

GSF1 – BIOMASS GENERATION EXAMPLE – LARGE BIOMASS PLANTS



Alholmens Kraft, Finland – 265 MW

Alholmens Kraft, a 265 MW bio-fuelled power plant located at the factory premises of the Finnish pulp, paper and timber manufacturer UPM-Kymmene in Alholmen, Jakobstad, Finland, is the world's second biggest biomass power plant. The plant, operational since January 2002, also supplies 100 MW of heat for the UPM paper mill and 60 MW of district heating for the inhabitants of Jakobstad. The Alholmens Kraft Power Plant designed by Metso utilises a Circulating Fluidised-Bed Boiler supplied by Kvaerner Pulping. The plant is owned and operated by Oy Alholmens Kraft, a 49.9% owned subsidiary of Pohjolan Voima. The other stakeholders of the plant include Perhonjoki, Revon Sahko Oy and Skelleftea Kraft.



Polaniec, Poland – 205 MW

At 205 MW capacity, the Polaniec biomass power plant located at Polaniec in south-east Poland is the world's third biggest biomass power plant. The plant, using tree-farming and agricultural by-products as fuel, began commercial operation in November 2012. The fully biomass-fuelled plant is owned and operated by GDF SUEZ and has the world's biggest and the most advanced biomass circulating fluidised bed (CFB) boiler which was manufactured by Foster Wheeler. The plant generates electricity enough for 600,000 households while offsetting 1.2 million tonnes of CO₂ emissions per year.



Kymijärvi II, Finland – 160 MW

Lahti Energy's 160 MW Kymijärvi II power plant located in the Lahti city of Finland, about 100km north of Helsinki, ranks as the world's fourth biggest biomass power plant. It is a gasification-based power plant utilising solid recovered fuel (SRF) such as unclean plastic, paper, cardboard and wood. Kymijärvi II is located near Kymijärvi I which generates power mostly from coal despite the installation of a biomass CFB gasifier at the plant in 1998. The Kymijärvi II power plant began commercial operation in May 2012 and comprises of an atmospheric pressure CFB gasifier 25m in height and with an outer diameter of 5m that converts waste-derived fuel into combustible gas, a natural-circulation steam boiler, Siemens SST 800 Tandem turbine, and Siemens Gen5-100A-2P generator. Metso provided automation system for the power plant. The Kymijärvi II plant generates 300 GWh of electricity and 600 GWh of district heat. The electricity is fed into the national grid using a 110-kV connection at the Kymijärvi substation.



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Port of Bristol – 150 MW

Permission was granted in 2012 for a new 150 MW dedicated biomass power station at Royal Portbury Dock in the Port of Bristol, North Somerset. The consent allows E.ON Climate and Renewables to construct a plant which could provide enough electricity to power up to 160,000 homes and displace almost 400,000 tonnes of CO₂ emissions annually. The 150 MWe plant will be fuelled by sustainably sourced wood biomass; mostly imported virgin wood, dedicated energy crops like Miscanthus and locally sourced waste wood.



Wisapower, Finland – 140 MW

The Wisapower plant located at UPM's Wisaforest paper mill complex in Pietarsaari, Ostrobothnia, Finland, has an electrical output capacity of 140 MW. The heat output of the plant, which has been operational since 2004, is 400 MW. Pohjolan Voima owns and operates the plant through its subsidiary company Wisapower Oy. The Wisapower biomass-fired power plant uses black liquor as its primary fuel. The SST-800 steam turbine and the generator used at the plant were supplied by Siemens. The boiler for the plant was provided by Andritz. Jaako Poyry was engaged as the EPC contractor for the plant.



New Hope Power Partnership, US – 140 MW

The biomass power plant built by New Hope Power Partnership (NHPP), based at South Bay, Florida, US, has an installed capacity of 140 MW. The New Hope Power Partnership biomass power plant burns sugar cane fibre (bagasse) as well as recycled urban wood for electricity generation. The power output of the plant is used for processing sugar cane as well as for supplying electricity around 60,000 homes.



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Vaasa Bio-gasification plant, Finland – 140 MW

The 140 MW biomass gasification facility in Vaasa, Finland, commenced operation in March 2013. Vaskiluodon Voima Oy, a subsidiary of Pohjolan Voima, built the plant with an investment of € 40 million (US\$ 52 million) as part of its existing 565 MW Vaskiluoto-2 coal-fired plant. The biomass power plant produces biogas from wood mainly comprising forest residue and then burns it to produce heat for power generation. The plant also provides 170 MW of district heating. The power plant involved the construction of an advanced CFB gasifier and the modification of the existing coal boiler. Metso delivered the bio-gasification plant as part of a contract awarded in June 2011.



Kaukaan Voima, Finland – 125 MW

Kaukaan Voima biomass-fired power station located in Lappeenranta, Finland, has an installed electrical capacity of 125 MW. The power plant, inaugurated in May 2010, also produces 110 MW of district heat for Lappeenrannan Energia and 150 MW of process steam for UPM's Kaukas mills. The plant is owned and operated by Kaukaan Voima Oy, a joint venture between Pohjolan Voima, Lappeenrannan Energia and UPM. The plant took three years to build and involved an investment of € 240 million (US\$ 331 million). The plant burns wood and peat for generating power.



Seinäjoki, Finland – 125 MW

The 125 MW Seinäjoki power plant owned and operated by Pohjolan Voima's subsidiary Vaskiluodon Voima is located in the Seinäjoki city in Southern Ostrobothnia, Finland. The plant has been operational since 1990 and has a district heat capacity of 100 MW. The Seinäjoki plant uses woodchips and peat as main fuel, and coal as backup fuel. Metso was awarded an automation retrofit contract for the biomass power plant in October 2013. The original automation system at the plant is being replaced by a Metso DNA automation system.

