

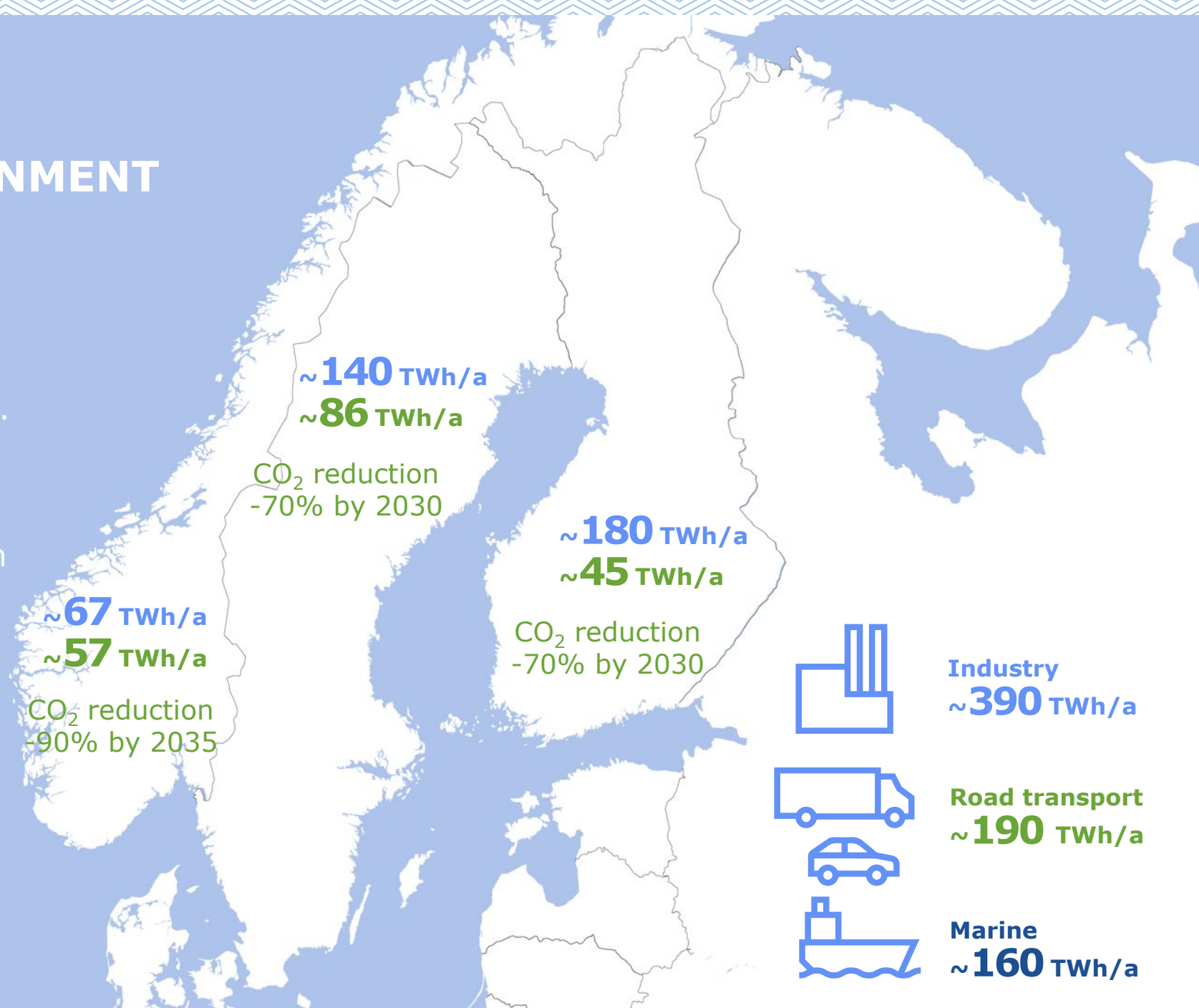


Gasdagarna 2021
Morgondagens biogasprojekt genom nya samarbeten

Erik Woode
Director Biogas Project Development & Execution

OPERATING ENVIRONMENT IN THE NORDIC GAS ECOSYSTEM

- Fast actions are required to achieve environmental targets.
- Demand for low emission solutions is a new standard.
- Some incentives are already in place, right mechanism enables transition.
- Huge market potential with total energy consumption 750 TWh/a
 - Biogas serve as enabler for growth in gas usage



GASUM — A NORDIC GAS SECTOR AND ENERGY MARKET EXPERT

We offer cleaner energy and services to help our customers to reduce their own carbon footprint as well as that of their customers.

