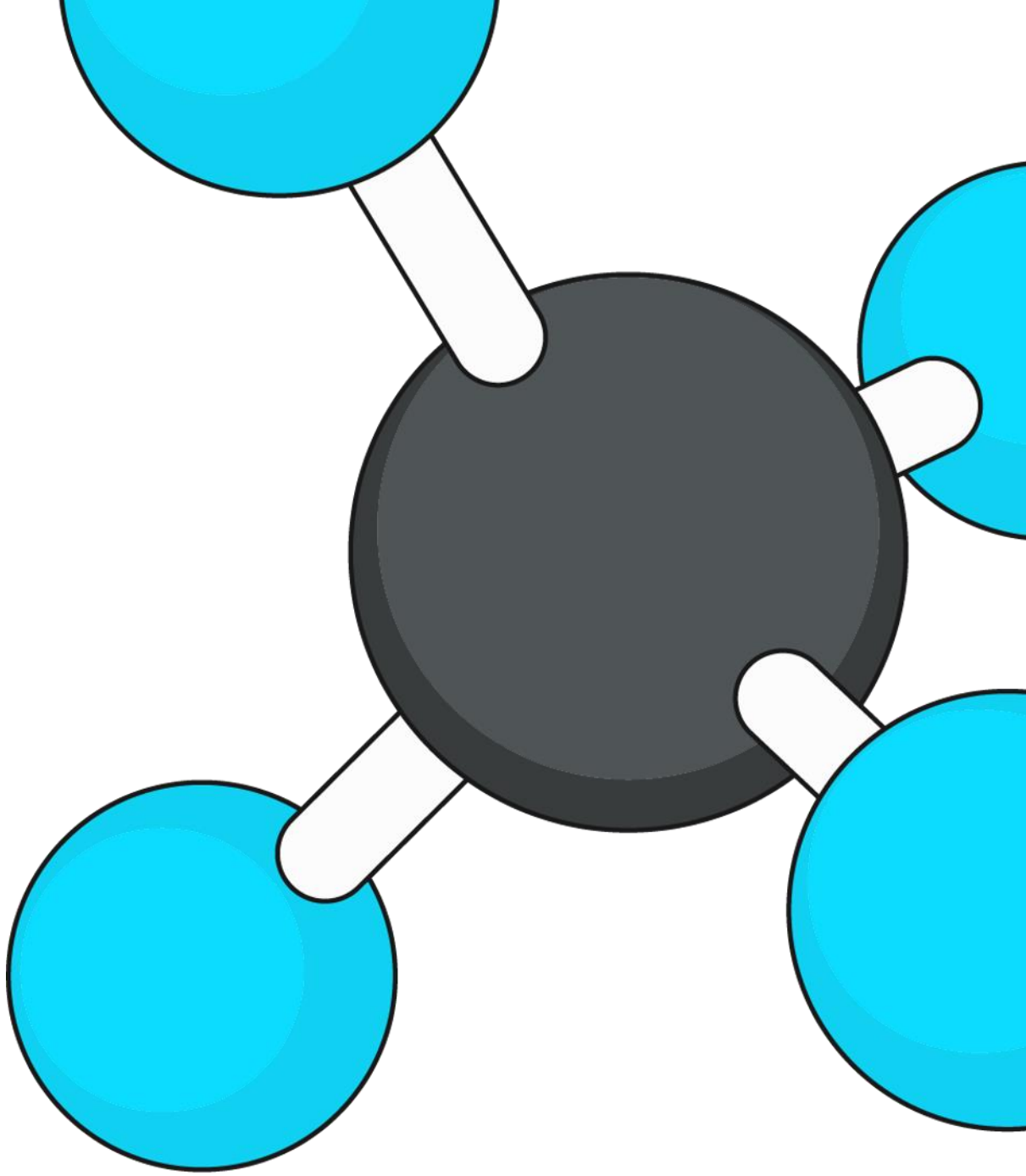
hycamite

IEA Bioenergy webinar 26.9.2024

Laura Rahikka, CEO, Founder



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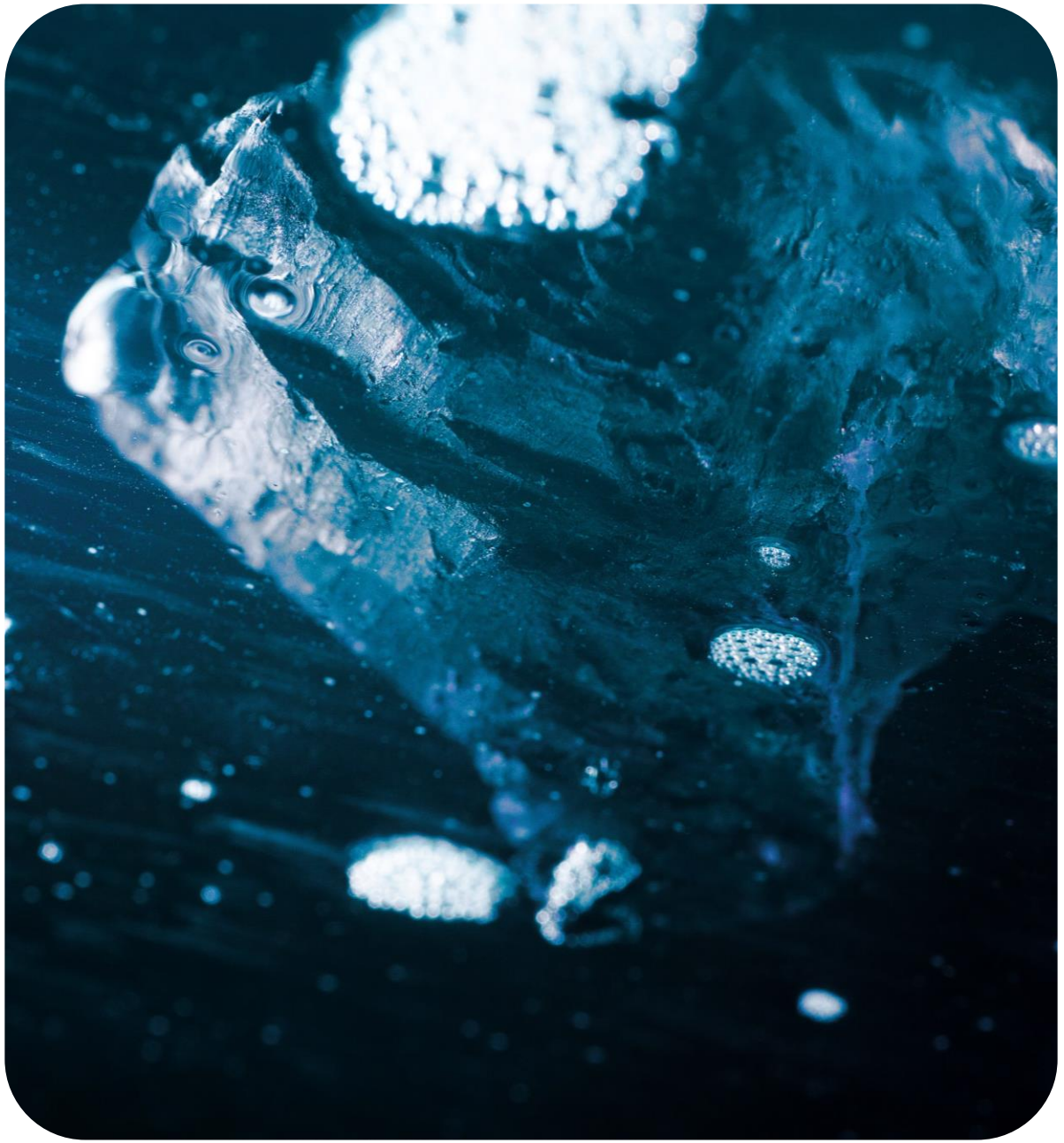
Company

A deeptech startup producing low-carbon hydrogen and high-quality carbon

- Industrial-scale zero emission hydrogen production
- Solid, high-value carbon products including battery-grade graphite
- Technology based on over 20 years of research at the University of Oulu
- More than 60 hycamates with different nationalities
- International, strategic investors
- Global coverage of strategic partners
- Industrial-scale demonstration plant capacity 2 kt hydrogen annually



