CCS Carbon Storage Successes April 2011

PILOTS ARE PROMISING

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CARBON STORAGE TECHNOLOGY IS ADVANCING BOTH IN Europe and America even in the face of financial, technical and regulatory challenges.

Alstom currently has six major carbon capture and storage pilot installations in operation and another two under construction. We even have second-generation technology at an advanced stage of development in our laboratories. As previously announced, we are also working on five large projects for commercial-scale demonstration, which will test three different capture technologies on a variety of fuels and at a scale of 250 megawatts, each due to store over a million tons of CO_2 per year.

Those five projects are still on track to be operational by 2015.

On the technical front, based on the feedback received from our industrial pilot program, I am increasingly confident that we will be able to overcome the scale-up challenges. We can already demonstrate capture rates of over 90 percent and very high purity CO_2 can be delivered for geological CO_2 storage. The cost estimations derived from our development program also indicate that commercial CCS will be competitive, like any other technology capable of delivering decarbonized power, including nuclear and onshore wind. The technology is the least of the challenges that remain.

However, there are other challenges over which we have much less direct control. These include the regulatory advances worldwide, achieving the financial closure of large-scale projects, and also public acceptance of CO_2 storage.

Starting with regulation, we are seeing strong progress worldwide. The European CO_2 Storage Directive has already been transposed into a legal framework in countries like France, Austria, Finland and Belgium, while work is well advanced in the United Kingdom, Spain and the Netherlands. Progress is a little slower in Germany and Poland, but I'm reasonably confident that we will have the regulation in place by the end of the year.

In the United States, there is no federal regulation in force, but we have seen significant initiatives emerging in key states like Illinois, Texas, Michigan, Louisiana and Montana, where important issues like long-term storage liabilities are being clarified. Canada's key province of Alberta has just introduced a new bill, currently under review.

Overall, progress has been strong, and I trust that we will eventually get the tools we need, where we need them. The question is the timing. As regulation sets the schedule, industry relies entirely on the diligence of various administrations for their project development agenda.

We have also seen an impressive track record of funding schemes dedicated to large-scale CCS emerging in the last two years. In Europe, it has amounted to 3 billion Euros, or $4 billion. In North America, $3.4 billion has been dedicated to the Clean Coal Initiative. Canada has ear-marked $3 billion for such efforts. Despite this impressive effort, and the dedication of all stakeholders, financial closure of CCS projects remains a significant challenge in most cases. This is owing to the fact that there is not yet a clear business model emerging for CCS. In Europe, we have the CO2 Trading Scheme, but the CO2 price is not high enough to justify CCS, and there is no long-term visibility. In North America and Canada, federal legislation on cap and trade failed to pass, and the only current business model is enhanced oil recovery, whereby CO2 is sold to operators to improve the recovery rate of their wells. But that potential is far too scattered and intermittent to support true widespread deployment of CCS. Finance will therefore remain an issue until governments decide either to give a strong and stable price to carbon, or to create an even playing field through regulation or tariffs for all decarbonized energy production technologies, including CCS.

Finally, geological storage of CO2 comes with its own public communication challenge. While on the technical front, the oil and gas industry has developed all the necessary tools to explore, monitor and verify selected sites to ensure safe and permanent storage, a major educational effort lies ahead in explaining this technology to the general public. This is obviously more a concern for onshore than for offshore storage. In a densely populated Europe, I strongly believe in storage clusters and in the future of offshore operations to overcome this issue.

This year will be a critical year for CCS. Governments, in partnership with industry, must urgently address - and solve - the challenges that remain. Those governments that are the fastest in unlocking the regulatory hurdles will determine which region will lead this technology in the future.

I am confident in the final outcome owing to the strong, continued motivation of all stakeholders.

CCS is moving closer to widespread deployment.