How energy policy encouraged and forced the utilization of straw for energy in Denmark

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Content of the talk

- Few words about AgroBioheat and FBCD
- Danish agricultural data
- Danish bioenergy history
- Present status
- Future perspectives
Promoting the penetration of agrobiomass heating solutions in European rural areas

Adopt modern solutions for agrobiomass heating and reap the benefits:

- Reduce your heating costs!
- Support rural growth and circular economy!
- Reduce your carbon footprint and help fight climate change!

Agrobiomass, a perfect heating fuel for:

- Farms and rural households.
- Schools and municipal buildings and other community energy projects.
- Agro-industries, greenhouses and others.

Canadian Biomass webinar, 20 October 2021
National cluster for food and bioresources

Food & Bio Cluster Denmark

Denmark’s national cluster organisation for the Danish food and bioresource industry. We are a unifying platform for innovation and growth – for Danish and international companies and knowledge institutions.
A new supercluster

- Membership driven
- Focus on innovation
- International cooperations
- Build on the foundation of 4 established organisations
37

€100 mio+

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A MEMBERSHIP ORGANISATION

310 members
Start ups
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Large companies
Universities
Organisations
Biomass for energy history

How energy policy encouraged and forced the utilization of straw for energy in Denmark?

• Danish Agriculture in brief
  • 62% of the area is agricultural land (2,662,030 ha.)
  • Cereal production cover 1,444,056 ha. (54%)
  • Straw production around 6,000,000 tons per year
  • 50% is used for bedding and energy production, 50% is mulched into the soil

• Crop rotation for Denmark:
  • 50% cereals (wheat, barley, oat, rye)
  • 20% grass/clover grass and fodder crops (maize)
  • 30% Industrial crops, vegetables and seed production
• Coal and natural gas era after oil crisis 1973, Danish Energy Agency
• Reduce dependence on OPEC, towards self supply in 1998
• No nuclear power, Energy taxes introduced, support for renewables
• Gas grid, straw for district heating, wind turbines
• CHP, decentralizing in 1990ies
• Saving energy, fossil free, biogas, wind, biomass
Decentralizing power production
Renewable energy production

Waste incineration
biogas
wood
straw
wind

Share of total energy consumption
Biomass used for energy production by type 1995-2018 (straw = light blue)
The straw to energy evolution...

- **Before 1960**: Family farms with all groups of animals.
  - Dairy cows, calves, sows, piglets, hens, chickens. All straw produced is used on the individual farms.

- **1960 – 1971**: Industrial production increases and there is a movement from countryside to cities and industry.
  - The farm structure changes towards monocultures both for animals and for crops. 90% of DK’s energy supply is based on imported oil.

- **1972**: Denmark joins EU.
  - Pig production continues to increase along with cereal production. Further specialization. Surplus of straw which is burnt on the fields.

  - The politicians are forced to restrict fossil energy consumption.

- **1975**: Beginning of production of straw boilers for small straw bales.
  - Political focus on diversification of energy supply.
• **1980-1990’s**: Legislative requirements to use domestically produced fuels are introduced. Increased funding for R&D in bioenergy.
  
  - Establishment of decentralized biomass-fired heating plants and district heating networks. Farmers organize straw suppliers associations

• **1991**: Burning straw in the fields is made illegal
  
  - Subsidies for bioenergy for heating are introduced to encourage transition away from fossil fuels.
Straw in Denmark is primarily used as fuel at individual farm plants, at district heating plants, and in large power and CHP plants.

- 6,587 small scale straw boilers on farms
- 70 district heating plants fire with straw
- 9 CHP plants using straw as primary or co-firing fuel
• Lisbjerg Power Station in Aarhus Municipality is the newest largescale straw-fired CHP plant in DK (110 MW fuel input). Opened in 2017.
From 2022 new emission limits for air pollution (dust) from combustion plants for solid fuels of less than 1 MW will be introduced in DK:

- All **new** straw boilers small and large must be equipped with filters. Will mean a significant price increase especially for small boilers that may “kill off” some producers – mainly of manual plants.
  - Existing straw plants do not have to comply with new limits.

- Existing filter solutions will not work for manual plants for practical (cold start) as well as for economic reasons.

- Cyclone solutions can be used for both, but challenge to filter out salt particles.
  - Investment and operation becomes more or too expensive.

- Conclusion: The future is uncertain!
Competition for straw and biomasses

- Conservation agriculture – the earthworms/soil carbon issue/agricultural biodiversity
- Straw incineration
- Straw for biogas
- Straw for Pyrolysis
For more information...

- Check out our newly updated Straw to Energy guide!
- Visit the website of the AgroBioHeat project about a wider utilisation of various types of agro-biomass at [www.agrobioheat.eu](http://www.agrobioheat.eu).
- Sign up for the free matchmaking event ‘Bringing Value to AgroBioMass’ and
  - attend our webinar about different cases of agricultural biomass utilisation
  - book interesting business meetings!
- [https://bringing-value-to-agrobiomass-2.b2match.io/](https://bringing-value-to-agrobiomass-2.b2match.io/)
Thank you for your attention!

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