Rux energy

Unlocking a hydrogen future

Solving hydrogen storage & transport

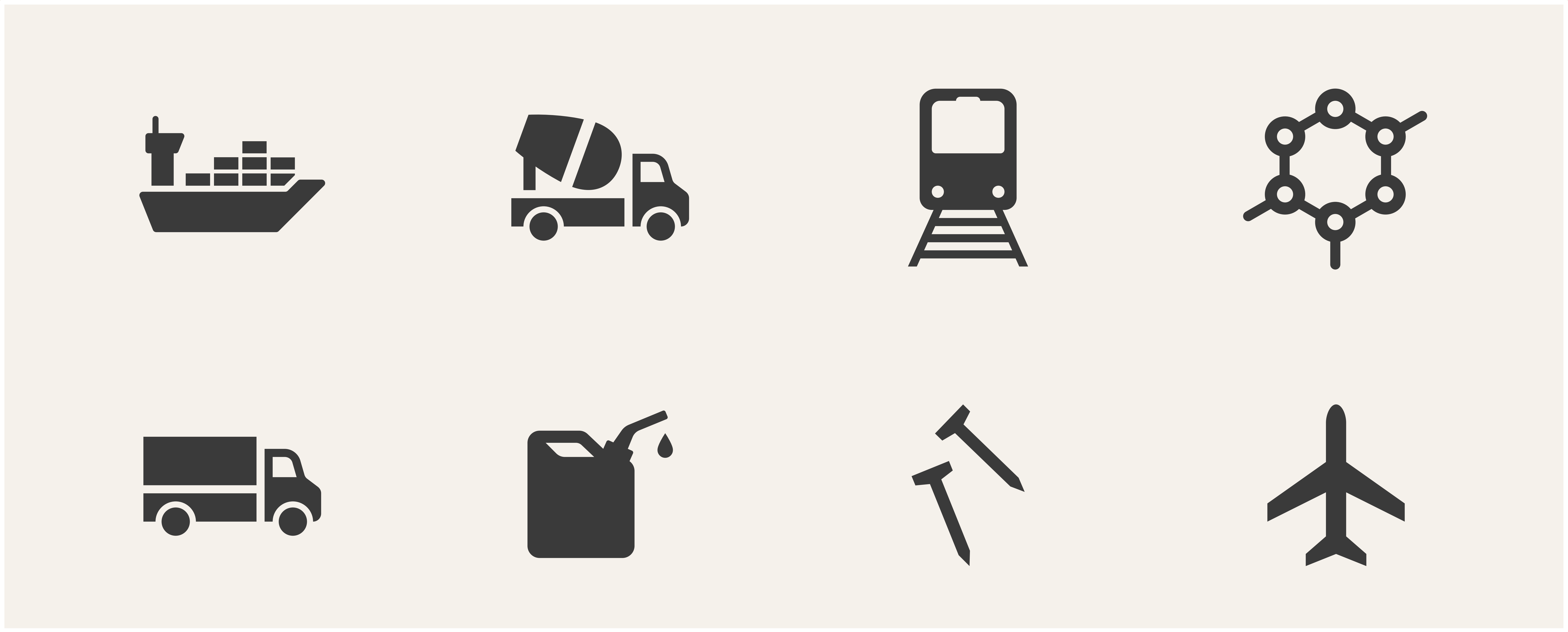
Affordable, Scalable, Safe

30%

of all global emissions arise from hard-to-abate sectors

Why do we need Hydrogen?

Hard-to-abate sectors



Princple 1

Electrify wherever you can but not **at every price**

Princple 2

Use **every** tool in the toolshed to achieve the **fastest possible** decarbonistation

