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## **Alstom and Statoil to jointly develop project for chilled ammonia-based CO<sub>2</sub> capture for natural gas in Norway**

Alstom has signed a joint development contract with Norwegian gas and oil company Statoil, to test Alstom's chilled ammonia technology for CO<sub>2</sub> capture from flue gases particular to natural gas combined cycle (NGCC) power plants.

The objective of the agreement covers the design and construction of a 40MW test and product validation facility at Statoil's Mongstad refinery in Norway. This facility will be designed to capture at least 80,000 tons per year of CO<sub>2</sub> from flue gases from the refinery's cracker unit or from a new combined heat and power plant being built by Statoil and scheduled to be in operation by 2010. The test and product validation facility is expected to enter operation by 2009-2010 with the first operation and testing phase to last 12-18 months.

It is the intent of both parties that this facility will lead to technical advances and the construction of a larger CO<sub>2</sub> capture unit that may eventually capture over 2 million tons per year of CO<sub>2</sub> at Mongstad. Because of the recognition of CO<sub>2</sub> as the main greenhouse gas contributing to global warming, development of CO<sub>2</sub> capture systems is an important milestone towards carbon emissions reduction. Alstom's chilled ammonia technology holds great promise for controlling NGCC as well as other industry generated emissions economically and with a significantly low energy loss.

Research suggests that chilled ammonia-based CO<sub>2</sub> capture can remove up to 90% of the CO<sub>2</sub> from flue gases. Compared to several proposed techniques that can separate carbon dioxide from the other gases, Alstom's chilled ammonia process greatly reduces the amount of energy used to capture CO<sub>2</sub>. This energy is referred to as an *energy loss* because the plant's energy output is reduced by the amount of energy needed to remove the CO<sub>2</sub>. Studies demonstrate that Alstom's technology may result in an energy loss of approximately 10% versus other methods of post-combustion CO<sub>2</sub> separation, which result in losses of nearly 30%.

Statoil's intention is to accelerate technological development with carbon capture and storage (CCS). Alstom and Statoil have been cooperating, in addition to other parties including the Electric Power Research Institute (EPRI), in the development of the chilled ammonia CO<sub>2</sub> capture technology since 2005. This deal follows an agreement made between Alstom and AEP (American Electric Power) in the US to develop the technology for application on utility coal-fired boilers and to carry out a pilot. Initial research and development of the Alstom chilled ammonia CO<sub>2</sub> capture technology has been jointly funded by Alstom, EPRI and Statoil. The first field tests will commence later this year at a 15,000 tons per year capture pilot plant to be located at the We Energies Pleasant Prairie power plant, Wisconsin, which is jointly funded by Alstom and EPRI.

*“CO<sub>2</sub> emissions are a worldwide problem and Alstom is leading the way in capture technology,” said Philippe Joubert, President of Alstom Power Systems. “We have a long history of collaboration with Statoil and this agreement represents our mutual commitment to both the technology and society at large.”*

*Statoil is an integrated oil company covering the whole value chain from exploration and production to manufacturing and marketing. With more than 25,000 employees in 30 countries, Statoil is the leading operator on the Norwegian continental shelf with an increasing share of international production. It is one of the world's largest sellers of crude oil and a substantial supplier of natural gas to the European market. In addition, the group has operation of 1,800 service stations in Scandinavia, Poland, the Baltic States and Russia.*

*Alstom sets the benchmark for innovative, environmentally friendly technologies in the world of power and rail transport infrastructure. Alstom built the fastest train and the highest capacity automated metro in the world, and provides turnkey integrated power plant solutions and associated services for a wide variety of energy sources, including hydro, gas and coal. The Group employs more than 65,000 people in 70 countries, and had sales of €14.2 billion in 2006/07.*

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