

Biofuels in heat and energy production - Green house sector

Secure Bio Supply – Seminar 27.1.2026

New Leaf - for green house production



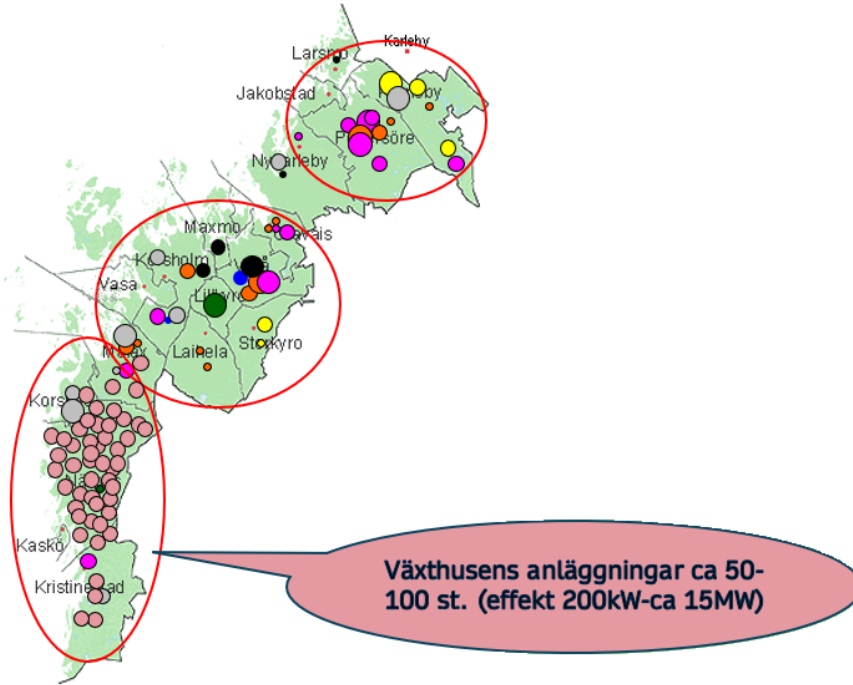
Responsible organisation:
University of applied Science Novia