Located in Kokkola Industrial Park, Finland

- Offices
- Pilot
- Laboratory
- Customer Sample Facility: commissioning expected Fall 2024

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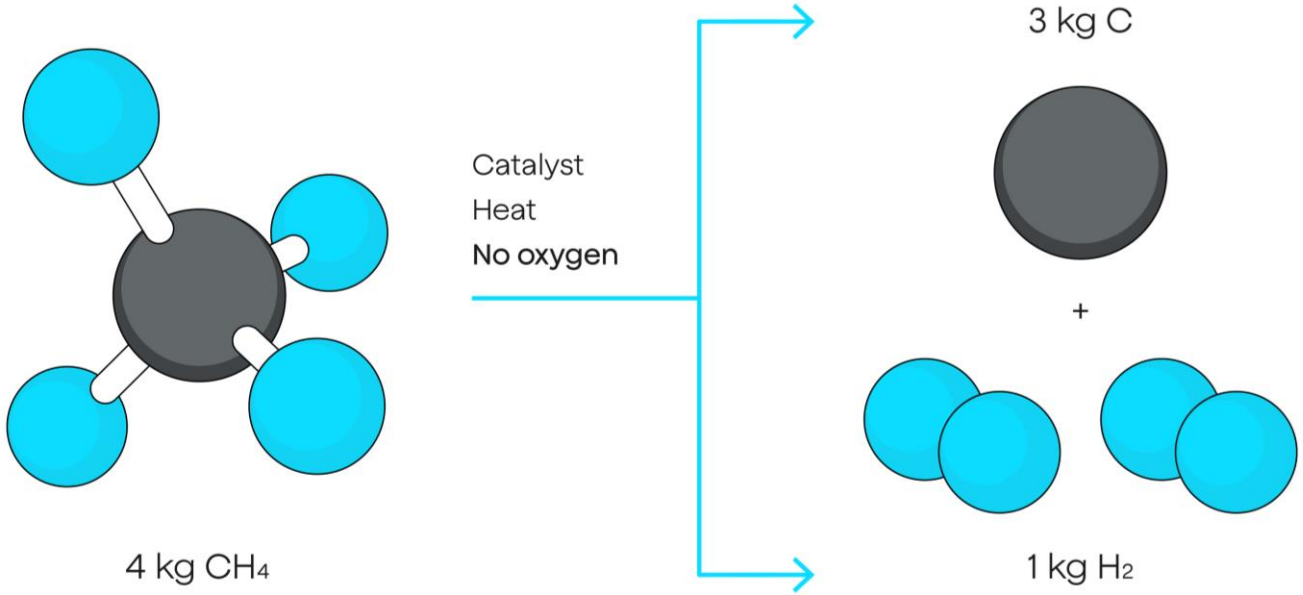
Technology

