

The ARable Biomass Renewable Energy biomass gasification - combined cycle plant

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This paper discusses progress achieved in the ARBRE biomass project. The project is located at Eggborough, near York, in the United Kingdom. ARBRE has been developed by First Renewables Ltd of the UK and TPS Termiska Processer AB of Sweden. The project is a commercial demonstration of a 10 MWe Biomass Integrated Gasification Combined Cycle (BIGCC) power plant using TPS atmospheric gasification technology. The project has a long term power purchase contract in the UK's Non Fossil Fuel Obligation electricity programme and will provide electricity for the domestic needs of 33,500 people. The electricity generated is sold into the local grid.

The project has won a contract with the European Commission's THERMIE programme as a targeted biomass gasification project to demonstrate:

- the biomass gasification and the associated combined cycle energy generation systems
- the establishment of fuel supplies from existing forestry sources and new Short Rotation Forestry (SRF) plantations

The overall objectives of high efficiency conversion BIGCC projects are to

- reduce fuel requirements
- reduce costs of electricity produced by projects of this kind and;
- provide a base for future project scale up and replication in the biomass sector

The first BIGCC projects are incurring higher costs due to relative immaturity of the sector, little or no demonstration of plant, lack of operational experience and technology risks. Furthermore energy crops are in their infancy and all stages of their development require to be proven, costed and efficiency gains identified and achieved. The paper will demonstrate how these cost and performance improvements are being achieved in the first ARBRE project and for subsequent replication at higher scale.

Details of ARBRE's fuel supply strategy will be given. The project requires 43,000 dry tonnes of wood fuel to be supplied per annum and this has been sourced from SRFs purposely established and from forestry products. The numbers and types of contracts will be summarised, together with the fuel specifications. 1150 hectares of SRF, predominately varieties of willow, have been established for the project within a 75 km radius and all aspects of procurement of this biomass source, from ground preparation, planting and cutback through to initial harvesting operations will be discussed.

The plant construction programme will be summarised, including the major successes and the difficulties the project has encountered. Details of commissioning and plant performance during its early months of operation will be given, including electricity generation, plant efficiency and levels of emissions to air.