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EXPRESS

Biomethane and wind power in North Karelia

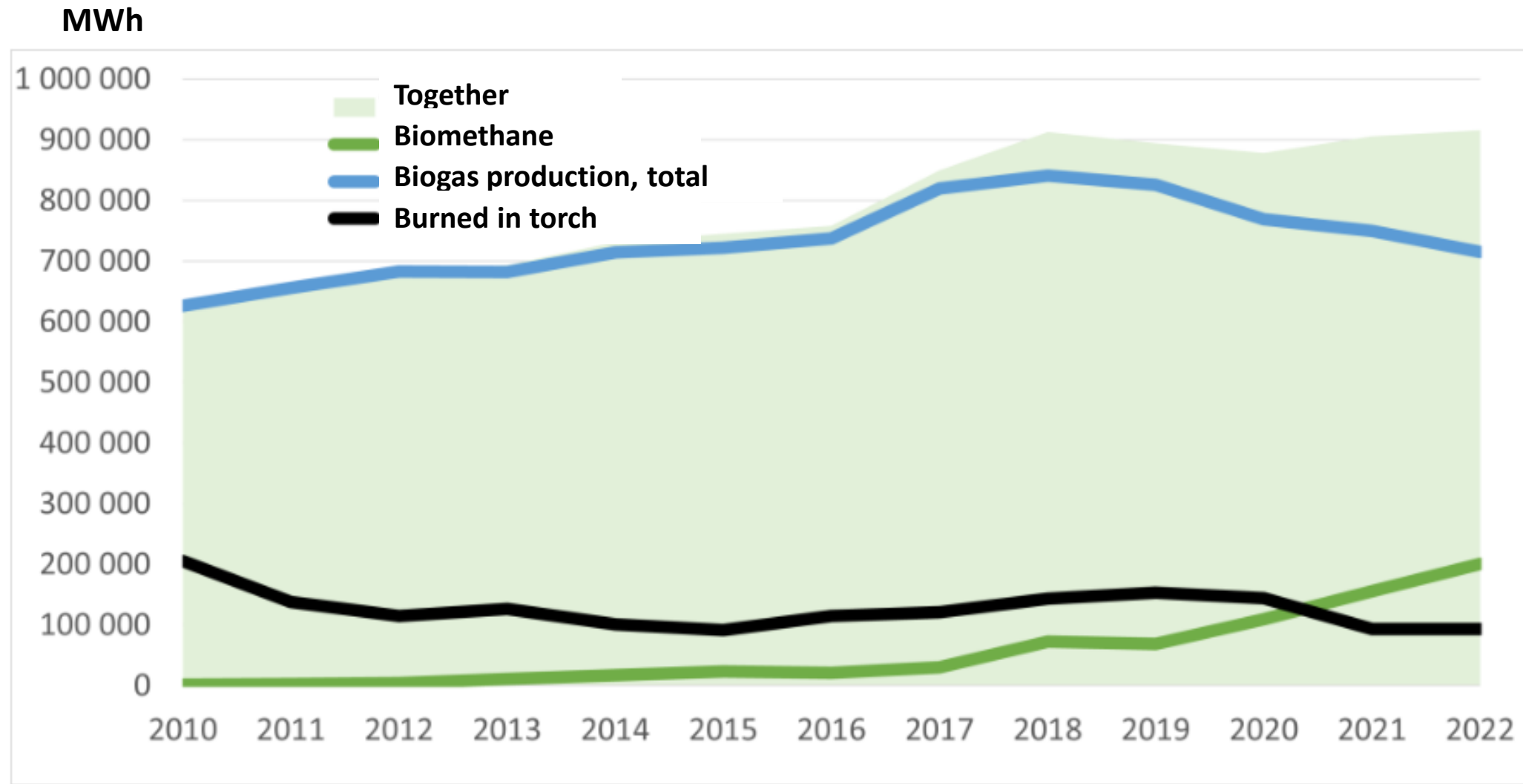
EXPRESS Thematic workshop, Kilkenny 22.11.2023