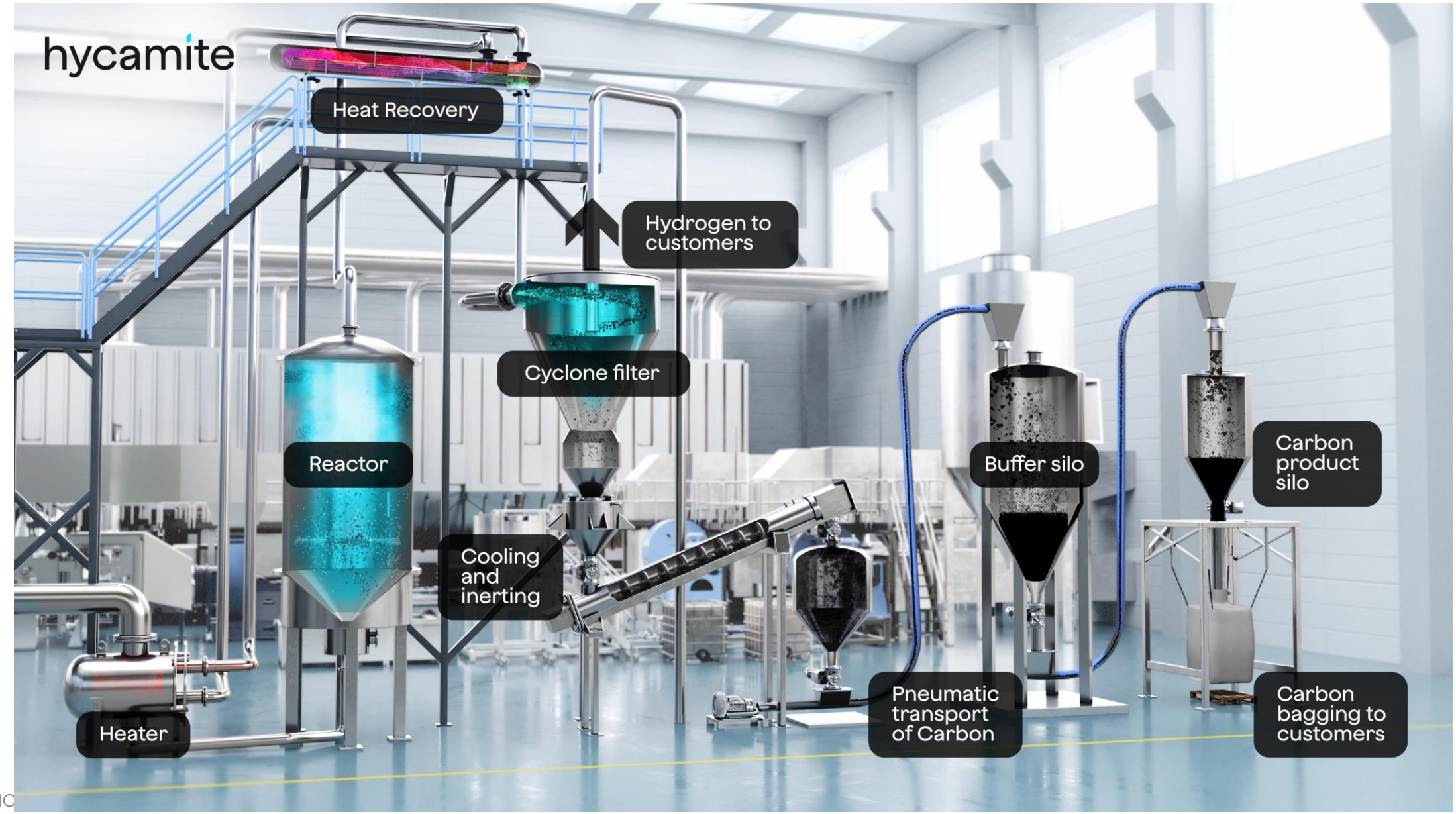
Methane splitting is one of the most promising technologies for producing low-carbon hydrogen

Disruptive technology

- Hycamite's proprietary technology: A thermo-catalytic process for splitting methane
- Splitting methane into low-carbon hydrogen and solid carbon
- 5 different catalyst families that significantly improve energy efficiency and increase the quality of the carbon
- No carbon dioxide emissions from the process



