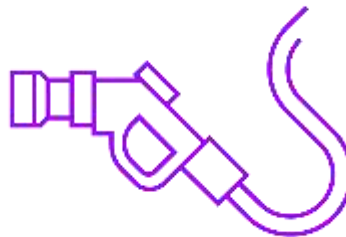
- 330 kg H₂/day capacity from containerized electrolyser
 - Total storage capacity of 789 kg H₂ (supply & bunkering storage)
 - Storage capacity for 2 bunkering operations (1 backup)
 - Possible to have H₂ externally delivered for redundancy purposes
 - Solution consists of well-proven and durable technology, with minimum footprint, high efficiency and maximum safety
- 15 minute bunkering time



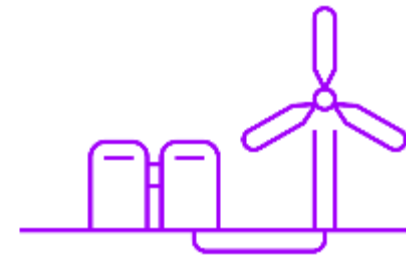
- Pure-play hydrogen company listed on OSE – facilities in Norway, Denmark and the U.S.
- Three divisions offering hydrogen technology and solutions for industrial and energy applications
- ~3500 hydrogen solutions delivered in ~80 countries world wide since 1927
- World #1 on hydrogen electrolyzers and hydrogen fueling – unrivalled performance and track-record
- Financially strong company with a world-class experienced management team in place



Hydrogen Electrolyzers



Hydrogen Fueling

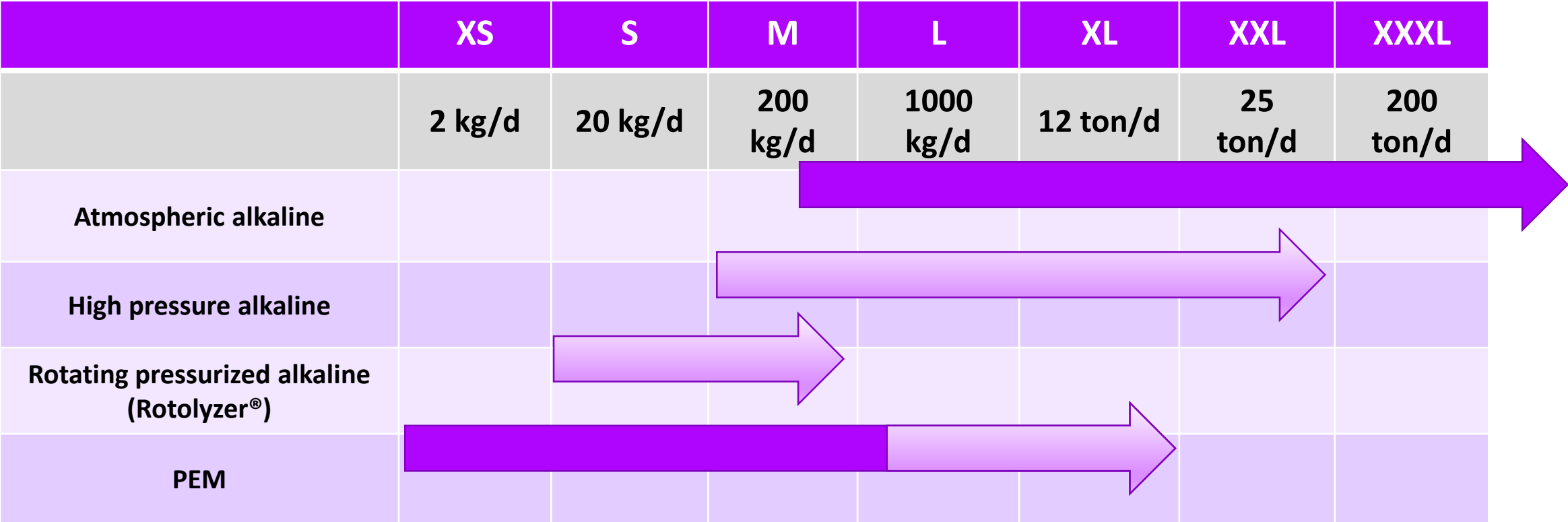


Hydrogen Solutions

Electrolysers - Current and future technology/product portfolio

Nel ASA Q2 2017

Nel Hydrogen Electrolyser



- Any type of electrolysers in any size – allow the customer to make their own choice
- Leading cost position across portfolio (CapEx/MW) w/continued cost reduction opportunities

Large scale hydrogen electrolyzers since 1927



Location:	Glomfjord, Norway
Application:	Ammonia/Fertilizer
Owner:	Norsk Hydro
Period:	1953-1991
Electrolysers:	168 units
H ₂ Capacity:	> 30,000 Nm ³ /hr
Power requirement:	~135 MW