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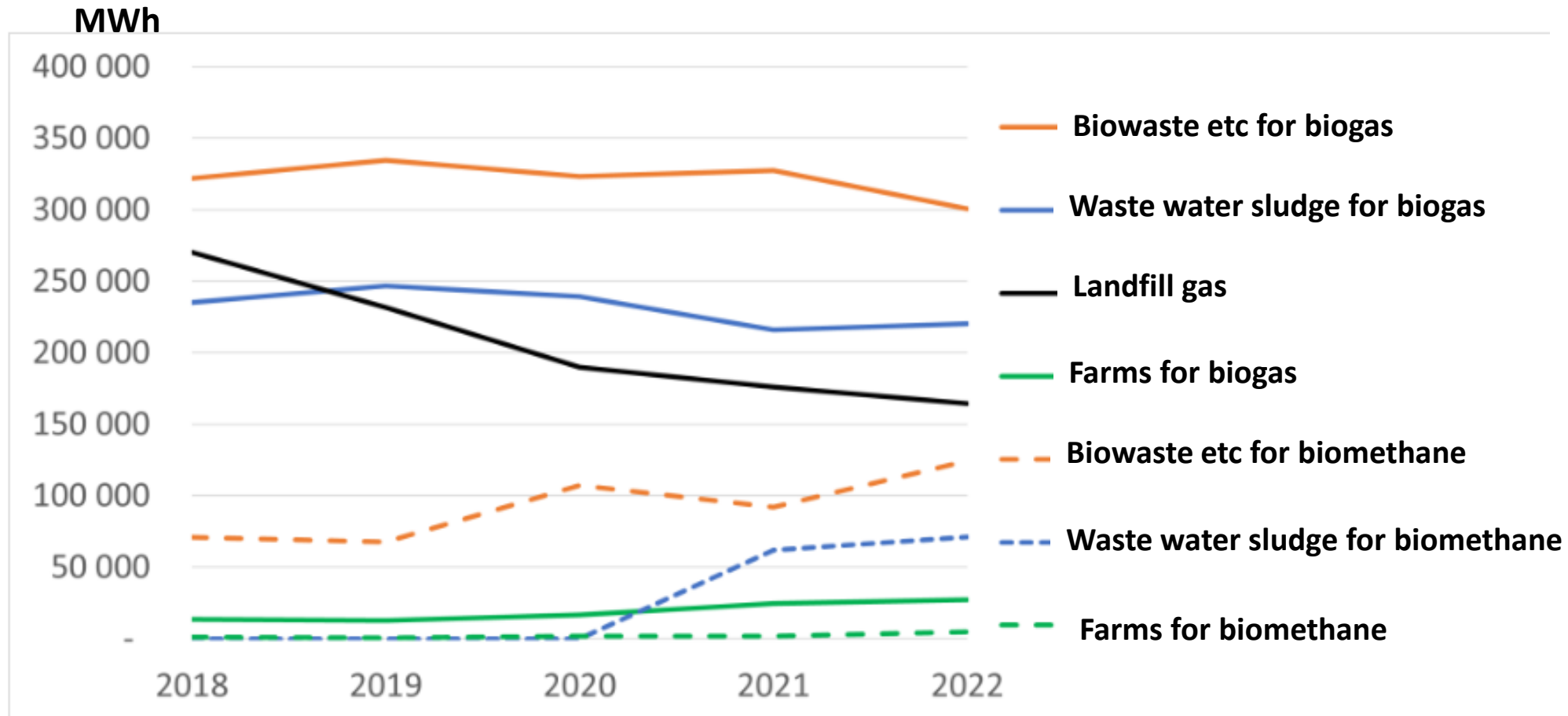
22.11.2023 | EXPRESS Thematic Workshop Kilkenny

Biogas and biomethane production in Finland



Kuva: biokaasun ja biometaanin tuotannon kehitys vuosina 2010-2022 (MWh). Vuoden 2022 tieto on ennakkotieto. Lähde: Tilastokeskus 2018-2022, vuodet 2010-2017 Itä-Suomen Yliopisto.

