Swedens Bioheat Success

WPAC - Halifax

23-24th September 2025

Gustav Melin

WTS

A part of BKtech

Presentation of Gustav Melin

Chairman of WTS –

WTS a company within the BKtech Group. BKtech try to build our technical development on Bioenergy and Knowledge.

Bioenergy Expert and advisor within the BKtech Group

CEO of Mantex AB

Former President of Bioenergy Europe and CEO of SVEBIO, the Swedish Bioenergy Association.

WTS
A part of BKtech

Optimize pruduction from measured moisture content!

- Mantex Biomass Analyzer, BMA, measure moisture content in biomass fuels in just a few minutes.

- Now we work with the BMA-technology to measure moisture content of the material flow in pellet factories with the following advantages:
- More optimized drying - which results in energy savings
- Controlled and optimized moisture level gives higher production capacity, more durable pellets and less fines.
- Either a higher weight or a higher energy content depending on customer and profitability

mantex

Produce your own sawdust for pellet production or powder for your WTS burner with a Swedish KlingMill

BIOENERGY WORKS

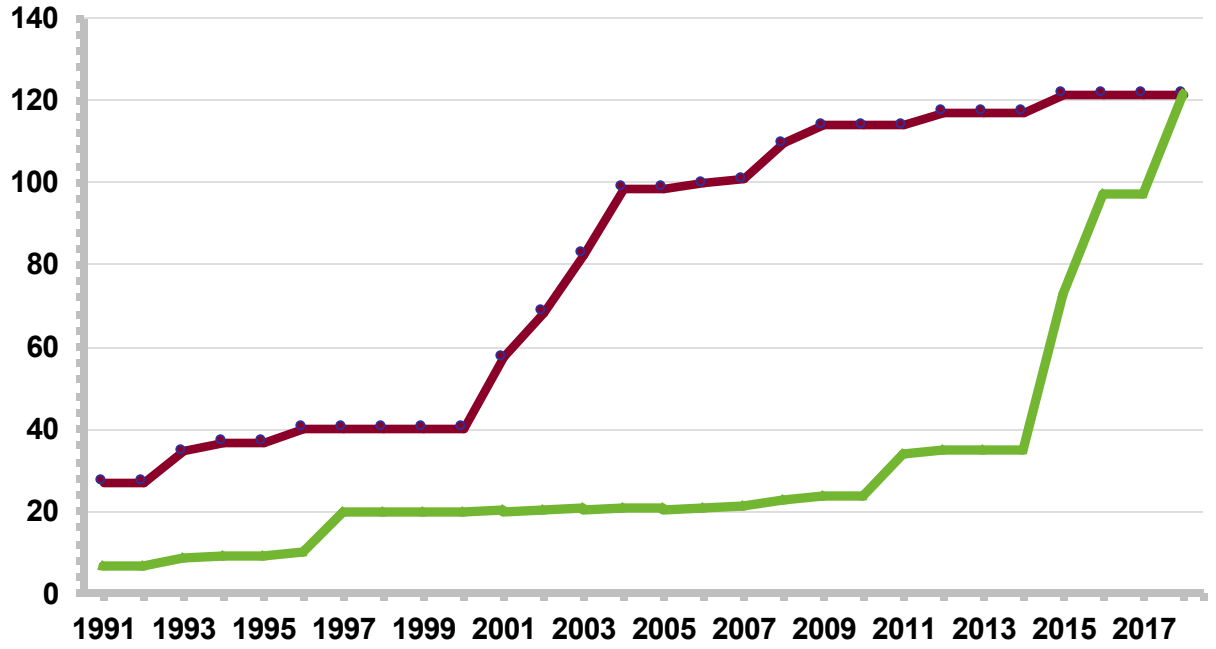
What kind of success is there in Sweden on bioheat

- **Forest industry more than 96 % bioenergy in energy use, exporter of electricity and heat to rest of society.**
- **District heating, 70 per cent of their energy from bioenergy, more than 90 per cent renewable.**
- **Industry outside ETS – the majority has shifted to bioenergy after 2013, due to high carbon tax and investment support.**
- **Residential, mainly heat pumps and district heating. Heat pumps due to historically low electricity prices from hydro and nuclear**

The Swedish carbon tax 1991–2018, €/ton

energi för nästa generation

The carbon dioxide tax was introduced in 1991, and has been increased in several steps to reach €120/ton



