BotH₂nia – Route so far Matti Malkamäki

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Aurelia Turbines: We make small gas turbines for industrial applications





We provide a complete package for heat and generation (CHP)

We design, build and sell high-efficiency gas turbines

> Our turbines can utilise a variety of fuels from standard fuels to hydrogen

Our turbines have high levels of efficiency, at a market-leading 40%

> Our know-how can be expanded to new products, such as compressors for heat pumps and hydrogen

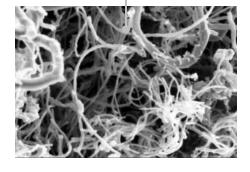
Our turbines target the SME customer, a large market that lack options CHP solutions

Hycamite TCD Technologies Oy – clean hydrogen and solid carbon

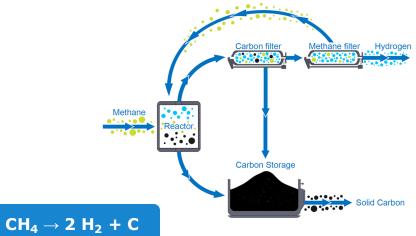
- Capturing carbon from methane in solid form:
 - Clean hydrogen
 - Solid, high-value carbon
- Deep-tech startup, intention to start building of the industrial scale demonstration facility











BotH₂nia

Hydrogen Bay of the North



Some European H₂ maps

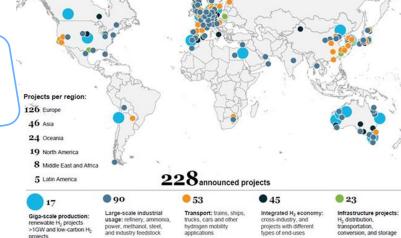




I Miles 🔰 in operation 🃁 planned 🗊 out of operation 🛛 © Copyright Ludwig-Bölkow-Systemtechnik







Targets of the initiative

1. To create a brand everyone in the area can refer to

2. To market this brand to European counterparties, and raise awareness of the area as hydrogen bay

3. To provide a platform for collaboration

4. To facilitate communication between projects in the area



BotH₂nia

BotH₂nia highlights the North in H₂-Europe

BotH₂nia is an open network for the cooperation of industrial investment and research projects around the Gulf of Bothnia and later even the whole Baltic Sea.

The aim is to ease financing possibilities for industry and enable cooperation on education, research, infrastructure, etc.

International approach – led by both Finnish & Swedish stakeholders



BotH₂nia

Current scope

- Swedish Hydrogen Development Center
- Regional hydrogen projects
- LKAB, SSAB, Vattenfall
- Invest in Norrbotten
- Municipalities
- Regional areas
- Vätgas Sverige
- Large companies
- Start-ups

- Finnish H₂ Cluster
- National H₂ network
- CLC P2X
- Fin H₂ Hub
- Regional hydrogen projects
- Municipalities
- Regional areas
- Large companies
- Start-ups

NORDIC HYDROGEN ROUTE

BOTHNIAN BAY

BotH₂nia Network

Åbo Akademi	ABO WIND	ALCEA	Aurolahti GROUP	AURELIA	Botnia H2Tec Services	OULU BusinessOutu	COMMUNICATION WORKS	Convion	🛞 Corporatum
Cursor	DIGIPCLIS			e Energiforsk	2 enersense	Estonian Association of Hydrogen Technologies	ຖ etha wind	FINGRID	F/exens Flexible energy solutions
@ fortum	GASGRID	Gen ₂ Energy	HANKEN	Hannes Snellman	HELEN	hycamite	🔊 Ilmatar	KANK-Uskentily of Applied Sciences	Kauhajoki
OSTROBOTHNIA CHAMBER OF COMMERCE	kiwa	Kokkola Karleby	KVARKENRÅDET MERENKURKUN NEUVOSTO	LAPIN AMK Lapland University of Applied Sciences	LAPPEENRANTA	Making our world more productive	LULEÅ UNIVERSITY OF TECHNOLOGY	LUT University	Magnus Associates
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Prizztech	ΡΥΗΆΙΟΚΙ		RAAHE	RECION	RI. SE of Sweden	SolarHydroGenesis	SIIKAJOKI	Skellefteå Kraft	SSAB
	stargate Hydrogen	Sumitomo	sweco 🕇	Tampereen yliopisto Tampere University	TURKU BUSINESS REGION	Taal4pro.com			VIAJARVEN VIATARVEN VIATARVEN
Vaasan yliopisto	VAISALA	VARAN AMMATTIKOREAKOULU UNIVERITY OF APPULD SCIENCES	VASEK		VTT	W3 ENERGY	WÄRTSILÄ	WASAGROUP	¥ WESTENERGY
ZZ ZELK	The BotH ₂ nia r	network aims to b	ouild a robust hyc	lrogen industry a	round the Gulf of	Bothnia and com	nbine our resourc	es to pursue this	common goal.

Finland – crossing boundaries to build hydrogen

BotH₂nia

- Fingrid has received ~ **180 GW of grid connection inquiries**!
 - Mostly onshore wind, also solar and offshore wind
 - No subsidies the market is working!
 - At least 300 TWh of new, clean and competitive electricity
 - On-shore wind costs ~ 20 € / MWh
 - Strong power grid north-south
- Large industrial hydrogen consumers in the area:
 - SSAB, Kemira, Kokkola Industrial Park...
- **Bio-based CO₂** is being generated in multiple bio-product plants
- Successful examples of **cross-border projects** and publicprivate cooperation



24 – 25 January 2023 – see you in Luleå!

Thank you!

Matti Malkamäki

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