



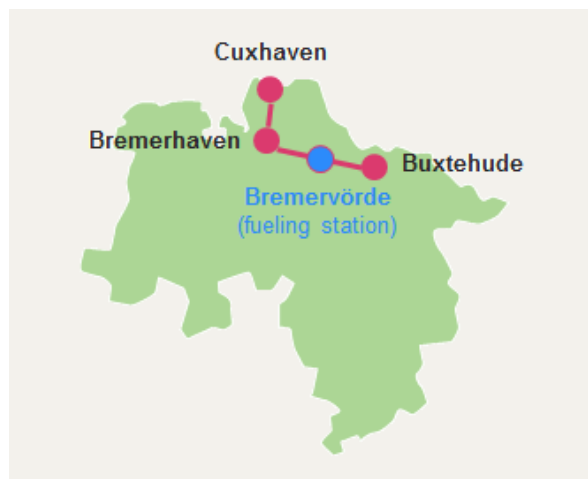
**A bridge between
Rail and high-
power usages**

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2018 – ALSTOM CORADIA iLint

First H2 train in commercial service in the world



World perspective for hydrogen trains

Alstom paved the way



iLint in the world

Several trials in German Regions, all over Europe (Sweden, Denmark, Poland, France...)

UK retrofit

« Breeze », the future Eversholt Rail zero emission train, based on Alstom Class 321 trainsets



Italy

Alstom will supply CoradiaStream hydrogen trains to FNM (Ferrovie Nord Milano) in the Italian region of Lombardy



France

Alstom will supply Regiolis Bi-Mode (catenary/hydrogen) to 4 French Regions via SNCF

Alstom Competitors

CAF with Toyota (Spain) - Talgo with Repsol (joint development)
Stadler for a US customer - Siemens with Mireo Plus (Germany)





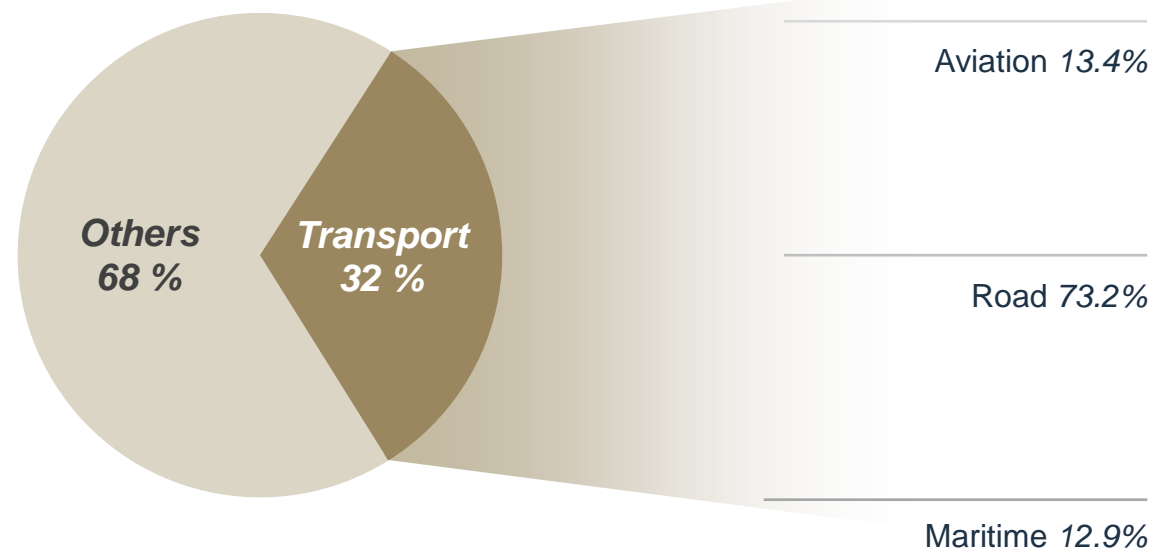
Rail transport and CO₂ emissions

Even being a small contributor, rail will benefit from modal shift and must act for the reduction of CO₂ and other emissions

