

ICO₂N's Work on the Importance of CCS

Since 2005, the ICO₂N group has been addressing challenges and seeking pro-active solutions towards acceleration of large-scale CCS deployment in Canada. With detailed studies of capture, transportation and storage, the ICO₂N group has undertaken an integrated analysis of what an entire CCS system could look like. This analysis looks at the technological, economic and policy aspect of CCS and is one of the most detailed studies of large-scale, multiple project CCS deployment anywhere in the world.

ICO₂N's conclusions from the economic analysis are as follows:

- Large volume reductions of CO₂ are feasible in the near term (starting from 2015);
- The economic gap to produce significant capture volumes must be addressed;
- As there is not a commercial solution yet, there is a need for government and industry to work together to share risks and rewards to enable deployment of CCS;
- There is a need for policy mechanisms to ensure a balanced approach so that the two main outlets for captured CO₂ - enhanced oil recovery and direct CO₂ storage - are incentivized.

Key Implications

There are three important implications coming out of this work that affect policy decisions:

- CCS can contribute significant CO₂ reduction volumes and is an important part of Canada's suite of GHG reduction options;
- The timing to set the stage for investment in CCS is now;
- CCS capture costs are significant and present an economic challenge that industry and governments around the world must work together to overcome.

The Economic Impact of CCS

The importance of proactively addressing the environmental challenges of Canada's oil sands cannot be underestimated. CCS is one tool to help lower the CO₂ intensity of the synthetic crude oil produced from the oil sands and bring it in line with the CO₂ intensity of other international sources of oil. Canada's oil sands reserves:

- Are at least 174 billion barrels and second largest in the world;
- Will remain one of Canada's principal economic engines of growth. Estimates are that the oil sands can generate \$885 billion in GDP activity from 2010 to 2020. Of this, \$150 billion will be spent on supplies and services from outside Alberta.

CCS is also a key element to reduce the CO₂ emissions of Canada's coal-fired electricity plants. Stephen Chu, the United States' Secretary of Energy, recently stated that coal "is likely to be a major and growing source of electricity generation for the foreseeable future". CCS is the tool to enable the continued use of this valuable resource while addressing associated CO₂ emissions.

Canada, however, is not an energy and environmental island unto itself. It is part of an integrated North American market and there are significant initiatives under way in the United States to similarly enable large-scale CCS deployment in the next decade.

Looking Ahead

With concerted, aggressive action by governments and industry over the next 10 to 15 years, there are two broad stages of possible development for CCS:

In the first stage (2012-2020 timeframe) CCS could result in CO₂ emissions reductions of between 25 and 35 Mt per year by 2020. CCS in this phase would be deployed:

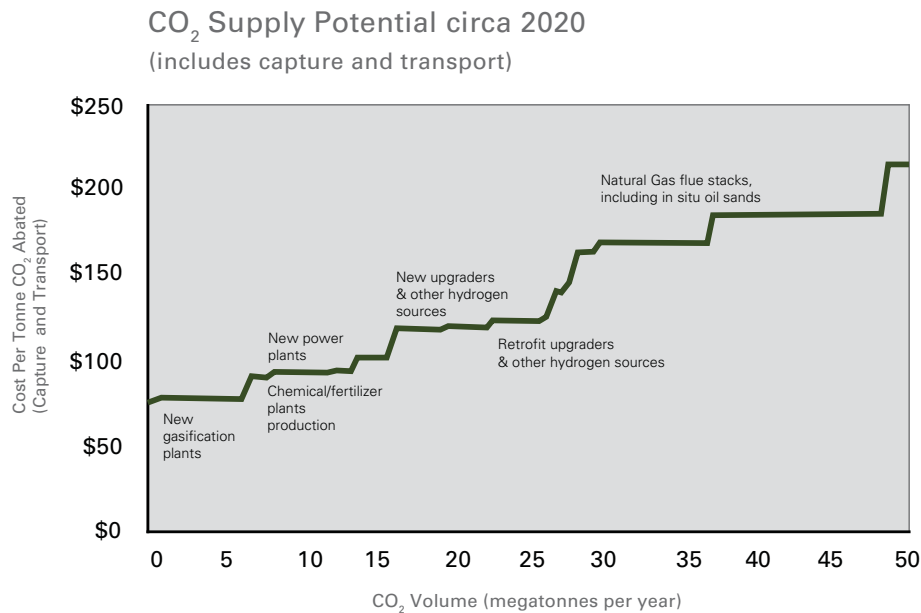
- At new and existing industrial plants;
- At new electricity generating facilities (coal plants);
- At hydrogen manufacturing facilities that are part of oil sands upgrading operations.

In the second stage, post 2020:

- CCS could be extended to many existing electricity generating facilities as their power purchase agreements expire and they come due for closure or refurbishment;
- Extending CCS to existing electricity generating facilities could increase the CO₂ abatement to 50 Mt per year or more by 2025/2030.

The Economics of Carbon Capture and Storage

The following chart provides a clear supply profile of average projected capture costs for CCS development in Canada.



Storing It Safely

In Canada, the geological formations being considered as likely candidates for long-term CO₂ storage – namely depleted oil and gas reservoirs and deep geological sequestration sites – have already proven safe for storing other gases and liquids. These same formations have trapped crude oil and natural gas underground for hundreds of millions of years.

Research

The Petroleum Technology Research Centre in Regina, Saskatchewan, conducted a risk assessment process in 2004 to evaluate the long-term fate of CO₂ injected into the Weyburn reservoir. For the case study, 4000 parameter combinations were evaluated and the results indicated that after 5000 years there is a 95% probability that 98.7% to 99.5% of the initial CO₂-in-place will remain stored in the geosphere.