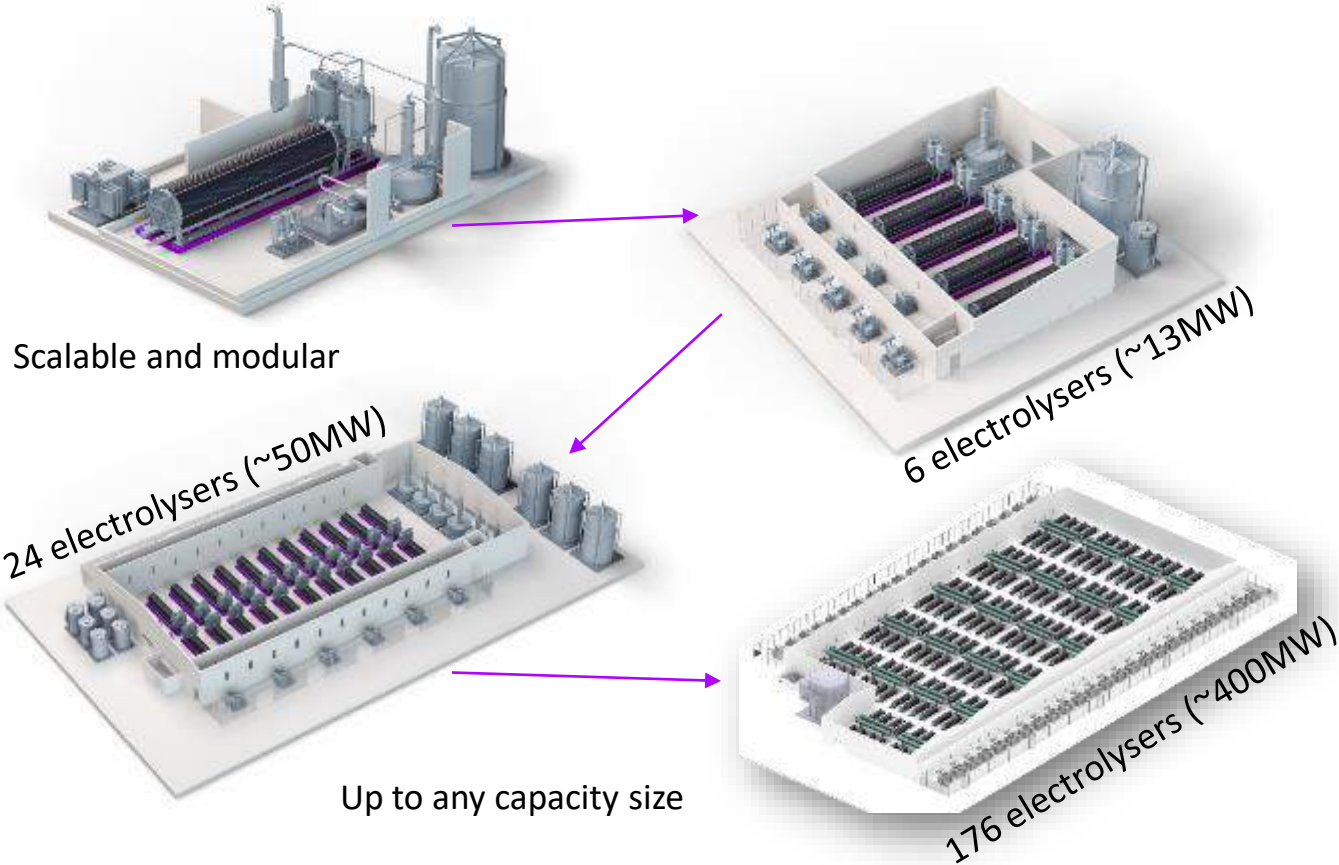
Delivered the world's largest electrolyser
in 1950s on 135 MW / 30,000 Nm³/h