EU-28 CO₂ emissions
±3.64GtCO₂

Transport CO₂ emissions
±1.17GtCO₂

RAIL 0.5%



RAIL CONTRIBUTION



HYDROGEN
&
BATTERIES



2 complementary technologies
for the decarbonisation of transport

Environmental benefits

replacing Diesel passenger trains with hydrogen

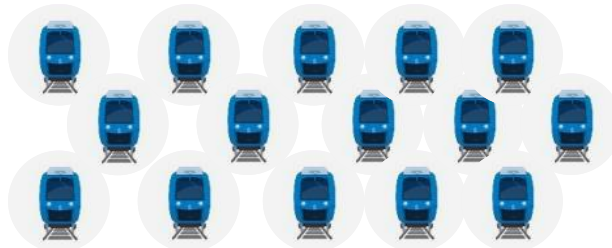
IMPACT OF ONE CORADIA ILINT



= 700 t CO₂
LESS PER YEAR

= EMISSION OF
400
CARS

IMPACT OF A 15 CORADIA ILINT FLEET



= 11 000 t CO₂
LESS PER YEAR

= EMISSION OF
6 000
CARS

IMPACT OF 6.000 CORADIA ILINT REPLACING DIESEL EUROPEAN FLEET



= 4 200 000 t CO₂
LESS PER YEAR

= EMISSION OF
2 400 000
CARS



HELION Hydrogen Power

ALSTOM's capitalizing on 20 years of expertise in high-power Fuel Cells

OUR POSITIONING

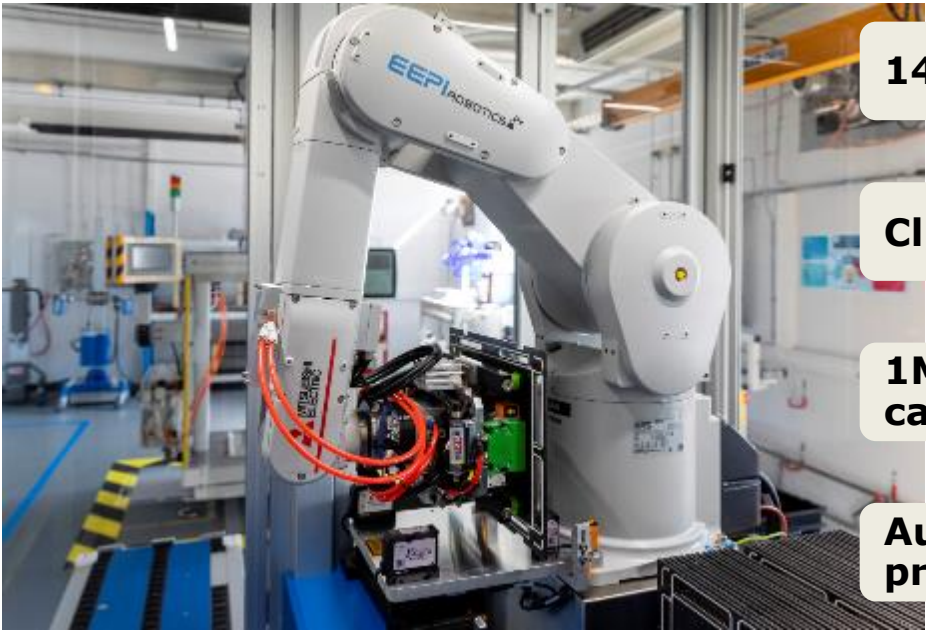
CORE TECHNOLOGY MANUFACTURER

PEM* and graphite Fuel Cell stacks

**FC RACK™ 200 KW
FUEL CELL SYSTEM UP TO SEVERAL MW
For high power transport & stationary**

**HYDROGEN TECHNOLOGIES EXPERTISE
H2 safety support and trainings**

INDUSTRIAL FACILITIES



14 test benches

Climatic test chamber

1MW of commissioning capacity

Automated assembly process (1 Fuel Cell/day)