Together with our partners, Gasum promotes development towards a carbon-neutral future on land and at sea.

Our services and solutions are used in maritime, road transport, industry and energy production.



REVENUE

€ 664 million

OPERATING PROFIT

€ 5,6 million

BALANCE SHEET TOTAL

€ 1 362 million

PERSONNEL

384

ENERGY PRODUCTS

Biogas, LBG, Natural gas, LNG, Power

SERVICES

Energy Market Services and Portfolio Management Services, Circular Economy Solutions



Maritime



Road transport



Circular economy



Industry and
energy production



Energy market services

WE ARE DEVELOPING THE NORDIC
GAS ECOSYSTEM AND PROMOTING
THE SUSTAINABLE DEVELOPMENT



7 LNG-terminals



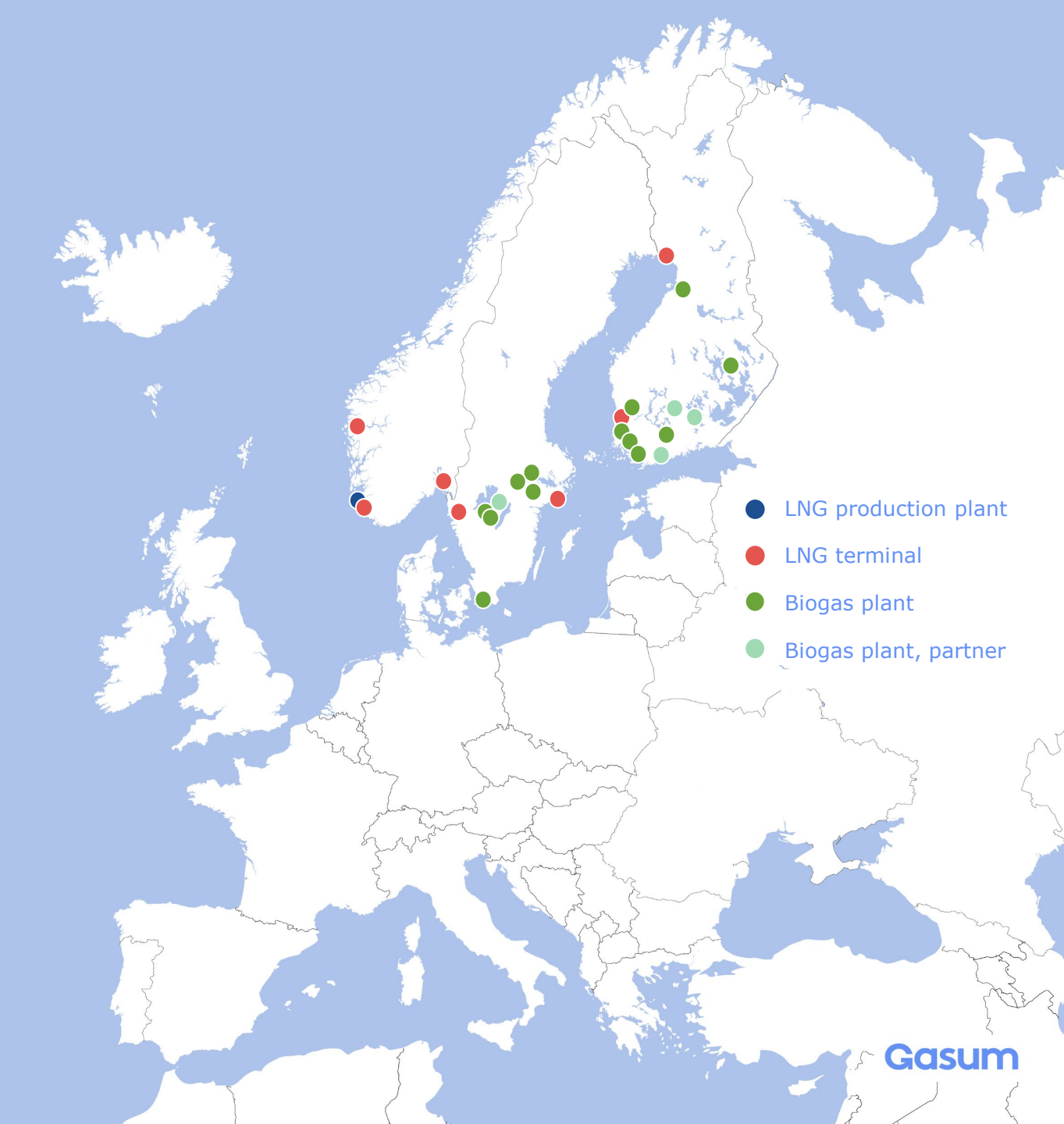
5 Bunkering vessels




19 Biogas plants



Over 90 gas filling stations





