

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



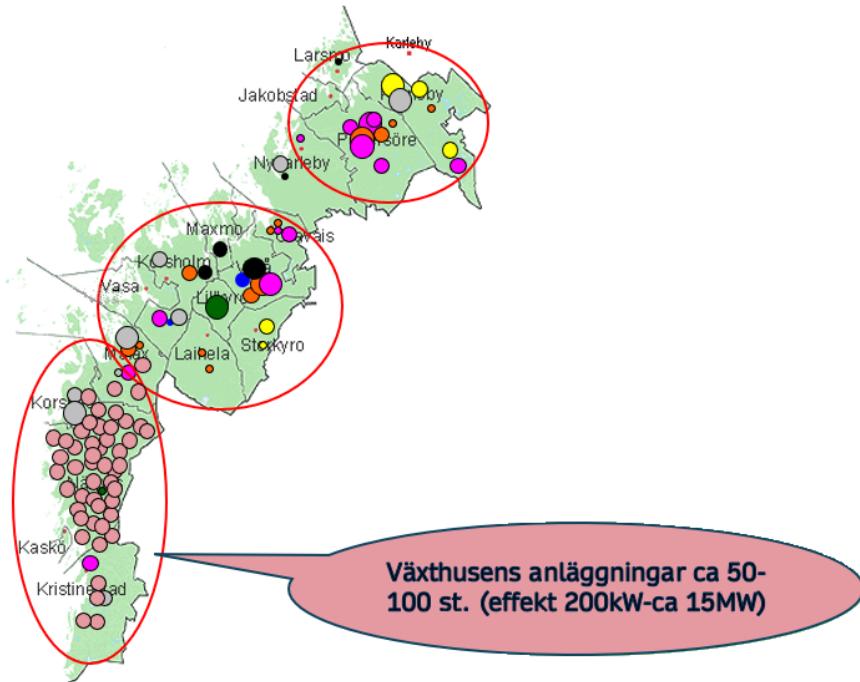
Medfinansierat av
Europeiska unionen

Peter Wiik, project manager

Esa Palmujoki, project researcher

Mats Borg, senior lecturer

