

JFE Engineering Licenses Wood Chip Biomass Gasification Technology for Power Generation

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JFE Engineering Corporation

TOKYO - JFE Engineering Corporation has signed an agreement with Danish engineering firm Babcock & Wilcox Vølund ApS to license the company's technology for the efficient gasification of wood chip biomass for use in electric power generation. JFE Engineering has obtained implementation rights in Japan and other Asian countries for the design, manufacture and sale of plants using the technology.

Vølund developed the technology over a 10-year period at a 42 ton/day capacity pilot plant that it built in Denmark using a fixed-bed updraft gasifier. Similar systems have been plagued with problems in waste tar water cleaning, but Vølund overcame those challenges with the development of a new system. Employing gas engines, it now achieves a high power generation efficiency of nearly 30%, and it is also able to supply heat to nearby residences-resulting in an extraordinary total energy use rate of approximately 85%. The Vølund plant is currently the only commercial facility in the world to use wood chip biomass gasification in order to stably generate power.

JFE Engineering's relationship with Vølund goes back 30 years to the licensing of grate combustion technology, and the company kept JFE abreast of its new gasification technology from the initial development stages.

JFE Engineering decided to license the technology because it had developed to the stage where commercialization was possible. In addition, the time was ripe in the domestic market, where the government's Biomass Nippon Strategy has prompted the establishment of several new programs in this area. JFE hopes to aid in the prevention of global warming and the reactivation of the forestry industry by bringing this technology to the domestic market.

Japan's domestic forestry industry has been significantly undermined due to an influx of cheap foreign materials, but it is urgent that thinning continue in order to maintain healthy, rich forests. Meanwhile, dioxin regulations prevent lumber plants from using simple combustion to dispose of bark, chips and other remnants.

Combustion boiler power generation provides a relatively large-scale means of converting clean biomass resources into energy, but it requires fuel to be dried to 25% or less moisture, and power efficiency is only about 15%. Such plants are usually not commercially viable unless they have a way to utilize the heat generated.

The use of gasification technology in power generation will double efficiency in comparison to boilers, achieving rates of approximately 30%. This provides for additional revenue from the sale of electricity, which will enable projects to maintain their economic viability.

Outline of biomass power generation technology

Licensed technology:

Fixed-bed updraft gasifier for non-polluted wood chips

Profile of technology supplier:

- **Name:** Babcock & Wilcox Vølund ApS
- **Location:** Esbjerg, Denmark
- **Business:** Design, fabrication and installation of waste incineration plants and biomass plants
- **Sales:** Approx. US\$100 million
- **Employees:** Approx. 400

Vølund is an established Danish engineering firm with a history of more than 130 years. Its main market is in Scandinavia, and it joined the U.S. Babcock & Wilcox group in 2000. JFE Engineering enjoys a friendly relationship with Vølund. JFE began licensing grate combustion technology for waste from Vølund in 1970, and began providing Vølund with its hyper grate technology, fluidized bed combustion technology and a number of flue-gas treatment technologies in 1998.

Track record:

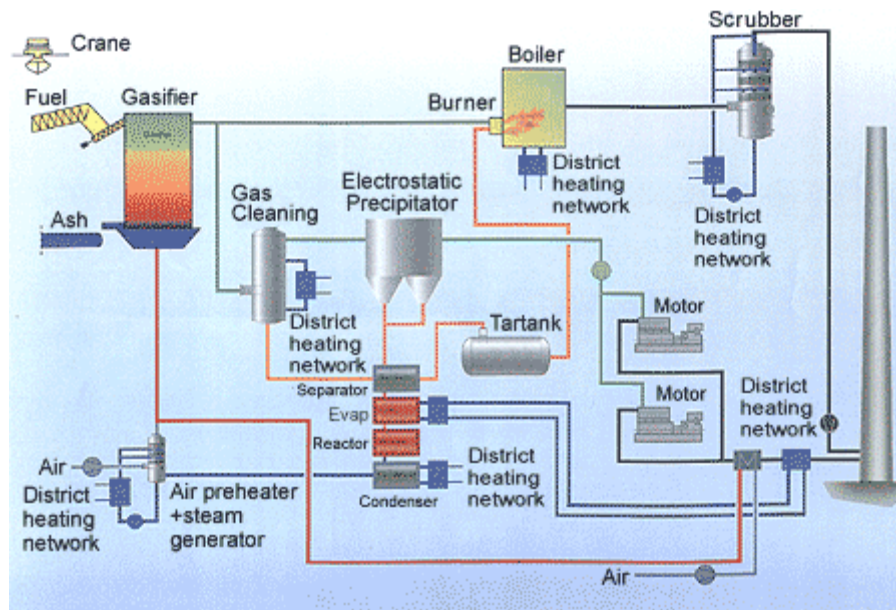
A commercial plant with a capacity of 42 tons/day is in operation in Harboore, Denmark. The plant generates approx 1.38 MW (efficiency of 29%), and collects 2.75 MW of hot water for use in district heating systems.

Description of technology and features:

- Able to directly treat green wood with moisture content of 35-50% without using a drying process
- High heat-use efficiency thanks to heat exchange within the gasifier (cooling gas efficiency, including tar, is 86-88%)
- Power generation efficiency is approx. 30%
- Quick turn-down to 10%, for greater operational flexibility
- Fully automated operation, requiring only a small maintenance staff
- Waste tar water is cleaned with self-generated heat and can be released to public sewers
- Ash has little residual carbon and no dioxin



Vølund's commercial plant (42 tons/day) in operation in Harboøre, Denmark



For further information, please contact:

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