Hycamite's process flow



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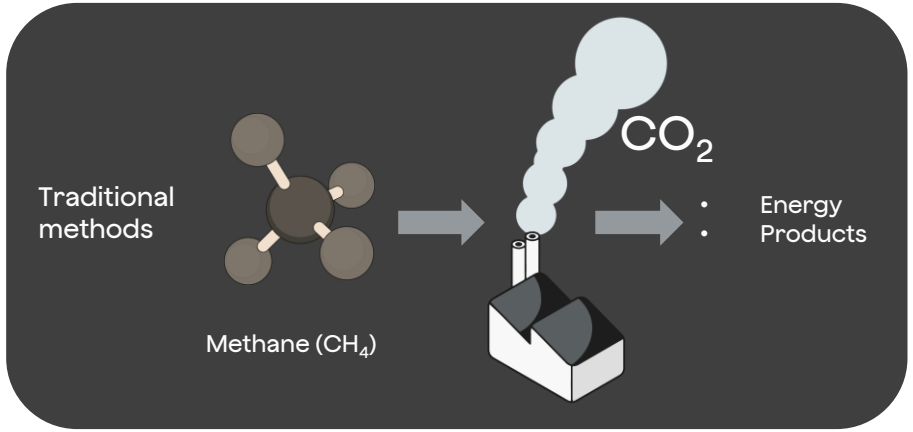
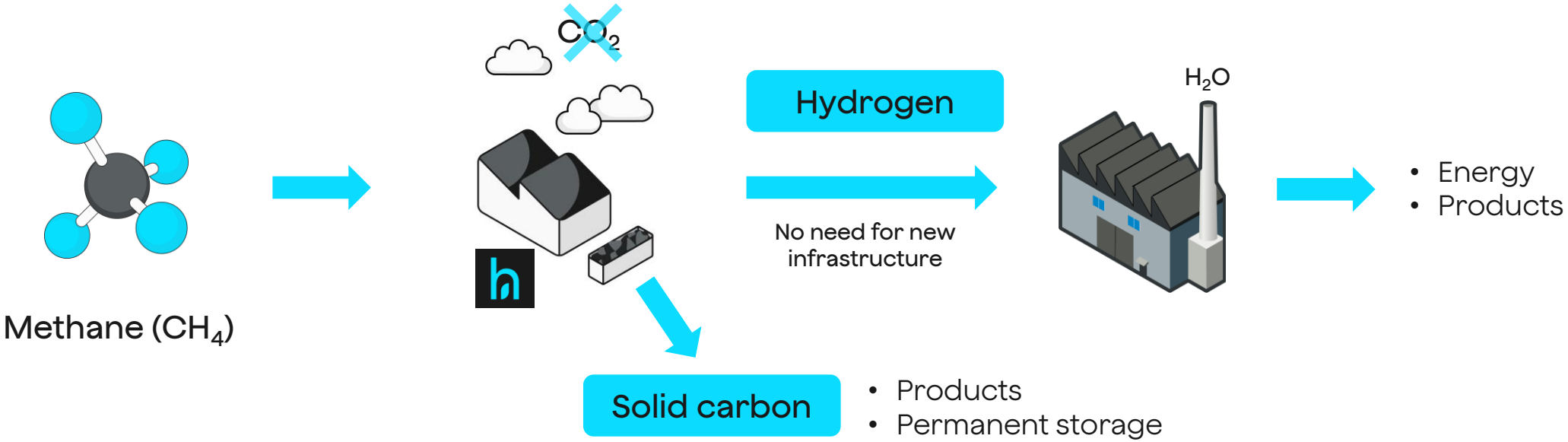
Our solution

Rapid and scalable decarbonization of industry

- Plug-and-play solution to decarbonize industries that use natural gas
- Utilizes existing infrastructure and can benefit from the waste heat of the customer