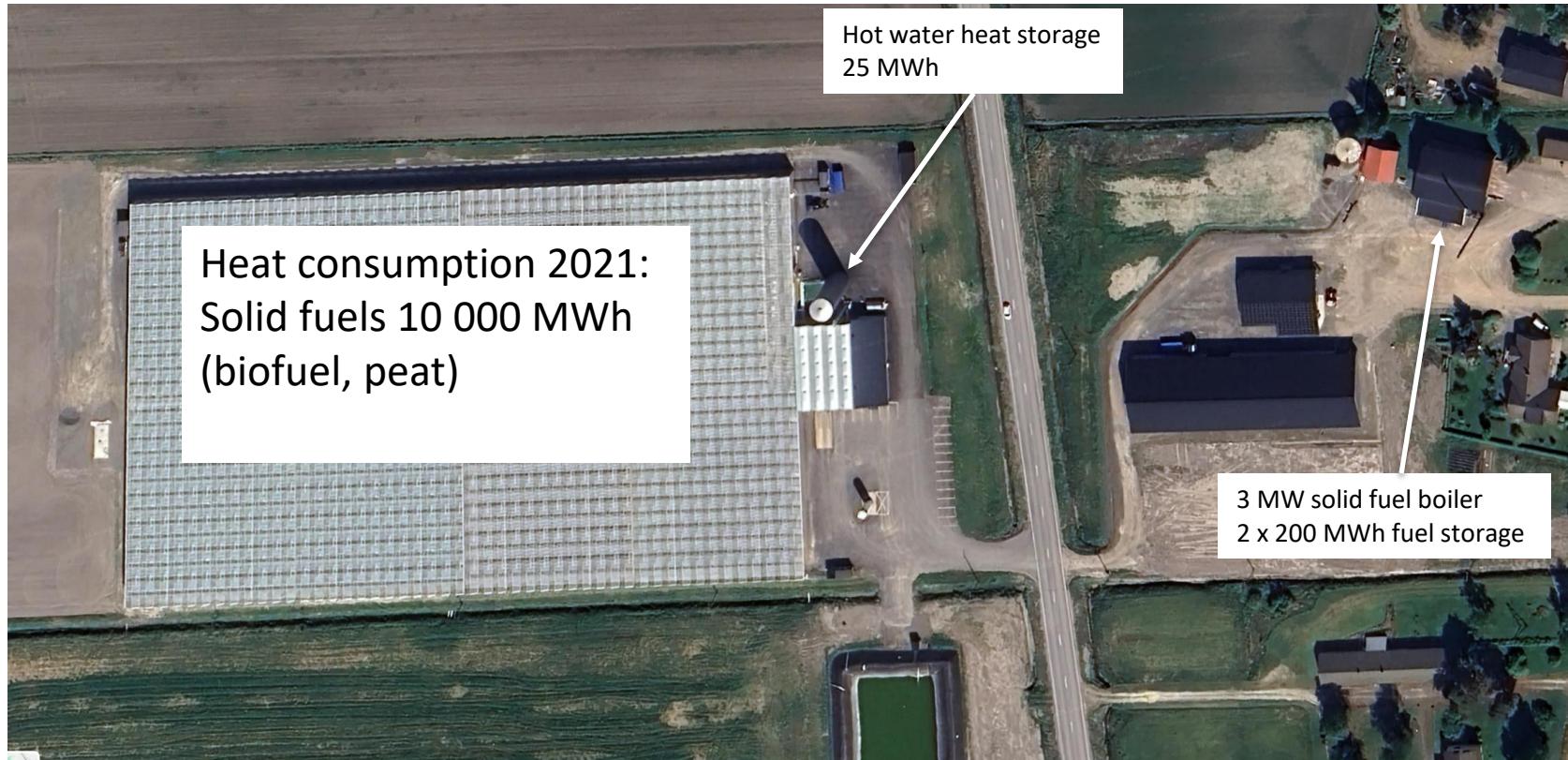
Greenhouse sector in Ostrobothnia



- 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

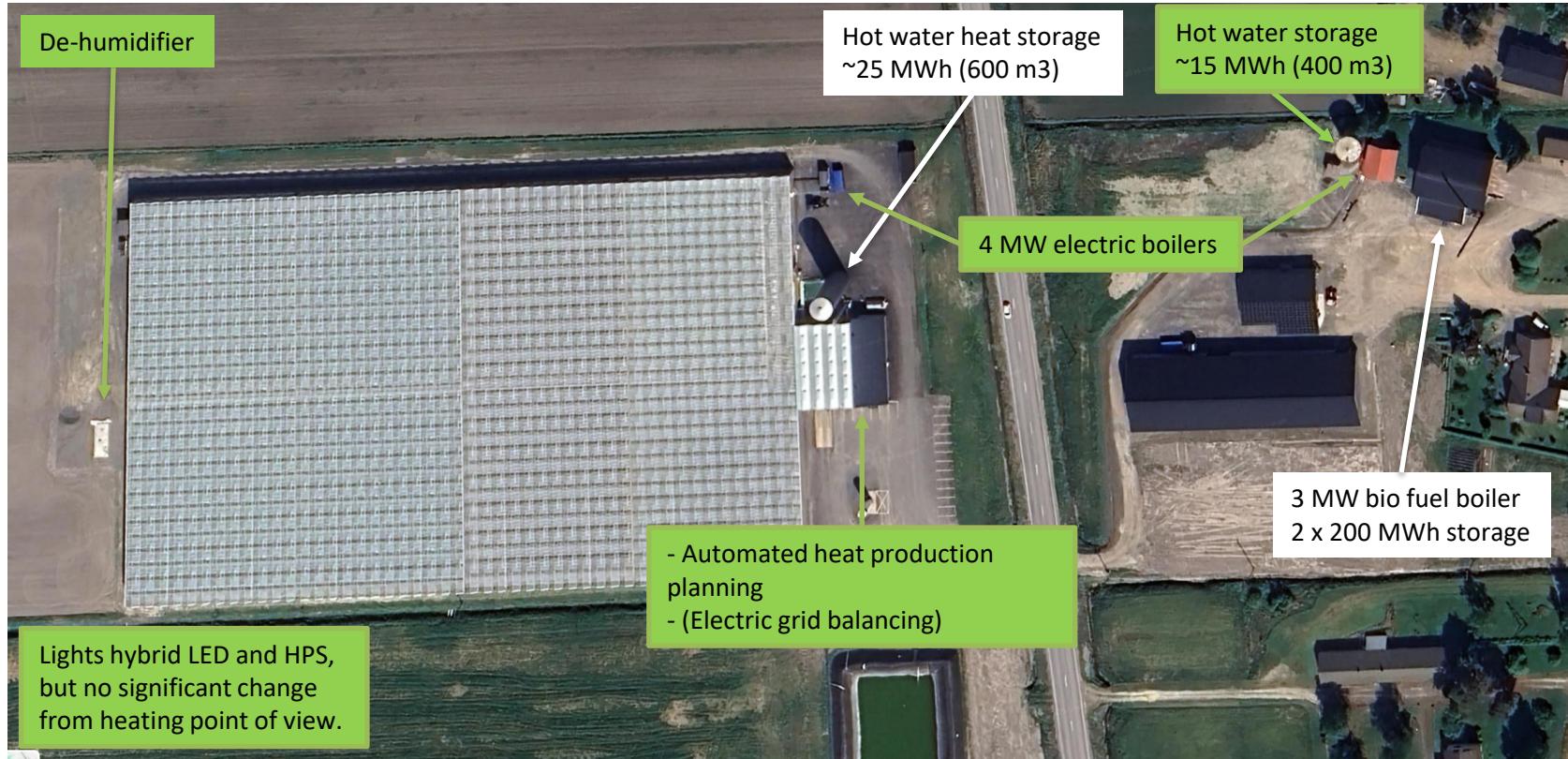
Greenhouse heat production, pre 2022 energy crisis

