

# District heating services BENET OY

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# Background

- Benet is private consulting company
- Our core speciality is bioenergy; biomass supply, district heating, co-generation, facility heating, district cooling etc.
- Forest fuels and in lesser extent agrofuels; straw, cereals, short rotation fuels
- Main work is to find sustainable energy solution for customers
  - Pre – feasibility evaluations
  - Feasibility evaluations
  - Basic engineering
  - Detail engineering ( through partnerships)
  - Purchase of energy services ( through competitive bidding)
  - Advisory service

# International work

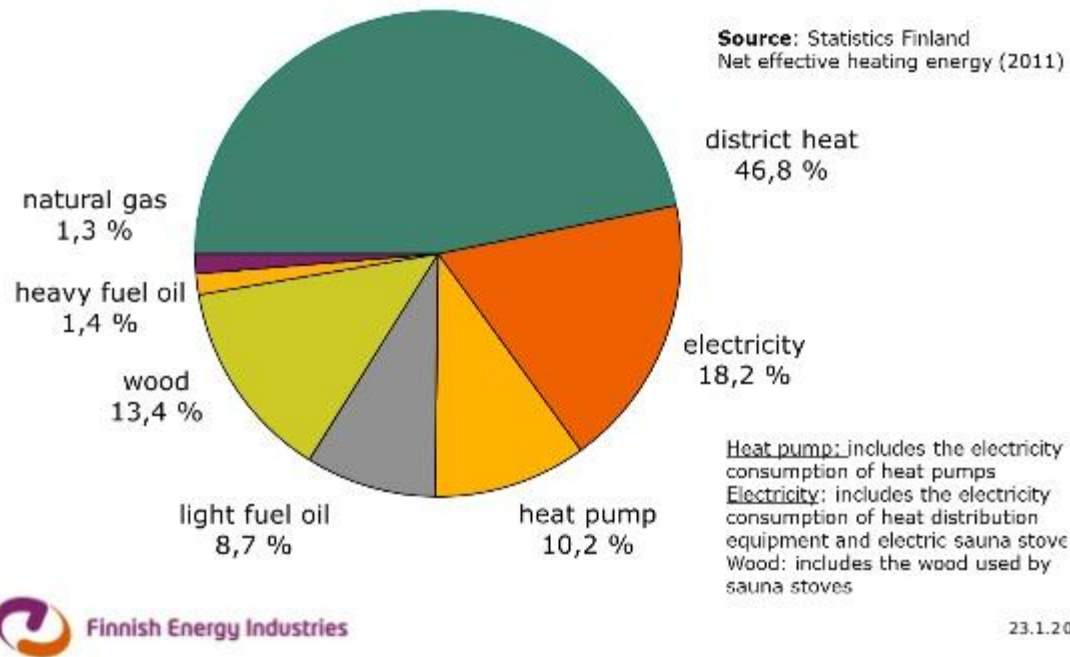
- Participation in international projects
- Direct consulting contracts with customers
  - Often related to biomass fuel supply , district heating or CHP
- Support activities in SME internationalisation
  - Market entry studies
  - Organisation of joint stands in international fairs for biomass related SME's

# Situation in Finland

- Biomass is an integral part of fuel balance, about 30 %
- District heating has high penetration, about 50 % of population
- CHP is nearly fully built, all major cities and industries with high heat demand have CHP plants, in Central and Northern parts with biomass!
- Presently small DH schemes are built in small towns and villages
- Small schemes are mainly privately owned and operated

