

Bioenergy

as a sustainable opportunity

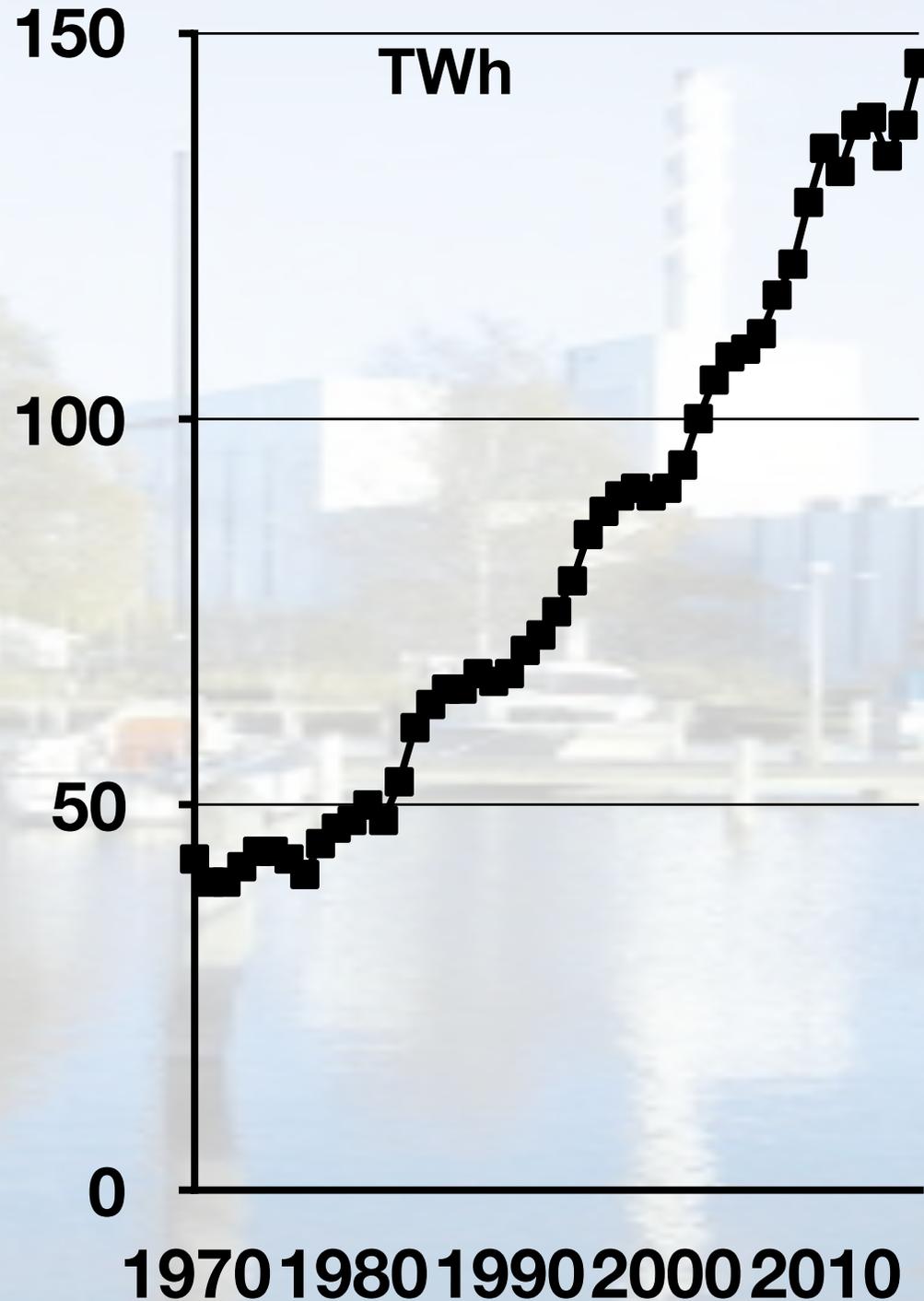
Tokyo 2017-05-22

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Bioenergy use in Sweden 1970-2016



- $\approx 1/3$ of total energy use
- 525 PJ
- 52 GJ/capita
- 1,7 kW/capita

The secret key to sustainable bioenergy:

The secret key to sustainable bioenergy:

Co-production!

To share costs

&

To increase income



1. Use already collected residues!

- **Bark, Black-liquor, Sawdust and cutter shavings**
- **Bagasse, Food industry residues**