Nel - Alkaline product range, both tailored and turnkey

Nel Hydrogen Electrolyser

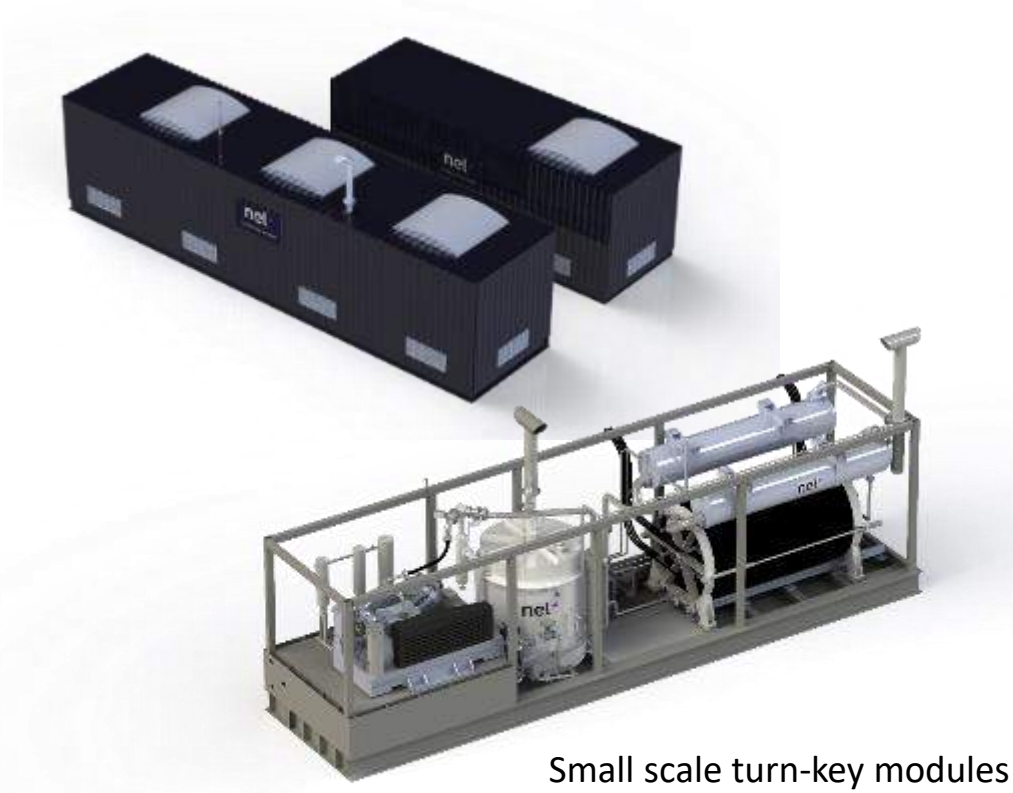
A A-RANGE

TAILORED ELECTROLYSER SOLUTION



C C-RANGE

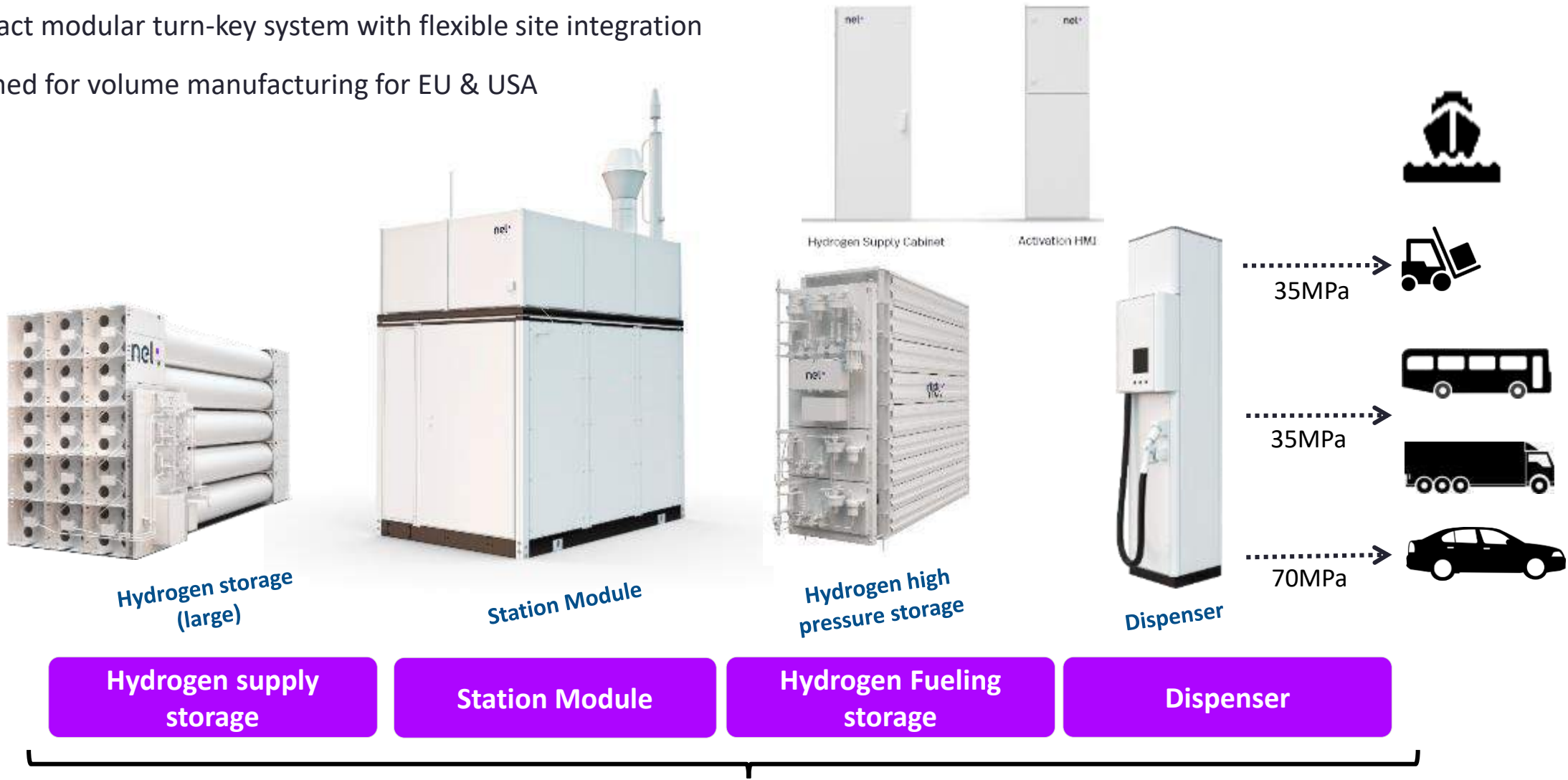
TURNKEY ELECTROLYSER SOLUTION



Fueling station modules – designed for volume manufacturing

Nel Hydrogen Fueling

- Compact modular turn-key system with flexible site integration
- Designed for volume manufacturing for EU & USA



Nel ASA: Awarded multi-billion NOK electrolyzer and fueling station contract by Nikola