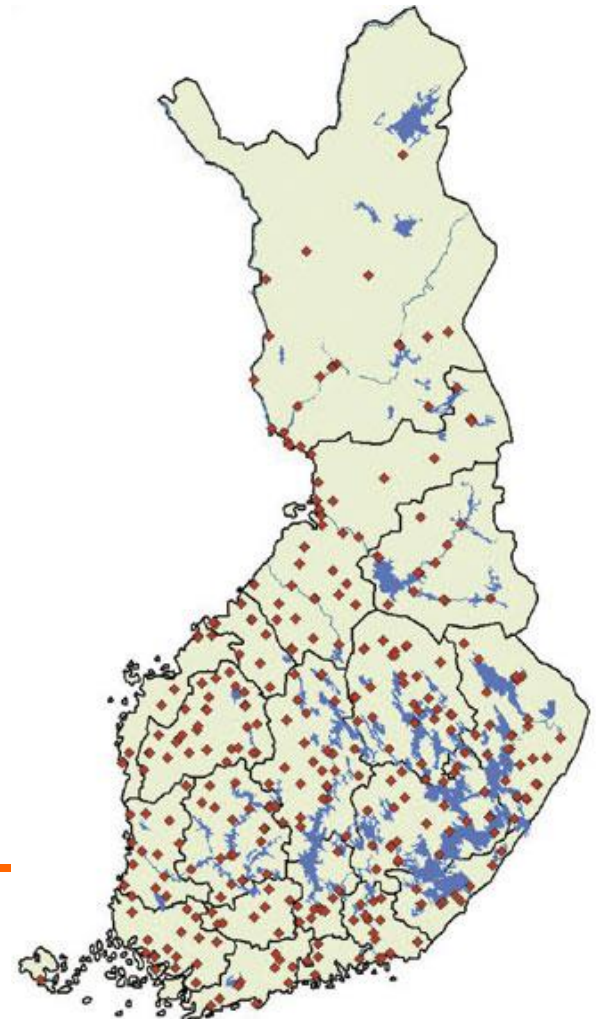
# District heating dominates

## Market share of space heating Residential, commercial and public buildings



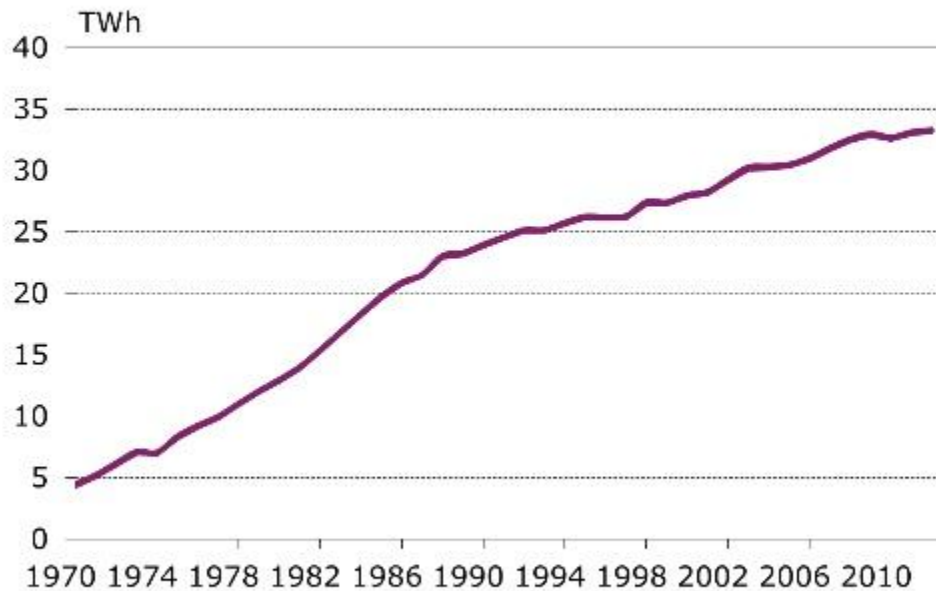
# Bioenergy in Finland

- **Over 400 medium and large scale biopower ( CHP-plants) and heating plants**
- **From farm size up to the world's biggest unit**