Timeline:
May 2024 – June 2026



Medfinansierat av
Europeiska unionen

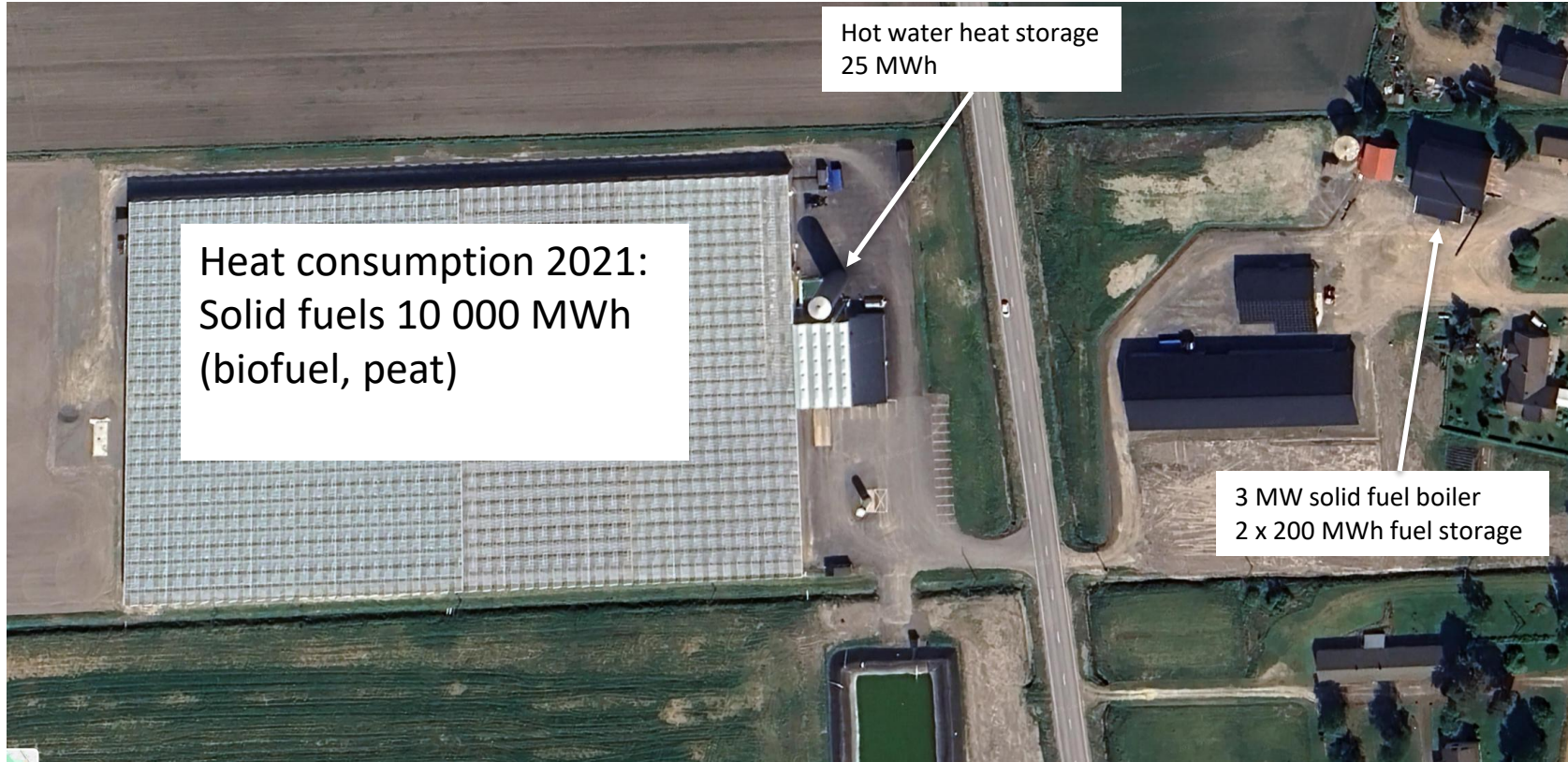
Greenhouse sector in Ostrobothnia



- 100 ha of greenhouses in southern part of Ostrobothnia
- Yearly production of 27 million kg tomatoes, 40 million kg of cucumbers, 60-70% of national production
- Energy need for heating of greenhouses (excluding electricity) about 400-500 GWh/year (y. 2021)
- Solid biofuels about 50% of this, corresponding to over 100 000 f-m³/year.
- Estimated total use of solid biofuel in same area is 150 000 f-m³/a