**We have an ambitious
mission to deliver 4 TWh
of biogas in the Nordics
by 2024.**

NYMÖLLA LBG PLANT

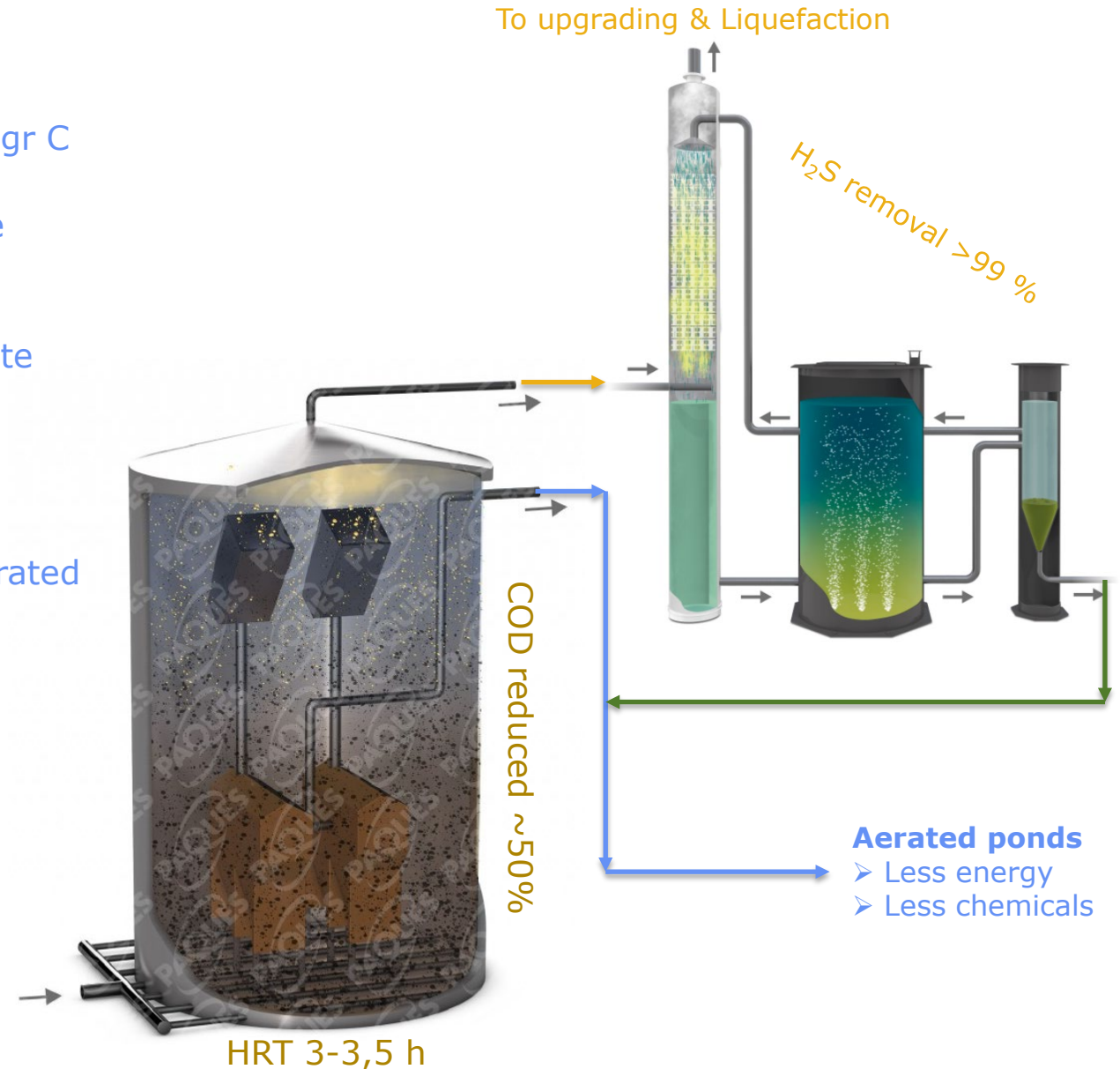
- Basic data
 - Discussions initiated with Stora Enso in 2016
 - Co-operation agreement signed 09-2018
- Wastewater volume $\sim 50\,000\text{ m}^3/\text{day}$
- COD-load 120–130 tons COD/day
- COD-reduction $\sim 55\text{--}60\%$
- Paques High Rate UASB-reactors
- Air Liquide upgrading and liquefaction
- Biomethane $\sim 220\text{ MWh}/\text{day} \approx 78\text{ GWh p.a.}$
- LBG $\sim 15\text{ tons}/\text{day} \approx 5\,650\text{ tons p.a.}$
- Original project completion planned for October 15th, 2020
- New project plan, *due to COVID-19*
 - Wastewater into process March - first biogas for upgrading late April
 - First LBG and commercial start-up June
 - **Full production early July**



