Press Release July 23 2010

Uhde Gasification selected for world´s first commercial Biomass-to-Methanol Plant for VärmlandsMetanol AB, Hagfors, Sweden

Uhde, a ThyssenKrupp company, has been selected as technology supplier and engineering partner by VärmlandsMetanol for a Biomass-to-Methanol plant with an annual production of 100,000 tons of fuel grade methanol from biomass (forest-residue). The conceptual design and feasibility study, which was presented to VärmlandsMetanol in April 2010, proves the technical and economic viability of this biomass gasification complex. Investments for the plant land at about SEK 3 billion (EURO 300 million)

VärmlandsMetanol and Uhde have now agreed to commence with the project realisation by entering into the engineering phase. "This contract confirms the confidence VärmlandsMetanol has in Uhde, in their gasification technology and their great experience as a world leading engineering contractor." according to Dr Björn Gillberg, CEO and founder of VärmlandsMetanol. For the project execution, Uhde will act as technology supplier and turnkey EPC contractor for the entire plant complex. Uhde has designed, built and put into successful operation over 100 gasifiers for coal, waste and biomass.

VärmlandsMetanol AB intends to build and operate the **world's first full scale biomass-to-methanol plant** in Hagfors, Sweden. The company will gasify biomass (forest residue) and convert the syngas into fuel grade methanol through a catalytic process - a proven technology, used for decades by the petrochemical industry. The plant will produce 100,000 tonnes/year fuel grade methanol and can also deliver district-heating water with a thermal duty of 15 MW. The plant will be strategically located in the forest rich province of Värmland.

Bio-Methanol produced through gasification of **cellulosic biomass is a superior liquid motor fuel** compared to other CO_2 neutral liquid fuels:

- **fuel properties are excellent** due to the high octane rating, it burns with very clean fumes and can be used in spark ignition port injected gasoline engines blended with gasoline (less than 25 %) without any modification. So called flexi fuelled vehicles (FFVs) can run on high methanol blends.
- **green house gas savings** exceed other liquid bio-fuels by far, 80-90 % in comparison to 15-40 % for agro-based ethanol.
- **the cars of tomorrow** will have electric motors powered by fuel cells – bio-methanol is the most cost-efficient and environmental friendly liquid fuel option for fuel cell vehicles.
- **in addition, it is safe to handle** - it degrades rapidly in soil, surface and ground water and burning methanol is extinguished with ordinary water.

The EU directive on renewable energy stipulates that 10 % of all motor fuels shall be **renewable energy by the year 2020.** The directive is an efficient market driver and a clear indicator for investing in second-generation bio fuels, such as bio-methanol.

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VärmlandsMetanol AB is public company owned by the Miljöcentrum Foundation, the Municipality of Hagfors, the Federation of Swedish Farmers (LRF), TRB (an organization representing 16 Swedish transportation corporations with a fleet of 7,600 trucks) and 800 private persons and 37 small corporations. As of date, in terms of project execution, land for the plant has been purchased. A so called detailed development plan for the site has been adopted 25 January 2010 according to the Planning and Building Act whereby an Environmental Impact Assessment and a Risk Assessment was concluded. According to the execution plan, the Swedish Environmental Court is expected to issue an environmental permit for the plant in 2011.

The CEO and driving force behind the project is Dr Björn O. Gillberg who successfully has acted as Environmental Controller for several of the largest construction projects ever carried out in Scandinavia (such as the Öresunds Bridge and the City Tunnel in Malmö). Dr Gillberg has received several honorary awards for his long lasting service to the environment. In 1991 he was elected to the UN 500 Global Roll of Honour and in 1999 he received an honorary doctorate at Lund University, Sweden, for his work in the field of environmental law and industrial sustainable practice.

Uhde is a Dortmund-based engineering contractor with a highly specialised workforce in the fields of chemical processing, energy and environmental protection. As to date, they have more than 4,500 employees and have successfully completed over 2,000 projects throughout the world. Uhde has over 65 years' experience in the development, design and construction of gasification plants. The list of references includes over 100 gasifiers worldwide based on different gasification technologies covering a variety of feedstocks.