



Heat Energy Entrepreneurship

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NORTHERN
WOODHEAT



North Karelia Polytechnic



We work in the energy field

- Special education
 - Wood energy counselling studies
 - Heat energy entrepreneurship studies
- Education materials
- Development projects

We operate in the area of Finland and Europe





North Karelia Polytechnic



North Karelia Polytechnic (NCP) was founded in 1992 among the first polytechnics in Finland.

- 7 study fields
- 22 degree programmes
- 4000 students
- 400 teachers and other staff
- Turnover EUR 25 million (year 2004)
- Funding from the Ministry of Education
- Maintained by the City of Joensuu



Heat Energy Entrepreneurship As a New Operational Model

- During the starting phase of heat energy entrepreneurship, in 1990's, entrepreneurs gained experiences by heating small-scale units, such as local schools and rest-homes
- The main operations included fuel supply for the boiler and also some control and maintenance work. Total volume of the business was low.
- Nowadays established heat entrepreneurs are ready to invest for new heating plants, which makes it possible for a customer to buy the heating as a service very comparable to district heating



Operational Models of The Heat Energy Entrepreneurship

1. An entrepreneur or a group of entrepreneurs invests and owns a heating plant and also takes care of the fuel supply and maintenance work.
 - Entrepreneur sells heat energy for the customer as a comprehensive service and the price for the heat is set in relation to the energy unit (€/MWh)