Trends: Landfill gas declining, biomethane production growing



Kuva: Biokaasun tuotanto eri laitostyypeissä vuonna (MWh). Vuoden 2022 tieto on ennakkotieto. Lähde: Tilastokeskus

Industry invests in biogas in North Karelia

1. Puhas Oy / Joensuu: Landfill gas collection

- Gas pipeline into neighboring Savon Voima CHP plant (for co-firing)

2. Joensuun Vesi Oy: waste water treatment plant

- CHP production for own energy use (Good Practise?)

3. BioKymppi Oy / Kitee (www.bio10.fi)

- In: Municipal and industrial biowaste, waste water sludges...
- Out: CHP production, CBG for traffic (fill-in stations with Wegas Oy), fertilizers

4. Farm Kähkönen / Valtimo

5. Puljonki Oy by NESTLE / Juuka (2023)

- In: side products from company's food industry process*
- Out: Substituting LNG in industrial steam production (9,500 MWh/y), fertilizers

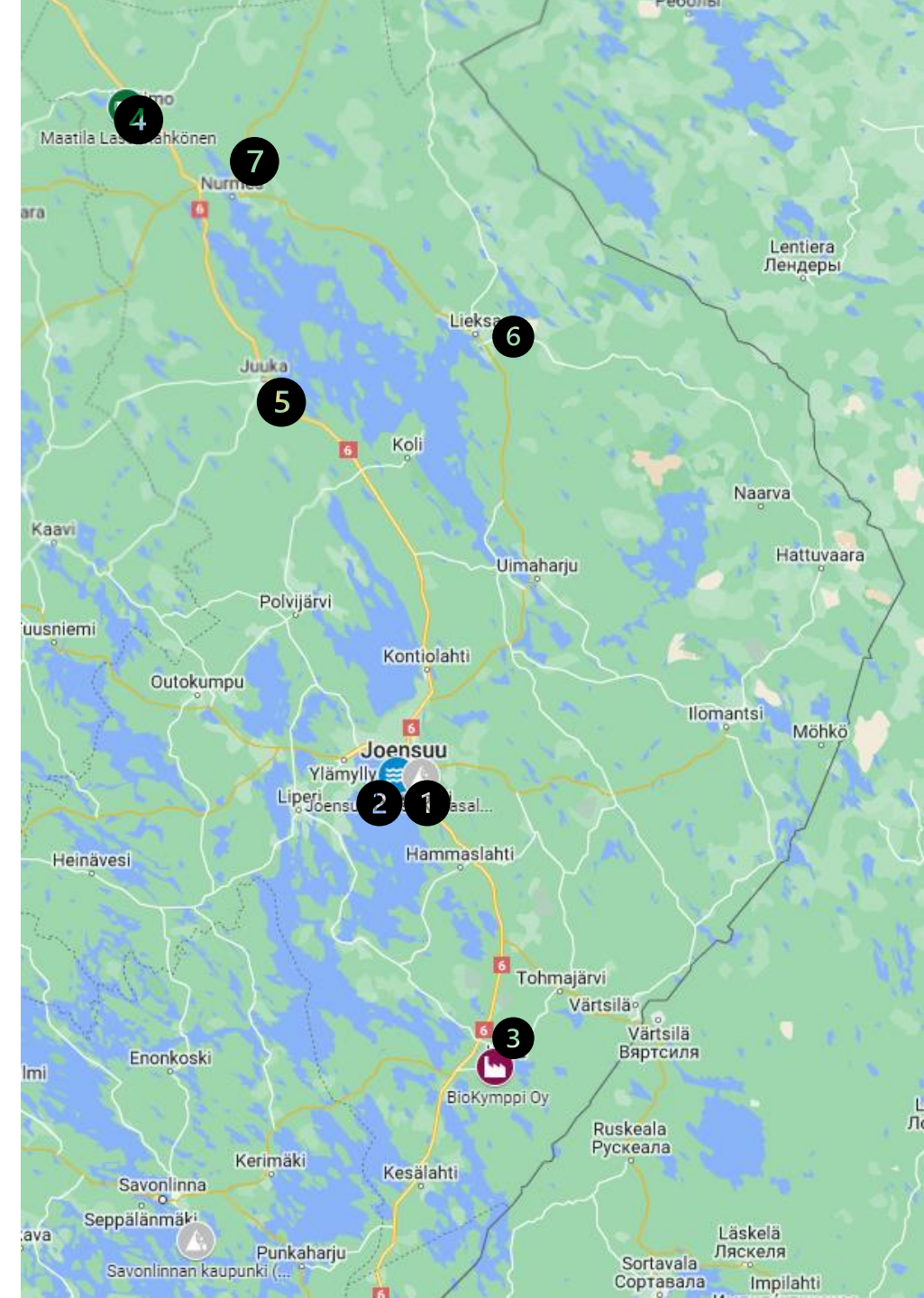
6. Pielisen Bio Oy / Lieksa (2024)