Nel ASA Q2 2017

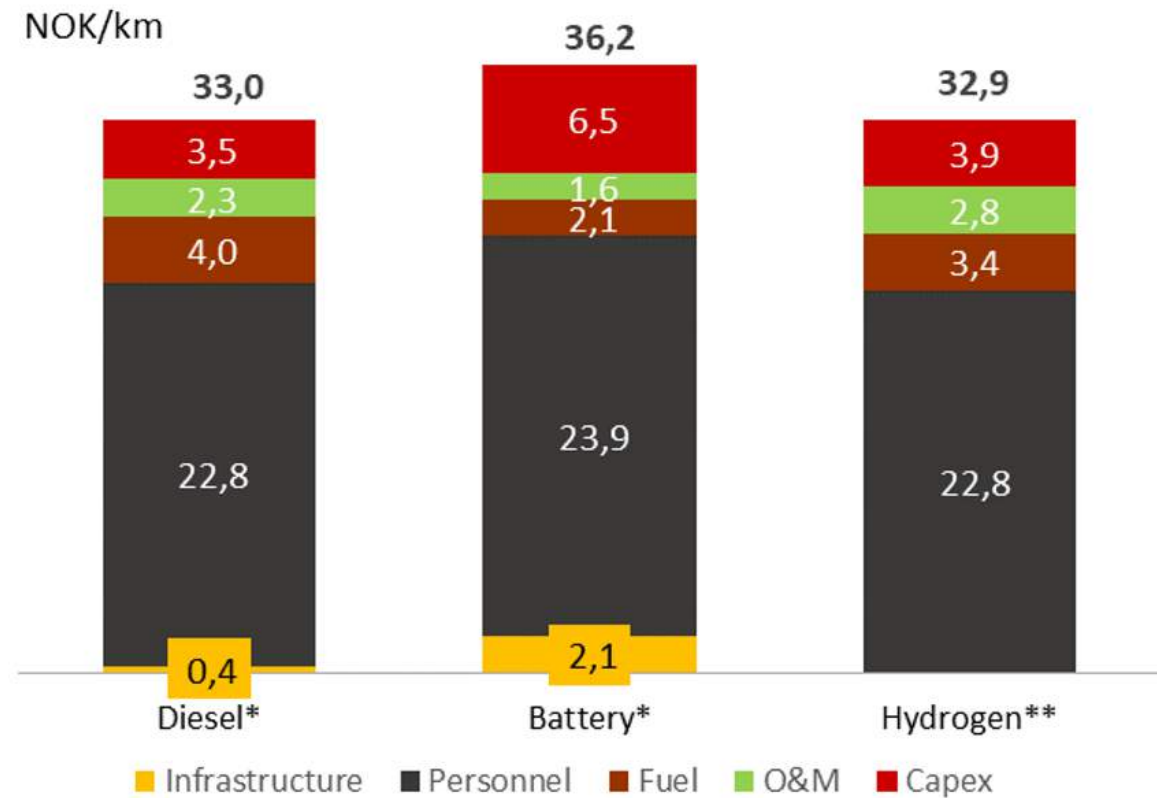
- **On June 28th, Nel ASA was awarded a contract for delivery of 448 electrolyzers and associated fueling equipment to Nikola Motor Company (Nikola)**
- Under the multi-billion NOK contract, to be deployed from 2020, Nel will deliver up to 1 GW of electrolysis plus fueling equipment.
- Nikola's plans include building more than 350 filling stations in US
- Nel ASA to provide engineering, electrolysis, and fueling equipment.
- Nikola will provide the balance of plant, construction, dispensers and other station equipment. Hydrogen stations will initially produce up to eight tons daily, but can also be expanded up to 32 tons per day Each
- Nikola truck is anticipated to consume around 50-75 kgs per day
- Each Nikola truck will store between two and three megawatt hours (MWh) of energy, with reach 1900 km
- Each station will have around 4,000 kgs of backup storage for redundancy
- Each station is anticipated to produce hydrogen at 700 bar (10,000 psi) and 350 bar (5,000 psi)
- Nikola will allow all hydrogen vehicles to fill at their station



Hydrogen electric busses have the lowest Total Cost of Ownership (TCO), i.e. NOK/km

Assumptions:

- Bus price: 3.3 MNOK (350 k€/bus)
- Hydrogen: 47 kr/kg (5 €/kg)
- O&M: 2.8 kr/km (0.3 €/km)
- **Hydrogen electric busses have the lowest cost per km, lower than diesel and battery electric**



Source: *Ruter, **Nel numbers

Nel ASA: Officially opens large-scale H2Station® production facility in Denmark

HYON



On 21st September, Nel ASA announced the official opening of its new Nel H2Station® factory in Herning, Denmark

Annual capacity of 300 hydrogen stations per year

The factory allows for both CE and UL-certified stations (Europe, US and Asian markets) to be manufactured on the same production line, providing assurance of product safety and more cost-effective deployment of hydrogen fueling

<https://youtu.be/7YxjytkkNi4>

HEXAGON COMPOSITES HYDROGEN



HEXAGON COMPOSITES GROUP

High growth technology company manufacturing composite pressure tanks and assembling systems for storage of natural gas, hydrogen and propane

- Headquartered in Aalesund, Norway
 - facilities in Germany, Norway, USA, Canada and Brazil
 - sales offices in India, Singapore and Russia
- 776 employees
 - of which 412 employees in Agility Fuel Solutions (50% JV)
- Listed on Oslo Stock Exchange (OSE:HEX)
 - market cap of approx. EUR 520 million





HEXAGON

HEXAGON BUSINESS AREAS

LOW-PRESSURE LPG

LPG CYLINDERS



HIGH-PRESSURE CNG & H₂

MOBILE PIPELINE®



HYDROGEN PRODUCTS



LIGHT-DUTY VEHICLES



AGILITY FUEL SOLUTIONS (50%)

HEAVY-DUTY VEHICLES



HEXAGON COMPOSITES HYDROGEN TYPE 4 CYLINDER INFORMATION

Type 4 cylinders designed and manufactured by Hexagon Composites' wholly owned subsidiaries Hexagon Lincoln, Hexagon Raufoss and xperion Energy & Environment*.

	NOMINAL WORKING PRESSURE (15° C)	OUTSIDE DIAMETER	OVERALL LENGTH	WEIGHT	WATER VOLUME	HYDROGEN CAPACITY
REF	MPa	MM	MM	KG	L	KG
A**	20	315	1 060	16	46	0.7
B	25	541	2 783	164	450	8.0
C	25	503	2 342	94	350	6.0
D	30	509	2 342	112	350	7.2
E	35	420	3 190	101	312	7.5
F	35	509	2 342	112	350	8.4
G	50	565	3 277	280	530	16.5
H	50	531	2 424	229	347	10.7
I	70	319	906	34	36	1.4
J	70	238	1 600	29	39	1.6
K	70	420	845	43	64	2.6
L	70	440	1 050	59	76	3.1
M	95	515	2 783	365	254	12.4

HYDROGEN DISTRIBUTION

COMPRESSED H2 FOR INDUSTRIAL GAS APPLICATIONS & MOBILITY



- Hexagon supplier to all major gas distributors, such as Linde, Air Liquide, Air Products and others
- Pioneer for introduction of 300 bar technology in industrial gas segment with German Westfalen AG
- Largest transport capacity worldwide: Up to 1.1 tons of hydrogen
- Flexible sizes ranging from 10 ft up to 45 ft and pressure levels of 250 bar, 300 bar or 500 bar
- Product portfolio includes standard modules for industrial clients as well as mobile refueling systems with cascade technology for refueling stations

“By introducing sustainable lightweight composite solutions to our transportation fleet, we continue to meet stringent environmental and safety standards and improve our own operational practices.”