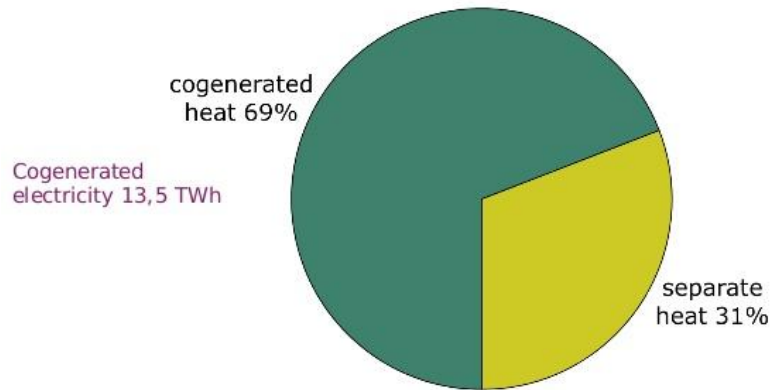
# Steady growth of district heat

Temperature corrected district heat consumption, TWh



# Co-generation is is energy efficiency

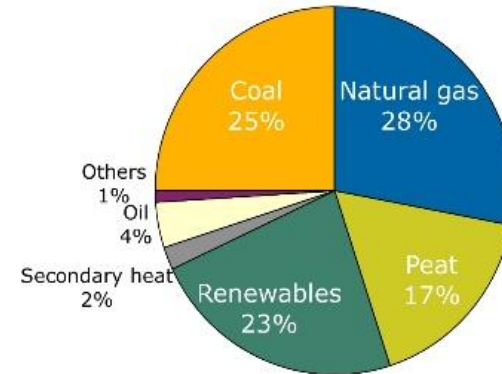
District heat production 2012  
36,6 TWh



21

Fuel consumption in production of district heat and CHP 2012

- fuel consumption 58,0 TWh

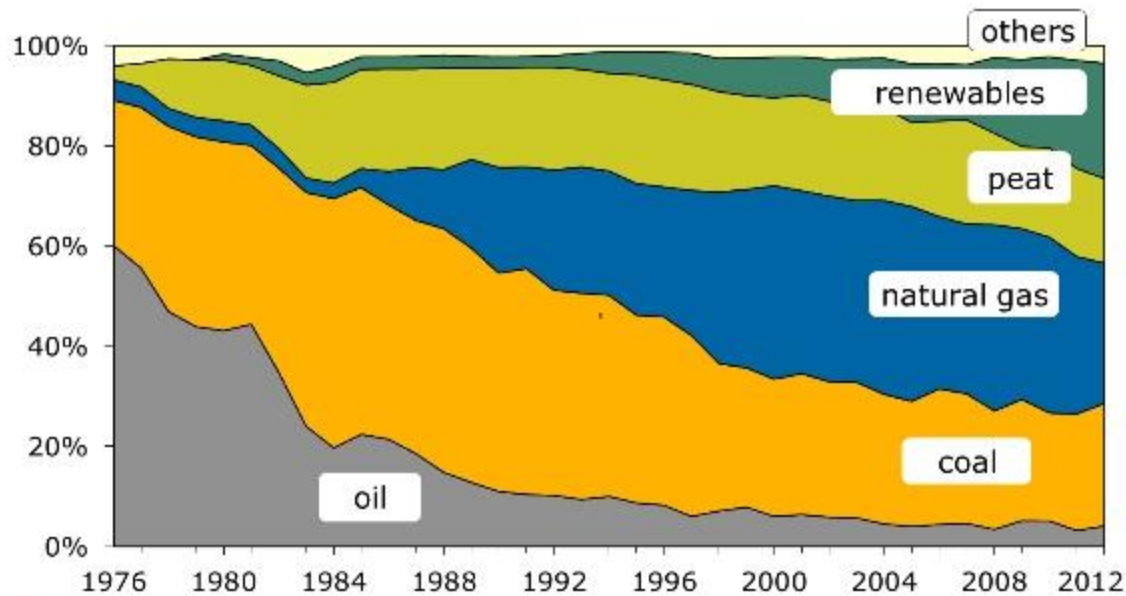


23.1.2013  
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# Strong development towards local fuels

Fuel consumption in production of district heat and CHP



# General features of district heating in Finland

- District heating gives possibility to co-generation, and at the same time is wise use of resources
- District heating is built almost to maximum, buildings outside network and in areas, where distances are too long for efficient operation, only small new networks are coming
- Recently, new networks are often private, private operator sell heat to public and private buildings
- New district heating schemes have all been based on biomass

# Recent references in Central Finland

- Hankasalmi railway station area
  - Initiative from housing companies, all having relative old oil heating systems
  - Agreement with municipality, that municipal buildings will also be connected to district heating network if; it is established and price of heat is less than present heating costs
  - Benet was consultant to define the project and arrange competitive bidding
  - Winning price was on average 74 €/MWh, including capital and running costs,
  - when oil heating costs without investment costs are about 120 €/MWh
  - 1,5 MW wood heated plant, 20 customers initially, 3 km network
  - Contractor OK-yhtiöt
  - Operation starts December 2012

# Other similar cases

## ■ Lievestuore

- Initiative from municipality, several schools and public buildings
- Benet organised the competitive bidding
- Winner price around 80 €/MWh, including capital and operating costs for plant and network, 10 year contract which continues according to normal district heating terms after the contract period
- (pellet option was also offered, about 90 €/MWh)
- Winner was Lievestuoreen lämpö, already operating one plant at Millog industrial area near by

## ■ Aura municipality

- 2,5 MW wood chip boiler, 3 km network
- 74 €/MWh, winner is company formed by 4 local farmers, starts next summer

# Last municipal centre in Central Finland

- Hankasalmi town centre
  - District heating for municipal and private buildings
  - Capacity about 2,5 MW
  - Competitive bidding, 14 interested companies, four bids
  - Due to start fall 2013
- 
- This is the last municipal town centre in Central Finland without biomass heating!