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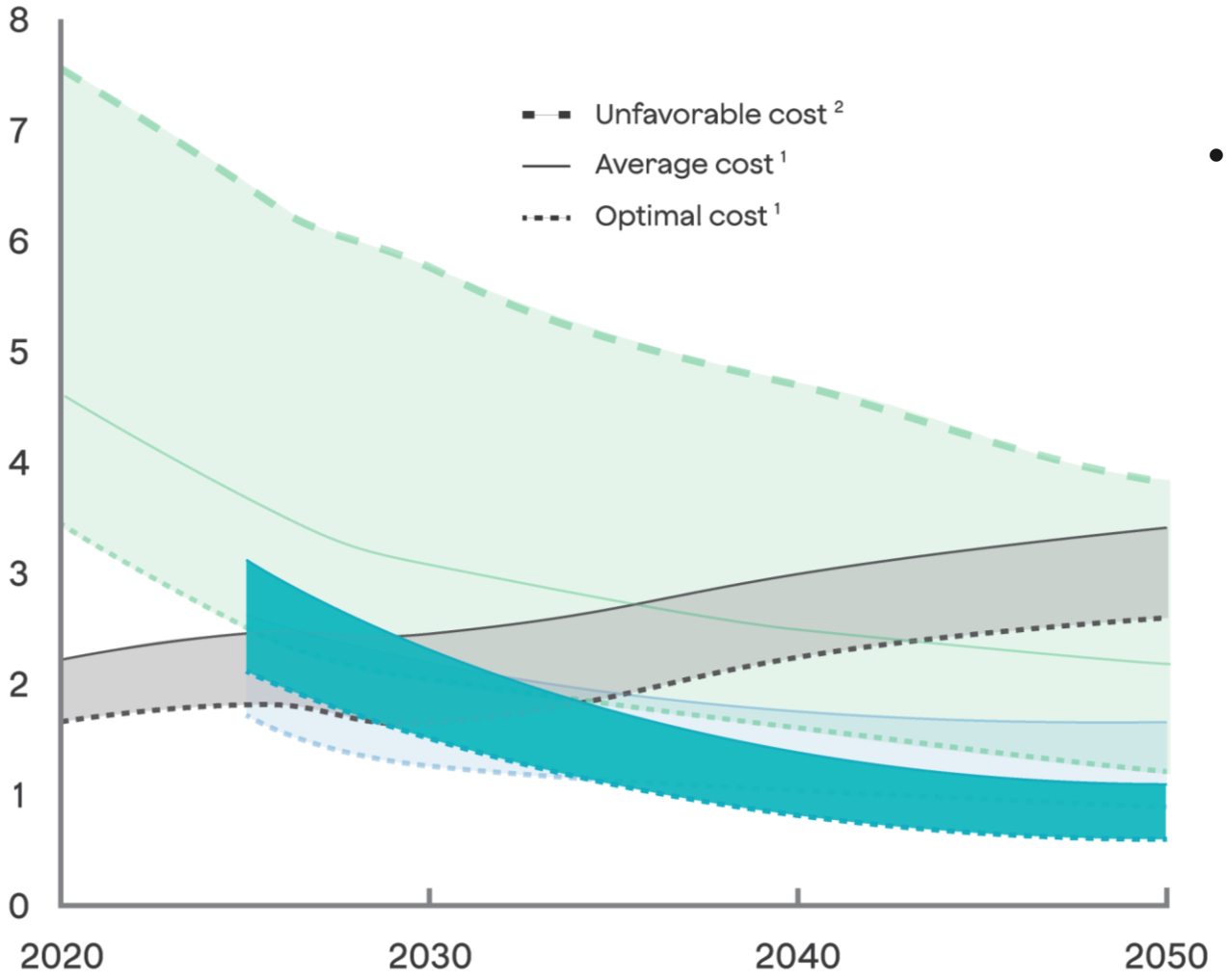
Benefit 1: Price

Competitive pricing due to two revenue streams, hydrogen and solid carbon



- No need for the end customer to pay a premium on low-carbon hydrogen

Gray hydrogen (SMR)

Green hydrogen (Electrolysis)

Blue hydrogen (SMR + CCS)

Hycamite hydrogen (TCD)

Sources:
[1] **McKinsey** Hydrogen & Derivatives Flows Model, October 2022
https://hydrogencouncil.com/wp-content/uploads/2022/10/Global-Hydrogen-Flows.pdf
[2] **World Energy Council**, Hydrogen demand and cost dynamics, December 2021
https://www.pwccn.com/en/industries/energy-utilities-and-mining/publications/hydrogen-demand-cost-dynamics-dec2021.html

