Hexagon Purus -

a Hexagon Composites company

Lightweight Hydrogen Storage – from Sea to above Summit

Jørn Helge Dahl, Global Sales Director

Kjeller Science Meet-up, 9 March 2021

Hexagon Composites ASA - Group Key Figures

3,4 bn NOK
Revenues 2019

~ 14,3 bn NOK
Market Cap HEX:OL

1.000 +
Employees

Hexagon Composites
Global leader in clean fuel solutions

~ 500.000

TYPE 4
HIGH-PRESSURE
CYLINDERS

~ 60.000

TYPE 4
VEHICLE FUEL
SYSTEMS

~ 1.500

TYPE 4
DISTRIBUTION
SYSTEMS

~ 18mn

TYPE 4
LPG
CYLINDERS

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Hexagon Composites ASA - Market segments

MARKET SEGMENTS		FUEL & ENERGY SOURCES
Automotive Fuel cylinders and systems for light-duty, medium-duty and heavy-duty vehicles; battery packs for MD/HD trucks		Hydrogen | Biogas/ RNG | Compressed natural gas (CNG) | Electric power
Mobile Pipelines Storage and transportation cylinders and modules for off-pipe- line applications		Hydrogen | Biogas/ RNG | Compressed natural gas (CNG)
Marine & Rail Fuel and storage cylinders for marine and rail		Hydrogen | Biogas/ RNG | Compressed natural gas (CNG)
Ground storage Cylinders for ground storage		Hydrogen
Aerospace Cylinders for spacecrafts, satellites, airplanes, drones		
Household and leasure LPG cylinders for leisure activities, household and industrial applications		LPG (Propane and Butane)

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Hexagon Composites ASA
Strong roots – Expanding out of Norway

1963

Lincoln Composites (US)
Type 3 and 4 cylinders

1992

Raufoss Fuel Systems (NO)
Type 4 CNG cylinders

1998

Ragasco (NO)
LPG cylinders

2000

Ragasco (NO)
LPG cylinders

2001

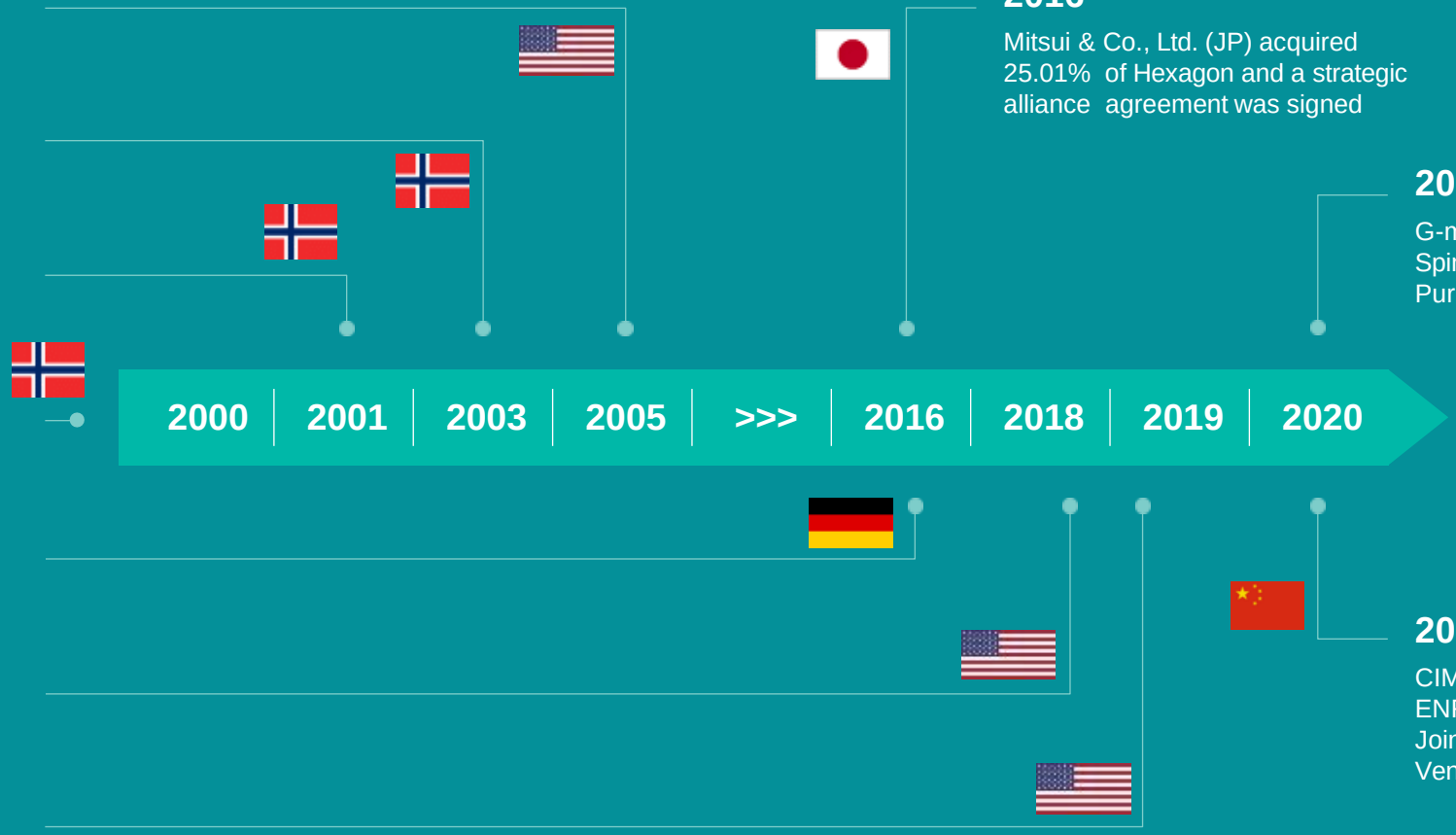
xperion Energy & Environment (GE)
Type 4 CNG & H2 cylinders