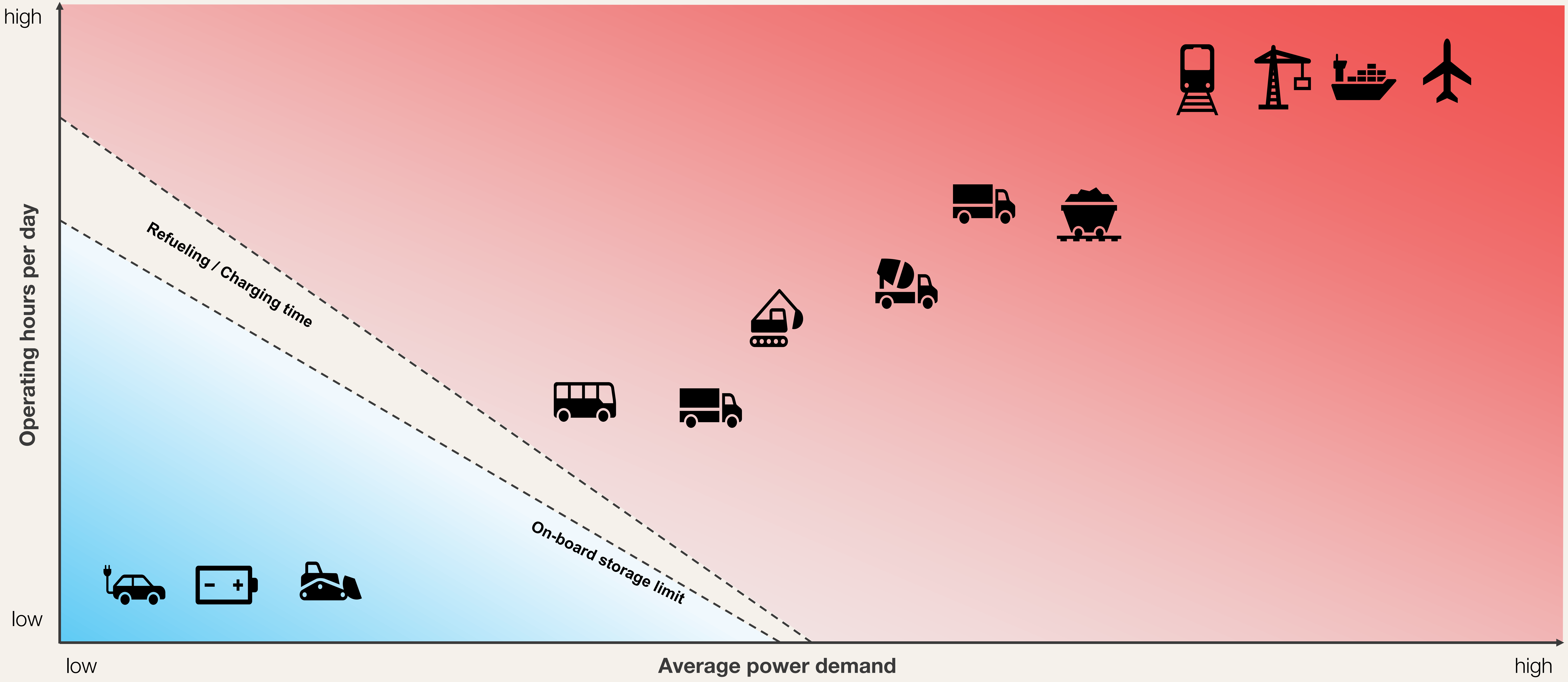
Princple 3

We **must beat diesel** (and other fossil fuels) on cost alone…

…without subsidies, by 2030

Where is Hydrogen most effective?

(Competitive Either/Or Comparison)



Where are we actually seeing Hydrogen demanded?

Clue: It's not either/or, it's Yes And!

Where are we actually seeing Hydrogen demanded?

High Energy MW-scale Electric Vessel Charging: 300 kW to 10 MW scale charging infrastructure, especially where the grid isn't sufficient (maritime, mining, construction). (Above: **Yinson GreenTech**, Singapore – need H2-powered flexible charging as the grid isn't sufficient)

