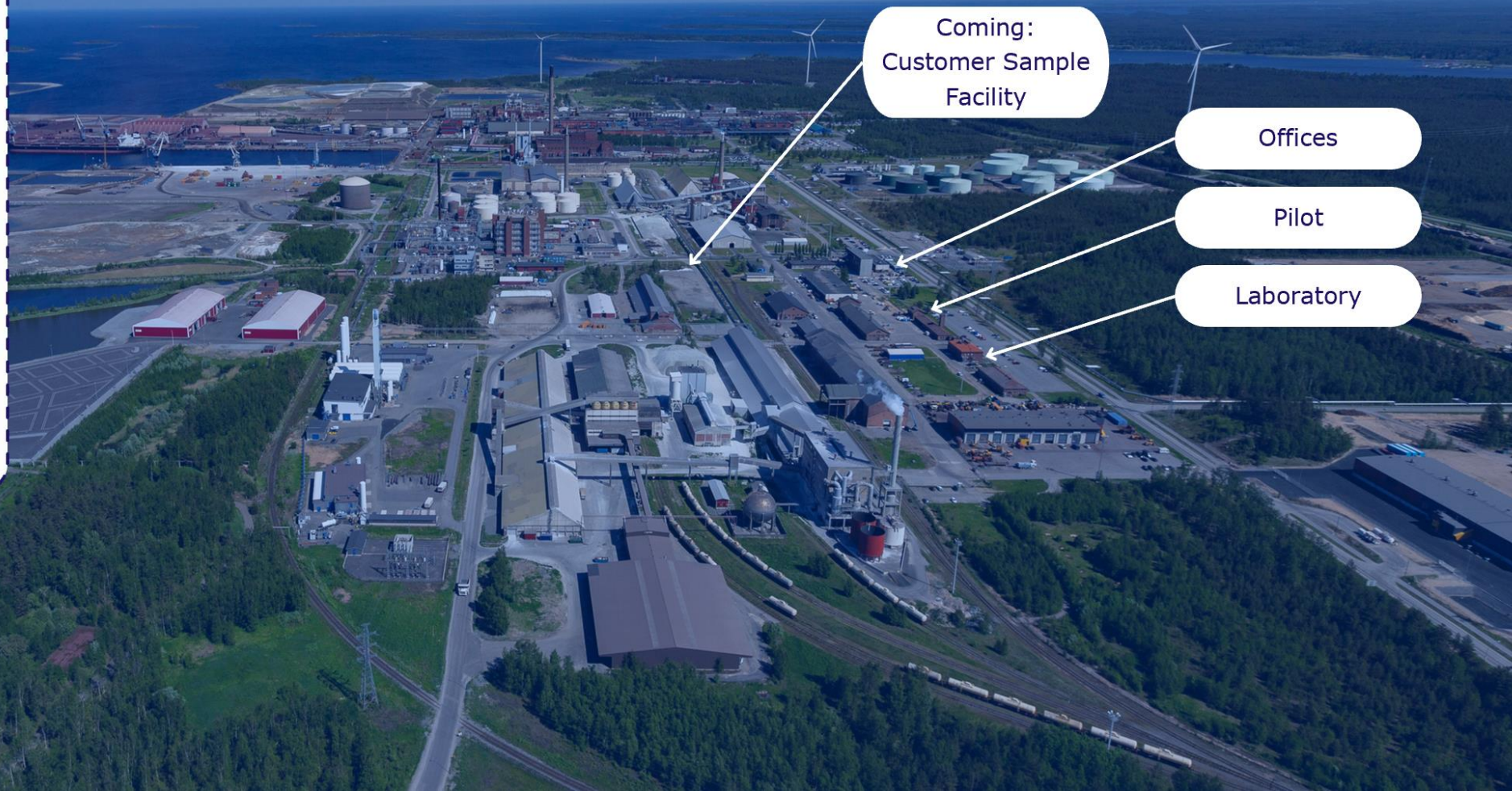




240214 Northern Power Oulu

# HYCAMITE - WE DECARBONIZE INDUSTRY

- Industrial-scale low-carbon hydrogen production
- Solid, high-value carbon products
- Technology based on over 20 years of research at the University of Oulu
- More than 50 hycamates
- International, strategic investors
- Global coverage of strategic partners
- Industrial-scale demonstration plant capacity 2 ktn hydrogen per annum



