District heating system based on pyrolysis of wood biomass

- Case study Sodankylä – not implemented

Jukka Lokka
Asiantuntija
+358 29 532 2737

Sodankylä case

- **Backroud for case**
  - Competitive bidding in Hilma 2018
  - Contact and a new technology:

  - High temperature biochar production with flouting-bed reactor

The technology

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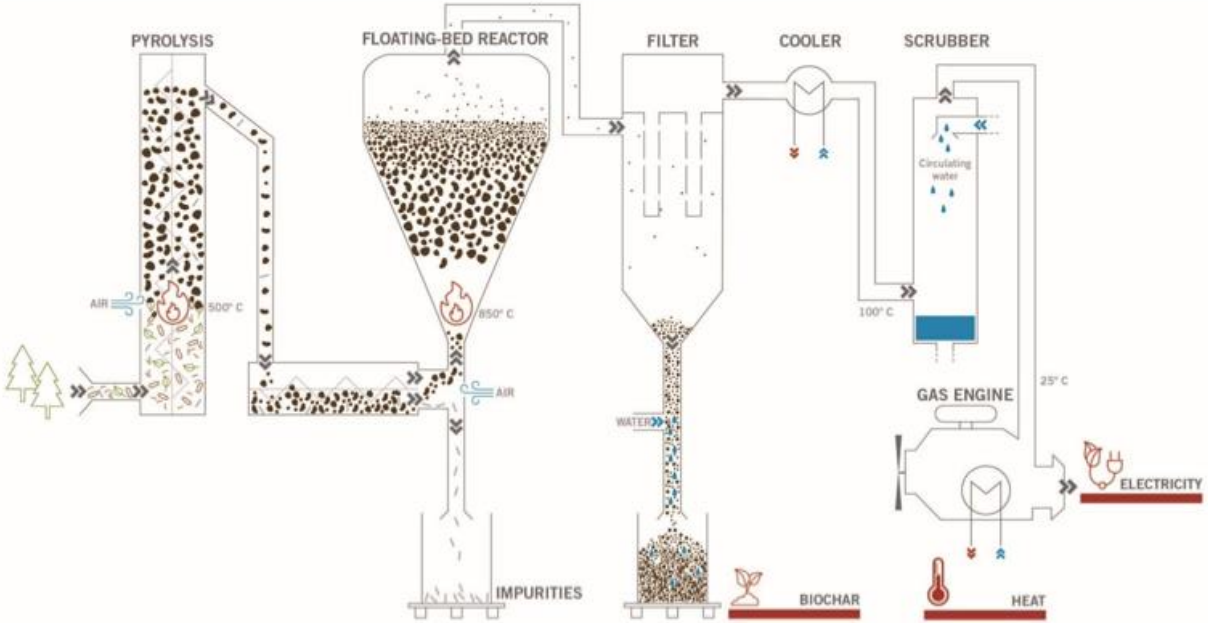
Das Holzkraftwerk.



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Energy flow in production

The CO_2 balance

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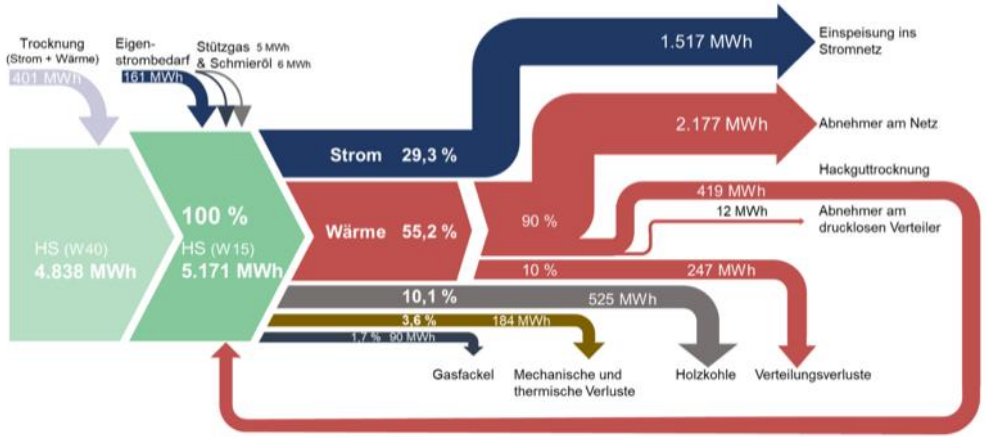
Energyflow of a typical* SynCraft wood power plant

