

# The SUNSTORE<sup>®</sup> Plant in Marstal

## **Marstal District Heating 100% Renewable District Energy System with Storage**

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# The SUNSTORE® Plant in Marstal

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**PlanEnergi:**

Consultant Engineers  
30 years years with  
renewable energy

- biomass
- biogas
- solar thermal
- heat pumps
- district heating
- energy planning



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## Marstal 2010

- 9 000 m<sup>2</sup> solar collectors Arcon HT<sub>1996</sub>
- 2 100 m<sup>3</sup> steel tank
- 8 019 m<sup>2</sup> Arcon HT<sub>2002</sub>
- 881 m<sup>2</sup> GJ-Teknik<sub>2002</sub> (Now Sunmark)
- 103 m<sup>2</sup> Wagner roof elements
- 108 m<sup>2</sup> Termomax evacuated tubes
- 211 m<sup>2</sup> IST CSP-collectors
- 10 340 m<sup>3</sup> pit heat water storage
- 400 kW<sub>heat</sub> heat pump using propane as refrigerant

1 460 end users and a yearly heat production of 28 000 MWh

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## Sunstore 4 Marstal

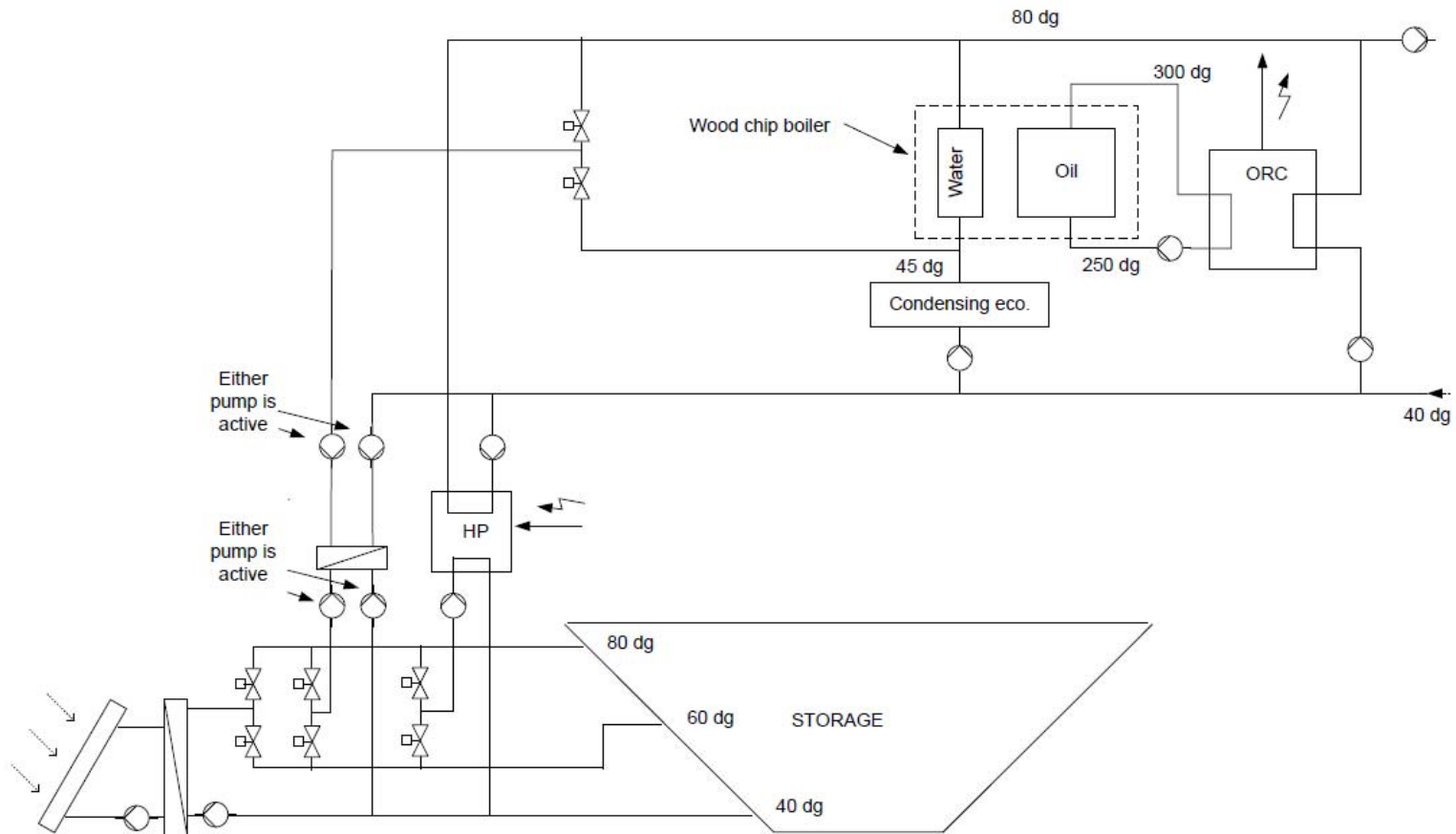
Supported by EU  
7<sup>th</sup> framework  
program