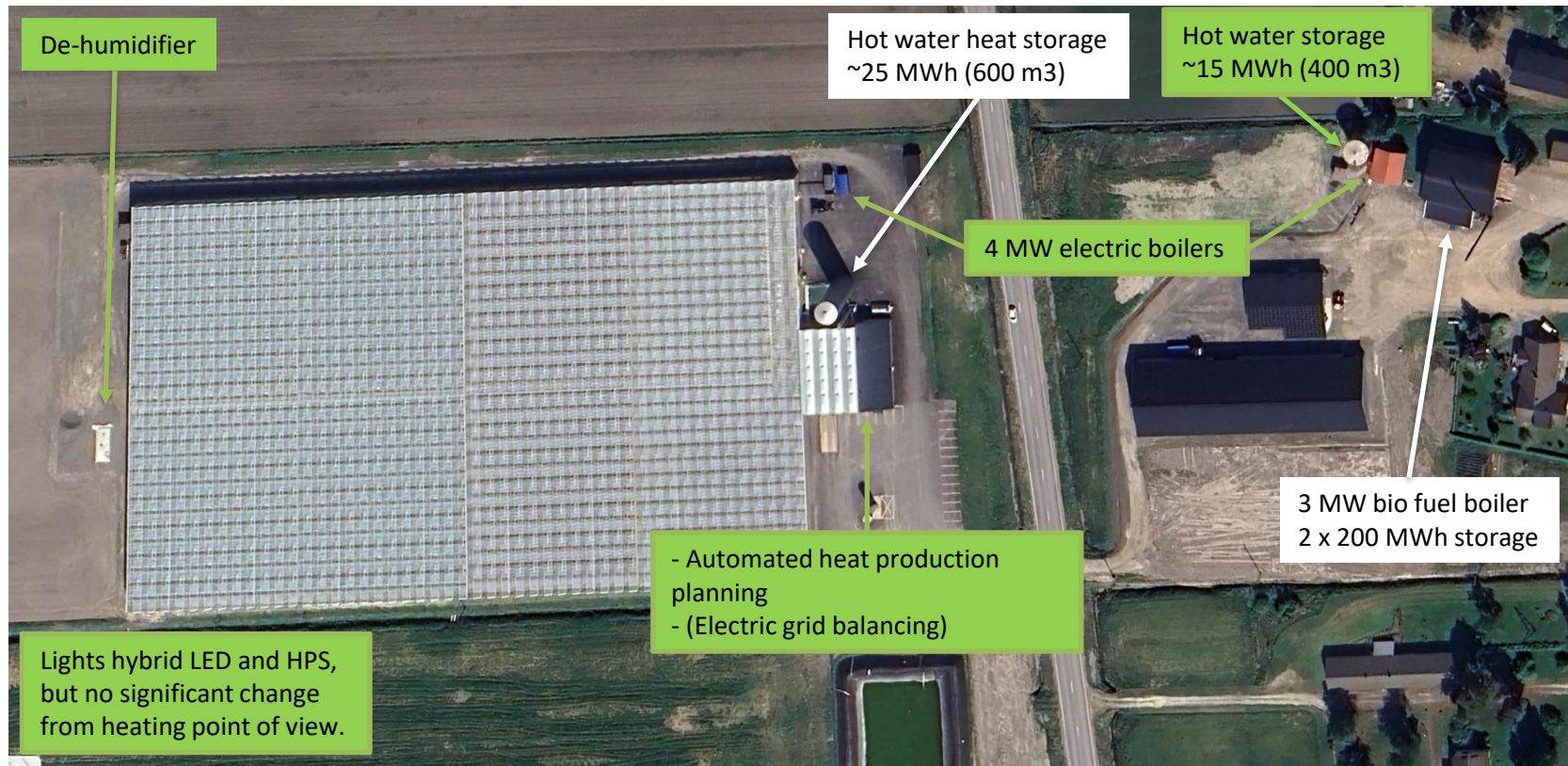
Greenhouse heat production, pre 2022 energy crisis