70+ PEOPLE

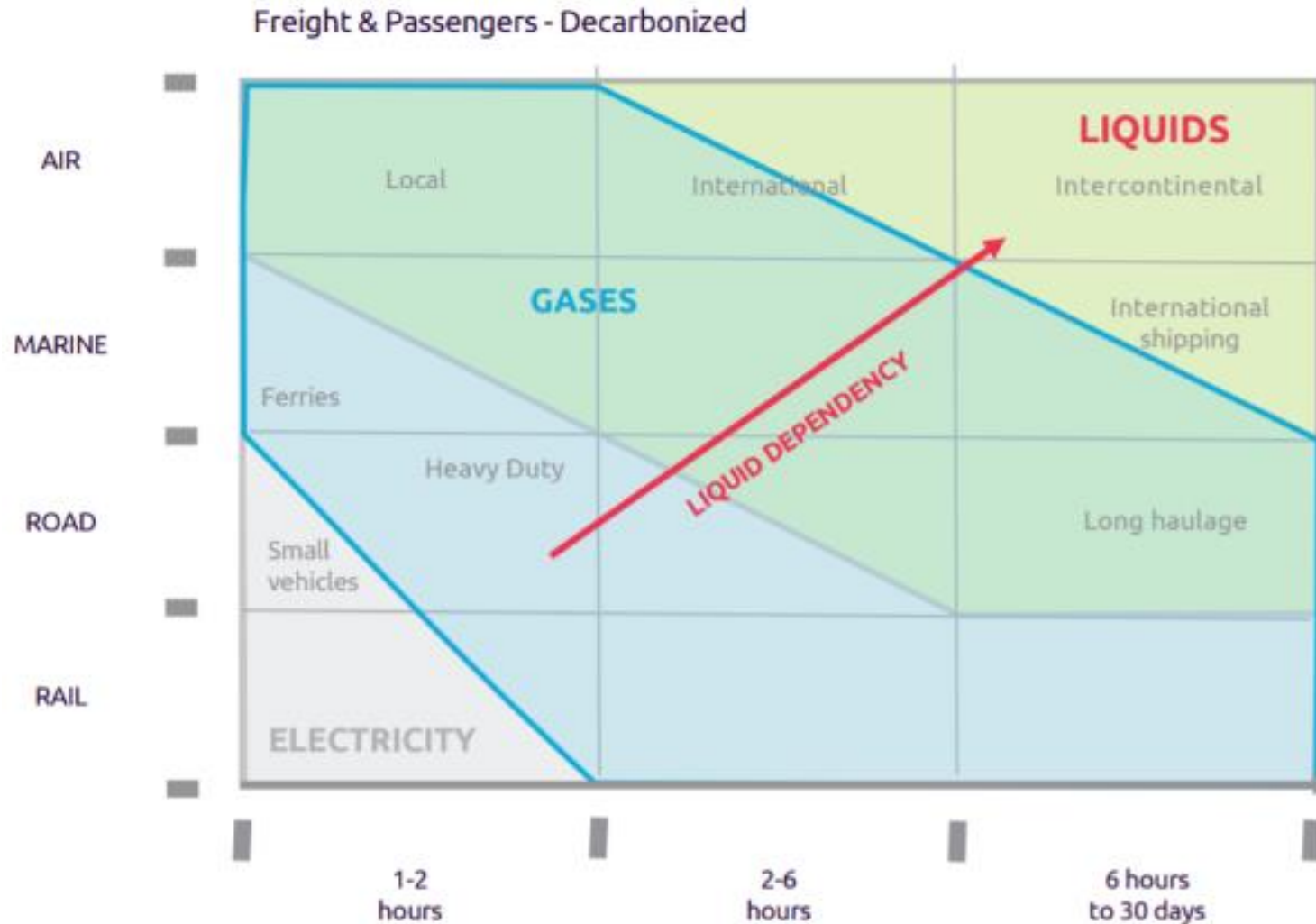
40+ PATENTS

**100m€ ALREADY
INVESTED IN R&D**

