NIRAS

4DH Research Centre - 3rd annual conference

Future DH technologies – in a local perspective

Lars Boye Mortensen, NIRAS

Point of departure

The Big Picture

Hans Henrik Lindboe ,

EA Energianalyse

”The role of district heating in the future energysystem”





The Project in Brønderslev

- A partnership between;
  - Brønderslev District Heating
  - Fleksenergi
  - Brønderslev Municipality
  - Aalborg University
  - NIRAS

Purpose of the project in Brønderslev

- To establish a partnership for DH industries across Northern Jutland to develop and demonstrate low-temperature concepts and products where the entire supply structure; production, distribution and utilization are “planed” together.
- To develop demonstration projects that will provide the framework for the partnerships activities to develop, test and commercialize low-temperature technologies in full scale, including the organizational and regulatory challenges.
- To identify funding and support opportunities for the partnerships development activities in the future.

Future goals

- To contribute to the conversion of the district heating sector in Northern Jutland to renewable energy by strengthening the existing competitiveness in relation to individual energy/heating solutions
- To develop industrial competences in low-temperature technology in Northern Jutland as a new business area and thus increase the DH heating business competitiveness. But also exploit export potential and by that ensure and create new jobs and growth in the district heating industry.

Work Group/Participants

DH Technical Suppliers	Institutions	Utility Companies
Logstor (District heating pipes)	UCN Aalborg	Brønderslev forsyning
Arcon (Solar heating)	AAU, Institut for Energiteknik	Års Fjervarme
Industrivarme A/S (Supply solutions)	AAU, Institut for Planlægning	Støvring Fjernvarme
DVI Nibe (Heatpumps)	Brønderslev Kommune	Viborg Fjernvarme
DESMI (DH Pumps)	Fleksenergi	
Inopower (Power Grid balancing systems)		
Halicon (Intelligent Heat Grid)		
Danfoss Redan A/S (User installations)		
NIRAS (Consulting Company)		