22 000 m2, tomato cultivation, artificial lights



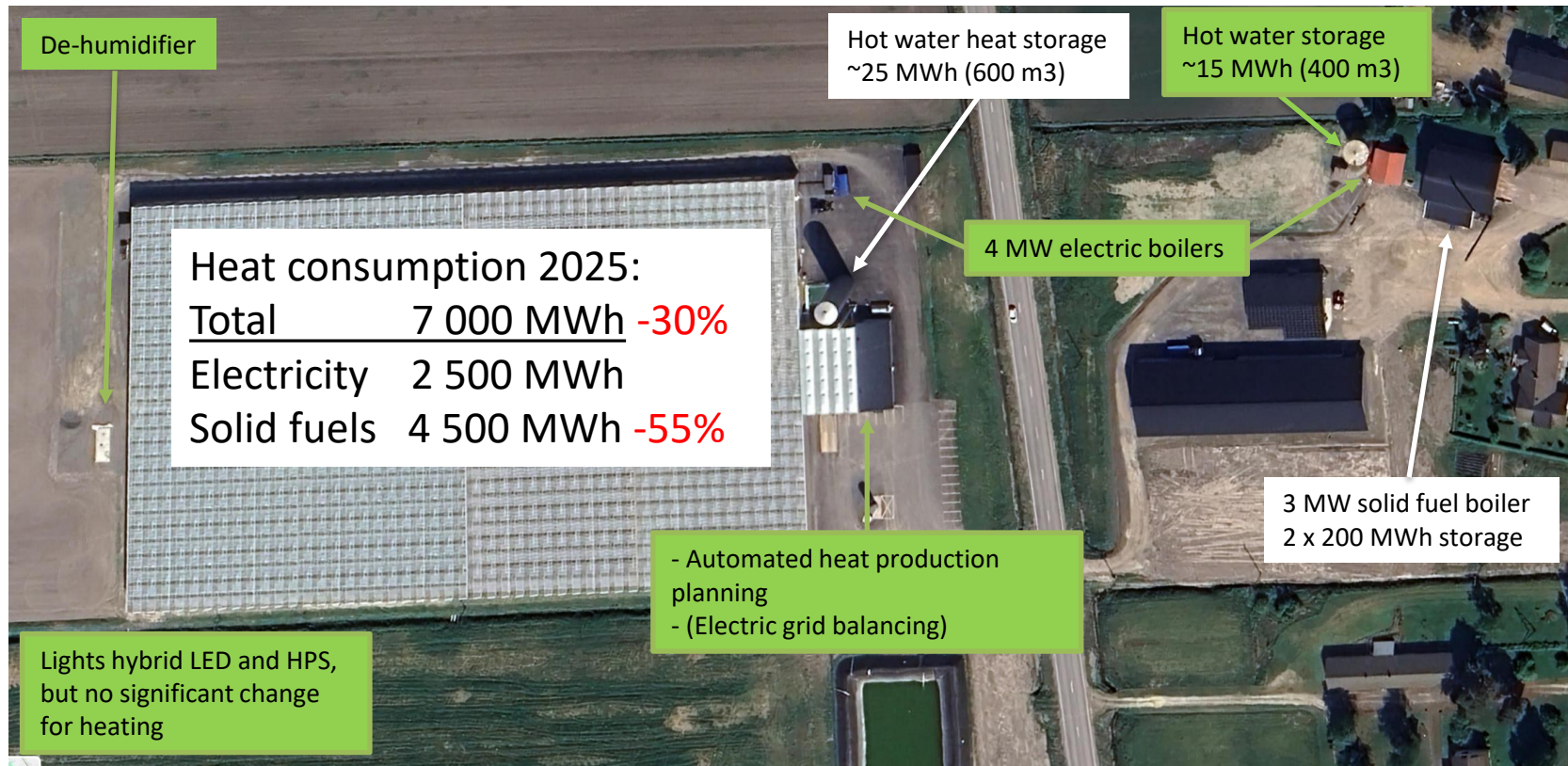
Greenhouse heat production, year 2025

22 000 m2, tomato cultivation, artificial lights



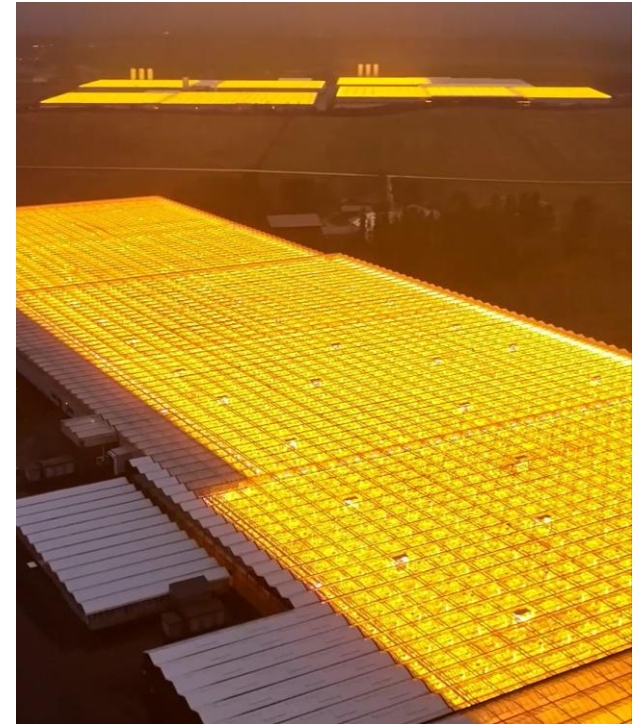
Greenhouse heat production, year 2025

22 000 m2, tomato cultivation, artificial lights



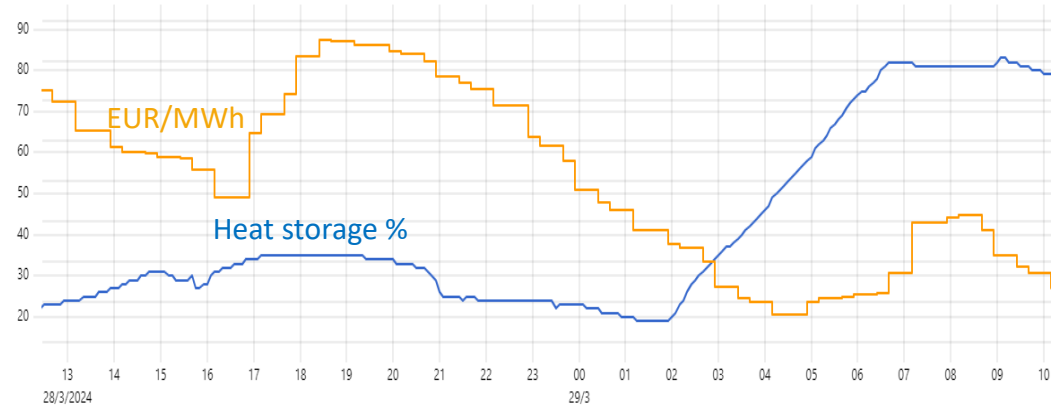
Impact on bio mass consumption

- Assuming reduced solid fuel usage of 2 500 MWh/ha and year for tall crop vegetable production (tomato, cucumber, sweet pepper) with supplemental lighting
- Southern Ostrobothnia:
 - Area of such cultivation: 50 ha
 - Energy reduction, 125 GWh/a
 - (biofuels 50% of this)
 - Reduced biofuel usage of over 30 000 f-m³/year
- Reduction in bio mass consumption -20%, significant on local scale in south parts of Ostrobothnia!



Impact on when bio mass is used

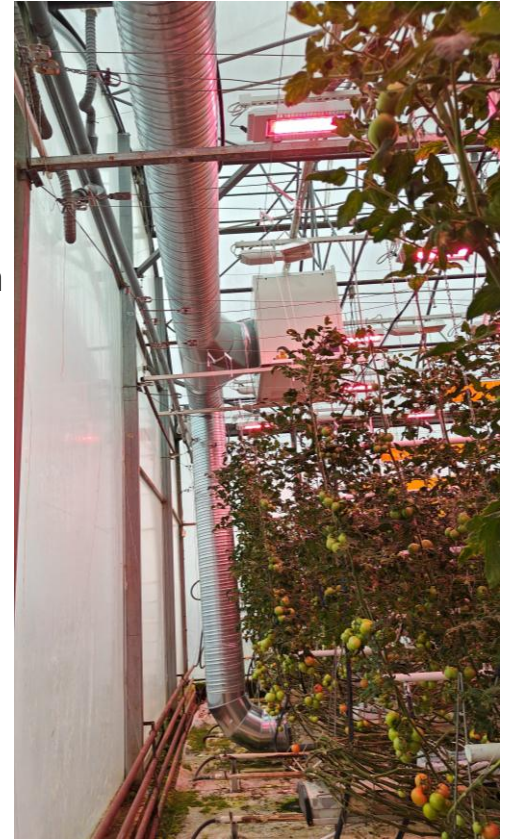
- Electric heaters are used when spot price is low, i.e. cheaper than other heat.
- A heat storage necessary to maximize use of electricity.
- Heat storage is optimized based >24h predictions of weather impacting both spot price and heat consumption
- A few hours of low spot prices enough to cover much of heat needed for a day.
- Bio fuel used primarily when spot prices are constantly high during for a long period



Picture: Nordic Energy Consulting

Conclusions and outlooks

- Significant reduction in use of bio mass for heating of green houses due to electric heaters and energy saving.
- Reduction can be even further due to heat pumps and small scale data centers!
- However higher electricity prices and especially fewer cheap hours can increase need for biomass, but not to levels prior to 2022.
- Bio fuel remains as important heat source, but usage is more concentrated to periods of consecutive days without cheap electricity → challenge for bio fuel producers due to uneven consumption!
- Need for co-operation between producers and consumer to develop model that ensures supply volumes and availability!
- Bio fuel consumption can be increased by new use, such as CO₂ source for cultivation or combined bio char and heat production.



Feel free to contact us

Peter Wiik

050 431 0866

peter.wiik@novia.fi

Webinars, articles etc

www.vakra.fi/nytt-blad

YRKESHÖGSKOLAN
NOVIA



Picture: Trädgårdsnytt

Thank you!