**UP TO 30MW
PER YEAR**

*PEM = Proton Exchange Membrane

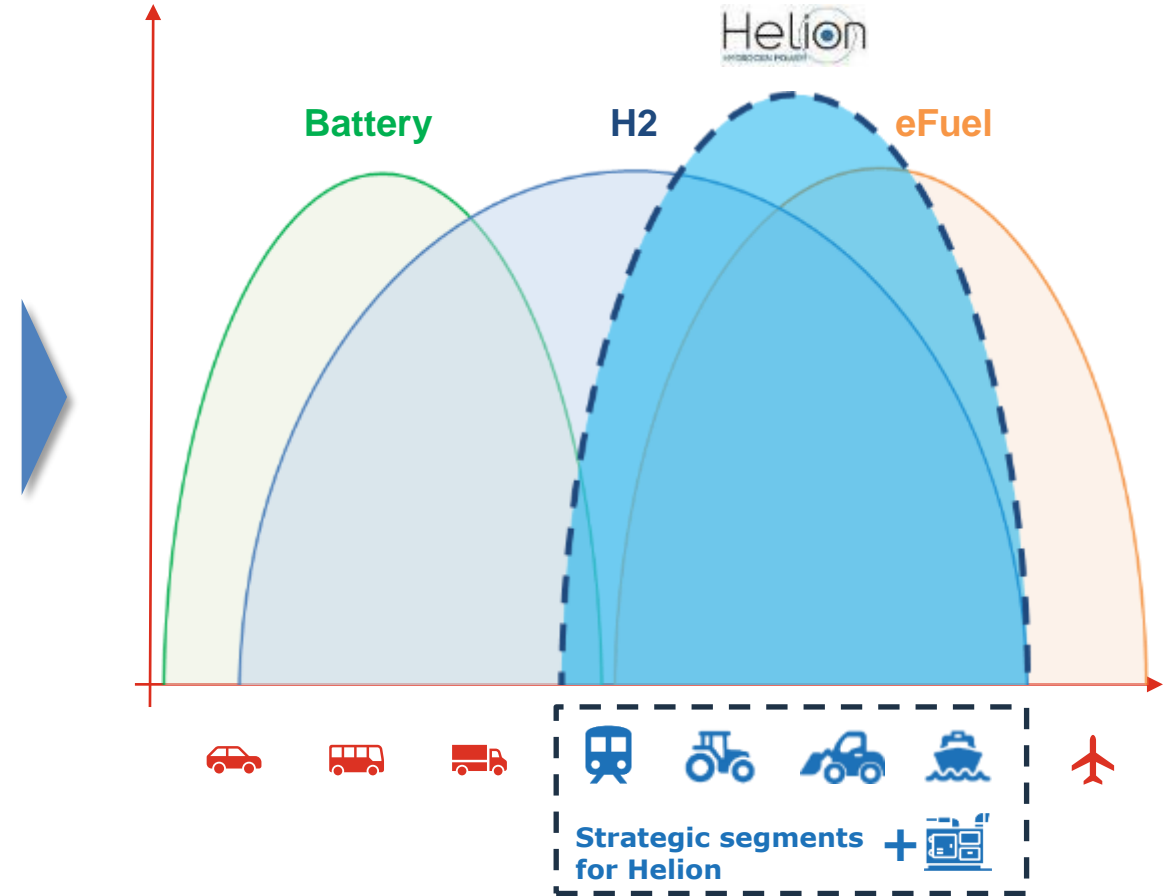