- Thomas Hollad, Bulk Transport Manager Northern Continent at Air Products



300 bar gas transport module
(photo: Air Products)



500 bar gas transport module (photo: Linde AG)

TITAN[®] H2 STORAGE TANKS IN CARBON COMPOSITE - BEING INTRODUCED TO THE MARITIME INDUSTRY

- **Hydrogen electric ship**
 - Flexible solutions
 - Fully or partly powered by H2

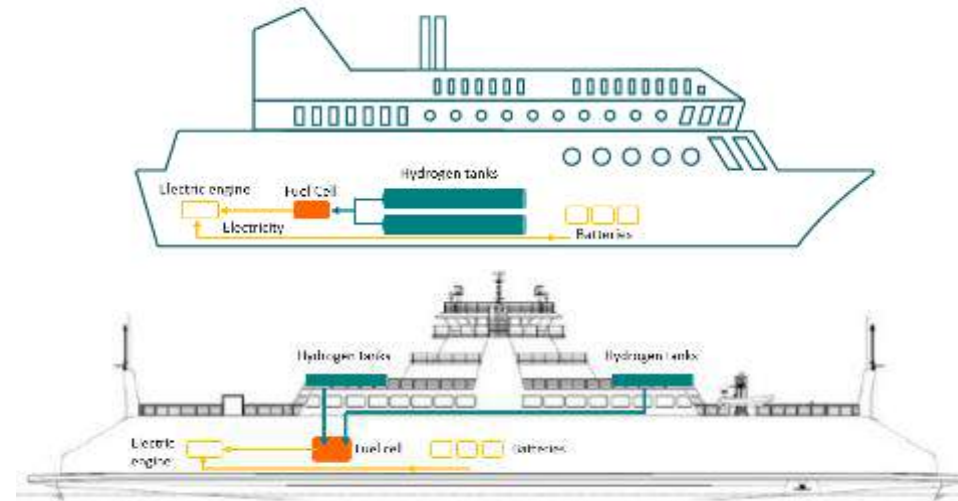
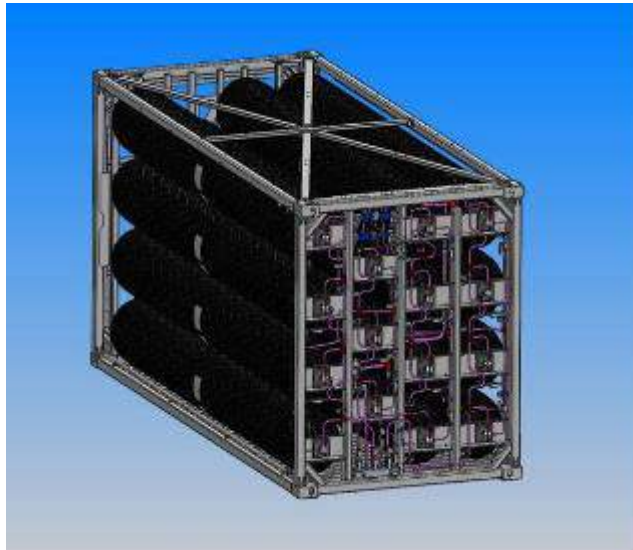


Photo: GKP7H2/Brødrene Aa

HIGH CAPACITY MODULE – NEXT GENERATION @700 BAR



20" container module under
development for 700 bar.
Target is 780 kg hydrogen
Market introduction 24-48 months
(based on approval lead time)
Tare weight 14 875 kg

Ca. 25 000 kWh each container
Equals ca. 14 000 kWh electric via
fuel cells

Target is to qualify to new ISO 17519 => market place worldwide after 2018

HEXAGON – SOME

HEXAGON PROVIDING TANKS FOR THE FIRST HYDROGEN VESSEL IN THE US

26.06.2018 PRESS RELEASE

Hexagon Composites' subsidiary Hexagon Lincoln has been selected to supply tanks for the first hydrogen fuel cell vessel in the US.

Golden Gate Zero Emission Marine (GGZEM) has been awarded a USD 3 million grant by the California Air Resources Board (CARB), supported by the "California Climate Investments" (CCI) program, to build the first zero-emission vessel in the United States. The zero-emission vessel will be the first of its kind in the US, and will use hydrogen fuel cells for the commercial maritime sector.

The 70-foot hybrid hydrogen fuel cell-battery catamaran, "Water-Go-Round" has a 22-kW dual electric motors, fuel cells and battery packs. The hydrogen tanks from Hexagon Composites will enable the vessel to operate the vessel for up to two days between refuelings.

"We're really pleased to have been chosen by Golden Gate Zero Emission Marine to work on this project in the US," said Trond Seth, Vice President Hydrogen Business Unit at Hexagon Composites. "Hexagon Composites is taking the lead in the hydrogen race and we truly believe that this path-breaking project will show the maritime industry, showing that zero emission technology is already available."



Source: Golden Gate Zero Emission Marine

STOCK EXCHANGE RELEASE
Aalesund, Norway | 12 June 2018

Automotive company commits to Hexagon Composites' hydrogen fuel-cell electric vehicles

Hexagon Composites will supply compressed hydrogen tanks for the first hydrogen fuel cell electric vehicles (FCEV) to be launched by an automotive OEM.

Hexagon is currently developing the tanks to support anticipated production of hydrogen fuel cell electric vehicles (FCEV) starting as early as 2020. Production is planned to run for at least five years. The combined value for development and serial production to be in the order of **approximately NOK 1.0 billion to 1.2 billion**.