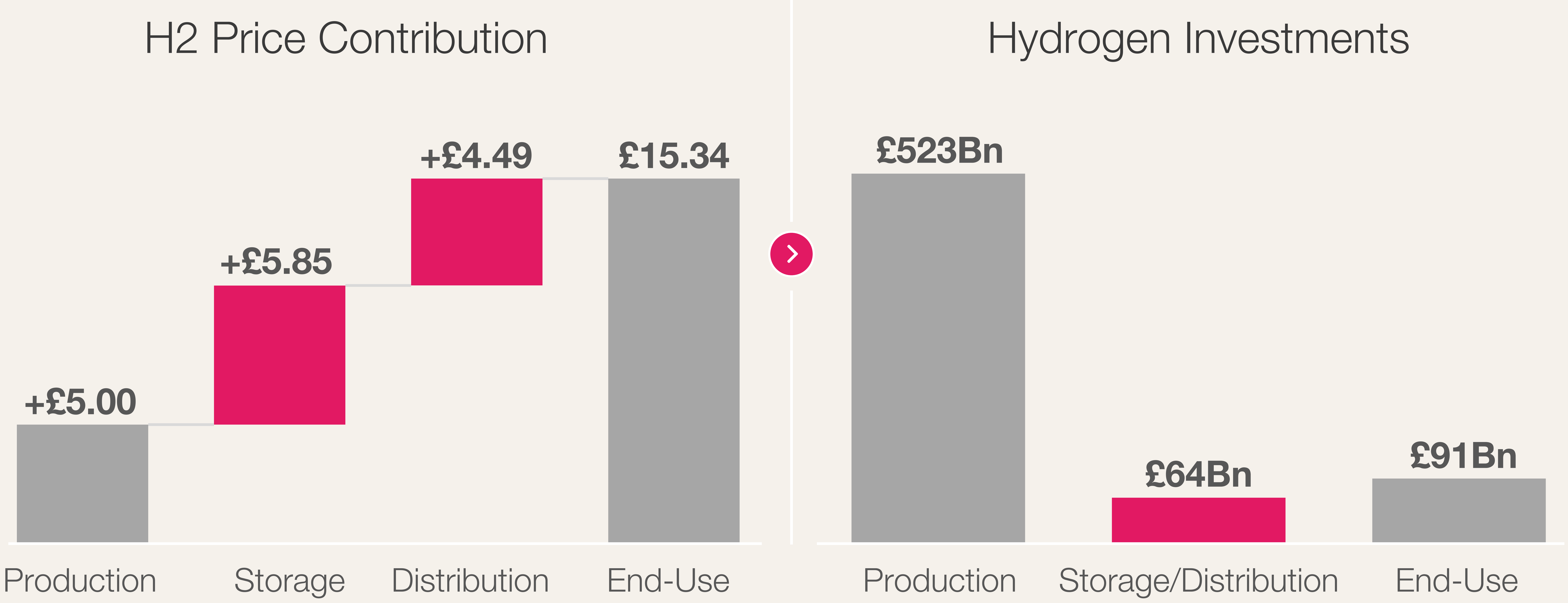
Where are we actually seeing Hydrogen demanded?

E-fuels manufacture: Hydrogen is the core ingredient in synthetic e-fuels like e-methanol which is used in both maritime and racing. (**VAST Renewables** solar-e-methanol South Australia)

Where are we actually seeing Hydrogen demanded?

Direc Re-Powering High-Powered Vessels/Vehicles: Hydrogen will be the lowest cost fuel (e or fossil) by 2040 without subsidy (Offshore Renewable Energy Catapult), potentially earlier. Some groups moving now. (**Windcat, CMB.Tech, MAN,** (recent 27 March 2025))

There is one big **PROBLEM**



Source: Hydrogen Council (September 2024), Harvard University Center for Environment (October 2024)