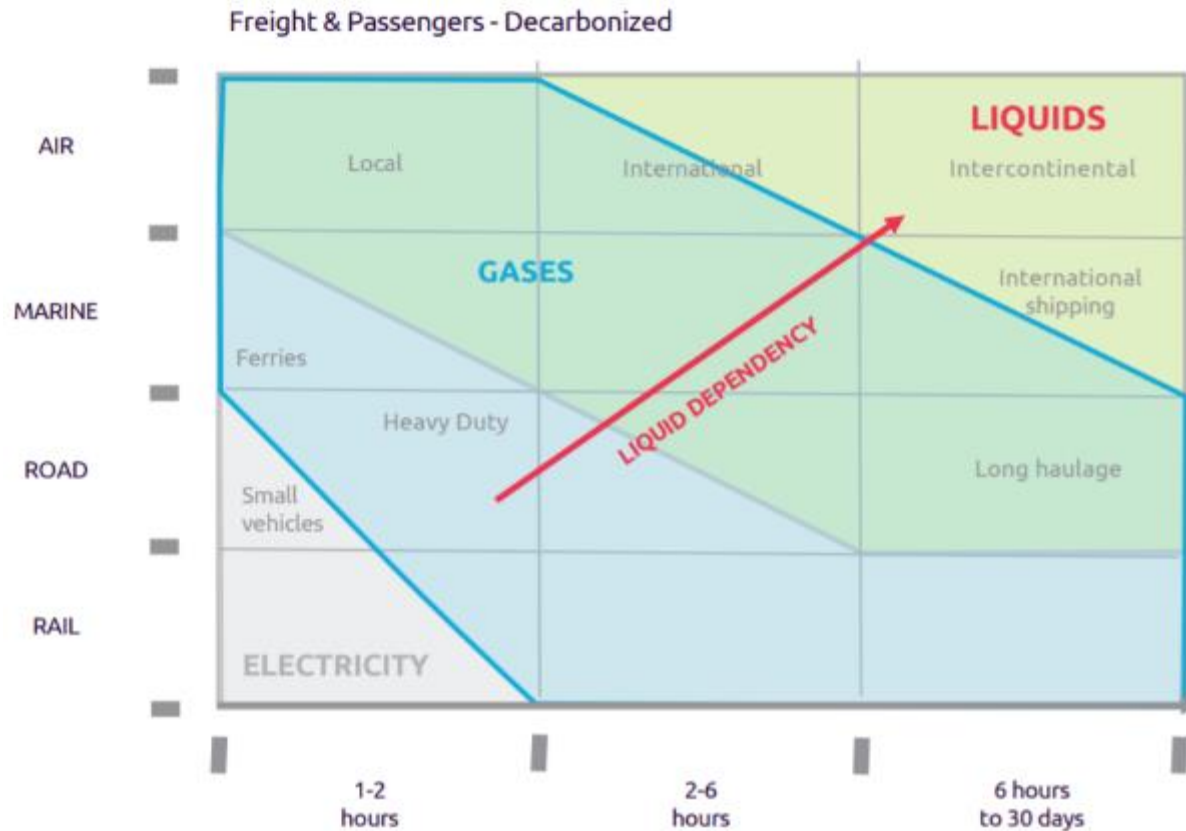
Power and distance impact your decision in terms of energetic vector



