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Proving Concepts

Celebrating five years in business the Danish biomass combustion company, Dall Energy, is forging ahead with several successful pilot and demostration projects using innovative combustion and heat recovery technologies.

Founded in 2008 by the CEO and inventor, Jens Dall Bentzen, the company Dall Energy was formed as a means of introducing and commercialising new biomass technologies to the market.

Innovator

Prior to starting the company Bentzen was a project manager with the Danish engineering consultancy COWI A/S, in charge of new biomass technologies research and development.

He was involved in a several innovative projects including the upscaling of a two-stage gasification process, optimisation of straw fire heating plants as well as software for determining energy efficiency and economics of biomass boilers.

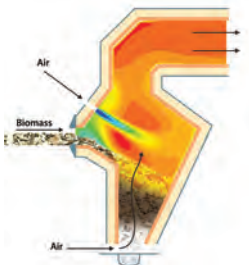
Bentzen had also invented a gas cooling and heat recovery system, the patent for which he then acquired from COWI when he set up Dall Eenergy.

Two stage furnace

Initially the company was focused on flue ga condensation but after research into inlet conditions for the flue gas condensation system, the company decided to extend the focus on low emission combustion.

In 2009 the company developed their novel biomass two-stage furnace. Gasification of the biomass, which enters the furnace mid-ship, is the first stage and takes place in the bottom section of the furnace.

Here the solid material is transformed into a combustible gas and fine ash. The gas velocity in this section is very low so the particles remain resulting in very low dust and particle emission from the furnace.



The gasification gas from the bottom part of the furnace is then burnt in the top section during the second stage. The gas combustion itself is in terms of flo , temperatures and emissions, very stable (see BI30 resp. 37 for a more detailed description).

Proof of concept

The company received a co-financing grant from the Danish energy agency for proof of concept and process verification.

A 2 MW pilot plant was built in co-operation with SEM Steel Industry A/S, a major manufacturer and supplier of machinery and components to the power and environmental industries, at their facilities in Odense. Verification with biomass such as straw and woodchips was completed in 2010 and an additional grant was awarded by the energy agency to build an 8 MW full scale demonstration plant. The 2 MW pilot has since been shipped to Warrick Mills production facility in New Hampshire U.S. Here wood chips are used together with ventilation exhaust from the factory to provide steam.

The 8 MW demonstration furnace at Bogense Fjernvarme heating plant

8 MW demo

Together with SEM and Weiss A/S, a subsidiary of SEM who design, manufacture and install biomass combustion plants in the 1-30MW range and who provided EPC services for the project, the demo plant was built for Bogense Fjernvarme, a district heating provider in the neighbouring town of Bogense.

The plant is a combination of third-party technology blocks including a Danstoker exhaust gas boiler, flue gas co - denser and condensate filter from Weiss as well the furnace and a quench type particle scrubber system from Dall Energy.

Placed before the flu gas condenser, the particle quench minimises the particle load in the condensate that otherwise would foul heat exchangers, nozzles and pumps resulting in reduced plant efficiency along with increased maintenance and replacement costs.

The quench water is re-circulated back to the furnace for temperature control and ash moisturising. The plant was first fired during at the end of Q1 2011 and operational during the latter half of 2011. During 2012 the plant was modified to improve overall performance and efficiency. Bogense Fjernvarme was subsequently able to drop their heat prices by 20%.

The "proof of concept" 2 MW two-stage biomass gasification pilot furnace at SEM Steel Industr . It has since been shipped to Warrick Mills, USA

New 9 MW demo

A new demonstration project in the works is a 9 MW biomass dis - trict heating plant for Sønderborg Fjernvarme in Sønderborg with former employer COWI acting as consultant. Unlike the previous two projects Dall Energy has assumed total responsibility for the total engineering and it will include other innovations such as two-stage flue gas condenser for extra high efficiency, a ceramic condensate filter and a low cost compact boiler.

This time the co-financing comes from the Danish Market Development Fund. The plant is due to be completed by Q4 next year.

Text Alan Sherrard
Photos & illustration courtesy Dall Energy
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Saxlund win two major material handling orders

Saxlund International GmbH, a subsidiary of Opcon, the energy and environmental technology Group, has reported winning two major contracts, in Germany respective France.

The German contract is for the exterior material handling for a biomass power plant being built by Viessmann for Prolignis Energie Consulting GmbH Co.KG, Ingolstadt.

The plant will provide steam and power to be used for the sterilisation of medical equipment manufactured by B.Braun in Melsungen.

The scope includes the delivery of floor discharger systems, chain-, belt-, vibroand ash conveyors as well as separation systems.

Installation is expected in January 2014 and the total order value is about 7,5 M SEK.

The French contract is from Doosan Babcock Ltd., the main supplier for the new E.ON "Provence 4 Biomasse" 150 MW biopower station in Gardanne.

The scope is a turnkey supply of a complete waste-wood distribution system with several silos, rotor discharge machines and conveyors.

Delivery will begin in 2013 with start-up in 2014. The total order value is over 25 M SEK.

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