*based on annual data from CW700-200 Hatlerdorf in 2016



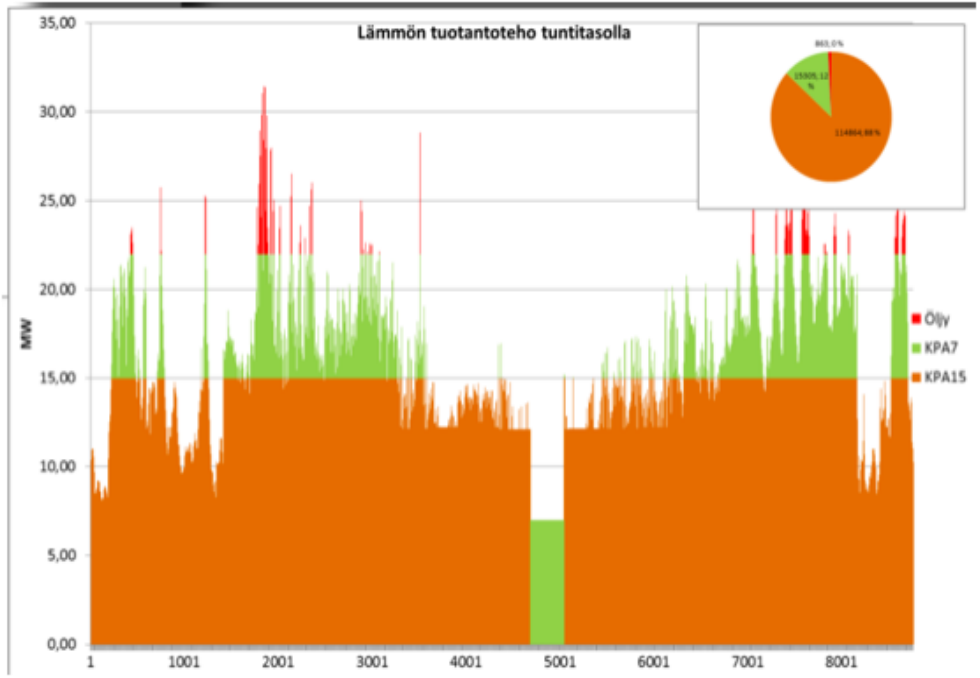
Biochar production benefits in case:

- Climate friendly way to replace old peat boiler – carbon negative
- CHP –production
- Relatively high active biochar
- Markets for improvement cutting wood

Two interesting questions:

- **How to balance district heating system?**

- **Is it possible to make circular economy solutions in the same time?:**
    - Prosessing other regional biomaterials?
    - Possibilities for food production?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Components for smart district heating system:

- **Main energy source running as high level as possible**
- **Small additional energy sources**
    - With main source, areal or building based
- **Storage**
    - Long and short term
- **Control system**
    - Demand response for price
    - Supply and storage controlling system

Possibilities for circular economy:

- **First ideas:**
  - Waste → raw material
  - Heat → heting buildings
  - Electricity → saving transfer fee

- **Possibilities studied in case**
  - Greenhouse / vertical farming
  - Fish farming in tanks
  - Insects
  - Biogas

Results:

- Economic benefits were quite small
- Ecolocical benefits were bigger
- Clearly economic benefits for regional economy
- Security of supply!

- https://jukuri.luke.fi/handle/10024/547812

Kiitos!

Luke
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