- In: Local food industry side products, agriculture biomasses, waste water sludges (8,000 MWh/y)
- Out: biogas for bakery substituting LNG, CBG for traffic fill-in station, heat

7. Suomen Lantakaasu Oy by Valio Oy & ST1 Oy / Nurmes (2025)

- In: Manure from farms into biogas
- Out: CBG → centralized liquefaction for traffic fuel (up to 150 GWh)

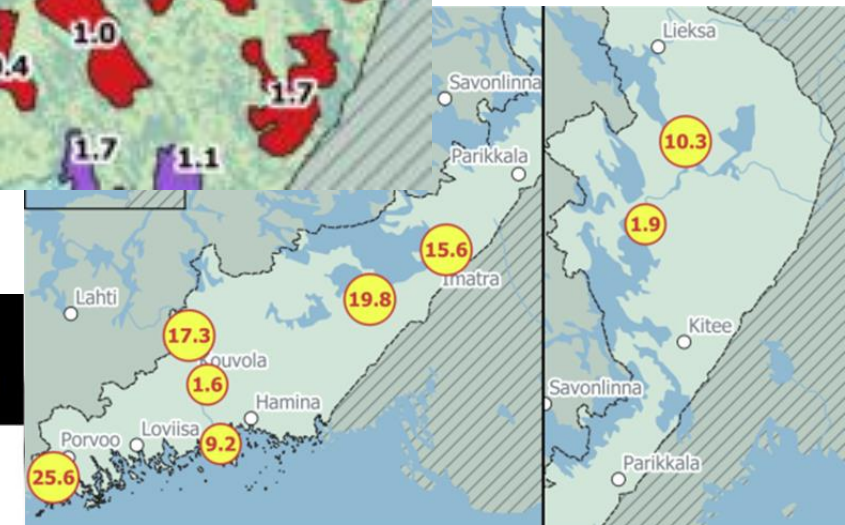
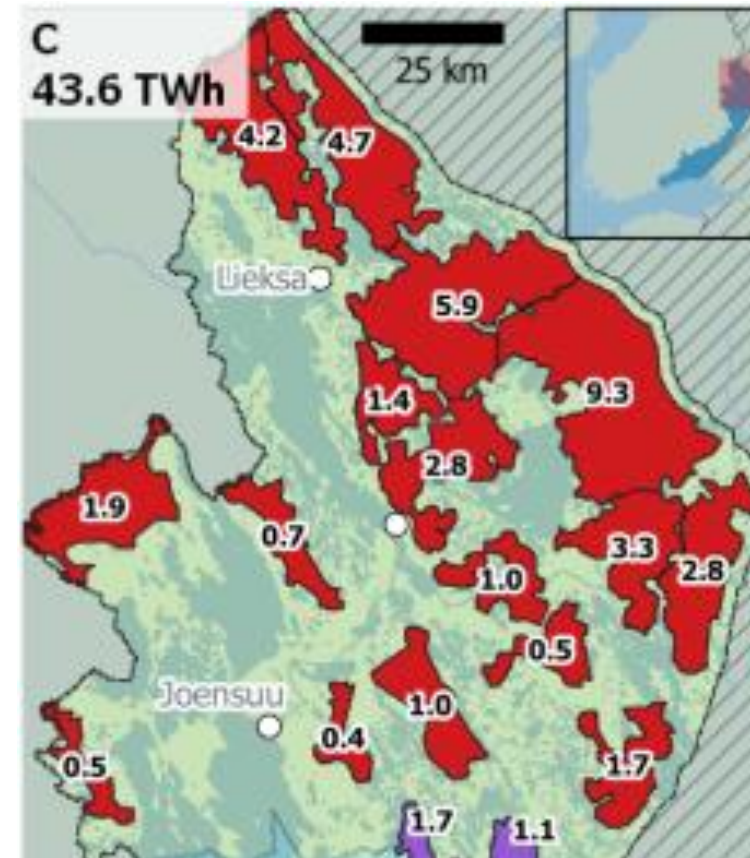
* Producing dressings from bones using Coctio Ltd. technology, www.coctio.com