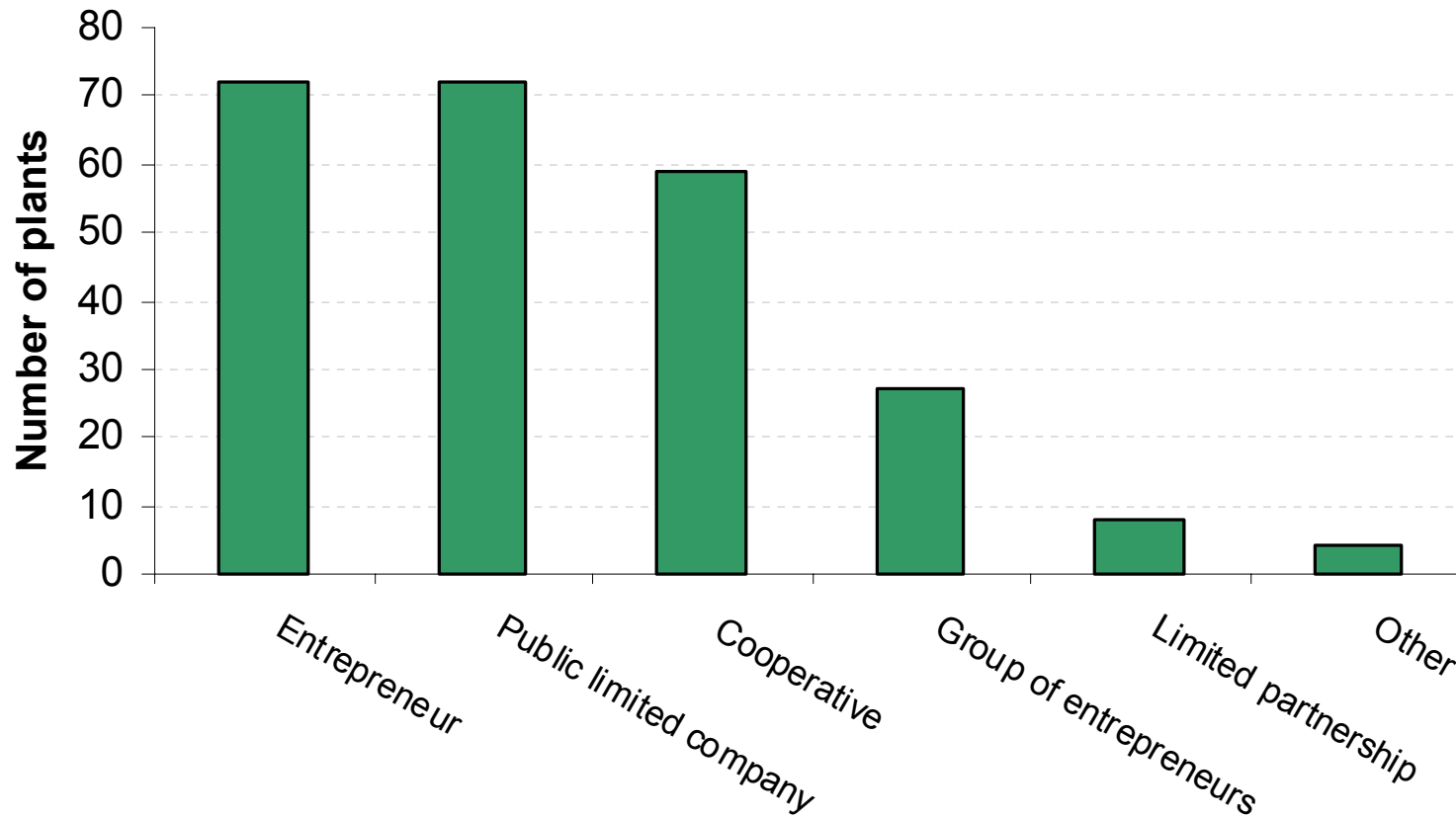


Operational Models of The Heat Energy Entrepreneurship

2. Municipality or the customer owns the heating plant and energy entrepreneurs take care of the fuel supply and technical maintenance work
 - Municipality, as an investor of the plant, has the main economic risk.
 - Entrepreneur's risk is limited to the own business activity and complying with the contract rules