22 000 m², tomato cultivation, artificial lights



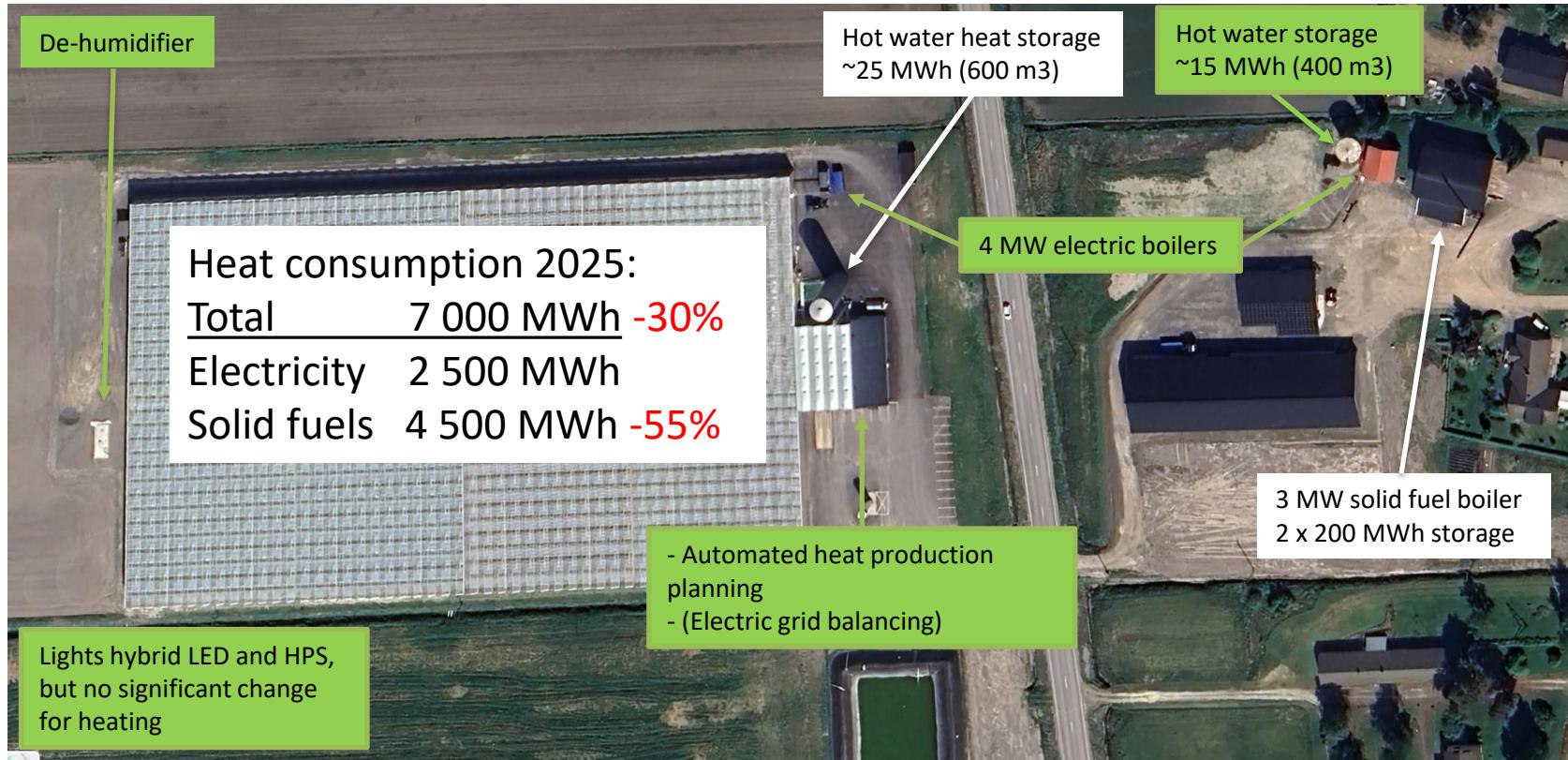
Greenhouse heat production, year 2025

22 000 m², tomato cultivation, artificial lights



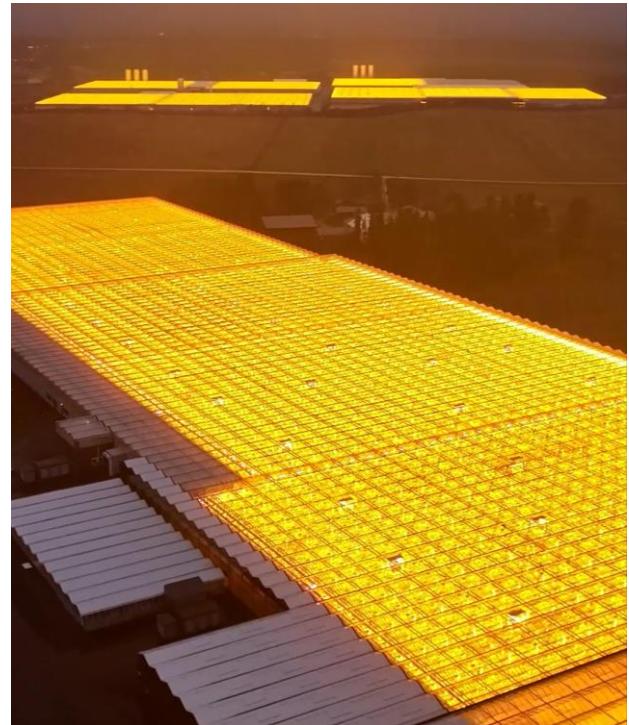
Greenhouse heat production, year 2025

22 000 m², tomato cultivation, artificial lights



Impact on bio mass consumption

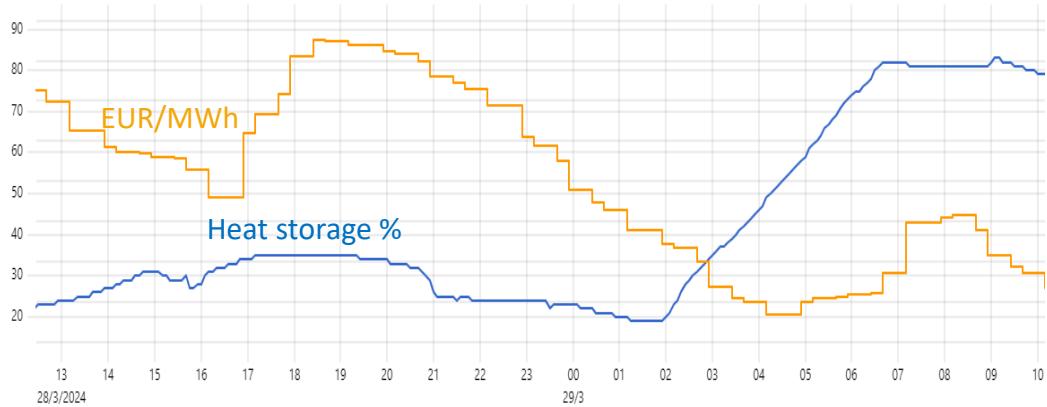
- Assuming reduced solid fuel usage of 2 500 MWh/ha and year for tall crop vegetable production (tomato, cucumber, sweet pepper) with supplemental lighting
- Southern Ostrobothnia:
- Area of such cultivation: 50 ha
- Energy reduction, 125 GWh/a
- (biofuels 50% of this)
- Reduced biofuel usage of over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



Picture: Yle

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

Novia vill hjälpa växthusodlare att optimera energilösningar