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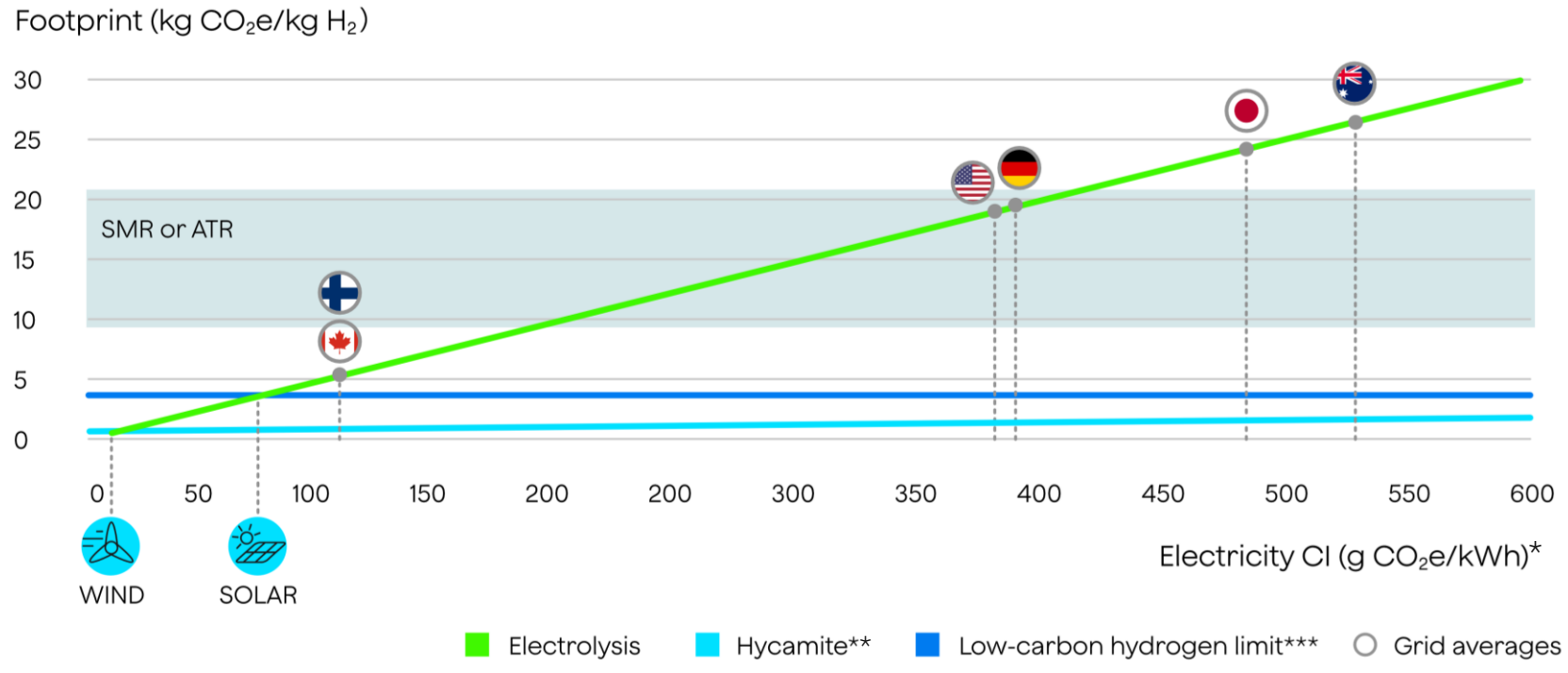
Benefit 2: Life cycle emissions

Ultra low-carbon hydrogen due to no carbon dioxide emissions from the process



* ourworldindata.org/grapher/carbon-intensity-electricity
** Hycamite's emissions are based on the EU LNG mix (upstream) and the shown electricity CI
*** EU renewable H_2 and Japan: 3.4 kg CO_2e/kg H_2, U.S.A. and Canada: 4 kg CO_2e/kg H_2

ATR: autothermal reforming
SMR: steam methane reforming

- In comparison, our hydrogen typically has the smallest carbon footprint – even with natural gas as feedstock
- Competing technologies require more power – this leads to a growing carbon dioxide footprint