Source: Cap Gemini and 100 experts for Breakthrough Energy, a Bill Gates initiative (2020)

H2 fits mostly everywhere...

... but with more impact on mid-high cluster of power/autonomy



Source: Cap Gemini and 100 experts for Breakthrough Energy, a Bill Gates initiative (2020)

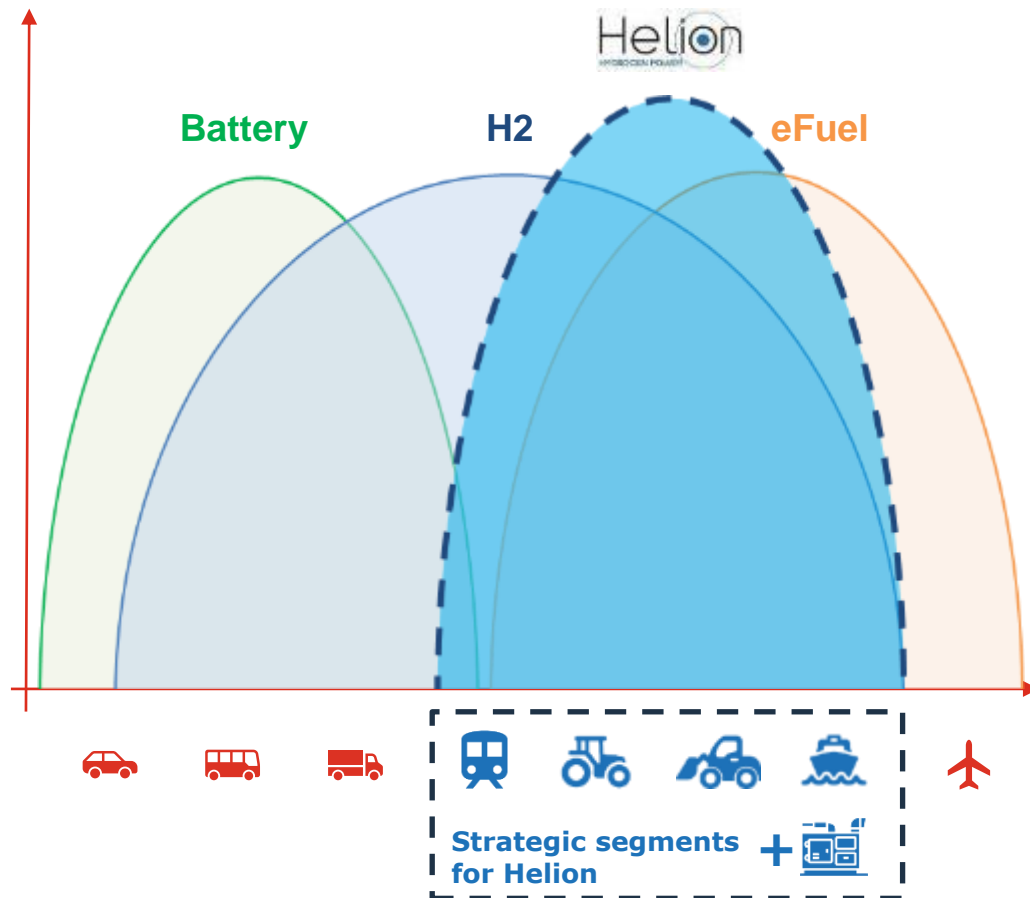


SCORE:
18500

YOU WIN!

Helion's sweet spot brings synergies...