Hur ska växthusodlare värma, belysa och hålla rätt grad av fuktighet i sina anläggningar i fortsättningen? Syftet med det tvååriga energiprojekten "Nytt Blad- För växthusproduktion" är att informera, upplysa och vägleda producenterna.

I maj 2024 tillträdde Peter Wiik som ledare för projektet "Nytt Blad- för växthusproduktion" som bedrivs i Yrkeshögskolan Novias regi under projektiden 1.5.2024-30.6.2026.

Peter Wiik, diplomingenjör i process-teknik till utbildningen, har tidigare varit anställd av Neste med förnybara bränslen som specialområde. Nu har han sadlat om yrkesmässigt på tydligt vis.

– Helt obekant är växthusbranschen inte för mig. Min morfar var växthusodlare i Pjelax. Mina föräldrar har i sin tur varit jordbrukare, säger Wiik som till vardags är stationerad i Dynamohuset i Närpes.



Att optimera energilösningar för växthusproducenter är en huvuduppgift för utvecklingsprojektet Nytt Blad- för växthusproduktion. Projektledaren Peter Wiik och projektforskan Esa Palmujoiki arbetar med att ta fram matnyttig information.

Picture: Trädgårdsnytt

YRKESHÖGSKOLAN

NOVIA

Thank you!