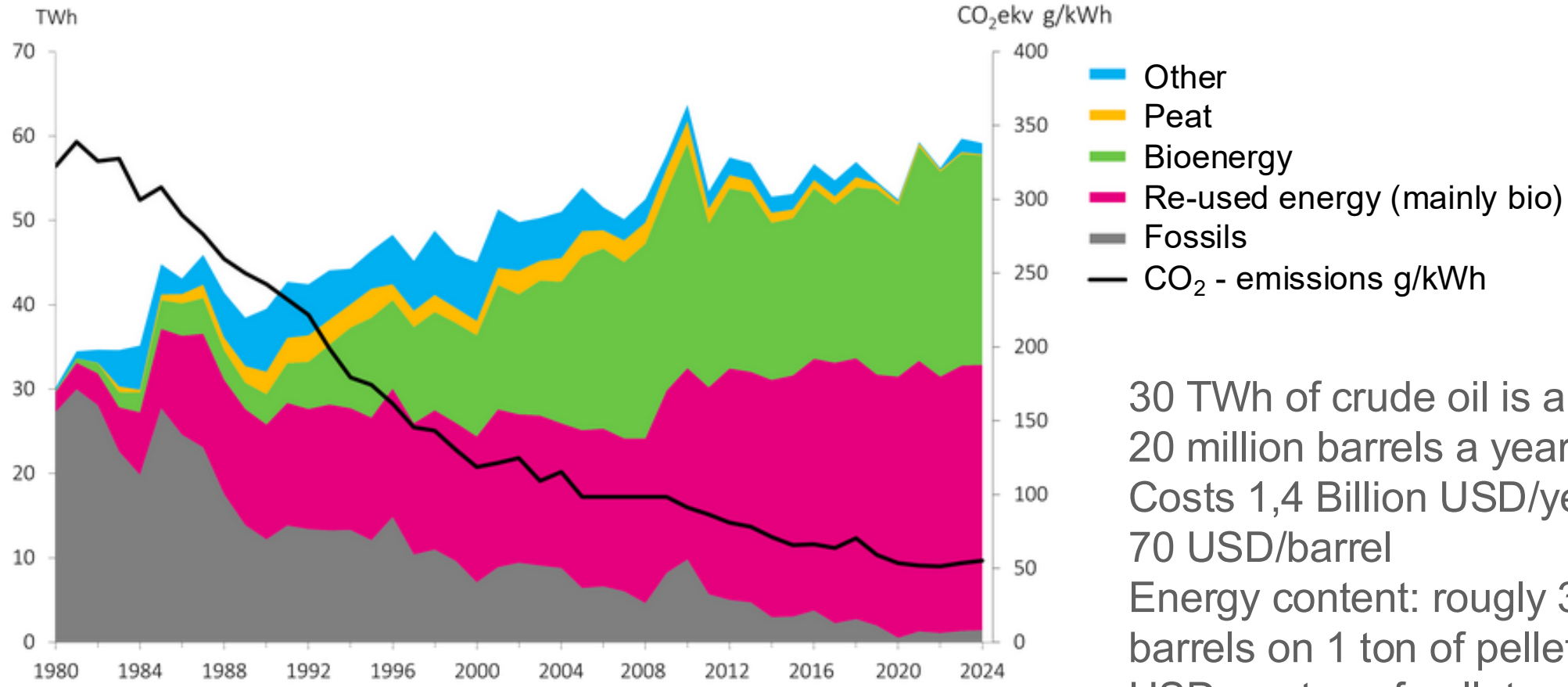
Red: the general carbon dioxide tax level, paid by residential and service sector.

Green: The tax paid by industries outside EU Emission Trading Scheme that are not required to have emission allowances, that is food industry etc..