"This is a strategically important customer contract fulfilment for the FCEV industry. Hexagon Composites is committed to investing in the success of these projects and for the adoption of Hydrogen in commercial applications as a low-carbon alternative fuel for mobility applications. This signals the vast long-term potential of this market. Maintaining our integrity, attention to safety and delivering to customer specifications for the Company. This selection confirms our leading position as a developer for the FCEV industry. The project leverages Hexagon Composites' Hydrogen Automotive business."

"Hexagon has been actively supported in the process by Mitsui & Co. as an alliance partner. This is a good example of the benefits of the partnership between companies in terms of increasing our global reach", said Jack Schimenti, President of Hexagon Composites ASA.

Hydrogen is a clean and safe energy carrier that can be used as fuel for power in a wide range of applications, and can be easily stored on a large scale. The life cycling properties of all-composite pressure cylinders, with plastic liners and carbon fiber structure, make them a more sustainable alternative than metal lined alternatives.

HEXAGON EXPANDS ITS MOBILE PIPELINE® BUSINESS INTO THE MARITIME INDUSTRY

15.02.2018 STOCK EXCHANGE RELEASE

Hexagon Composites' subsidiary Hexagon Lincoln has been awarded to supply high-pressure CNG TITAN® tanks for the first storage onboard a LNG (Liquefied Natural Gas) gas supply vessel (GSV) being built for Babcock Schulte Energy. The TITAN® cylinders will store compressed boil-off-gas from the LNG tanks and flash gas from cargo operations and supply the CNG as fuel to the ship's dual-fuel propulsion engines.

The boil-off-gas recovery system is designed by the UK based company, Babcock LGE Process, a market leader in specialized systems for handling, storage and distribution of liquefied gases in both the marine and onshore sectors. The TITAN® cylinders are an integral part of the ship's patent pending FGSV system, developed by Babcock LGE Process to enable the LNG bunker vessel to meet the emission limits of the IMO Emission Control Areas (ECA) regulations.

"By compressing the boil-off and flash gas and supplying it as fuel to the ship's engines, our clients will save distillate fuel costs and at the same time reduce the vessel's emissions of sulphur oxides (SOx) and particulate matter (PM)," said Andre Scott, General Manager at Babcock LGE Process. "In addition, we eliminate fugitive emissions of LNG from the cargo systems, providing a true zero emissions solution."

"We're really pleased to have been chosen by Babcock LGE Process to work on this cutting-edge project. Babcock's boil-off-gas recovery system is an innovative way of meeting stringent emission regulations. It is a cost-effective way for vessel operators to address environmental concerns, and our TITAN® tanks are a key enabler for achieving this," said Miguel Raimao, Vice President Mobile Pipeline® Americas at Hexagon Lincoln. "TITAN® remains the industry leader for large scale Type 4 storage vessels; it's the only marine scale solution that combines lightweight with high pressure performance."

"This order marks our expansion of our Mobile Pipeline® solutions into high-horsepower fuel systems and the maritime application, which we see as a great future market opportunity," said Jack Schimenti, President of Hexagon Lincoln.

The maritime class acceptance for this project is performed by Lloyds Register.



<https://www.youtube.com/watch?v=fCCbMAxWXGc>

PowerCell – some press releases

HYON

PowerCell appointed as fuel cell stack supplier to Nikola Motor Company

Gothenburg, Sweden, November 9, 2017

The leading Nordic fuel cell company [PowerCell Sweden AB \(publ\)](#) has been appointed as the primary fuel cell stack supplier to Nikola Motor Company.

Nikola Motor, the Utah-based company that is developing heavy-duty transport powertrains, has announced that they have chosen PowerCell Sweden AB as the primary fuel cell stack supplier for their pre-production testing vehicles. "If all goes well during the next few months, we will be integrating PowerCell S3 fuel cell stacks into our production line-up", says CEO Trevor Milton.

PowerCell S3 (100 kW) is a fuel cell stack with best-in-class power density for automotive application. The compact design makes it easy to integrate into various vehicle types. The stack is based on industrial components which makes it suitable for commercial applications.

By 2021, Nikola Motor Company will bring to market the Nikola Two, a truck line-up that will deliver more than 1,000 horsepower and 2,000 ft. lb. of torque. The horsepower of any semi-truck on the road – all with "zero local emissions", as announced by Nikola.

The unique high power density of PowerCell S3 makes the fuel cell stack a perfect choice for Nikola Motor that aspires to deliver top performance and zero-emissions trucks.

"We are excited and feel honoured by the Nikola appointment and are looking forward to the order and to delivering cutting edge zero emission power for the Nikola trucks of PowerCell Sweden AB."

This information is insider information that PowerCell Sweden AB (publ) is providing pursuant to the EU Market Abuse Regulation. The information was submitted to the agency of the contact person set out below, at 18:50 CET on November 9, 2017.

Pictures

PowerCell S3

Nikola Two

More pictures of Nikola Two are downloadable at <https://nikolamotor.com>

PowerCell signs MOU with Siemens regarding development of marine systems based on fuel cell technology

Gothenburg, Sweden, August 14, 2018

[PowerCell Sweden AB \(publ\)](#) has signed a memorandum of understanding with German industrial group Siemens AG regarding a joint development of marine systems based on fuel cell technology. The aim is to integrate PowerCell's fuel cell systems in Siemens' marine drive and power generation for the marine segment.

Siemens AG is a world leading manufacturer of integrated propulsion and power systems for marine applications and has developed a complete system that is being called SISHIP BlueDrive. PowerCell and Siemens will jointly develop a fuel cell system that can be integrated into ships such as ferries, yachts and cruise ships.