- 15 000 m<sup>2</sup> solar collectors
- 75 000 m<sup>3</sup> pit heat storage
- 1 MW (cooling) compressor heat pump
- 4 MW wood chip boiler
- 0.75 MW ORC



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## Principle diagram



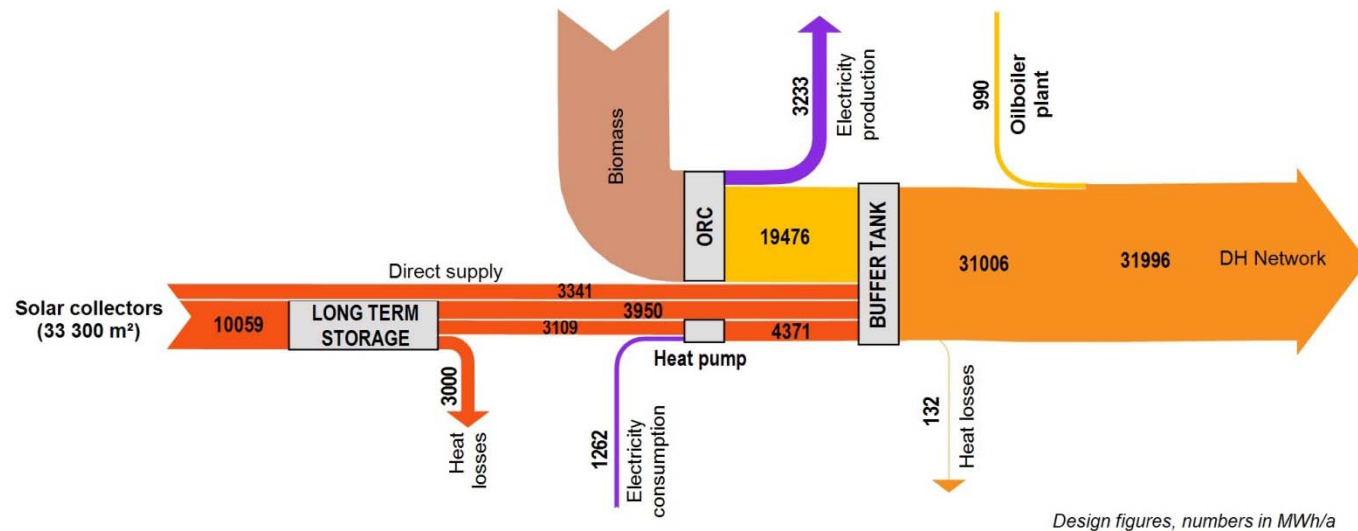
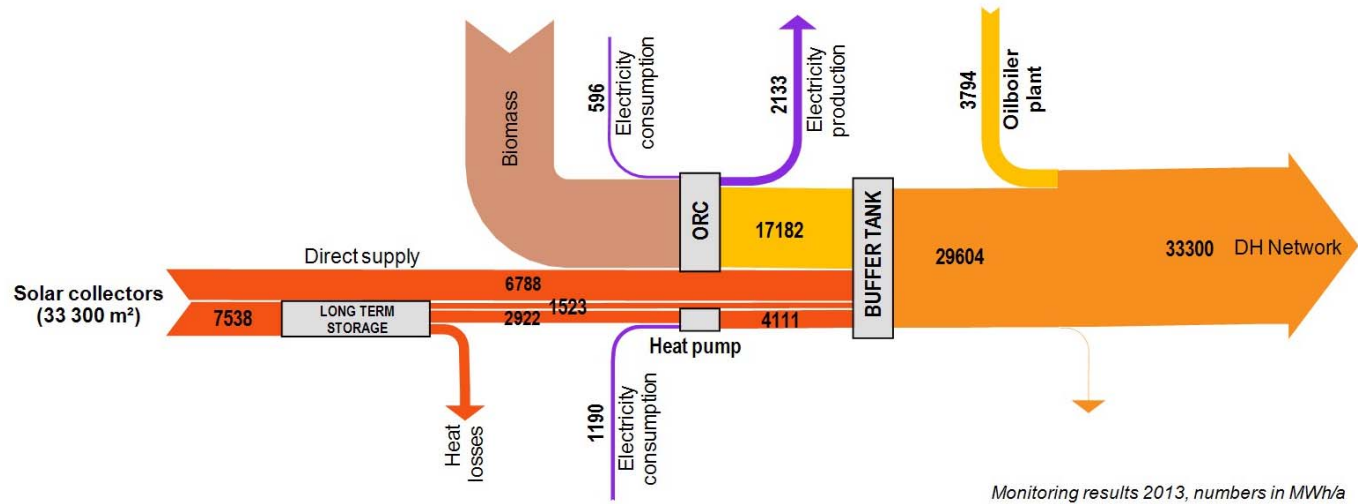






