District heating distribution in areas with low heat demand density

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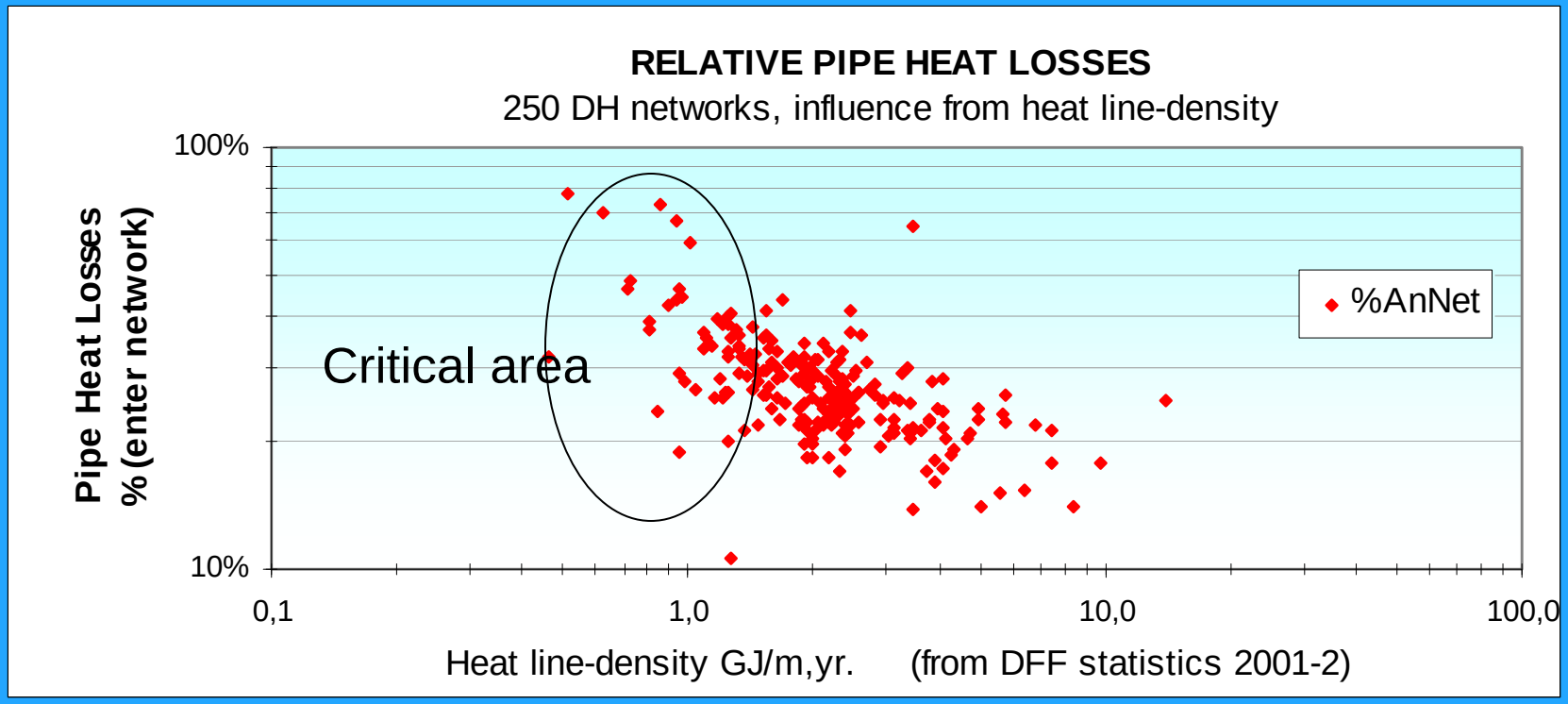
Objective

to propose and to analyse measures for improving the economy of heat distribution in areas with low heat demand density.