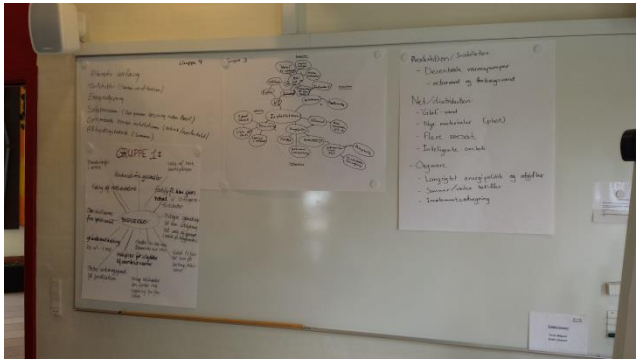
Fase 1: Workshops

Workshop 1

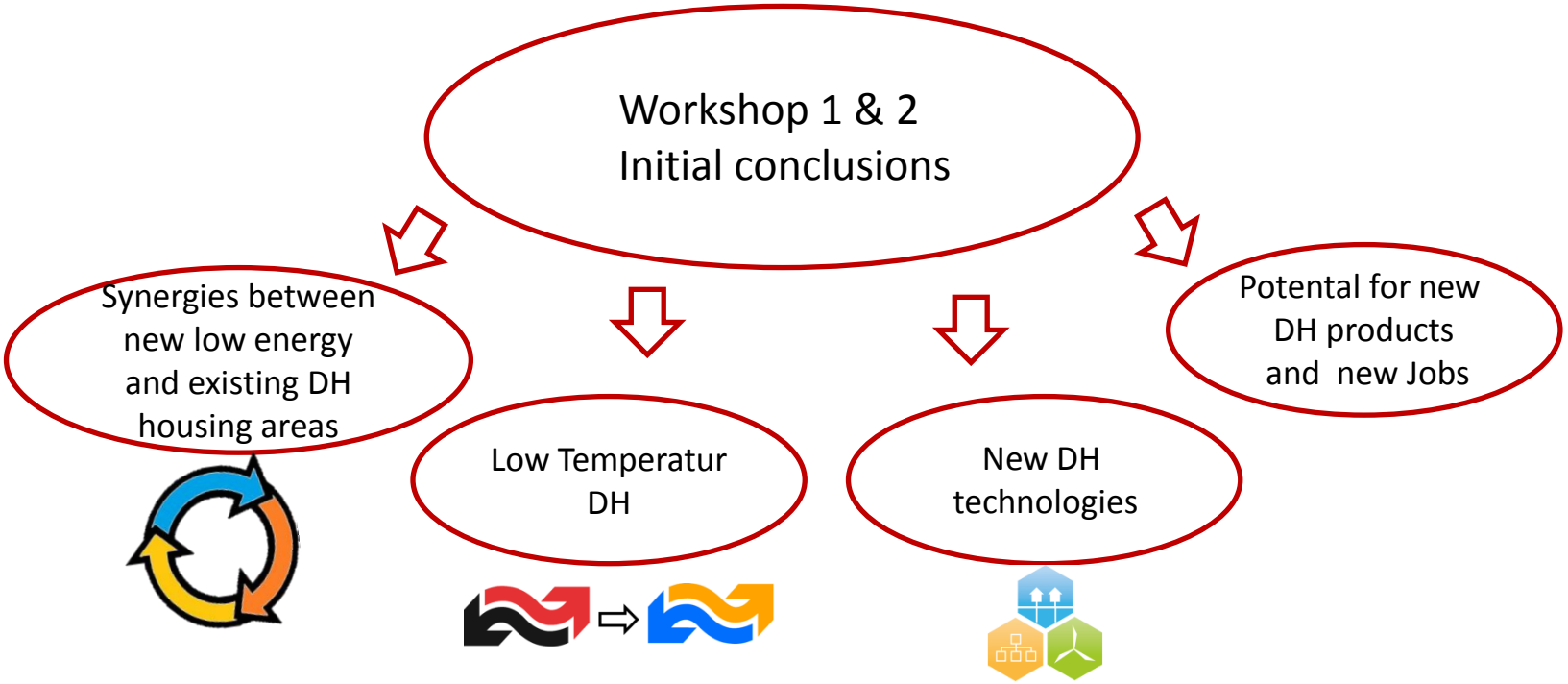
1. Dynamic tariff structure
2. Supply differentiated building regulative
3. Heatpumps / electric heater
4. Optimising return temperatures
5. Distribution – Pipe materials and types
6. Distribution – reducing pipelenghts lternative piping