Source: Swedish Finance Ministry / Svebio

SVEBIO

Different types of energy sources and total emissions in Swedish district heating in TWh, 1980-2024



30 TWh of crude oil is almost 20 million barrels a year
Costs 1,4 Billion USD/year at 70 USD/barrel
Energy content: rougly 3 barrels on 1 ton of pellets 210 USD per ton of pellets

BIOENERGY WORKS

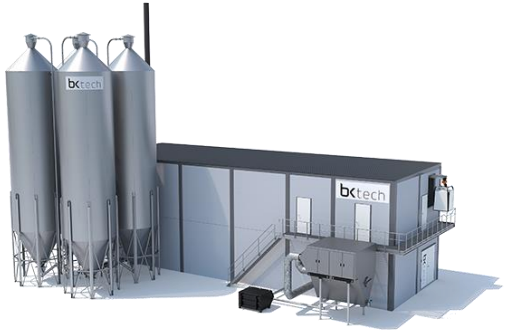
Igelstaverken, example Combined Heat and Power in Södertälje

200 MWth for district heating.
85 MWe for Power production

Possible to combine electricit/heat production with biochar and pyrolysis oil creating a cost efficient solution that switch in and out from electricity production depending on solar and wind. Many hours gives improved economy.

Bktech Group
Product range from 1-15 MW (1,5 – 22,5 t steam/h)

For steam, hot water & thermal hot oil

BioOne	BioDuo	BioTwin	BioMulti	BioMax
				
Pellets, 0,87 – 3 MW	Pellets, 3 – 4 MW	Pellets, 3 – 6 MW	Multifuel, 5 – 9 MW	Multifuel, 10 – 15 MW

Whiskey distillery
High Coast
870 KW steam production from wood pellets
since 2021

Potato processing
Vätternpotatis
3 MW steam production from wood pellets
since 2020

Brewery
Krönleins 4MW steam production from wood powder since
2023

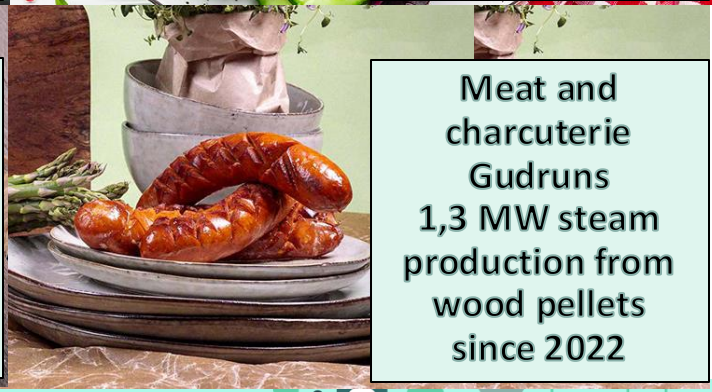
Dairy products
Falköping Mejeri
4 MW steam production from wood pellets
since 2020

Poultry products
Guldfågeln
3 MW steam production from wood pellets
since 2023

Poultry products
Lantfågeln
870 KW steam production from wood pellets
since 2022

Crisps/snacks
Svenska Lantchips
3 MW steam production from wood pellets
since 2018

Meat and charcuterie
Skövde Slakteri
1,3 MW steam production from wood pellets
since 2022