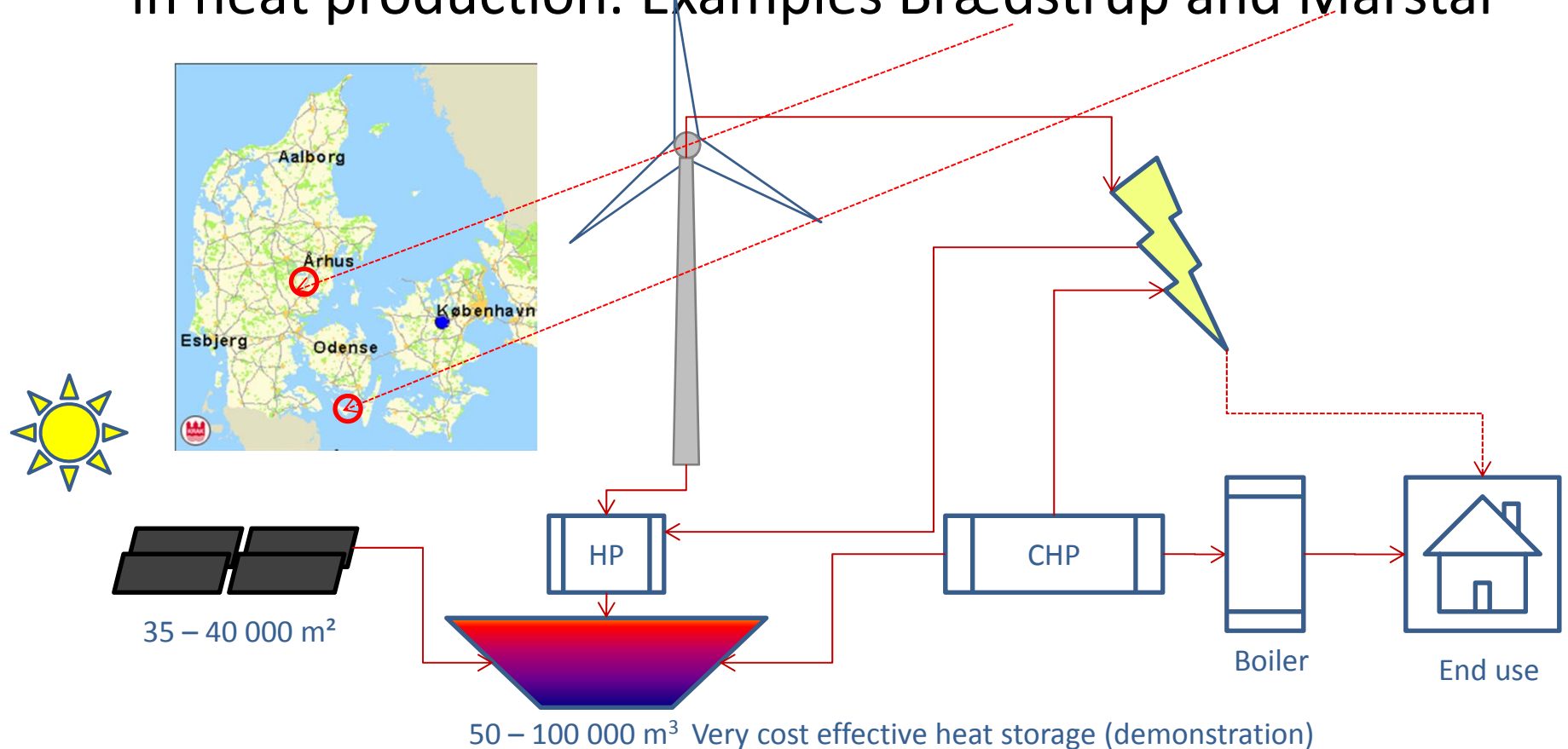


# Energy flow diagram. Comparison between monitoring results year 2013 and design values



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The SUNSTORE<sup>®</sup> concept can integrate renewable electricity in heat production. Examples Brædstrup and Marstal



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## Relevance of the SUNSTORE concept

The concept is adaptable to different regions with different types of conditions. This includes:

- Able to integrate power and heat production (power to heat in periods with high production from wind and solar and CHP production in periods with low production from wind and solar)
- Energy output in terms of heat, cooling, electricity and even desalination according to the demand in the region and with 100% RES
- Flexibility in the mix of solar, biomass energy, geothermal energy, excess heat and electricity (heat pump) related to availability and cost of resources
- Flexibility in the types of biomass (able to use wet and not very homogeneous resources)

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**More information on**

**[www.planenergi.dk](http://www.planenergi.dk)**

**[www.solarmarstal.dk](http://www.solarmarstal.dk)**

**[www.braedstrup-fjernvarme.dk](http://www.braedstrup-fjernvarme.dk)**

**[www.sunstore4.eu](http://www.sunstore4.eu)**

**[www.solar-district-heating.eu](http://www.solar-district-heating.eu)**