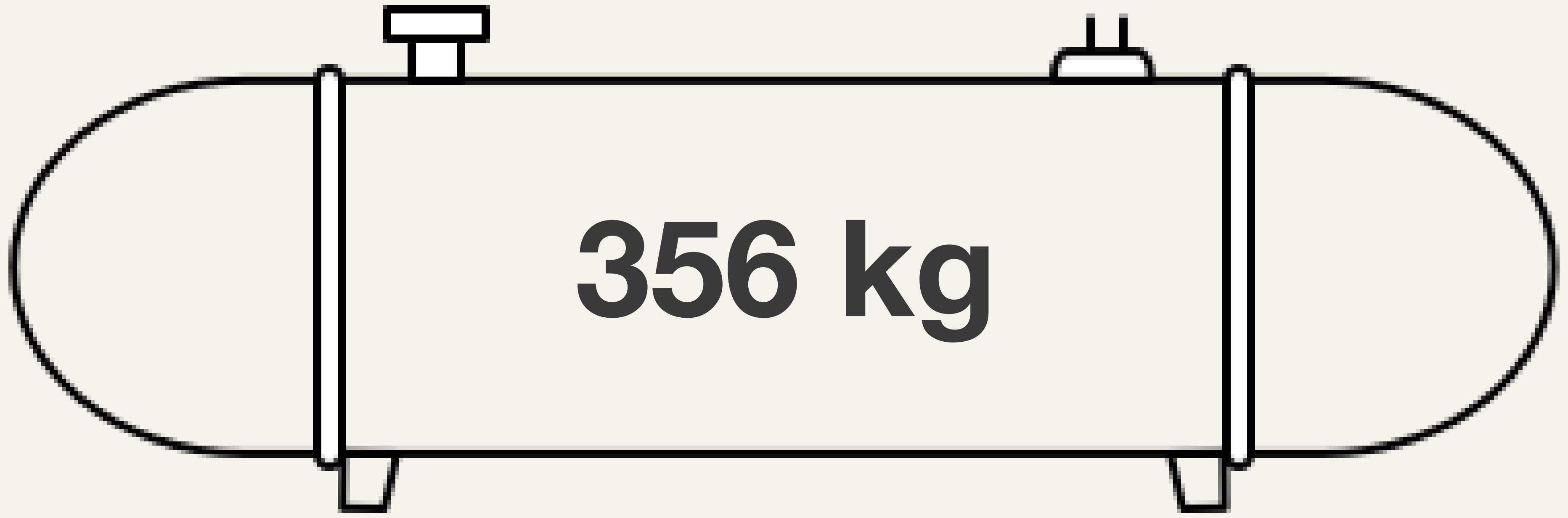
We **SOLVED** this problem

- Cost-parity with Diesel
- Interoperable, high-capacity packaged gas
- Breakthrough safety and efficiency

Rux HARMONY

We integrate **nano-porous materials** in ISO-certified, containerised storage systems