2. Collect free residues!

- Branches and tops in forestry
- Harvesting residues



Residues make major resource

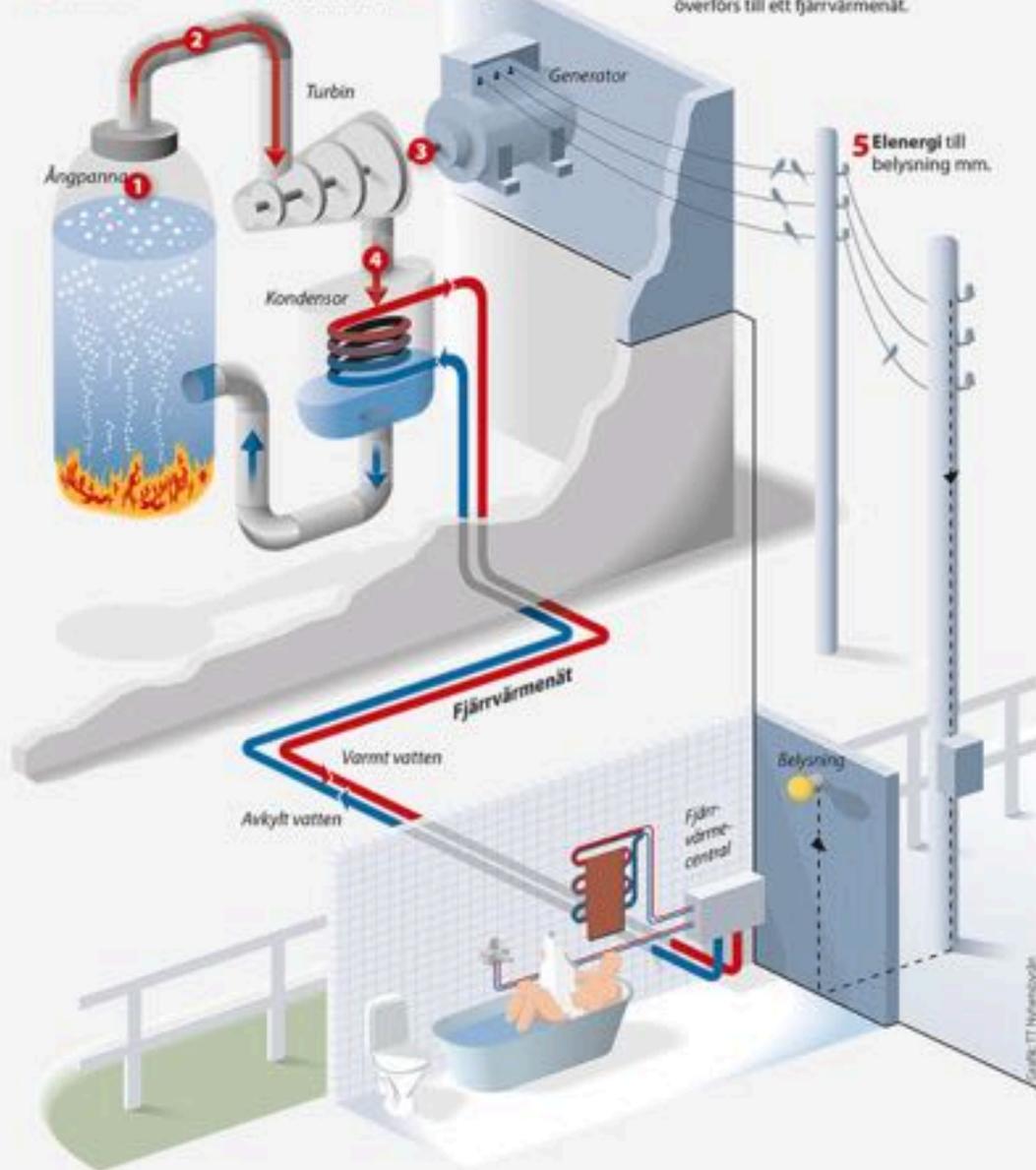
- **1/2 of biomass harvested**
- **Maybe 1/4-1/3 of global energy demand!**

Establish multifunctional plantations

- Carbon sequestration in soil and standing biomass
- Cadmium phyto-extraction on arable land
- Removal and concentration of radioactive contamination
- Buffer strips along open streams reduces nutrient leaching
- Vegetation filters for treatment of sewage sludge and waste water
- Windbreak plantations to reduce wind erosion
- Vegetation zone plantations reduces water erosion
- Increased soil organic matter leads to improved productivity
- Increased biodiversity and improved game potential in open farmlands

Kraftvärme

- 1 Ångpanna** eldas med bibränsle.
- 2 Ånga** leds till och driver turbinen.
- 3 Turbinen** ger elkraft via generatorn.
- 4 Restvärme** Ångan (restvärmen) från turbinen kondenseras och överförs till ett fjärrvärmennät.



Klimatsmart



Fjärrvärmens är viktig för en mer hållbar miljö. I Kristianstad har

Klimatsmart



Fjärrvärmens är viktig för en mer hållbar miljö. I Kristianstad

130 MW el
330 MW boiler



Fjärrvärmens är viktig för en mer hållbar miljö. I Kristianstad

Hedensbyn bioenergikombinat





Lantmännen
Agroetanol

Select language



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**Solutions for the transition
to a sustainable society**



Bioraff

The Lantmännen Agroethanol production plant is located at Händelö outside Norrköping. Production takes place in close collaboration with the adjacent combined heat and power plant.

Feed

Agrow Feed™ is the common name for Lantmännen Agroetanol's Swedish feed materials. The products are protein supplying and starch poor, the fat content contributes an interesting energy source. We transform grain as feedstock for ethanol and fermented protein feed and thus contribute to a responsible agriculture and make farming thrive.



Sweden's largest ethanol and protein feed mill is located in Norrköping. Here we have the capacity to produce 180 000 tonnes Swedish-made protein animal feed annually.

Our main product is Agrow Drank™ 90, which is a fermented and concentrated form of grain and food returns. A tasty protein feed with prebiotic properties containing 30-35 percent protein, depending on variations over the year. The product is dried and pelletized (6 mm).

at Händelö
laboration

Enköping power Producing their own fuel



Multifunctional biomass utilisation

- **Co-generation of electricity and heat**
- **Co-generation of liquid fuels and heat**
 - Ex methane and district heating
- **Co-generation of liquid and solid fuels**
 - Ex ethanol and lignin powder
- **Co-generation of liquid fuels and food or animal feed**
 - Rape-seed oil and feed
 - Ethanol and feed or food
- **Co-generation of electricity, heat and solid fuels**
 - Biomass to electricity district-heating and drying heat for wood-pellets production
- **Extraction of chemicals before combustion**

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Do you remember?...

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