... between railway and other high-power usages

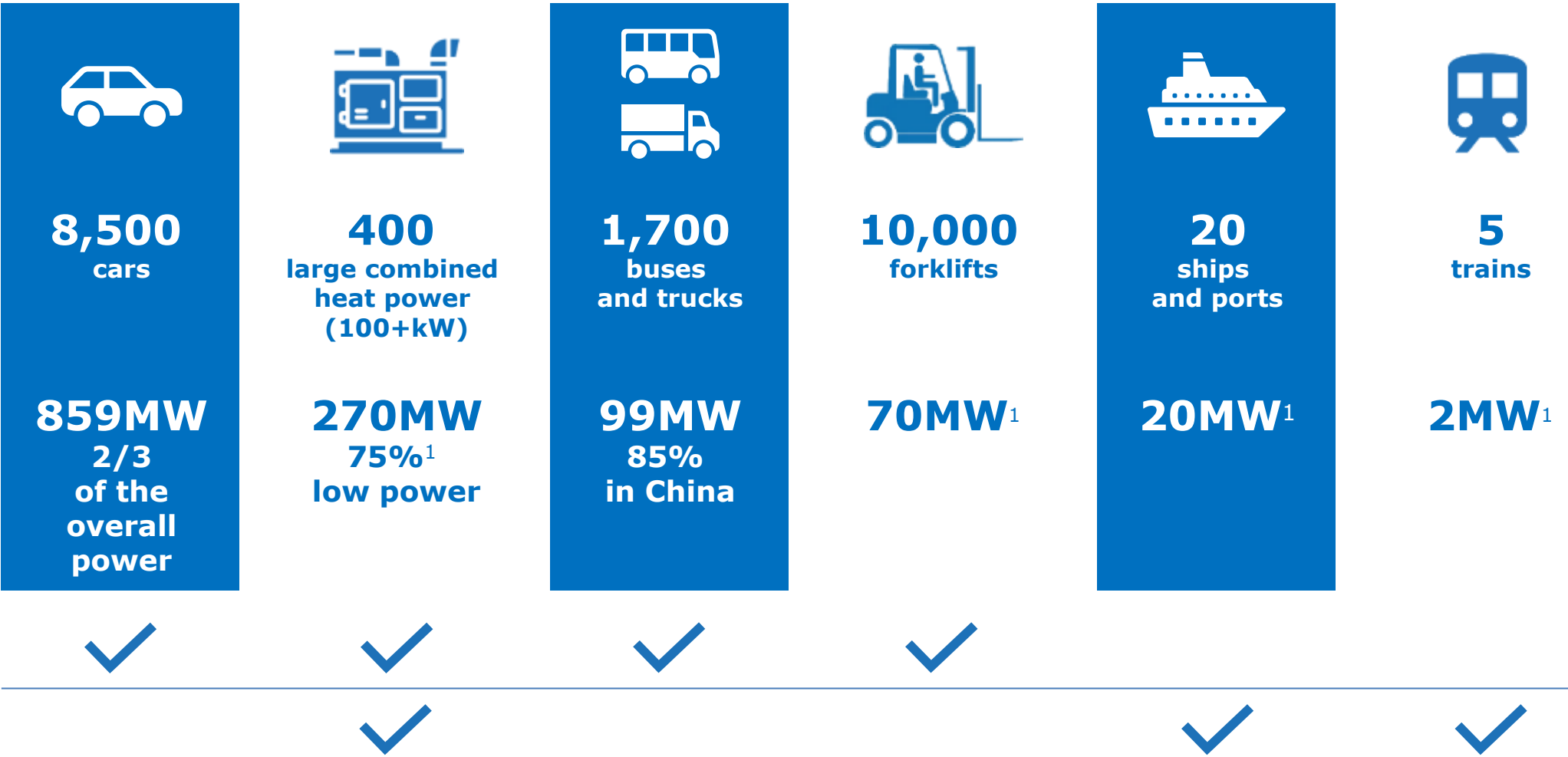


★ **BONUS STAGE** ★

- Same clients' typology
- Lower volumes (difficult for automotive players)
- Technical barriers (norms, integration...)
- Potential higher gross margin

Business synergies from 2 different technologies

Metallic for high volumes & low power vs Graphite for the rest



Metal



Graphite



Main source: E4tech (The fuel cell industry review 2020)
Note 1: source Alstom



High-power clients request ubiquity

a mid-size company like HELION can adapt easily to clients' requests



Regional & freight trains

300 kW – 1 MW



Power generation & backup

150 kW – 2 MW



Mining & construction vehicles

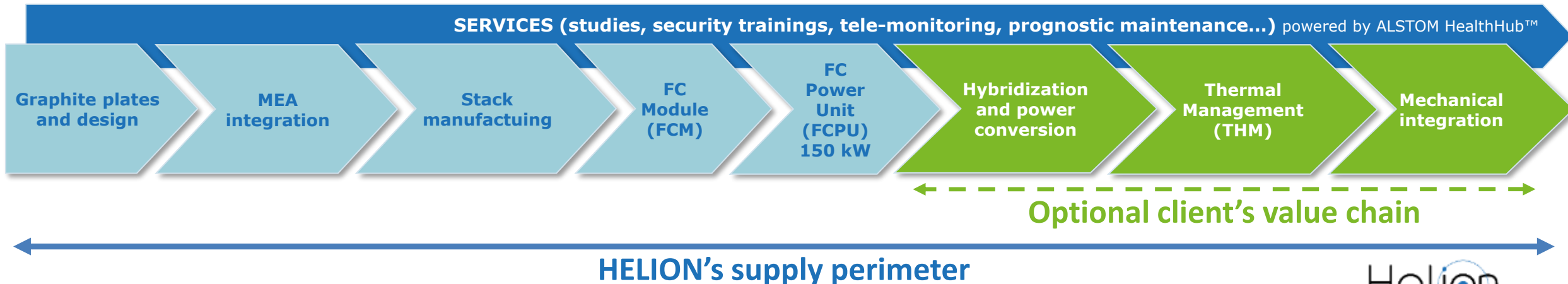
200 kW – 2 MW



Maritime & inland barges

150 kW – 2 MW

FUEL CELL SUPPLY PERIMETER



HELION Hydrogen Power

Ready for your Net Zero ambitions





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