The main problem

- Heat losses
- Costs

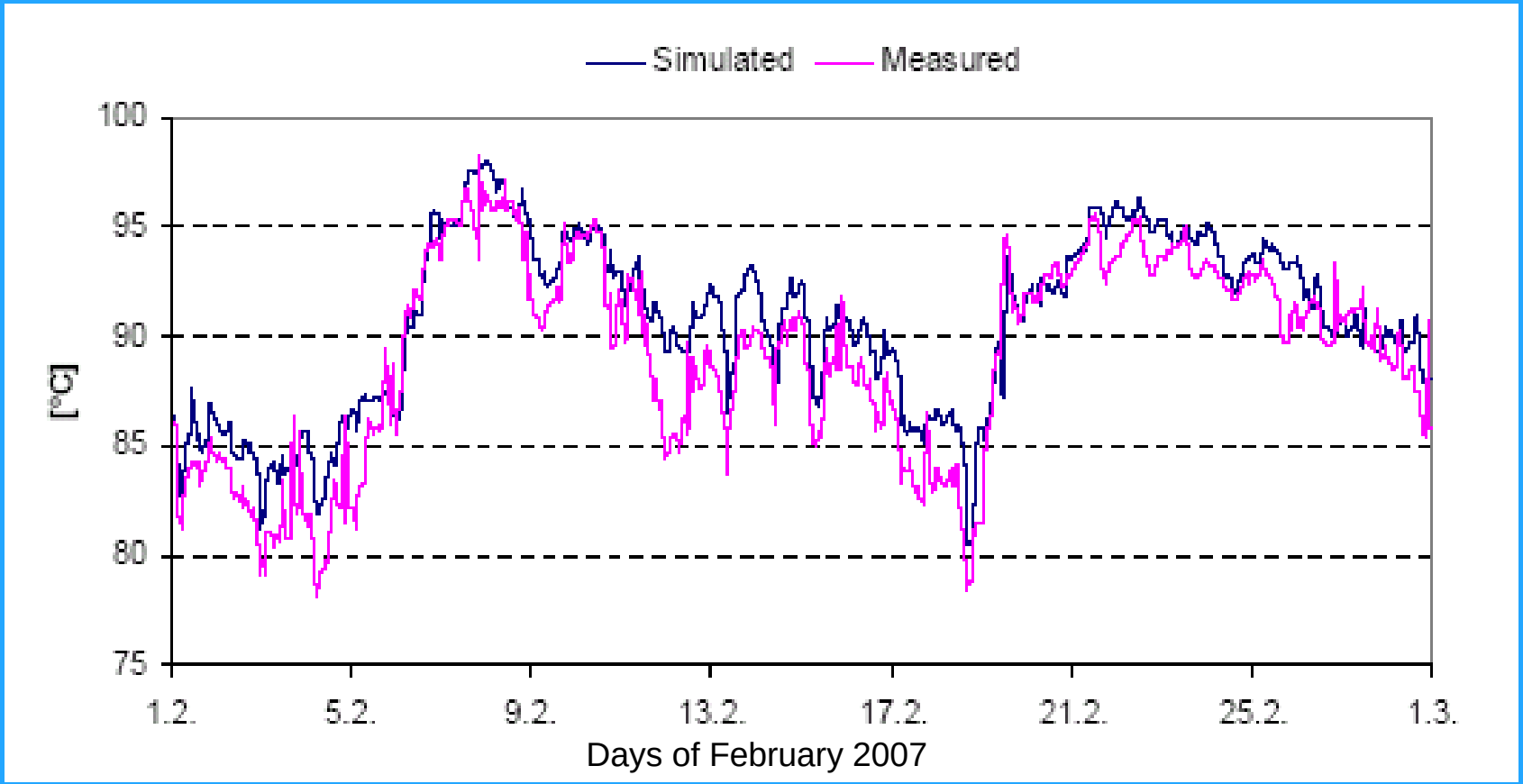


Working approach

- Analysis of existing systems in order to define reference systems
- Analysis of new techniques with potential of lowering system costs
- Analysis of new district heating applications for more efficient use of existing structures

Reference systems

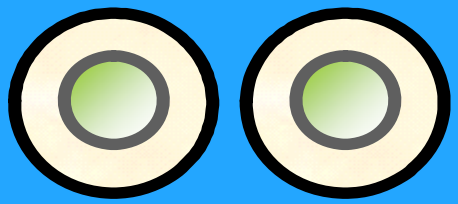
Example Neidonkallio:
31 buildings, 2500 m,1.4 MWh/m,yr



Supply temperatures for pipe system with series 1 insulation

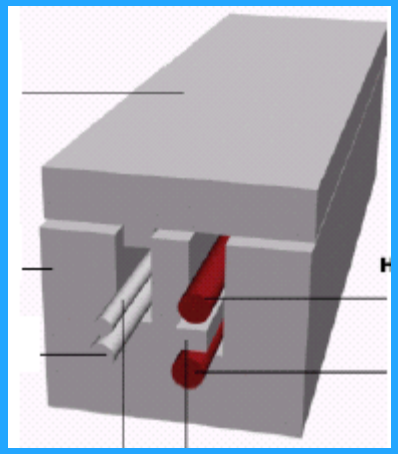
Cost analysis of alternative distribution techniques