2018

Digital Wave (US)
Testing and requalification technology

2019

Agility Fuel Solutions (US)
Fuel systems and Type 4 CNG & H2 cylinders



2016

Mitsui & Co., Ltd. (JP) acquired 25.01% of Hexagon and a strategic alliance agreement was signed

2020

G-mobility and e-mobility Spin-off and listing of Hexagon Purus

2020

CIMC ENRIC Joint Venture

Driving energy transformation

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Hexagon Purus

Company introduction

Driving the hydrogen transition

Hexagon Purus is a global leader in key technologies needed for zero emission mobility

Successful listing on Euronext Growth Oslo

- Purus listed on Euronext Growth Oslo on 14 December 2020
- Raised gross proceeds of NOK 750m following strong interest from Scandinavian and international institutional investor
- Allows Purus to pursue an individual growth and investment agenda, and reinforce and develop its leading position in the e-mobility space
- Hexagon Composites remains a majority owner and strong industrial partner, holding c. 75% of the shares in Hexagon Purus

Global organisation with engineering, manufacturing and R&D capabilities in Europe and North America

[1] Term sheet agreement signed for a strategic cooperation with CIMC ENRIC, a leading Chinese manufacturer of energy equipment

Hexagon Purus' product areas

Hydrogen solutions

High pressure vessels

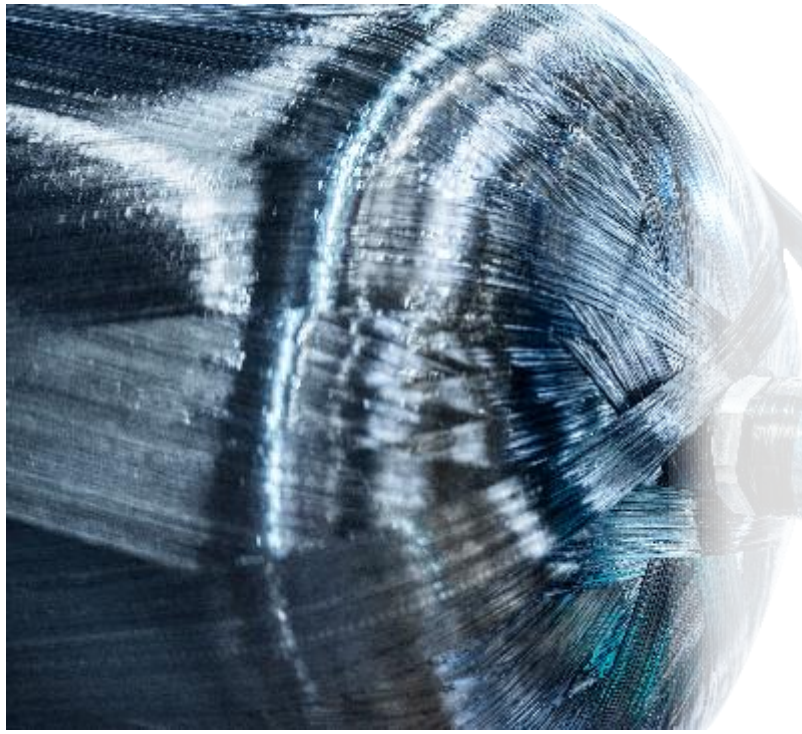
Fuel storage systems

Distribution systems

Battery solutions

Electric vehicle systems

Hexagon Purus is a leading provider of type 4 cylinders – the optimal and preferred cylinder for hydrogen applications



NON-CORROSIVE:
Polymer liner is corrosion free

GOOD FATIGUE STRENGTH:
High-strength carbon fibre construction reduces impact damage and fatigue

LEAK-FREE:
Precision-machined valve interface to ensure leak free operations

LIGHTWEIGHT:
Reduces vehicles mass and enhances handling and driveability

Hexagon Purus' offering

	TYPE-3	TYPE-4
Cylinder technologies		
Description	Fiber composite cylinder with aluminum lining	Fiber composite cylinder with plastic lining
Total cost of ownership		Lower
Storage density		Higher
Mobility applications	✓	✓

Type 4 cylinders provide a superior combination of weight, safety, efficiency and durability for hydrogen applications

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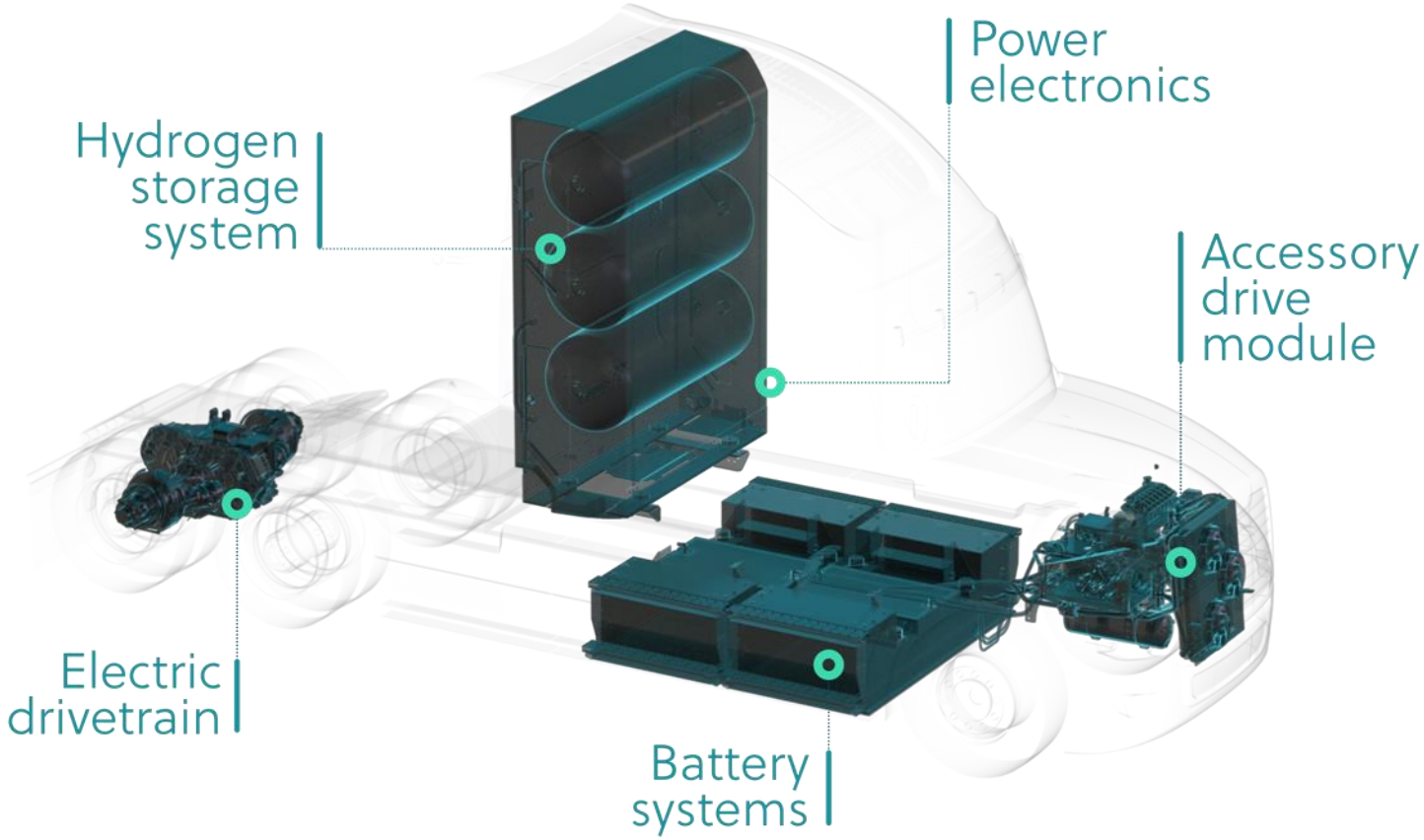
Hexagon Purus' hydrogen cylinder system serves a wide range of mobility & storage applications