Coming:  
Customer Sample  
Facility

Offices

Pilot

Laboratory

# METHANE SPLITTING (THERMOCATALYTIC METHANE DECOMPOSITION)

## Hydrogen and solid carbon

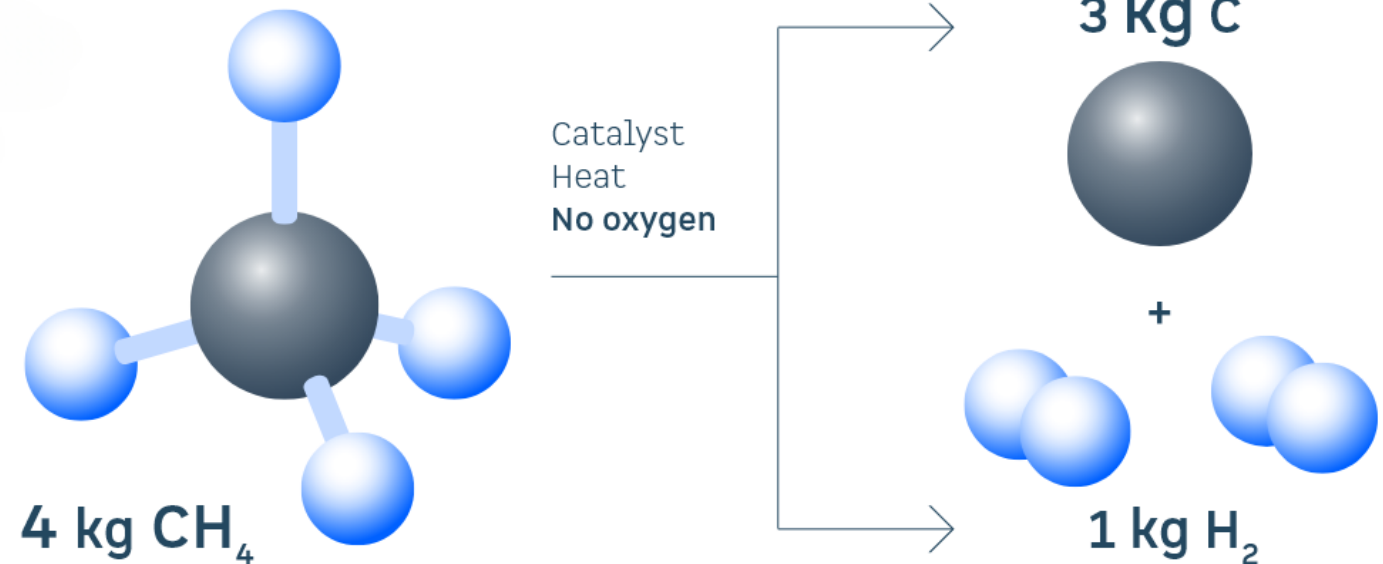
- Methane from natural gas or biogas
- No CO<sub>2</sub> emissions from the process

## Total life cycle emissions

- less than 1 kgCO<sub>2</sub>e/kg
- Negative if biogas is used as feedstock

## Applications for solid carbon

- The carbon can be further processed into synthesized graphite
- Steel industry; as an additive and in slag formation
- Replace part of the cement
- Electroconductive applications: batteries, supercapacitors, polymers
- Soil improvement material





Heat Recovery

H<sub>2</sub> to customers

Cyclone filter

Reactor

Cooling and inerting

Buffer silo

Carbon product silo

Heater

Pneumatic transport of C

Bagging

Carbon to customers

# KEY BENEFITS OF THE TECHNOLOGY



## Benefits

- The high-value carbon product serves as a secondary revenue stream
- The plants can be built next to the hydrogen customer
  - No need for additional infrastructure (H<sub>2</sub> , CO<sub>2</sub> , power)
  - Enables the use of waste heat from the customer
  - Easier permitting process
- Scalability
  - Even up to 100's of kton hydrogen per annum
- Energy efficient process
  - Only 1/8th of the energy the electrolyzers need to produce the same amount of hydrogen
  - Approximately half of the energy needed as heat
- Possibility to reach negative emissions via the use of bio-feedstock

