AALBORG CSP
- Changing Energy

16.6MW$_{TH}$ CONCENTRATED SOLAR POWER PLANT

for Brønderslev Forsyning, Denmark

CSP integrated with **BIOMASS-ORC**

PROJECT FACTS

CUSTOMER NEED

Heat as primary energy

Electricity periodically produced

CONCENTRATED SOLAR POWER PLANT

26,929m² parabolic troughs

up to 330 °C

END USERS

4,500 households

ENVIRONMENTAL SAVINGS

23,000 tons CO_2 / year

Aalborg CSP in close collaboration with the Danish district heating plant (Brønderslev Forsyning) carried out a comprehensive feasibility study and established a 0.8MWth test facility to investigate the potential of using concentrated solar power (CSP) as an add-on to a biomass-fired Organic Rankine Cycle (ORC) plant. Based on the positive findings, Aalborg CSP was awarded the contract to develop and supply the 16.6 MWt CSP plant enabling production of heat and electricity within one carbon-free system.

This combined solution is the first large-scale system in the world to demonstrate how CSP, with an integrated energy system design can optimize efficiency of ORC even in areas with less sunshine, in this case Denmark.

"This project is yet another good example of how the Aalborg CSP integrated energy system approach for combining fuel sources and multiple energy streams opens new markets where CSP creates value. Through close cooperation with the client, we can unlock the black-box to create projects in areas where otherwise it would not be possible" – says Svante Bundgaard, CEO of Aalborg CSP.

The achievement of the world's first CSP system combined with a biomass-ORC plant is supported by the Danish Government's Energy Technology Development and Demonstration Programme (EUDP).

Construction and installation of the system set records as it reached completion in just short six months. The ORC part of the project is scheduled to go operational in 2018.

FROM IDEA
to reality

Summer 2015
0.8MWth test plant, performance monitoring

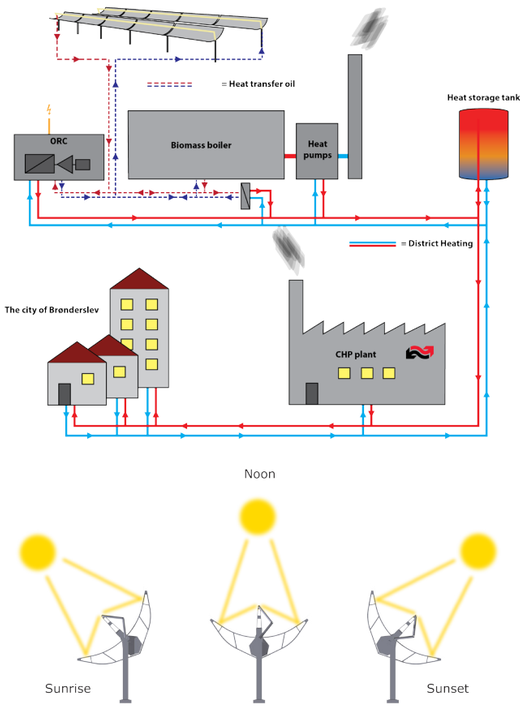
Winter 2016
Contract for 16.6MWth large-scale plant

Spring 2016
Construction begins

Winter 2016
CSP plant goes operational

Year of 2017
First solar season with excellent performance

Harvesting the sun ***IN THE MOST EFFICIENT WAY***



The solar energy plant is based on the CSP parabolic trough technology consisting of 40 rows of 125m U-shaped mirrors with an aperture area of 26,929m².

These mirrors collect the sunrays throughout the day and reflect them onto a receiver pipe, which sums up to 5 kilometre receiver tubes. This receiver pipe is surrounded by a special glass vacuum tube and inside this runs - only heated by the sun - thermal oil with temperatures up to 330 °C. This high temperature is able to drive an electric turbine to produce electricity, but the flexibility of the system also allows production of lower temperatures for district heating purposes.

The solar heating system can thus alternate between providing heat or power. To maximize yield of energy, the waste heat is utilized and sent to the district heating circuit whereas electrical power is generated at peak price periods.

On sunny days, the solar-thermal system is set to reach 16.6 MWth capacity.

CHANGING ENERGY
around the world

Aalborg CSP is a leading developer and supplier of innovative renewable technologies aiming to change the way energy is produced today. Relying on extensive experience from some of the most efficient concentrated solar power (CSP) projects around the world, the company designs and delivers green technologies and integrated energy systems to lower the cost of energy for industries and power plants worldwide.

Aalborg CSP places strong focus on R&D activities and partners with knowledge-based companies and institutions to create leading-edge technologies. As a result, the Aalborg CSP engineering design is centred on a value-adding concept providing solutions that excel in operation, increase plant revenue and contribute to a greener future.

Headquartered in Aalborg (Denmark) and with sales & service offices in Spain, the US, Australia and Indonesia, Aalborg CSP has realised more than 1,700MWth cost effective green energy solutions to a variety of industries worldwide.

5 sales & service locations
more than 1,700 MWth solar installations

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