7. Flexible delivery concept

Workshop 2

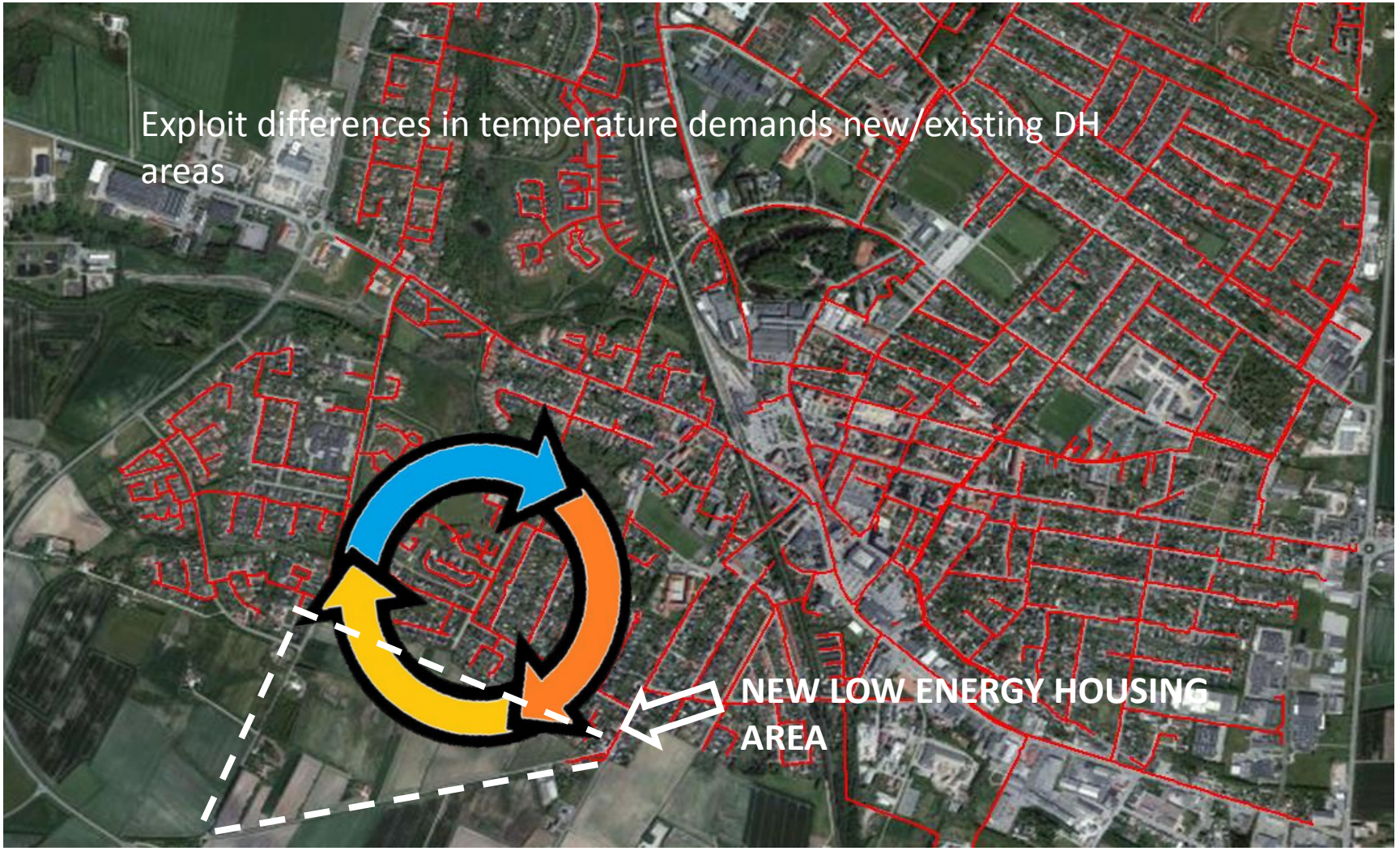
1. Future owner structure of substations, tariff structures and collection of data and management of remote heating network
2. Heating / Cooling supplies of low-temperature areas
3. Pipe type and distances
4. Development of domestic installations