The high rate process...

1. Waste water > buffer tank, 50.000 m³/d @ 38 degr C
2. Chemicals > buffertank, to optimize water for the biological process.
3. Biogas produced from waste water in two high-rate reactors.
4. Waste water returns to Stora Enso
5. H₂S reduced from biogas in a biologically regenerated caustic scrubber.

Unit	Pcs.	Capacity (m3)
Buffer tank	1	5000
ICX reactors	2	3500
Biomass buffer	1	800
Biogas buffer	1	550
Chemical tanks	5	1*75, 1*50, 3*10



GASUM – STORA ENSO NYMÖLLA INDUSTRIELL SYMBIOS

Nära samarbete med närliggande verksamhet kring råvara och infrastruktur

Gasum arrenderar mark av Stora Enso

Flytande biogas (LBG) levereras till transportsektorn

Behandlat vattenflöde tillbaka till Stora Ensos externrening

Investeringsstöd från Klimatklivet



BORLÄNGE

Manure & biowastes

120 GWh/a LBG to transport sector

Investment grant from the climate leap



NYMÖLLA

Pulp & Paper wastewater, cooperation partner Stora Enso

75 GWh/a LBG to transport sector

Investment grant from the climate leap



GÖTENE

Manure & agro wastes

120 GWh/a LBG to transport sector

Investment grant from the climate leap

SKÅNE

Manure & agro wastes

240 GWh/a LBG to transport sector

Investment grant from the climate leap

KALMAR LÄN

Manure & agro wastes

120 GWh/a to transport sector

Investment grant from climate leap



Official plans

685 GWh/a (>51 000 tons LBG)

Total investments >250 M€

Grants 87,5 M€

Gasum

JOIN THE CYCLE

Gasum



HOW CAN WE HELP YOU?

Erik Woode | +46 720 64 74 76
erik.woode@gasum.com