Example applications for Purus' hydrogen cylinder systems

- Heavy-duty vehicles
- Transit bus
- Distribution modules
- Rail
- Marine

Hexagon Purus is a world leading provider of solutions for electric drivetrain integration

Examples of parts Hexagon Purus integrates in fuel cell electric heavy-duty trucks



Hexagon Purus offers hydrogen fuel systems, battery systems and integrated electric drivetrain integration for zero emission medium and heavy-duty vehicles, both battery electric and hydrogen electric

Our battery system and drivetrain offerings have demonstrated superior performance and garnered exceptional feedback from OEMs and end-users

Strong customer relationships across a variety of end-use applications

Toyota fuel cell electric heavy-duty truck
(Photo: Toyota)

350 bar cylinders for the Xcelsior transit bus – operating in California, US

700 bar cylinders to Mercedes GLC-FCELL
(Photo: Daimler AG)

300 bar and 500 bar gas distribution modules for Linde
(Photo: Linde AG)

1st hydrogen vessel in the US; 70 ft hybrid hydrogen fuel cell electric catamaran
(Photo: Golden Gate Zero Emission Marine)

World´s 1st hydrogen-powered regional train Coradia iLint from Alstom, Germany
(Photo: Alstom)

950 bar cylinders for Western Canada's first retail hydrogen refuelling station
(Photo: HTEC Hydrogen Technology & Energy Corporation)

Battery packs for Daimler's two new battery electric truck models eCascadia and eM2, and additional system components for the eM2

Adjacent markets

Construction & mining

Agriculture

Drones

Aviation

Other applications

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Several recent contract announcements

HINO

Selected by Hino Trucks as development partner to provide battery packs and drivetrain integration on multiple Hino platforms

NEW FLYER

Selected to supply high-pressure hydrogen tanks for New Flyers Xcelsior CHARGE H2™ hydrogen fuel cell electric transit buses

STADLER

Awarded contract for supply hydrogen cylinder systems for first hydrogen powered commuter train in the US

Talgo

Selected to deliver high pressure hydrogen cylinders for the first zero-emission hydrogen train in Spain

Everfuel

Multi-year frame agreement with worth €14m to deliver multiple units of hydrogen distribution systems through to 2025

Leading global industrial gas company

Substantial order from leading global gas company to provide type 4 hydrogen cylinders for transportation of hydrogen to industrial customers

Purus launching a JV in the world's largest hydrogen market

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CIMC ENRIC

- Signing of JV agreement in March 2021
- CIMC ENRIC is a leading Chinese manufacturer of clean energy equipment headquartered in Shenzhen, China, and listed in Hong Kong

1,000,000
FCEVs by 2035

50%
of new car sales to be zero emission[1] by 2035

5,000
hydrogen refueling stations by 2035

Source: "Energy Conservation and New Energy Vehicle Technology Roadmap 2.0"
1) Includes plug-in hybrid electric vehicles (PHEV) as included in the "new energy vehicles" (NEV) term used by the Chinese government

Strong momentum continuing to build – entering Northeast Asian market for hydrogen-powered passenger cars…

- ✓ Hexagon Purus nominated for serial supply of cylinders for a zero emission FCEV SUV
- ✓ First prototypes delivered by the end of 2020
- ✓ 2-year contract
- ✓ Estimated sales value of €25m

"Hydrogen is a key focus of Hexagon Purus. We are pleased to become an approved supplier to a major OEM in this large market, and to bring our leading type 4 cylinder technology to a new innovative collaboration."