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Benefit 3: Products

Balanced carbon product portfolio

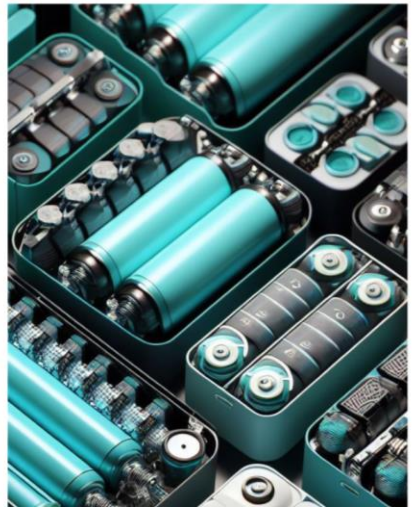
Batteries

Concrete

Steel

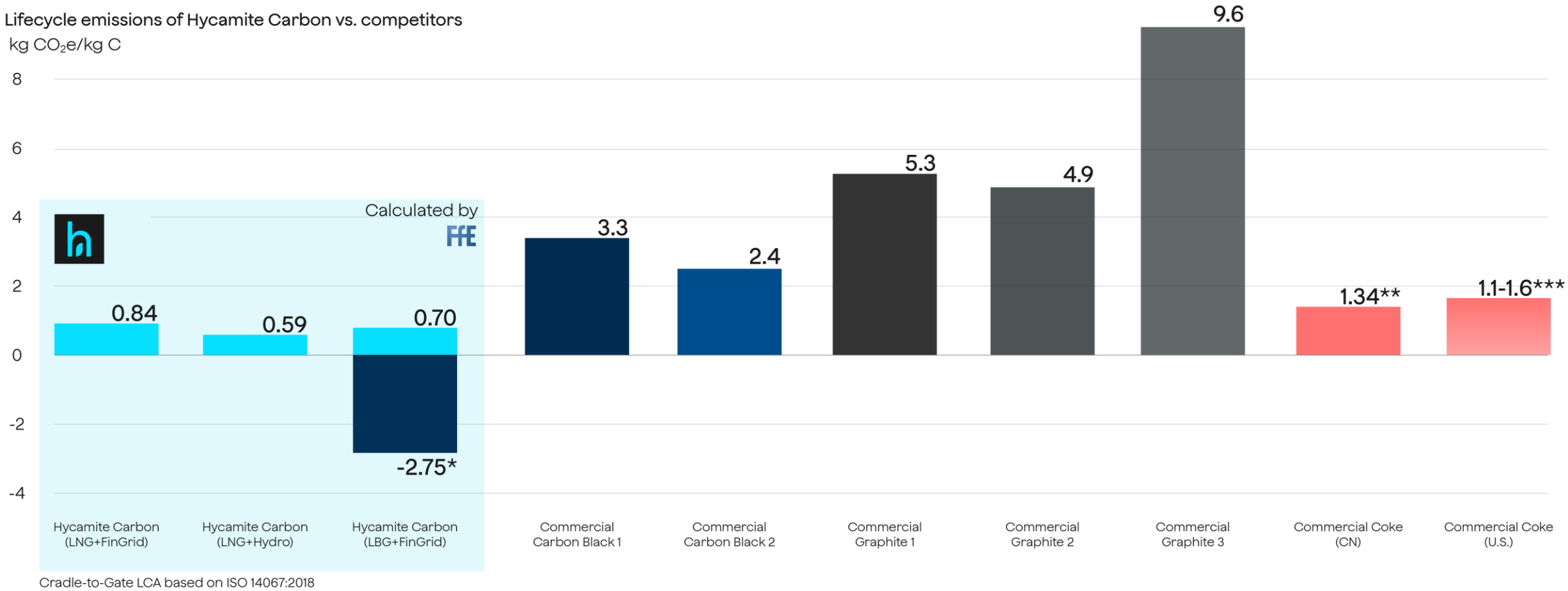
Polymers

Supercapacitors



- Customized carbon products and production volumes according to the client's needs
- A wide range of carbon products for various applications, such as the battery industry, concrete and cement industry, steel industry, tire industry or conductive polymers
- Hycamite is the only company able to produce large volumes of battery-grade graphite from methane splitting on an industrial scale

Hycamite's carbon has low CO_2 footprint[1]



Cradle-to-Gate LCA based on ISO 14067:2018

LNG: liquefied natural gas **LBG:** liquefied biogas

* Only if the solid carbon is permanently stored

** Source: Ecoinvent v3

*** Source: https://www.blaschakanthracite.com/wp-content/uploads/Carbon-Footprint-Archival-Report-v-4-September-20151.pdf

[1] compared to other commercial carbon products included in the studies referred to above

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Status quo
Entering industrial scale

- 3 years of pilot plant operations
- We are now commissioning our first industrial scale plant, the Customer Sample Facility (CSF)
- CSF is the largest methane-splitting plant in Europe
- Technology proof-of-concept on an industrial scale
- Production of large-volume carbon samples to clients

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Thank you!

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This isn’t magic – It is science