Initial Conclusions from the workgroups (fase 1)

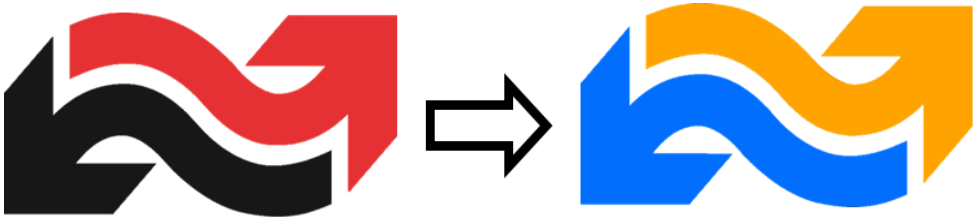


Synergies – Work groupe Conclusions
Low energy housing/existing high temp.DH)

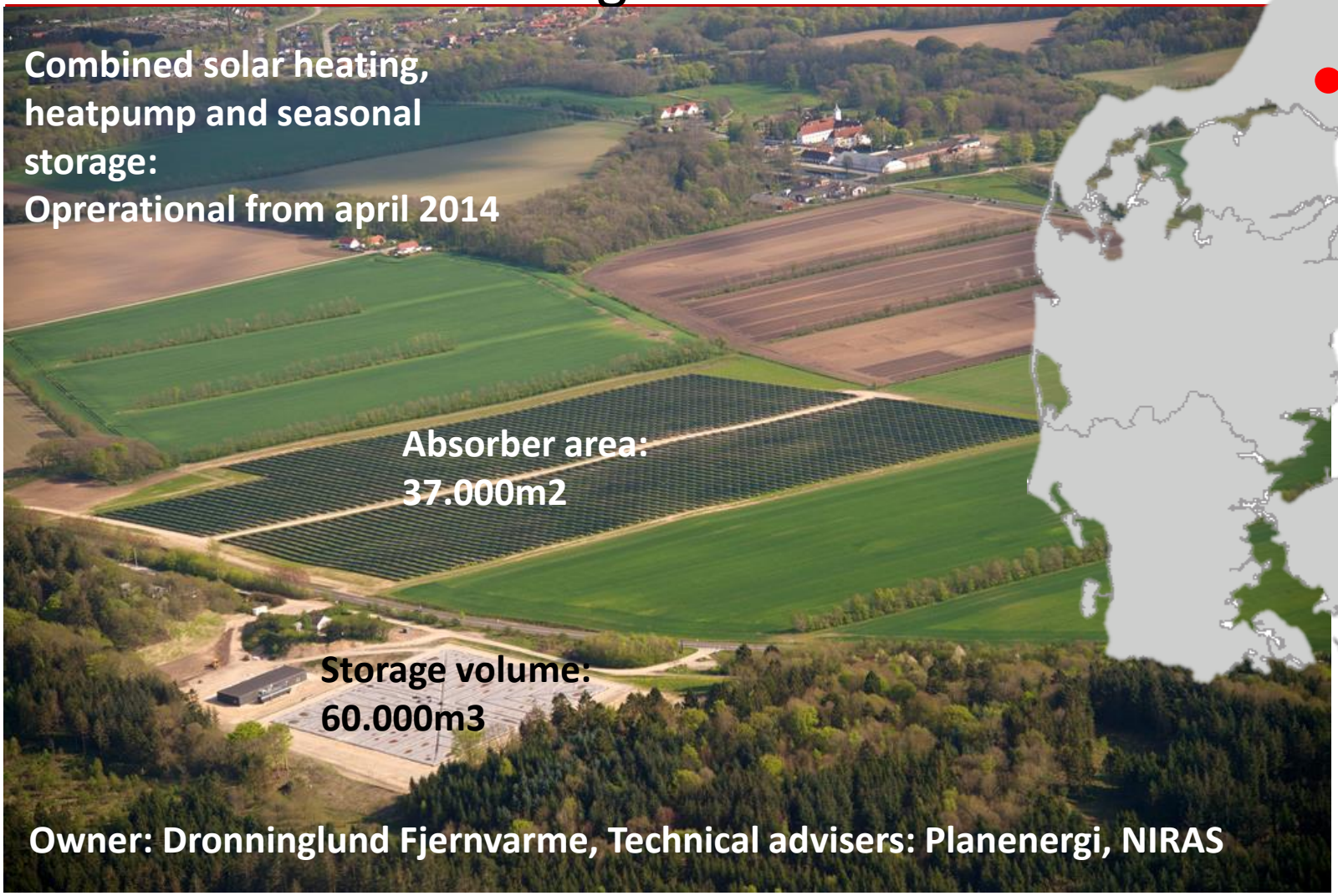


Low temperature DH – Work groupe Conclusions

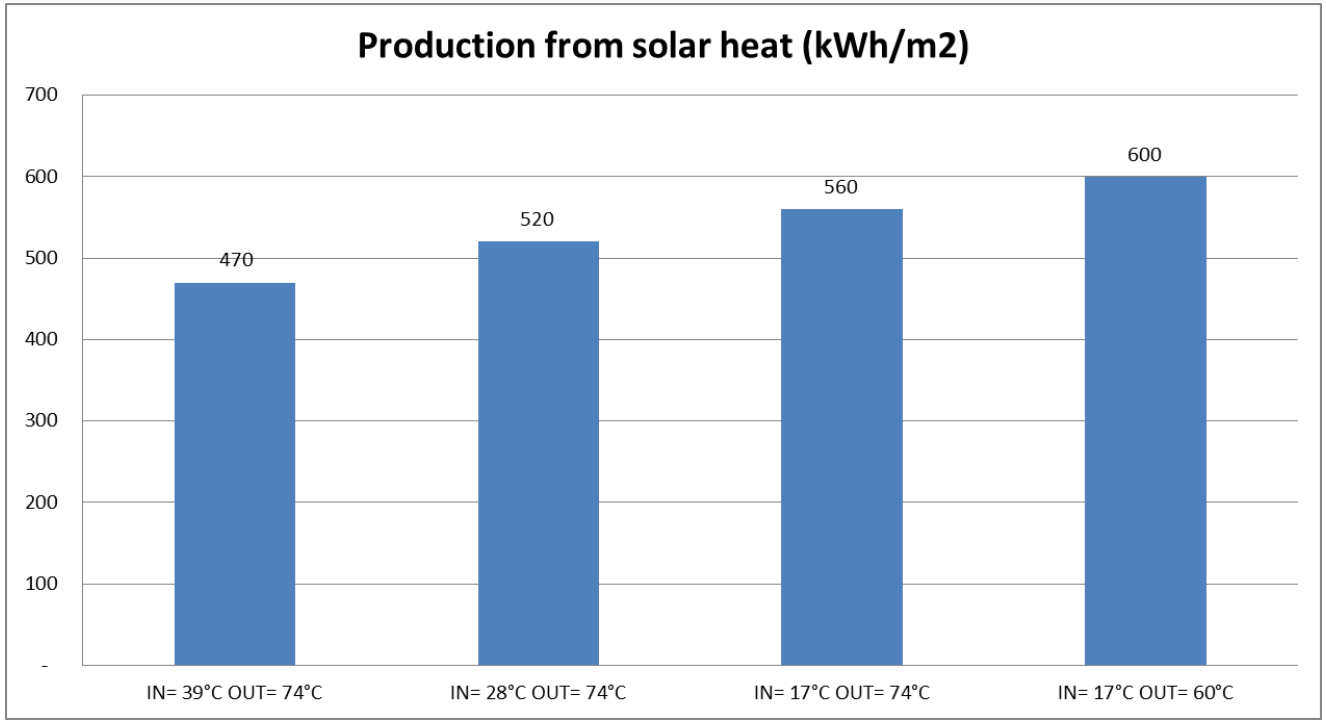
- Huge Potential for development of low temperature district heating technologies to :
  - Reduce heat loss in distribution system
  - Utilize low temperature waste heat, geotermal energy (Heat pumps)
  - Integrate local and seasonal DH storage facilities
  - Efficient integration of RE energy sources in DH (example from Dronninglund - next)