Commercial shipping is affecting the environment through emissions of greenhouse gases and particulate matter. The International Maritime Organization, IMO, has set a target to reduce emissions from commercial shipping with 50 percent by 2050, which will require a decrease in the use of fossil fuels. In June a power generating system was developed by PowerCell's Norwegian joint venture Hyon, which is based on the principle for a fuel cell-based power generating system for marine vessels.

Great potential

"In large segments of the marine industry a rapid transition has already taken place towards electrification and decreased use of fossil fuels as strong trends", says Per Wassén, CEO of PowerCell Sweden AB. "If commercial shipping is to meet the IMO target, and seriously to change poses, large sections of it has to convert to much more sustainable power sources. A very promising alternative and Siemens and PowerCell see a great potential in this now entering into."

For further information, please contact:

Per Wassén

CEO, PowerCell Sweden AB (publ)

Phone: +46 (0) 31 720 36 20

Email: per.wassen@powercell.se

About PowerCell Sweden AB (publ)

PowerCell Sweden AB (publ) develops and produces fuel cell stacks and systems for stationary and mobile applications with a world class energy density. The fuel cells are powered by hydrogen, pure or reformed, and produce electricity and heat with no emissions other than water. As the stacks and systems are compact, modular and scalable, they are easily adjusted to any customer need.

PowerCell receives Chinese order worth more than MSEK 200

Gothenburg, Sweden, March 31, 2017

The leading Nordic fuel cell company [PowerCell Sweden AB \(publ\)](#) has received a large order from Chinese Wuhan Tiger Fuel Cell Vehicle Co. LTD. PowerCell will provide Wuhan Tiger with fuel cell stacks and systems amounting to more than MSEK 200 until 2019. In a first stage, PowerCell will deliver two PowerCell MS-20 systems and 28 PowerCell S2 (35kW) in the second half of 2017.

In October 2016 PowerCell Sweden AB (publ), signed a Memorandum of Understanding with a Chinese partner to develop mutual business opportunities. The agreement included an ambition to provide fuel cell vehicles for the Chinese market.

"The number of vehicles in China is rapidly rising, as are the major environmental problems. Chinese authorities have therefore offered subsidies for manufacturers of so-called New Energy Vehicles. Our fuel cell technology is the foundation for a series of vehicles that will be produced in China, for the Chinese market. The fact that our PowerCell S2 will have a maximum output of 35kW makes the fuel cell stack very attractive", says Per Wassén, CEO of PowerCell Sweden AB.

Wuhan Tiger focuses not only on identifying applications for clean energy, but also on vigorously promoting the industrialization of hydrogen energy. Under the brand Tiger H2FCV will Wuhan Tiger Fuel Cell Vehicle Co. LTD. launch buses and eventually distribution trucks partly powered by PowerCell's fuel cells.

PowerCell will provide Wuhan Tiger with fuel cell stacks and systems amounting to more than MSEK 200 until 2019. In a first stage, PowerCell will deliver two PowerCell MS-20 systems and 28 PowerCell S2 (35kW) stacks in the second half of 2017.

For further information, please contact:

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This information is insider information that PowerCell Sweden AB (Publ) is obliged to make public pursuant to the EU Market Abuse Regulation. The information was submitted for publication, through the agency of the contact person set out above, at 08:45 CET on March 31, 2017.

About PowerCell Sweden AB (publ)

Historical background



PowerCell - The Leading Nordic PEM-Fuel Cell Company

- All central functions located in Sweden
 - Subsidiary in Germany
 - Distributors: Japan, S. Korea & S. Africa
 - Joint Venture in Norway
- Advanced fuel cell and reformer laboratories
- Patented world record in fuel cell power density
- ISO Certified 9001 & 14001
- 10'000 share holders
- Stock value ~200MUSD