350bar Hydrogen tanks



Low pressure Rux-tech enabled H2 tank

World's FOAK Prototype delivered in Dec24

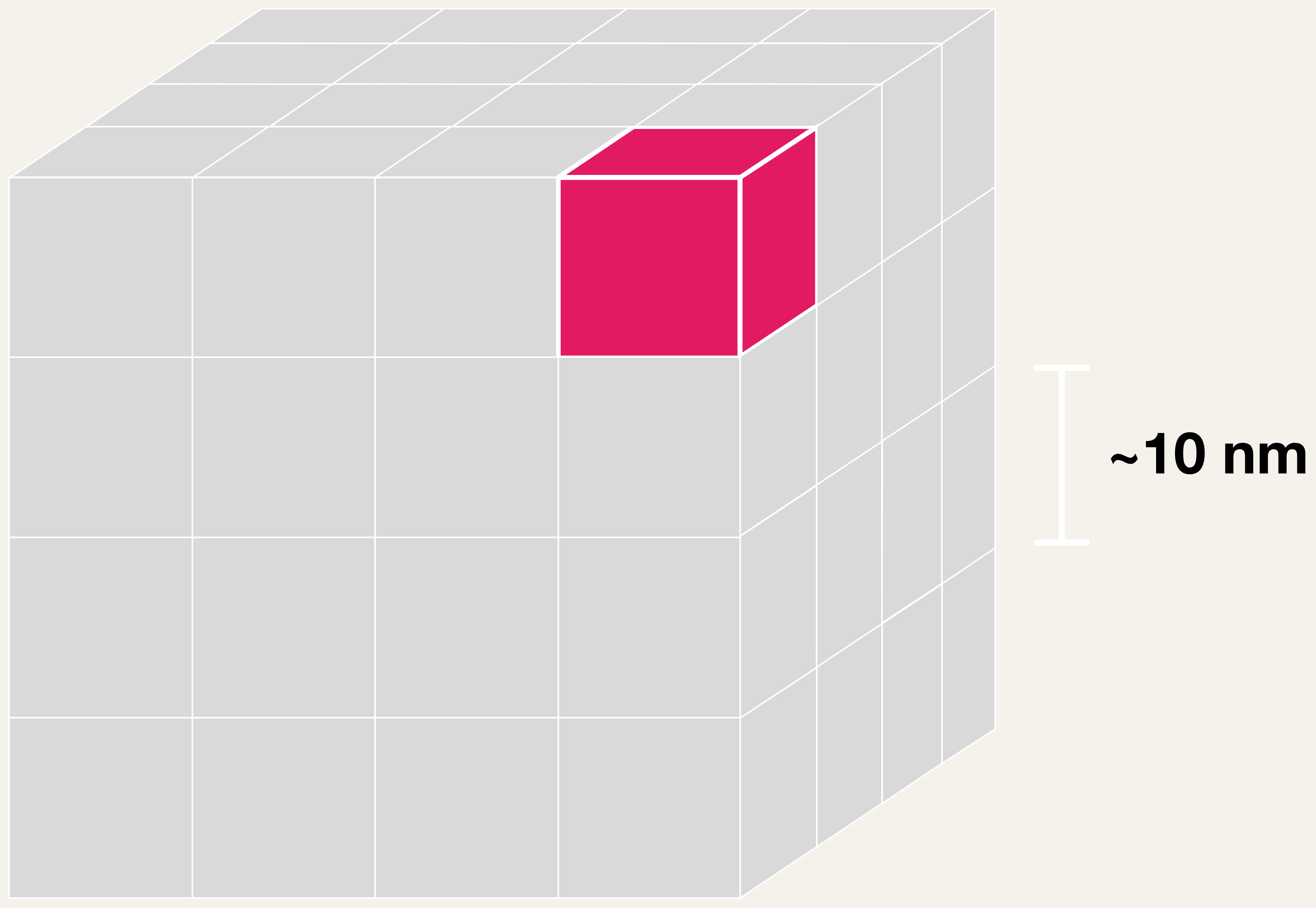
285% uplift

Patented nano-porous materials integrated in next-generation carbon composite tanks

Exemplary Rux storage system operating at LNG-like temperatures and low pressures (~20ft container volume)

**Performance validation by National Composites Center (Bristol, UK)*

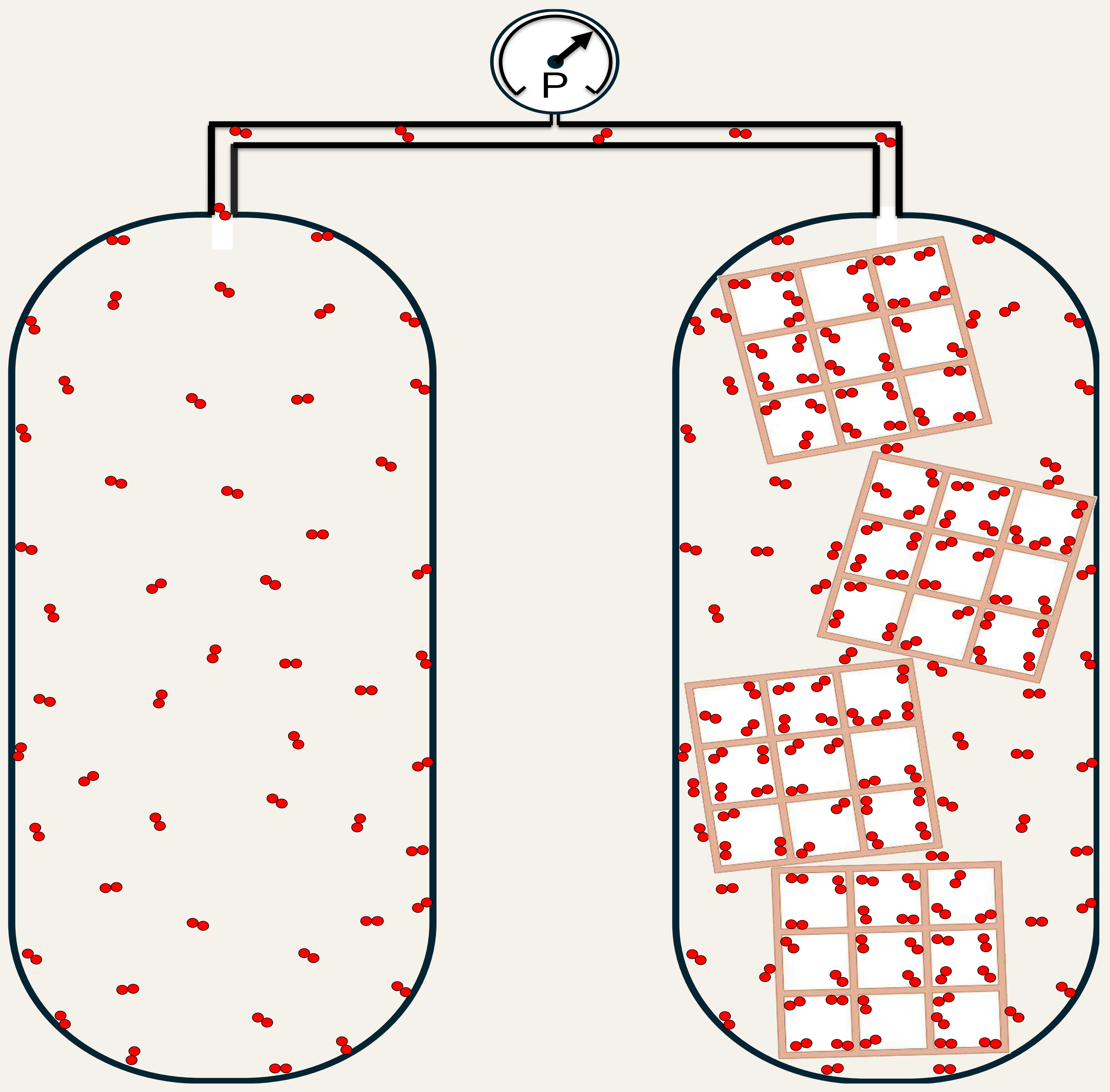
Our patented materials act like a **molecular sponge** for hydrogen