Green electricity production &
hydrogen economy
make up the biggest potential
for Green Energy Transition
in North Karelia

Huge potential for renewable wind power & green hydrogen

- Theoretical wind power potential 43,6 TWh (about half of the current electricity consumption in Finland)
 - supplementing large solar power potential is 1,4 TWh
- Abundant availability of **clean water** and **biogenic CO₂** (forest & energy industries) for Power-2-X production
 - availability of forest biomass
- Reliable power grid covering the region



LUT Scientific and Expertise Publications
 Tutkimusraportit – Research Reports

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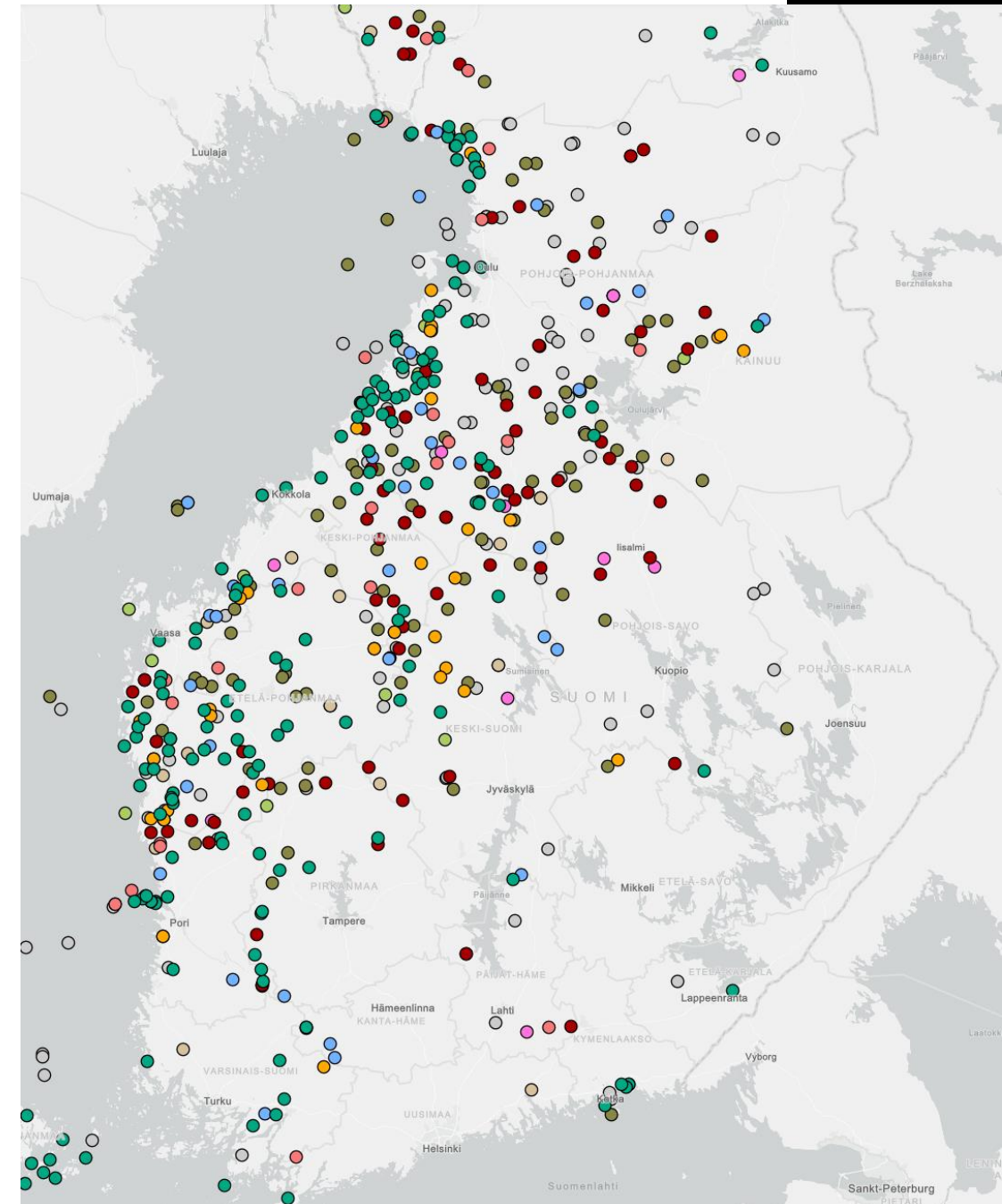
Hannu Karjunen, Päivi Sikiö, Jukka Lassila, Julius Vilppo,
 Otto Räisänen, Eero Inkeri, Tero Tynjälä, Petteri Laaksonen

South-East Finland Hydrogen Valley
 Project report

Indicative power-to-X electricity demand (TWh)
 100% CO₂ conversion to methanol
 Fossil+biogenic sources included (>100 kt/a units)

Reality:

- **Almost no wind park projects progressing in North Karelia / Eastern Finland**
 - Highway 5 as an investment border line
 - In North Karelia three wind park projects in early-phase permitting process (60 MW + 2 * 120 MW)
- **Military radar requirements block projects in practise**
 - Investor orders a costly sensor impact statement for the planned investment design from VTT
 - Results to Defence Forces
 - ← Permitting (Y/N)
- **In Finland:**
 - Wind power capacity 6,116 MW (06/2023)
 - 1,468 windmills
 - Public investment plans for:
 - 63,1 TWh on ground
 - 57,6 TWh off-shore
 - During 2023 about 2,000 MW of new capacity gets finished, but no new projects starting (construction)



