

Danish biomass gasification and combustion specialists Dall Energy ApS has completed the delivery of a 17 MWth turnkey biomass boiler plant to Rouen, France for the French energy company Dalkia. The heat plant was officially inaugurated on December 10, 2020 with the first fire and handed over on March 5, 2021.

Dalkia fires up state-of-the-art plant

WITH 71 MUNICIPALITIES AND NEARLY 500 000 INHABITANTS, the Rouen Normandy Metropolis (Métropole Rouen Normandie – MRN) is the ninth largest “Métropole” in France. Since January 1, 2015, the role of MRN in the energy transition has been strengthened with the creation of a master plan for its heating networks as part of the Metropolitan Area’s Climate Air Energy Territorial Plan.

Going for 100 percent renewable heat

This was further enhanced as part of the 2016 Paris Climate Agreement with amongst other things had objectives relating to the densification and extension of existing heat networks, the greening of the last network not supplied by renewable or recovered energy (so called ENR & R), and the development of new innovative projects.

The metropolitan area has nine local district heat plants that are independent of each other, six of which supply renewable heat from biomass and geothermal, and two that are waste-to-energy plants. Representing over 9 percent of final energy consumption used in space heating in MRN, these nine heat plants combined supply around 335 GWh of heat per annum. Of this, around 58 percent comes from renewable or waste-to-energy sources with the balance from fossil gas that was used at the one heat plant, the Petite Bouverie facility operated by Dalkia, an EDF company.

Demonstration installation

As featured in Bioenergy International no. 1/2019, Dall Energy was selected by Dalkia to supply a turnkey boiler for the Petite Bouverie heat plant fuel switch project. Also the fifth, and thus far, largest installation for Dall Energy, the overall project for Dalkia also includes extension of the heat network. The entire project has received funding from the European Union’s Horizon 2020 Research and Innovation Programme (Grant Agreement no. 811529), to upscale and demonstrate its staged biomass gasification technology with Dalkia.

– Eighty percent of the heat for the district heating network of Métropole Rouen, is now produced from local renewable energy which means

CO₂ reductions of 27 000 tonnes per year, remarked Sylvie Jehannot, CEO of Dalkia during the first-fire ceremony.

The project constraints were considerable. Already four of the nine MRN heat plants operate on biomass, so the 17 MWth Petite Bouverie heating plant needed to be biomass flexible in terms of source and moisture content. At the same time, the French Agency for Environment and Energy Management (ADEME) and energy companies like Dalkia are keen on using local biomass, in particular unused green woody waste that often ends up in landfills.

In the case of Petite Bouverie this is green park- and garden waste from pollarding, fruit tree pruning, hedge clippings, street-tree maintenance and “bosage” landscape management sourced within the MRN territory, about 100 km radius of the facility. The fuel is supplied chipped/shredded by the company Biocombustibles. Onsite there is removal of oversize and contaminants such as stones and metals which along with other front end fuel handling was installed by Dalkia. According to Dall Energy, its furnace can gasify biomass with a moisture content of up to 60 percent.

Load flexibility and low emissions

The other constraint was the plant itself. Having operated on gas, there were no hot water buffer tanks installed. Thus, the boiler needed to be able to deal with fluctuating daily loads of the around 17 000 households connected to the 42 km long network. This is possible since the gasification furnace can be modulated between 20 and 100 percent load without problems.

Fuel and load flexibility were not the only reasons for Dalkia to select Dall Energy for the project. The proprietary gasification system enables a cleaner combustion ensuring that air emissions are significantly lower than what can be obtained with traditional grate incineration system, a key consideration for Dalkia.

– Particulate emissions are up to 90 percent lower when compared to a conventional grate solution, said Jens Dall Bentzen, CEO of Dall Energy.

Nonetheless, on the backend of the plant is an electrostatic precipitator



A proud Jens Dall Bentzen, CEO of Dall Energy by the furnace of Dalkia’s revamped Petite Bouverie heat plant in Rouen, the largest ever supplied by Dall Energy.

(ESP) along with a 5.4 MWth flue gas condenser, the latter supplied by the French company Terraotherm.

– The dust emission limit is set at 5 mg/Nm³ so that is why an ESP has been installed. The flue gas condenser increases the overall efficiency by recuperating the heat in the moist fuel gases, said Jens Dall Bentzen.

Circular use of local biomass also in Denmark

It is not only in France that energy companies look to source biomass locally. In Sorø, Denmark, the local utility company Sorø Fjernvarme A/S has made extensive studies to find a way of lowering the prices for their district heating consumers, and get a greener footprint.

As outlined in Bioenergy International No.1/2020, Sorø Fjernvarme is now nearing completion of a new 12 MW combined heat and power (CHP) plant, which is using Dall Energy’s biomass technologies.

Scheduled for commissioning in June this year, the plant will be able to operate on 100 percent woody green waste collected from the local recycling stations. The patented biomass gasification furnace with staged combustion will convert the surplus biomass into green electricity and sustainable heat for the local district heating network.

The scope of Dall Energy delivery comprises of a biomass gasification furnace and a hot oil boiler, including all associated auxiliary equipment, electrical and control systems with responsibility for turnkey delivery of the equipment, design, procurement, installation, and commissioning.

Opening export markets for Dall

As mentioned, the Dalkia Rouen project marks the first project in Europe outside of Denmark, and the largest ever in terms of installed MW capacity for Dall Energy but it would seem not to be the last.

(Right) At the first fire ceremony were Denis Bobillier (left), Dalkia; Jens Dall Bentzen, CEO Dall Energy; Michael Starbaek Christensen, Danish Ambassador to France; Sylvie Jehannot, CEO, Dalkia, Nicolas Mayer-Rossignol, Président de la Métropole Rouen Normandie et Maire de Rouen.

– This project with Dalkia is start of Dall Energy becoming exporter to European market. We have a great collaboration with Dalkia, which naturally means a lot for us. The fact that they have chosen our technology as the best choice has opened many doors for us, not only in France but also in Germany and at home in Denmark. We currently have quite a lot of projects in the pipeline, both with Dalkia and with other companies. France has emerged as one of our focus markets, and in order to serve our French customers in the best way, we have now several French speaking employees, ended Jens Dall Bentzen.

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