Dall selected for Denmark's first green waste CHP plant

In Denmark, Dall Energy has been selected by local heating utility Sorø Fjernvarme A/S to supply a turnkey combined heat and power (CHP) plant to the town of Sorø. The 12 MWth and 1 MWe plant will primarily be fired on local woody green waste and will replace a fossil gas fired facility as part of the goal to have 100 percent of the district heating from renewable sources.

– We see from our recycling facilities that we can recover most of the fuel needed for the new heating plant. The green waste is local, CO_2 neutral and renewable, said Tommy Fer, Project Manager at Sorø Fjernvarme.

– IT WILL BE THE FIRST district energy plant in Denmark that will use local woody green waste from gardens and parks as the main fuel, said Jens Dall Bentzen, CEO of Danish biomass gasification and combustion technology providers Dall Energy.

Recycling, materials, nutrient– and energy recovery

Sorø Fjernvarme is local district heating utility acquired by AffaldPlus in January 2018 from Sorø municipality. AffaldPlus is a joint municipal waste management company owned by six municipalities (Faxe, Sorø, Næstved, Vordingborg, Slagelse and Ringsted) in south and west Zealand. A major operator in Denmark, AffaldPlus runs 20 recycling sites throughout the six municipalities servicing around 300 000 citizens and 30 000 businesses.

Approximately 170 000 tonnes per annum of household and industrial waste is handled by AffaldPlus of which about 80 percent of the volume is recovered into more than 40 different types of recycled and secondary materials from cardboard and paper to chemicals and recyclable PVC. The company also operates two waste-to-energy facilities, located in Næstved and Slagelse, for energy recovery of materials that cannot be recycled while less than 6 percent ends up in landfill.

Ten green waste receiving centres

The Danish government's resource strategy stipulates that 25 percent of all garden and park waste should be converted into biomass fuels to replace fossil fuels. This led AffaldPlus to look for alternatives to composting several years ago. Recycling and recovery efforts at AffaldPlus thus also includes green waste such as hedge- and roadside trimmings, grass cuttings, bush and tree "lop and top" and pruning from private gardens, public parks and other urban green areas.

Digestible organic material from ten green waste receiving centres is supplied to local biogas plants whereas woody residues such as tree-care debris, hedge- and bush trimmings is currently processed into biomass fuel at Næstved and Faxe. The fuel, currently being supplied to third-parties, will be used for the new CHP plant. Residual green waste material that cannot be used as a substrate or biomass fuel is used to make raw compost for use as a soil improver for agriculture.

Turnkey delivery for Dall

The scope of Dall Energy delivery comprises of a biomass gasification furnace and a hot oil boiler, including all associated auxiliary equipment such fans, piping, a fuel feeding system, ash handling system, electrical and control systems. Dall Energy is responsible for turnkey delivery of the equipment, including design, procurement, installation and commissioning.

– We've seen from our other energy plant installations that one can use such fuel as woody green waste. However, this is the first project contract that we have signed explicitly with the assurance that it will be possible to fire the plant with 100 percent woody green waste, said Jens Dall Bentzen.

The furnace design started in Q4 2019, and the plant is scheduled to be handed over for commercial operation during the summer of 2021.

Base load heat and power plant

The plant will be designed for operation on 100 percent green waste but can also utilise regular woodchips, providing extensive fuel flexibility.

– We estimate that on an annual basis, about 80 percent of the fuel will be green woody waste with the balance made up of forest biomass and woodchips. This is based on the volume of green waste received at our recycling centres which has remained relatively stable over the years, said Tommy Fer.

To be operated as a baseload plant, it will have a thermal capacity of 12 MW heat and approximately 1 MW electricity. The plant efficiency will be up to 110 percent (LCV based) depending on the fuel quality.

Significant savings for heat customers

Once commissioned, the plant is also expected to provide energy cost savings to district heat customers along with the environmental and climate benefits. According to AffaldPlus, an average 130 m2 Danish household can expect reduced annual heating costs of up to DKK 3 748 or almost 25 percent by the end of 2022 compared to current levels in the Sorø Fjernvarme network.

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