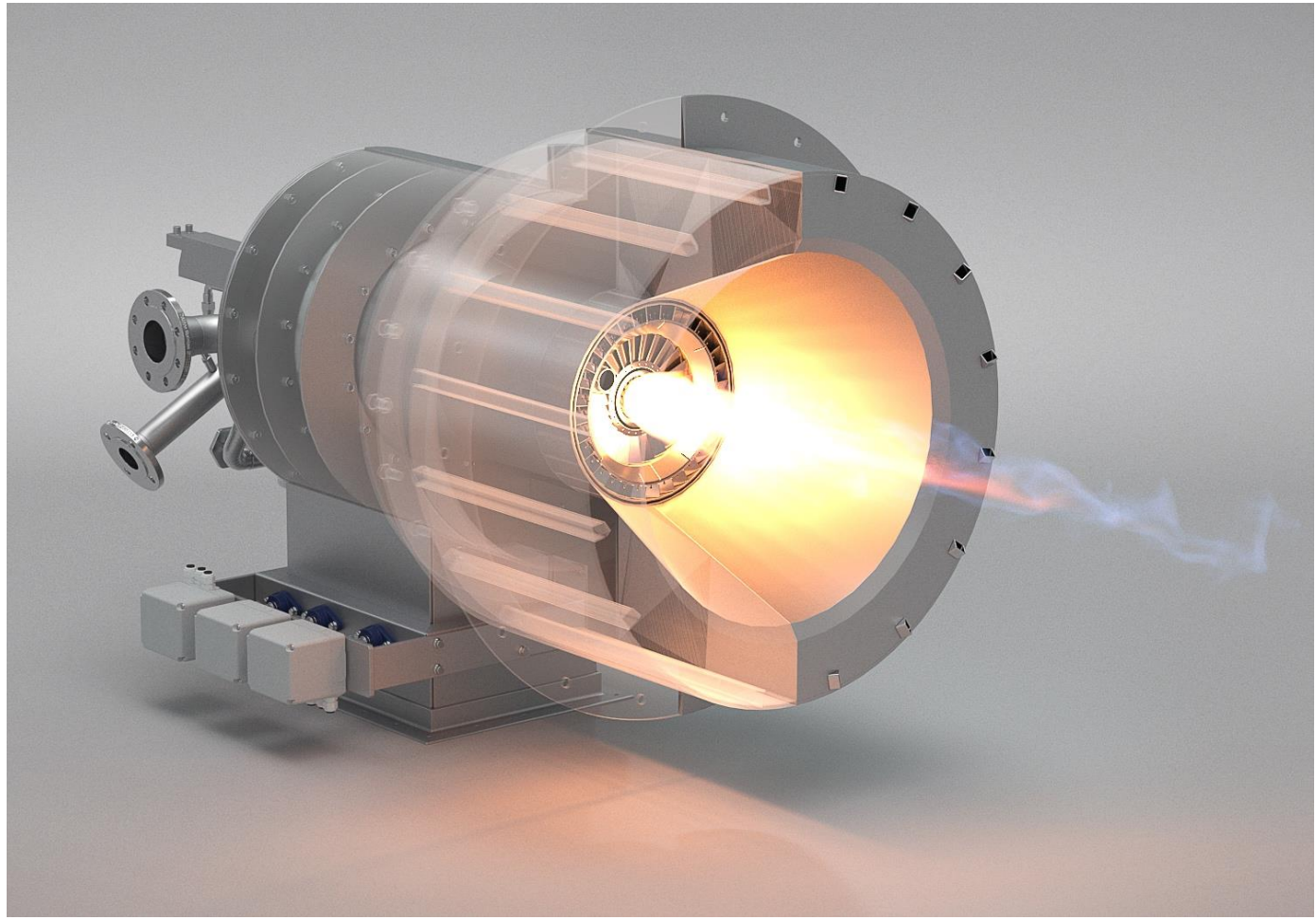
Meat and charcuterie
Gudruns
1,3 MW steam production from wood pellets
since 2022

Join the green switch movement

bktech

Create flexibility with Multi Fuel Burners?

- Excellent equipment for combustion of powder, liquid, or gaseous fuels.
- Our burner supply air at four levels, creating an oxygen/fuel blend optimal for complete and immediate combustion.
- Normally installed with two fuels even though three or more installed fuels are possible.
- The fuel switch flexibility secure a good economy and energy security.
- There is no environmentally better solution than biomass fuels with proper cleaning.



Possible fuels in WTS multi fuel burners

Liquid

- Oil, HFO, diesel, bio-oils

Gaseous

- LPG, natural gas, biogas, waste gas, syngas or pyrolysis gas

Dry biomass,

- Wood powder, from pellets, brickets or any other dry wood.
- Biochar and torrified material
- Agri pellets
- Rice and Sun flower husks
- Draw from breweries
- Dust from flooring industry
- Any other dry powder of biomass

Other

- Peat powder
- Coal powder

Ordinary multi fuel burner installation providing steam for a lot of different industries

For example laundry

TVNO, Norrköping

- 6,5 MW
- Bifuel, powder from pellets A1 and oil.

Also available with electric steam production as a supplement

Burner and boiler description at IWB Bahnhof, Basel

Similar installations at

Söderenergi 4 times 35 MW burners in one boiler installed 2005, wood pellets.

Norrenergi 2 * 20 MW burners.

Paris, La Defense district heating. 2 times 26 MW burners on agri pellets

Heating asphalt is a local activity in all European countries

- All asphalt plants run on wood pellets or bio-oil in Sweden, after increased carbon tax in 2018*.
- *Approx €120/ton CO_2

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Cement dryer conversion at Nexe, Našice, Croatia

- The Nexe cement dryer will run 24/7, 330 days per annum.
- Availability of saw dust will limit the tonage of biomass, expected more than 12 000 tons.
- Purpose to lower CO_2 emissions and fuel costs
- Scheduled to start running in March