Rux Metal-Organic Framework (MOF)

Gaseous Hydrogen molecule (H_2)

H_2 always remains gaseous, seamless adsorption, no energy required



Standard H_2 storage tank

MOF-enabled storage system

1 gram of **Rux MOF** has the equivalent surface area of a **football field**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surface area of a football field

Highest **EFFICIENCY** means **LOWEST COST**

	Cost	Safety	Density	Efficiency	
Liquid H2	153 $/MWh	Explosion Risk	2.10 MWh/m^3	66%	**Thermo-Pressurized**
350bar CH2	78 $/MWh	Explosion Risk	0.67 MWh/m^3	91%	
700bar CH2	110 $/MWh	Explosion Risk	1.27 MWh/m^3	84%	
Rux-tech	**72 $/MWh**	**Low pressure / Inherently Safe**	**2.00 MWh/m^3**	**95%**	**Adsorption**
CN-Methanol	217 $/MWh	Toxic	4.38 MWh/m^3	40%	**Chemical Storage**
CN-Ammonia	248 $/MWh	Extremely Toxic & Flammable	3.52 MWh/m^3	35%	
Metal Hydrides	525 $/MWh	Spontaneous Ignition	2.12 MWh/m^3	42%	

1. Based on Rux Energy's End-2-End Techno-Economic Model
(Co-developed with PA Consulting); CN = Carbon Neutral (Fuel produced from 100% zero-emission sources)

Day in a Life of a **Tugboat**

Rux is making agile shoreside / shore-to-ship power a reality with our feasibility studies & pilot trials

SPOHL Project

(Shoreside Power)