Smaller size of anything reduces costs and heat losses



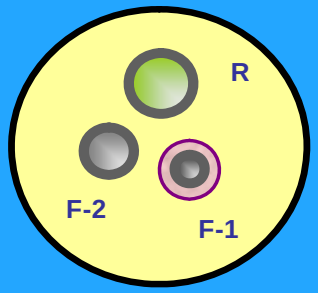
Single pipe

Twin

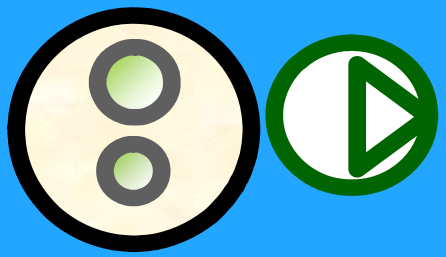


EPESPEX-system

Substation with Ackum.

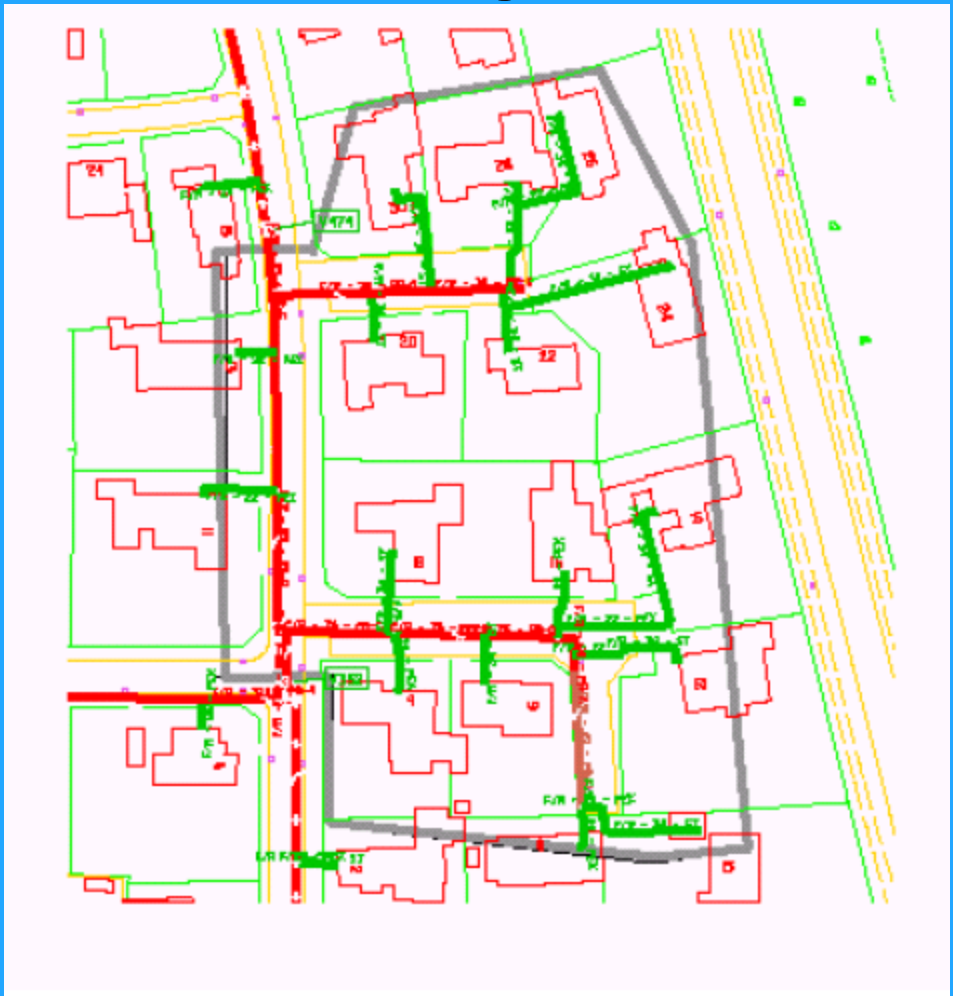


Triple pipe



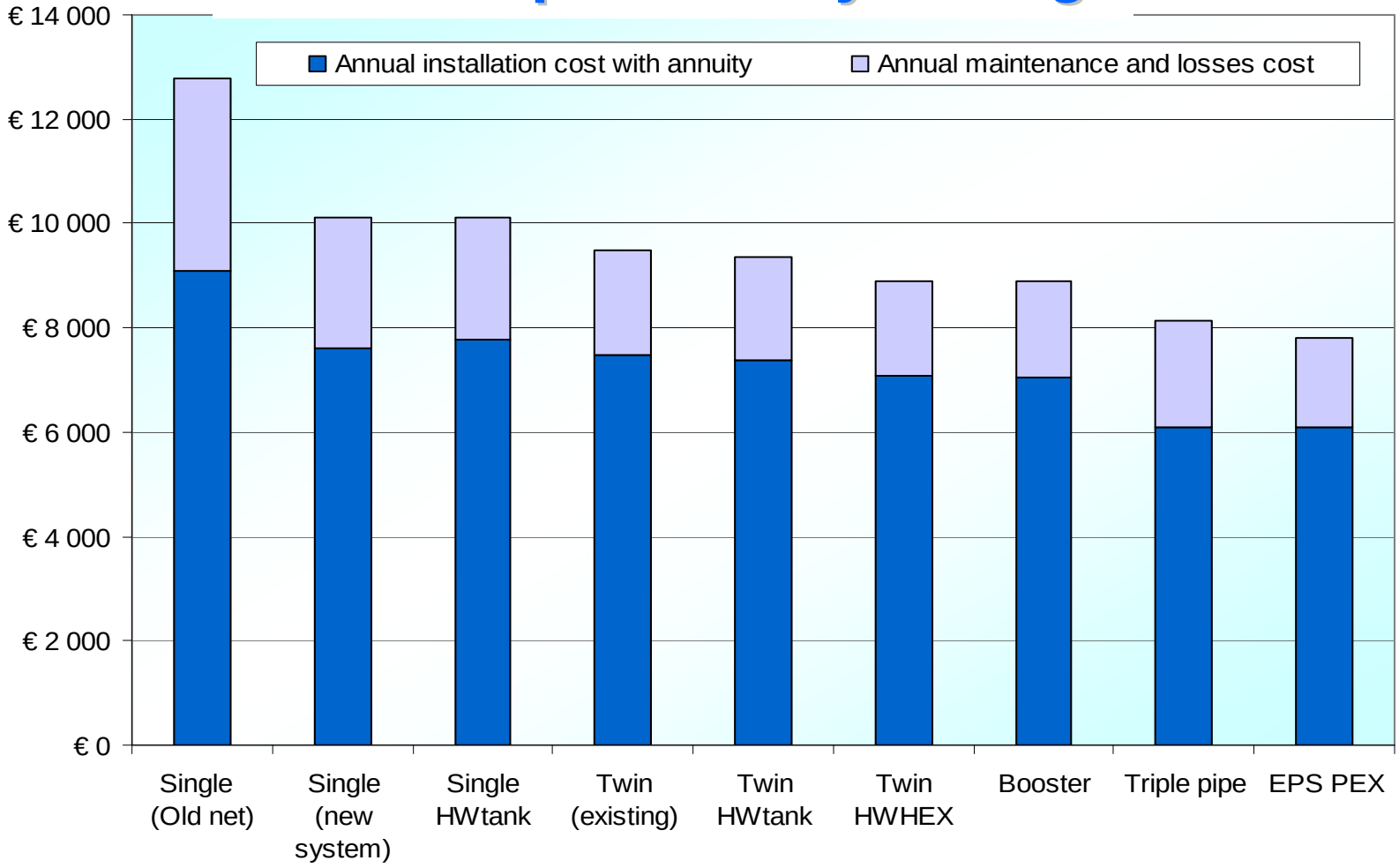
Twin with Booster

Reference systems

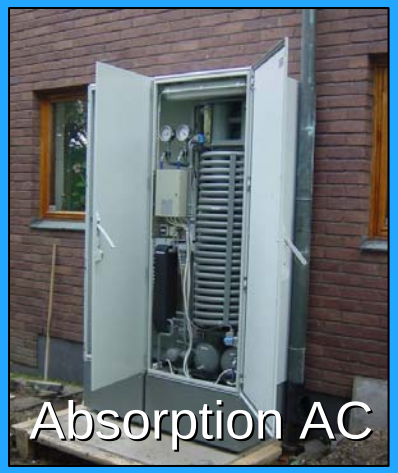


Example
Nykøbing, Falster, Dk
16 houses
574 m
0,56 MWh/m,yr