- Michael Kleschinski, EVP Hexagon Purus

Maritime – the hydrogen sea adventure has started

Hexagon Purus taking a stronger position

Foto: Per Eide

Above the Summits

Hexagon Purus in aerospace

- Propellant and Pressurant Tanks used in Spacecraft, Launch Vehicles, and Satellites
- Experience with Man-Rated and Unmanned Applications
- Type 3 & Type 4 options
- Track record over 9 years with a portfolio of 8 different customer specific high-pressure tanks developed

Above the Summits

Hexagon Purus in aviation

- Enabling our vision of Clean Air Everywhere by offering COPV’s for Aviation
- Focus on Commuter, Regional and Short-Range Aircraft where CHG can be relevant
- Existing 350 bar and 700 bar Options or Custom Solutions Available

Source: Roland Berger input on electrification of the aircraft industry

Compressed hydrogen distribution

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Hydrogen Distribution

- X-STORE is our brand and it is owned by Hexagon Purus. Systems and cylinders made inhouse
- There are more than 400 X-STOREs in the field.
- We pioneered with the first Type 4 cylinders for hydrogen in 2014.
- Vertical cylinder mounting for highest packing density ➔ highest payloads
- Newly approved standard EN17339 unleash further potential increasing the payload

Cost Reduction potential→ lower opex

Reduced opex by higher payload on Compressed Hydrogen Distribution

Container size:	10ft	20ft	30ft	40ft	45ft
EN17339	Storage capacity	Storage capacity	Storage capacity	Storage capacity	Storage capacity
Pressure	kg H2	kg H2	kg H2	kg H2	kg H2
318 Bar	187	421	655	889	1005
381 Bar	217	487	758	1029	1164

- The new European standard EN 17339 for composite cylinders for hydrogen distribution is approved and will be part of the ADR by Jan 2023
- Can possibly be used already from 2021
- It adapts the safety factor to the automotive standards
- Cylinders become lighter

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Hydrogen type 4 tank information*

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	Nominal working pressure (15°C)	Outside diameter	Overall length	Tank weight	Water volume	Hydrogen capacity	Weight ratio (hydrogen weight/tank weight)	Suitable for neck mount	Approval
	MPa	mm	mm	kg	L	kg	%		
A	25	503	2342	94	350	6.3	6.7	✔	TPED
B	25	654	2413	147	581	10.4	7.1	✔	ABS/US DOT
C	25	653	4419	267	1170	21.0	7.9	✔	ABS/US DOT
D	25	653	5689	342	1544	27.8	8.1	✔	ABS/US DOT
E	30	509	2342	112	350	7.4	6.6	✔	TPED
F	31.8	503	2342	94	350	7.8	8.3	✔	TPED/ADR**
G	35	430	3190	101	312	7.5	7.4	✔	EC79/HGV2
H	35	430	2110	67	193	4.7	7.0	✔	EC79/HGV2
I	35	509	2342	112	350	8.4	7.5	✔	EC79
J	38.1	509	2342	112	350	9.0	8.0	✔	TPED/ADR**
K	50	531	2424	180	347	11.0	6.1		TPED
L	70	332	921	33	36	1.4	4.2	✔	EC79
M	70	440	1050	59	76	3.1	5.3	✔	R-134/HGV2
N	70	530	2154	188	244	9.8	5.2	✔	EC79/HGV2
O	70	705	2078	272	457	18.4	6.8	✔	R-134/ HGV2 planned
P	95	515	2783	365	254	12.4	3.4	✔	PED/US DOT

* This list summarizes frequently built units, other sizes may also be available.
** Starting March 2021

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Clean air everywhere
HEXAGON
PURUS