the PEMBINA institute Sustainable Energy Solutions

The Pembina Institute's Perspective on Carbon Capture and Storage (CCS)

Updated February 19, 2009

Context:

- The Pembina Institute is a non-partisan, national sustainable energy think tank. Our mission is to advance sustainable energy solutions through innovative research, education, consulting and advocacy.
- The Pembina Institute published its initial research and perspective on CCS in 2005. Since then, it has remained actively engaged in public discussions and research regarding CCS.
- In November 2008 the Pembina Institute and the University of Calgary's Institute for Sustainable Energy, Environment and Economy (ISEEE) co-presented a thought leader forum on CCS. The Forum brought together one hundred industry, government, environmental NGO, land owner, First Nations and academic representatives to discuss key policy design issues related to CCS.
- The Pembina Institute's perspective on CCS is informed by our technical, economic and policy research and interactions with different sectors.

The Pembina Institute's perspective in short:

The Pembina Institute views CCS as one of a number of technologies that can contribute to reducing greenhouse gas (GHG) emissions on the scale required to combat dangerous climate change. It is critical that CCS be considered as part of a portfolio of solutions, and that adequate attention also be paid to more sustainable, low-impact energy solutions, especially renewable energy and energy efficiency. The urgent need to deal with rising emissions compels consideration of CCS in Canada and elsewhere, but the costs of implementation are generally high, technical challenges remain for large scale implementation, and not all areas have suitable geology and sound regulation is needed to minimize environmental risk.

The Pembina Institute believes that development and deployment of CCS in Canada should be conditional upon:

- a massive scale-up of energy efficiency and low-impact renewable energy production;
- application of CCS in regional contexts, notably the availability of preferable, more sustainable energy options and the suitability of the geology;
- implementation of a strong regulatory framework to minimize the risk of leaks, monitor movement of the carbon dioxide (CO_2) and address outstanding issues such as the ownership of pore space and long-term liability;
- a fair distribution of investment between taxpayers and polluters, with polluters quickly shouldering the full cost of CCS deployment;

200 - 608 7th Street SW • Calgary, Alberta, Canada, T2P 1Z2 • P:(403)269-3344 • F:(403)269-3377 • www.pembina.org

- establishment by government of a price on emissions high enough to stimulate the adequate deployment of low/no emission technologies, including CCS where appropriate;
- an increase in public education and awareness in order for CCS to be more widely accepted as a viable technology within a portfolio of solutions for reducing GHG emissions.

When and where should we turn to CCS?

- CCS is an "end-of-pipe" waste disposal option for GHG pollution created by the combustion of fossil fuels. Our preference is for "end-THE-pipe" solutions where we can shift from fossil fuel combustion processes to low-impact renewable energy options. Accordingly, we believe that:
  - Approval of new electricity generation facilities using CCS should be conditional on showing that future electricity demand and supply cannot instead be balanced by maximizing energy efficiency and low-impact renewable energy.
  - Approval of retrofitting existing electricity generation facilities with CCS should be conditional on showing that future electricity demand and supply cannot instead be balanced by maximizing energy efficiency and low-impact renewable energy, and on demonstrating that the public interest would not be better served by the closure of such facilities.
  - Approval of CCS in conjunction with other new industrial facilities, including oil sands operations, should be conditional on showing that they are in the public interest.
  - CCS for Canadian oil sands operations has specific challenges that increase the cost of deployment: notably, some emissions streams have low CO_2 concentrations and/or are small. This could limit the applicability of CCS to oil sands operations in the near term to bitumen upgrading facilities that produce higher-concentration CO_2 streams.

Geologically, where should CO_2 be disposed of?

- Canada's strategy for CCS should be focused on permanent "disposal," not temporary "storage" of GHG emissions. Accordingly, based on our review of the current scientific literature and consultation with leading experts, our current perspective is that:
  - The most reliable and secure location for CO_2 disposal is deep saline aquifers.
  - The use of CO_2 for enhanced oil recovery (EOR) is not primarily a disposal solution but a use of CO_2 that may or may not result in a net reduction in global GHG emissions. Given the uncertainty of the net environmental benefit of using CO_2 for EOR, it should not be a priority for Canada's deployment of CCS.
  - The most suitable geographical area for CCS in Canada is found within the Western Canada Sedimentary Basin in parts of Saskatchewan, Alberta and northeast British Columbia. Further work is needed to assess the suitability of other areas.

GHG emissions reduction policy and CCS

- We believe that GHG emissions reduction policy should be based on the polluter-pays principle applied where feasible to all emitters, including both energy producers and consumers. As a result, large industrial facilities should be required to transition, as quickly as possible, towards shouldering the full social and environmental cost of GHG emissions (including adequate monitoring) as a cost of doing business.
- We believe that this objective should be achieved through a cap-and-trade system or carbon tax that puts a high enough price on emissions to ensure that the private sector invests sufficiently in emission reduction technologies, including CCS where appropriate. Unfortunately, neither the federal regulatory framework proposed in March 2008 ("Turning the Corner") nor Alberta's *Specified Gas Emitters Regulation* represents a sufficient incentive for GHG emissions reductions on the scale required. In particular, the prices that these frameworks put on emissions are far too low to ensure that industry implements CCS. Recent analysis has shown that price levels of $50/tonne CO_2 equivalent by 2010 and $200/tonne by 2020 could secure the GHG reductions needed for Canada to play its part in preventing dangerous climate change while sustaining strong economic and employment growth.[1]
- Both the Government of Canada and the Government of Alberta have allocated taxpayer dollars to encourage industry to deploy CCS. We believe that taxpayer dollars should only be used if they are *invested* in CCS, with the assurance of a reasonable financial return on their investment (e.g., government could retain equity in CCS infrastructure). Further, public investment in CCS must not come at the expense of the public investment needed to ensure a massive scale-up of energy efficiency and low-impact renewable energy production.

[1] *Deep Reductions, Strong Growth: An Economic Analysis Showing Canada can Prosper Economically While Doing its Share to Prevent Dangerous Climate Change* (The Pembina Institute and David Suzuki Foundation, 2008). Available online at http://climate.pembina.org/pub/1740.