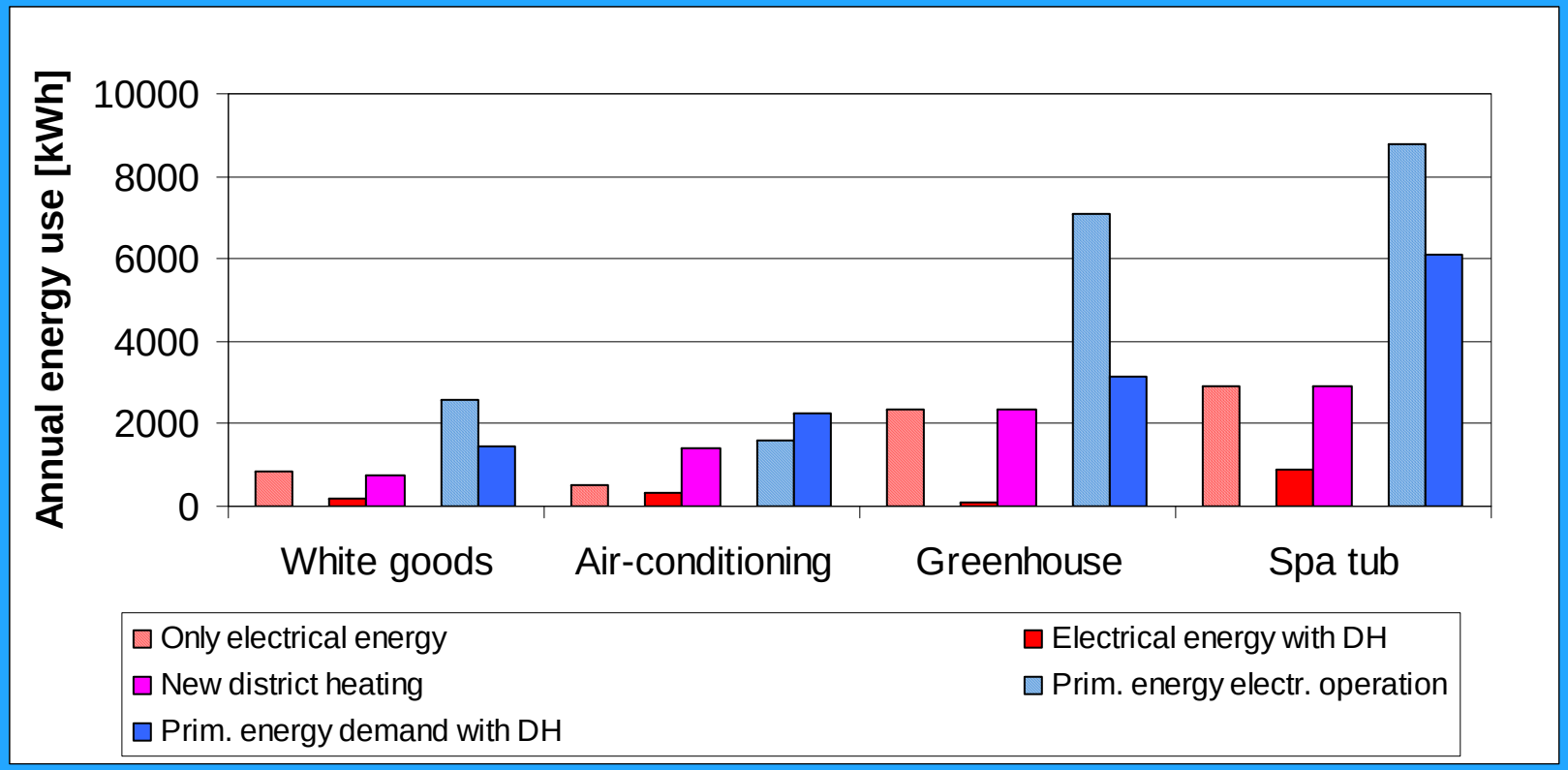
Cost comparison Nykøbing



Increased use of district heating instead of electricity - Demo Göteborg



Göteborg- house - comparison Electrical energy vs. District heating



5550 kWh electricity replaced by 7500 kWh district heating

DH-systems in areas with low heat demand – Main conclusions

- Simpler design for lower costs → low pressure, low temperature recommended
- Smaller pipe dimensions such as to be achieved with twin-and triple pipes are important cost factors
- Degree of connection is an important factor → marketing
- House-to-house trassing should be applied if possible
- Examples of cost reduction: 25 resp 40 % in two reference cases

Conclusions continued

- New loads such as for washing and dishing equipment can improve the utilisation of the district heating net
- Use of primary energy can be reduced by 35 % with the new loads in the Göteborg demonstration