# CUSTOMER SAMPLE FACILITY

**2 kt of H<sub>2</sub> &  
6kt of solid carbon**  
production capacity

**18 kt CO<sub>2</sub> p.a.**  
emission reductions  
(compared to SMR)

**2024**  
Operational

**Three different  
reactors for testing**  
2 industrial  
1 marine



Kokkola, Finland

## Partners

**SWECO** 

  
ENVINEER

  
CLIMATE  
FUND

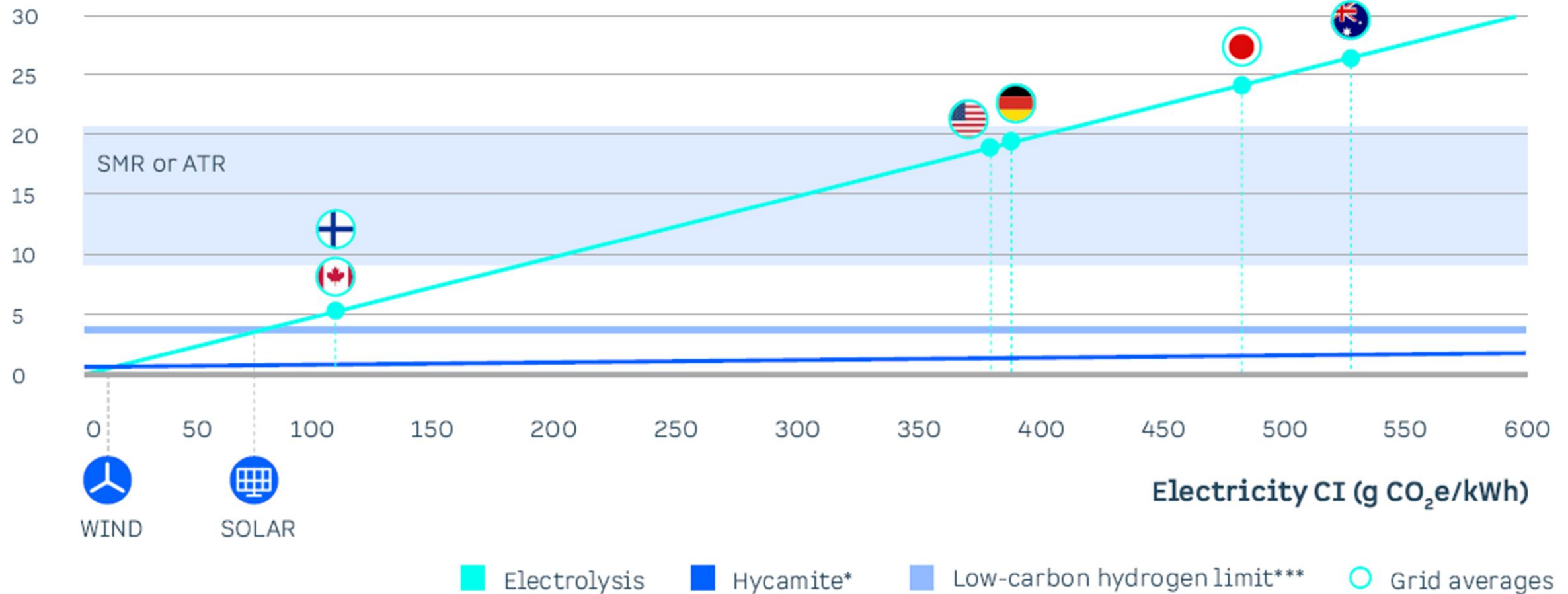
**ABB**

 **Hulteberg**  
CHEMISTRY & ENGINEERING

**BUSINESS  
FINLAND**


# EFFECT OF THE CARBON INTENSITY OF ELECTRICITY

Footprint (kg CO<sub>2</sub>e/kg H<sub>2</sub>)



\* ourworldindata.org/grapher/carbon-intensity-electricity

# Thank you!

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STRATEGY EXECUTION

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# Contact us



**Laura Rahikka**

CEO, Founder

[laura.rahikka@hycamite.com](mailto:laura.rahikka@hycamite.com)

+358 40 7236101



**Natascha Skog**

VP Hydrogen

[natascha.skog@hycamite.com](mailto:natascha.skog@hycamite.com)

+358 50 5595575



The logo features a stylized 'H' icon on the left, composed of three overlapping rectangular blocks in shades of cyan and blue. To the right of the icon, the word 'hycamite' is written in a white, lowercase, sans-serif font.

**hycamite**