Stack evolution

S1



S2



S3



1-5 kW	5-35 kW	30-127kW	
1-5 kW	5-30W	30-100 kW	100 kW +

System range



PS 5



MS 30



MS 100

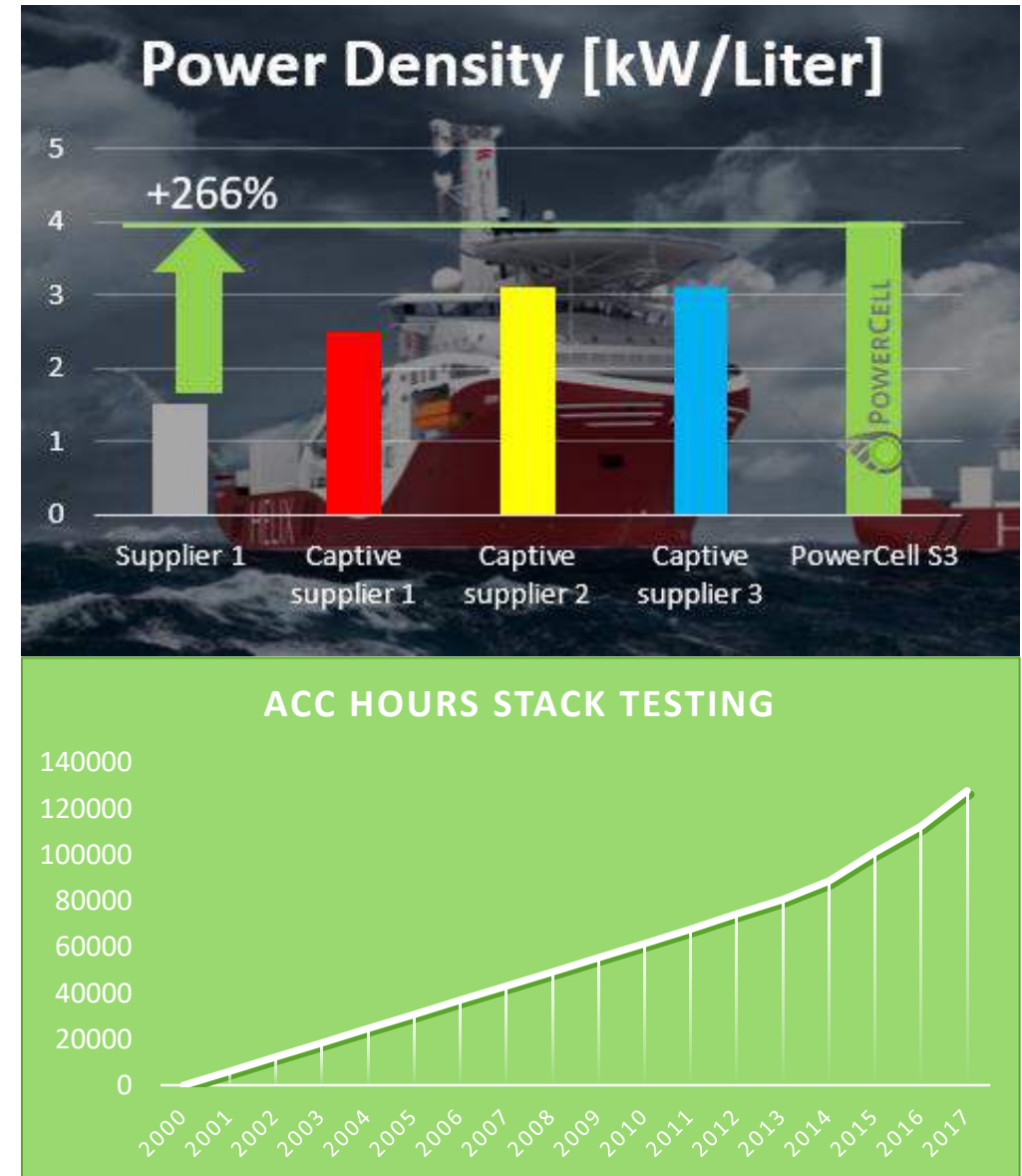


Containerized

The S3 stack



- 100 kW maximum capacity
- Highest power density in the world
4kW/Stackliters
- 455 cell package durable for marine application
- 130'000h of cycle testing iterations
- 32'000h of unique S3 testing



MS-100 – with Stack S3

Building block for maritime applications



PowerCell MS-100



FC system technical data

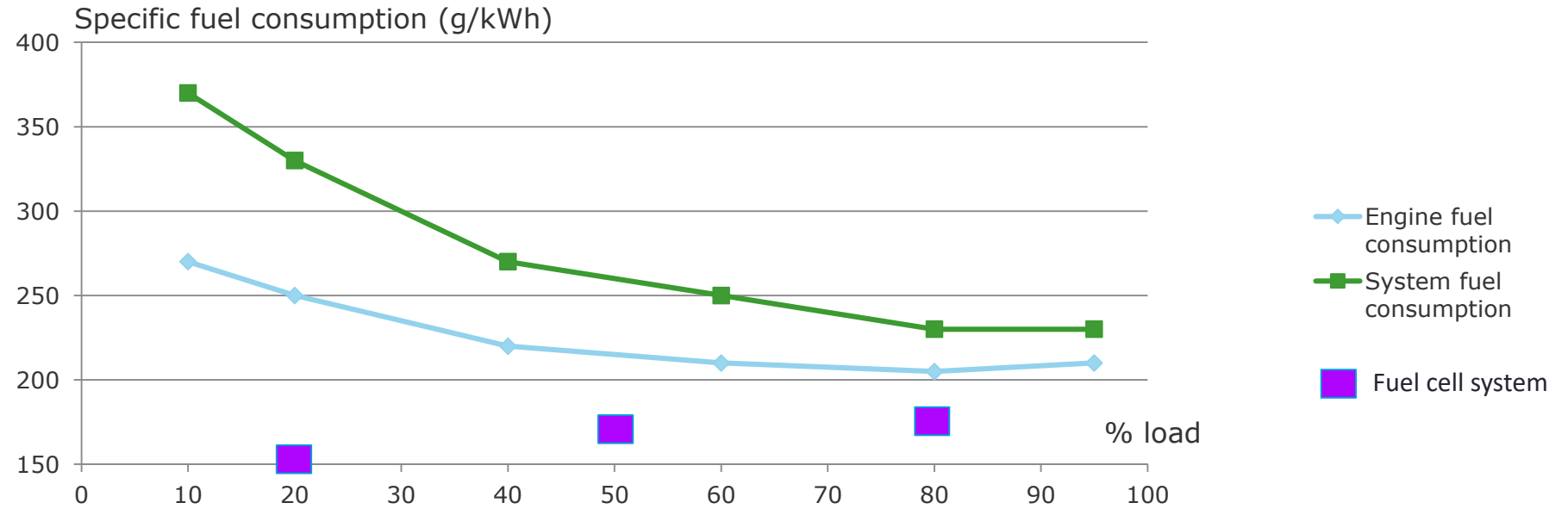
Number of cells	455
Max. continuous net power	100 kW
DC net out at max. cont. power	332 V; 300 A
System pressure (at full load)	2.6 bar _{abs}
Voltage range <small>(Peak Power EOL .. OCV BOL)</small>	250 .. 500 V
Coolant flow (pump integrated)	150 l/min
Coolant outlet temperature	70 °C
Waste Heat	82 kW
System Efficiency <small>(LHV H2 in to DC stack out)</small>	52 %
Dimensions (H x W x D) ¹⁾	750 x 750 x 520 mm
Weight ²⁾	98 kg

1) Not included: brackets, covers, heat shields, coolant reservoir

2) All included (but Radiator and DC/DC converter not within system content)



Efficiencies of maritime engine and electrical systems vs. fuel cells



HYON

Thank You !