UK based project - 11 partners

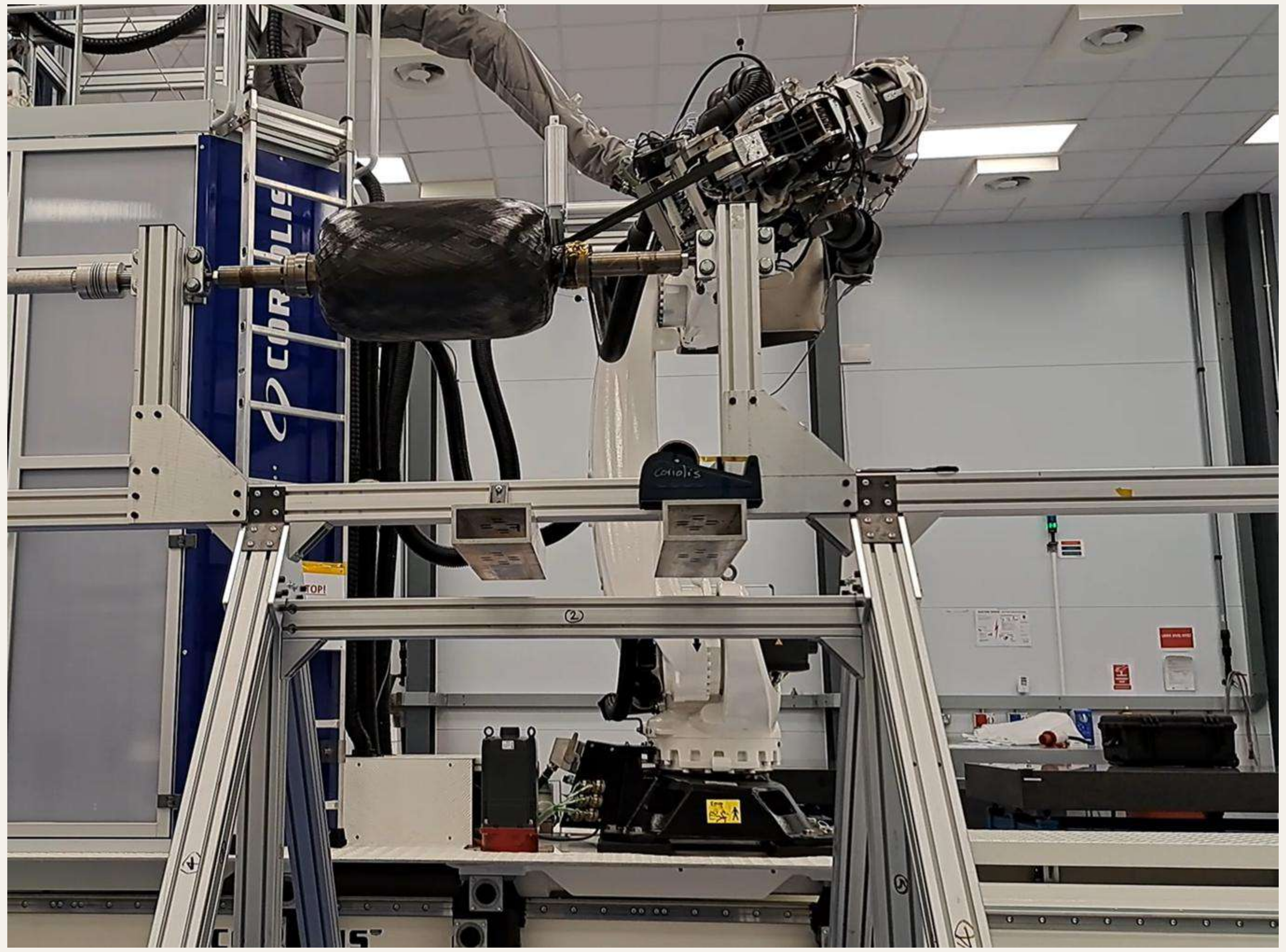
Benchscale Feasibility and Design Engineering

- Goal: Carnot 70% efficiency engine
- Goal: Rux agile storage scalable to 40 MWh

£3M subsidy from **Innovate UK** via Clean Maritime Demonstration Competition Round 4

Manufacturing of world’s First-of-a-Kind Type V storage tank for H2 storage utilizing MOFs