Example of efficient RE integration
Sunstore 3 in Dronninglund



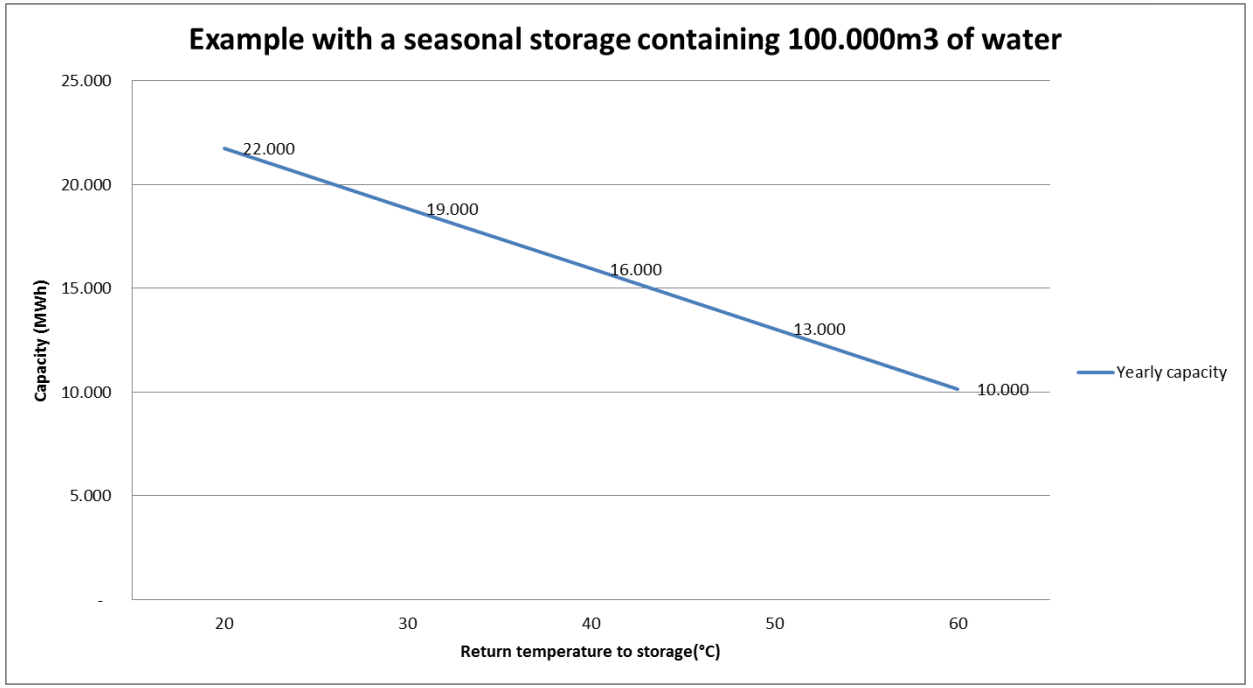
Solar heating in low temperature DH – increased efficiency



*Estimate

Seasonal storage in low temperature DH – increased efficiency

- A seasonal storage containing 100.000 m3 of water utilized 2,5 times during a year
- Approx. 20% increased capacity per 10°C reduced return temperature



*Estimate

New technologies – Work groupe Conclusions

- DH Pipe Technology
  - Alternative pipe materials
  - Trippel pipes, quatri pipes (Cooling)
  - Pipe routing (minimize investment/heatloss)
- Small heatpumps
- Optimized house installations heat/cooling
- Seasonal heat storage
- Smart heat grid (2 way communication)

Fase 2: implement Local Demonstration Projects

Fokus areas:

- Technical development :
  - Combined heat and cooling solution for low energy housing
  - Optimized pipe- types, materials and pipe routing
  - Optimized substations
- Management and operation :
  - 2 way communication, management and operation of a DH "smart grid"
- Customer Interface / organization
  - Tariff structures, owner structures, utility/customer Interfase
- Support functions
  - Technical modeling of the components in the energy system
  - User economy, corporate finance and economics
  - Calculating reference scenarios

Global challenges - Local solutions

Thanks for your attention !

Lars Boye Mortensen/NIRAS