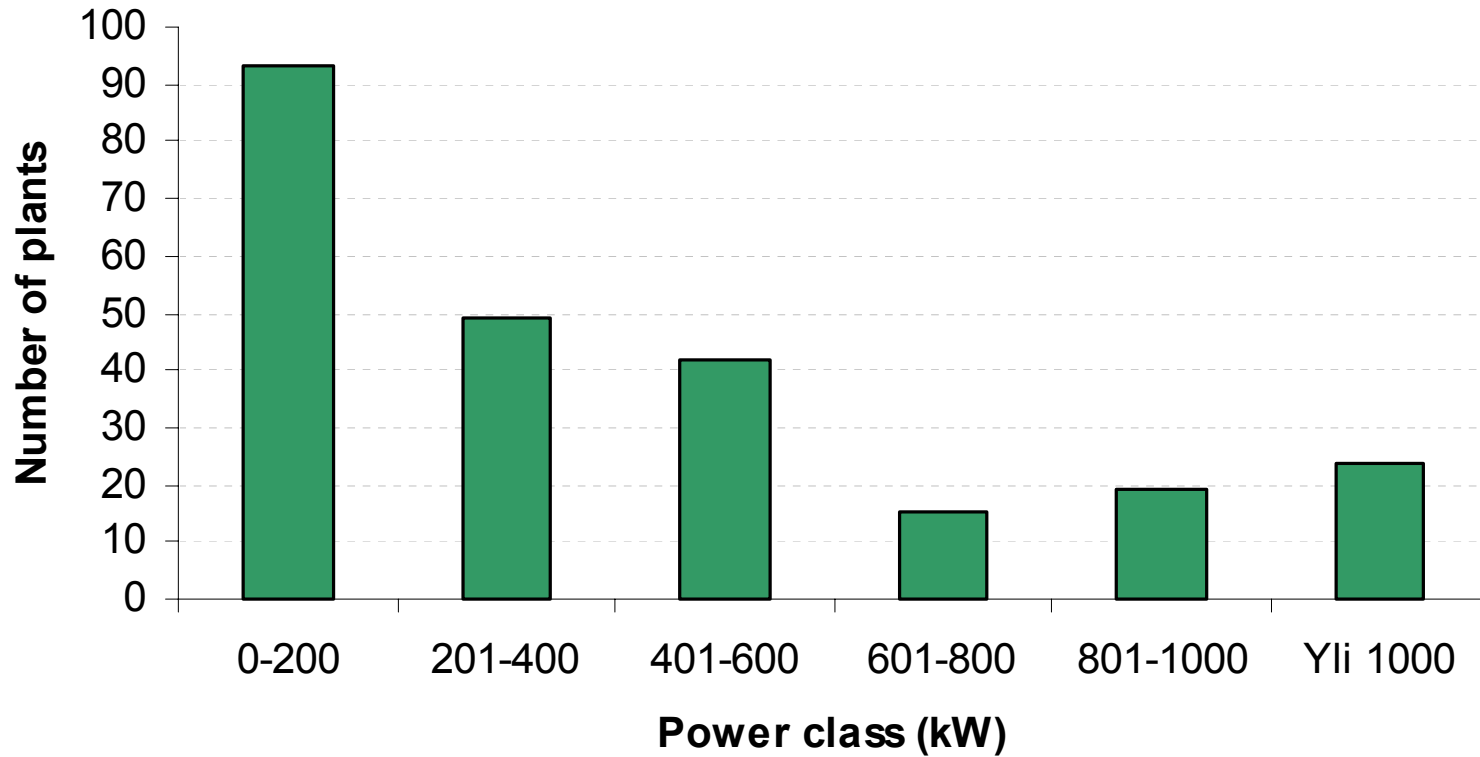


Number of The Heating Plants Taken Care by The Heat Energy Entrepreneurs



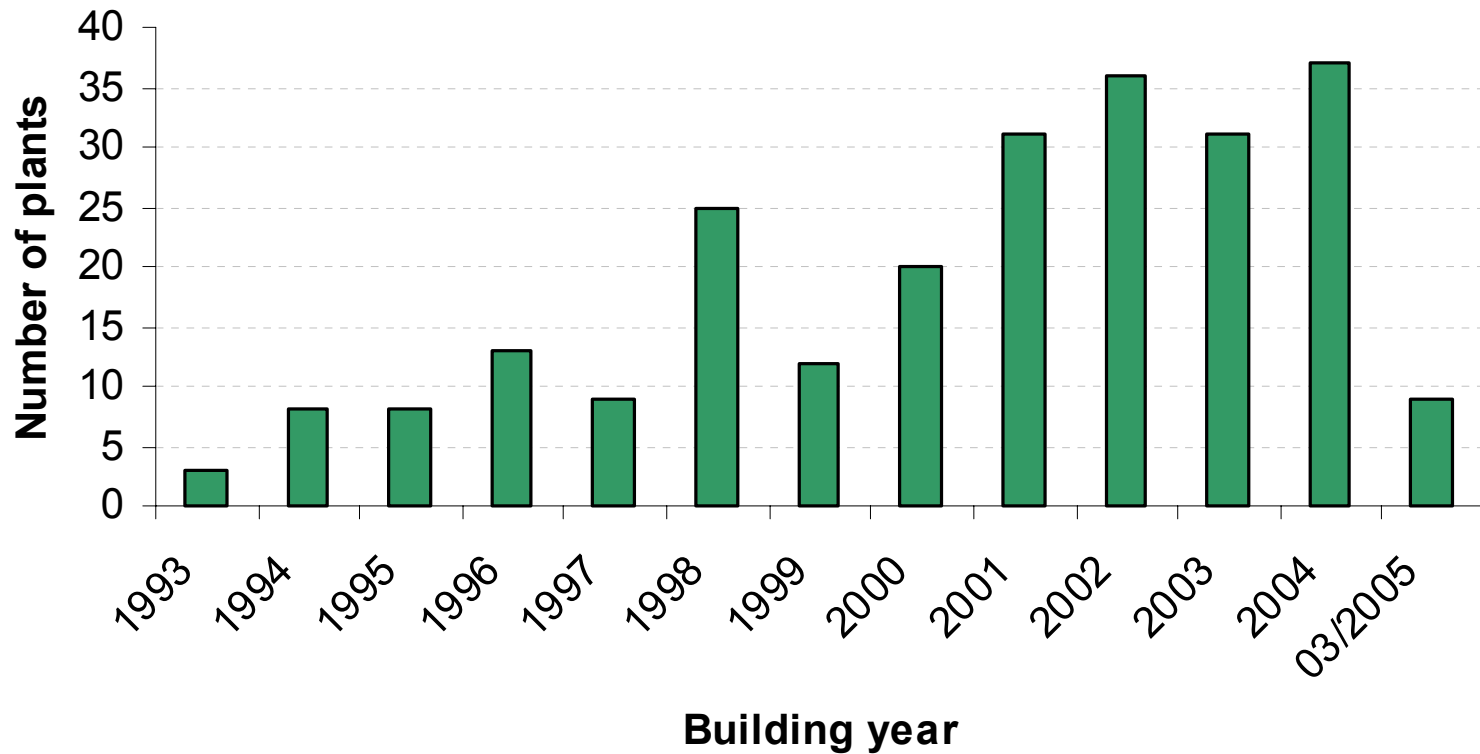


Size Distribution of The Plants





Building Year of The Plants Using Woodchips And Taken Care by The Heat Energy Entrepreneurs





Business Volume in The Heat Energy Enterprise

- Example: 500 kW
 - Solid fuel boiler 500 kW
 - Fuel Woodchips
 - Amount of produced heat/a 1200 MWh
 - Annual fuel consumption 1900 m³ (loose)
 - Heated building volume Approximately 27 000 m³
 - Length of the grid 400 m
 - Investment costs of the plant 267 000 € + VAT

- Business volume:
 - Total price of the heat 48 €/ MWh, containing
 - 28 € heat production + maintenance work
 - 20 € capital costs

- Annual business volume $48 \text{ €} * 1200 \text{ MWh} = 57\,600 \text{ €}$



Contractual Stakeholder Groups in The Heat Energy Business

- Municipality and heat energy entrepreneurs providing the service
- Owners and the equitable owners of the real estates
- Actors along the raw-material supply-chain