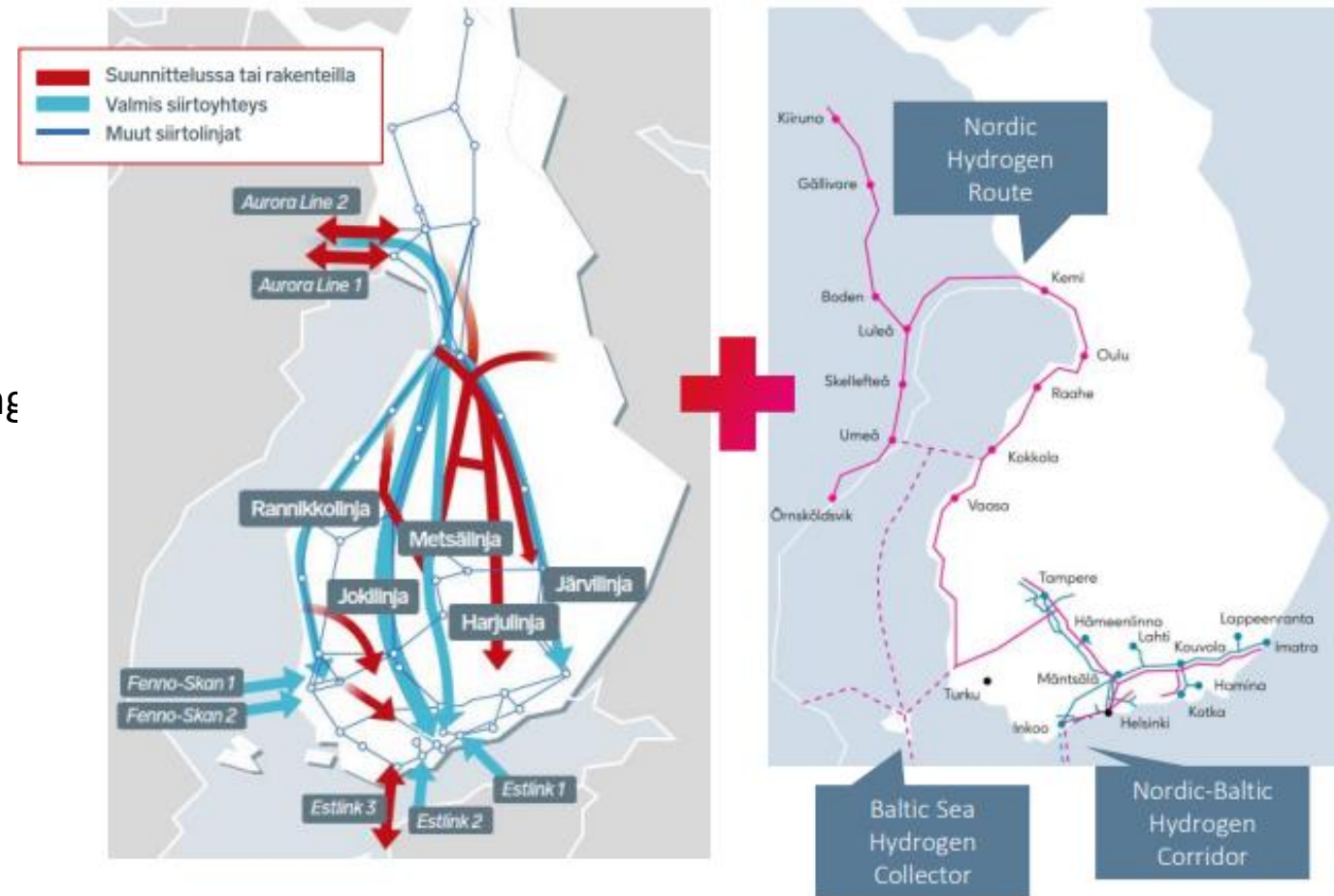
Side effects

Eastern Finland neglected in national infrastructure investment plans !

- National (power) grid
- Gasgrid (for H₂)

Main goals for EXPRESS

- Affecting national infrastructure plans and boosting search for new radar technology investments in cooperation with neighboring regions
- Home work:
 - Data on investment opportunities and potential bottle necks (grid etc)
 - Proactive land use planning & cooperation (Fingrid, military, State, neighbor regions)
 - Streamlining the permitting / planning process of investments
 - Increasing local awareness on hydrogen economy & green energy transition
 - Adapting Community wind concept for improving the local acceptance of wind power projects?



Thank you!

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