Industrial Use of Captured CO2

PETER GRUBNIC, Principal Manager – Projects Evaluation and Asessment, Global CCS Institute

By PETER GRUBNIC, Principal Manager – Projects Evaluation and Asessment, Global CCS Institute

When energy ministers from major economies met at the Clean Energy Ministerial (CEM) in Abu Dhabi recently, one of the reports they considered was one investigating the industrial use of captured CO_2 to accelerate the uptake of carbon capture and storage (CCS).

This was one of the pieces of work commissioned by the governments of Australia and the United Kingdom, which chair the action group looking at carbon capture, use and storage (CCUS). We partnered with Parsons Brinckerhoff in the execution of the report, titled *Accelerating the Uptake of CCS: Industrial Use of Captured Carbon Dioxide.* [1]

The findings indicate that CO_2 reuse has the potential to provide a moderate revenue stream for near-term CCS project development in favorable locations where reuse applications and markets are close to the emission source. This is particularly the case with some developing countries, where there is high demand for energy and construction materials. It is also the case in emerging economies like China and India, which are particularly interested in the revenue stream that could be generated by reusing captured CO_2.

Assuming a threshold of 5 Mt per annum of global CO_2 reuse potential, the report concluded that the following reuse technologies hold the most promise: CO_2 for use in fertilizer; CO_2 as a feedstock in polymer processing; algae production; mineralization (including carbonate mineralization, concrete curing and bauxite residue processing); liquid fuels (including renewable methanol and formic acid); and CO_2 enhanced coal bed methane recovery.

Of these, algae and mineralisation — especially for building materials — get the most media attention. It seems that innovations, especially ones that turn a “bad” gas into something useful, can capture the public’s imagination. Just consider this article [2] from a major Canadian newspaper, talking about a company that has found a way to recycle Styrofoam, using solvents that include CO_2. The invention was named on the Top 20 chemistry breakthroughs [3] in Canada in the past 100 years.

Or consider this recent Fortune magazine article [4] that starts off with the comment: “What if scientists could transform coal-fired power plants from giant carbon dioxide emitters into giant carbon sinks? Some say that they can and will.”

These kinds of reuse technologies are great for their own green value, and it is

encouraging to see venture capital and other early-stage investment flowing in that direction.

For the purposes of widespread commercial scale deployment of CCS, it must be noted that revenues from CO2 reuse alone cannot act as a driver. A carbon price and early stage government support are required.

However, where demonstration projects do proceed, reuse revenues can act as a modest offset to CCS costs, and hence will benefit early demonstration projects. The reuse technology that presently provides the largest revenue support is enhanced oil recovery (EOR).

The report found that CO2 reuse can provide learnings associated with storage and can help foster community acceptance of storage. The use of CO2 in EOR, when combined with measuring, monitoring and verification to track migration of the CO2 plume, illuminates the geological detail of the storage reservoir and enhances understanding of the factors influencing sub-surface CO2 migration. The Weyburn-Midale and Cranfield projects are existing examples of this potential.

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http://www.chem.info/blogs/2011/05/industrial-use-captured-co2

Links:
[1] http://www.globalccsinstitute.com/resources/publications/accelerating-uptake-ccs-industrial-use-captured-carbon-dioxide
[2] http://www.thestar.com/article/970999--hamilton-solving-the-foam-waste-problem-with-a-green-solvent
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