# Jyväskylä Social Housing, Kaunisharju

- 8 building groups, 22 buildings, total capacity about 800 kW
- Three separate pellet fired heating plants
- Winning price 90 €/MWh
- Winner : Propellet Oy
- Operation starts in December 2012

# Leivonmäki town centre, Joutsa municipality

- School, elderly people home, social housing, fire department and apartment houses
- Town is very sparsely built, difficult for DH
- Three separate wood chip heated plants, total capacity 800 kW
- Price level 87 €/MWh
- Operation starts next fall
- In negotiation phase

# 5 Rural schools, Jyväskylä

- Local, city owned energy company offered heat contracts based on ground coupled heat pumps
- Certification of the use of power generated by wood fuels (renewable aspect in bid evaluation)
- In contract phase



# Benet task in these cases

- Preliminary planning of the heating scheme
- Potential site
- Customers
- Total annual energy and peak power needs
- Preparation of bidding documents
- ( Encouraging local companies to bid/ assistance before bid opening )
- Competitive bidding
- Evaluation of bid
- Drafting of contract
- Follow-up of the contract

# Technically Harvestable Potential of Forest Chips in Finland



Small trees from early thinnings  
5 mill. m<sup>3</sup>/0.9 Mtoe/36 PJ  
Still potential to increase



Logging residues from final harvesting  
8 mill. m<sup>3</sup>/1.4 Mtoe/57.6 PJ  
Quite well utilized



Stump and root wood from final harvesting  
2 mill. m<sup>3</sup>/0.4 Mtoe/4.4 PJ, well used

# Supply chain machines



Thinnings  
Small wood



# Young stand thinning



# Social benefits

- Biomass is local fuel and all money paid for fuel stays in the local economy
- Plant will not need more staff than coal plant
- Fuel chain will employ, major part of fuel costs are salaries
- Logging residue collection, storing, chipping/crushing, transportation
- In Central Finland the average direct and indirect employment is about 600 man years
- About one manyear per 2500 MWh biomass fuel consumed
- This is from well functioning system with several large plants, for small plants the employment effect is relatively higher
- Small tree harvesting from thinnings **is encouraged** to improve stem wood growth

# Co-operation with Serbia

- To transfer the practical knowledge and encourage local entrepreneurs
- We like to have a long term co-operation where we can with relatively small input to assist municipalities and companies to utilise local resources for heating ( and/or cooling, CHP )
- Advisory work to customers
- Support work to SME´s or energy companies to start cost effective heating service
- Training services as and when needed
- Study tours, visits to similar cases and discussions with decision makers

# *District heating?*



***lisalmi before and after district heating.***

1.11.2011, Sinun ja luonnon ehdoilla eilen, tänään ja huomenna

KAUKO  LÄMPÖ

NEXT STEP:

BIOENERGY CONFERENCE AND FAIR

4.- 6.9.2013 in Jyväskylä

And

Tailored touring to meet municipalities and businesses  
utilizing bioenergy

THANK YOU FOR YOUR ATTENTION



# Present workload

- Energy advisory work for citizens
  - Funded by Ministry of Employment and Economy, Regional Council Of Central Finland, Municipalities and energy companies
  - Free energy advisory services via internet, e-mail, phone and face to face meeting
  - Present in several happening throughtout the year
  - Energy related tradeshows
  - Etc.
- Local/national energy consulting
  - Feasibility studies of district heating networks, heating plants CHP plants etc.
  - Energy solution studies – comparisons between own plant/purchased services; **Recently** more often clients want external experts to provide heat
  - Procurement service for municipaities and industries: definition of project, preparation of tender documents, evaluation of bids, preparation of contracts, follow-up of contracts etc.
  - Central Finland energy balance calculation