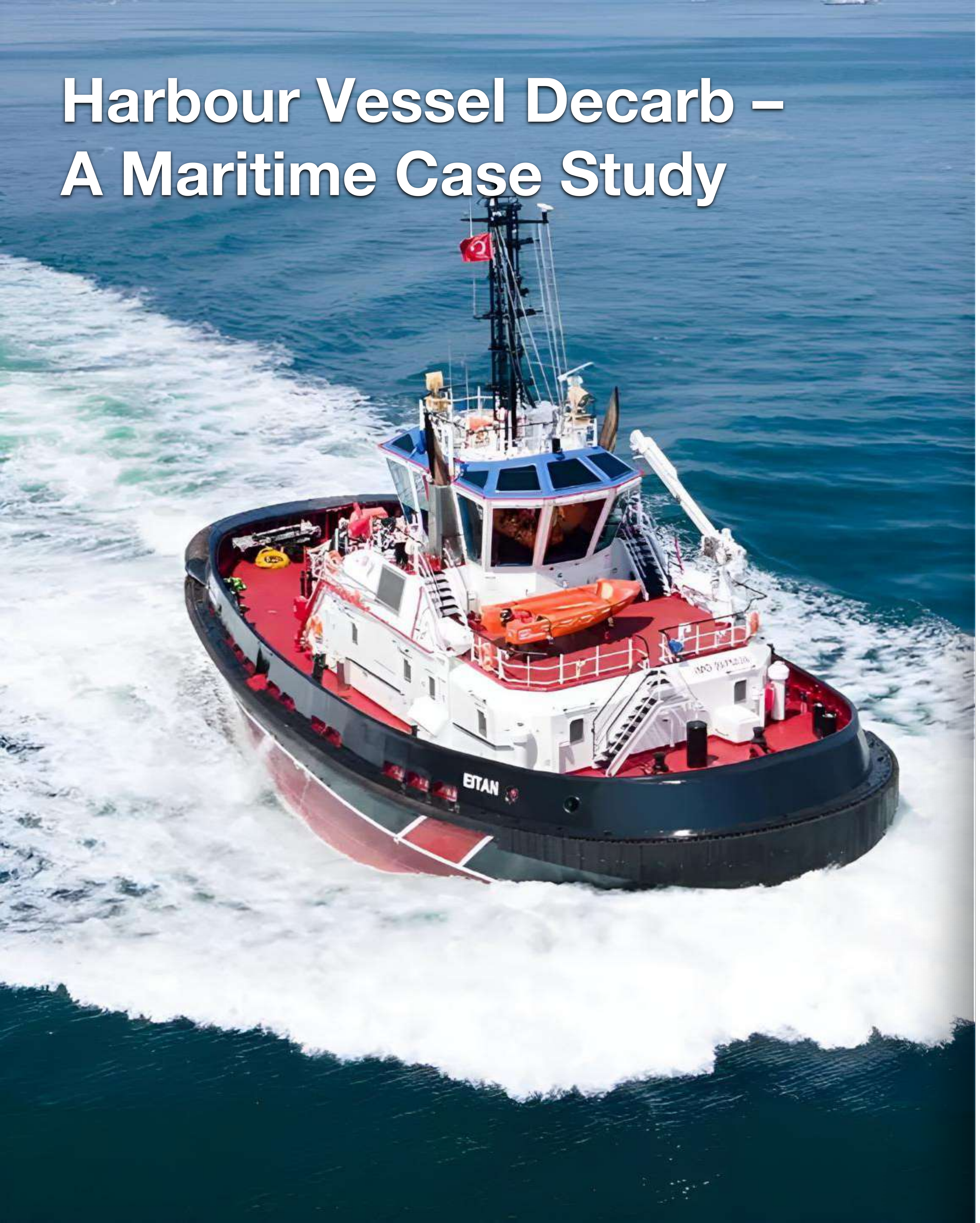
Preparation of support structure (mandrel)



Composite wrapping process using Automated-Fiber-Placement

Wrapped composite tank ready for curing step in autoclave

Harbour Vessel Decarb – A Maritime Case Study



HyZEM - Hydrogen Zero Emissions Marine Vessel

For Tug boats + Crew Transfer vessels

CHARTWELL MARINE

FREEPORT EAST Felixstowe Gateway 14 Harwich

STEAMOLOGY zero emission power solutions

duodrive

R3Energise Recycle Reuse Repower

NATIONAL COMPOSITES CENTRE

Cranfield University

UKRI

Innovate UK

Designed for:

- Extreme brake-horsepower outputs
- High efficiency, high torque, fast refuelling, ruggedised and space constrained applications
- Power output up to 5 MW output, 50 MWh - all day operation matching existing diesel tug operational uptime.

Key Takeaways

Hydrogen is coming…

…but not how we thought

Key Takeaways

Cost is everything…

…our target is cost parity with diesel

Key Takeaways

Collaborative not competitive…

…is what will get us to decarbonize, faster, and cheaper.

Join us in accelerating the path to zero carbon

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Rux Energy acknowledges the Gadigal & Dharawal people of the Eora nation (Rux Energy and NSW R&D Partner Sites), Whadjuk Nyoongar people (Rux Perth), and the Bunurong people of the South-Eastern Kulin Nation (Rux Victoria), on whose lands we conduct our research and business. Sovereignty was never ceded - always was, always will be Aboriginal land.

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