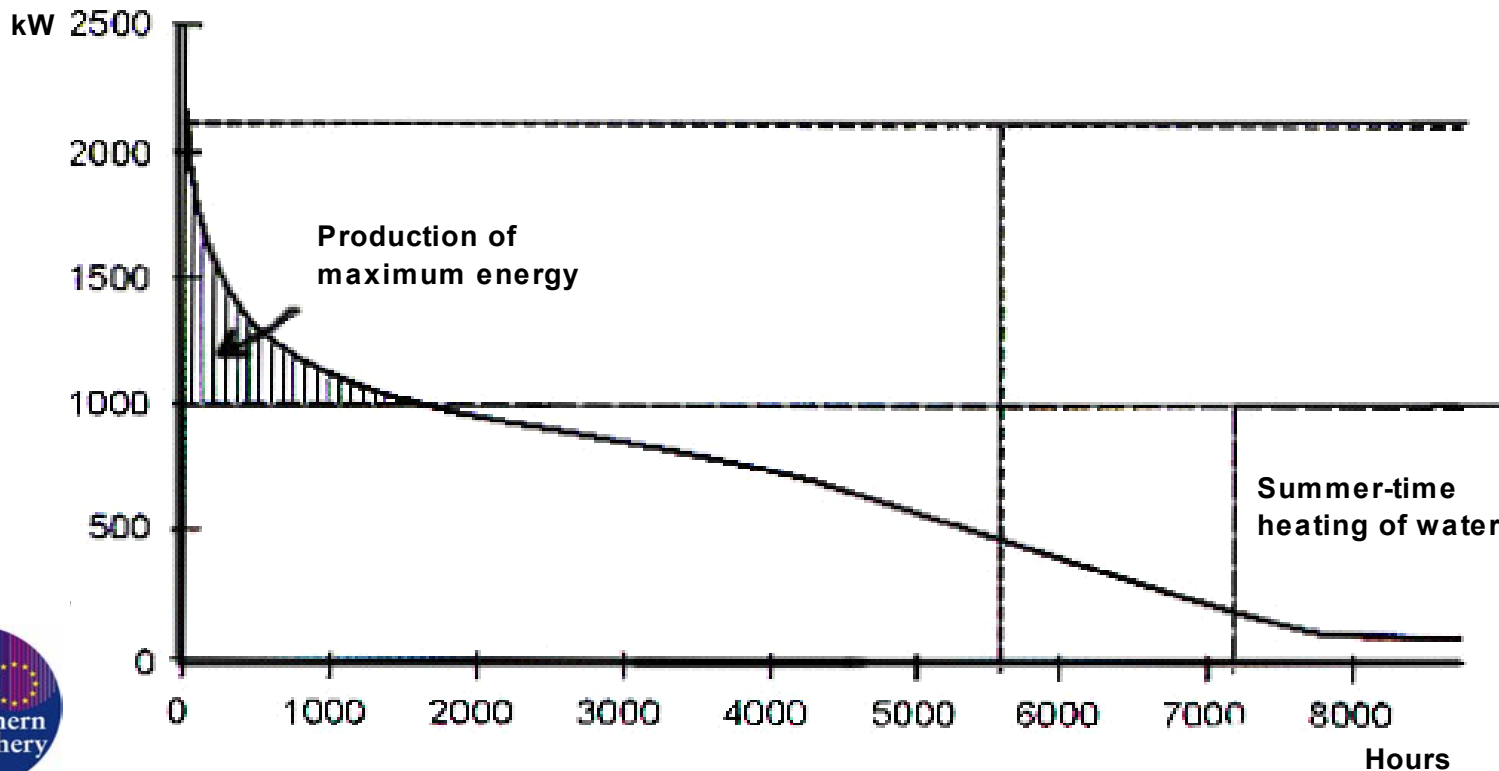
Heat Energy Entrepreneurship As a Part of Municipal Energy Solutions

- Requirements of the municipal energy solution
 - Multiple objectives: politics, environment, attitudes, economy, technology
 - Heat energy entrepreneurs compete with large energy companies
 - Challenging situation
 - Demands know-how on technology, economics, legislation, negotiation skills etc.



Acquisition Process of The Heating Plant

- The scaling of the heating plant according to the total heating load is very essential
- Aim is to cover from 80 to 90% from the total energy demand by using bioenergy





Requirements of The Public Acquisition Process

- Acquisition process; competitive tendering
- Purchasing criteria: price, quality, environmental impacts can be noticed as a new criteria!
- Tendering process and the decision; complying with the rules and technicalities



Things To Be Taken Into Consideration in Profitability Calculations

- Repayment period
- Interest rate
- Alternative fuels