CARBON CAPTURE AND STORAGE
A Pembina Institute–ISEEE Thought Leader Forum
November 10, 2008

Carbon Capture and Storage: The Views of the Canadian Public

Jacqueline Sharp

October 2008

Sharp, Jacqueline
Carbon Capture and Storage: The Views of the Canadian Public
published October 2008

Production management and Layout: Roberta Franchuk
Editor: Laura Fauth

Questions regarding this publication can be directed to:
The Pembina Institute
Box 7558
Drayton Valley, Alberta
Canada T7A 1S7
Phone: 780-542-6272
Email: info@pembina.org

Download additional copies of this publication from the Pembina Institute website: www.pembina.org.

About the Pembina Institute

The Pembina Institute is a national non-profit think tank that advances sustainable energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy, and environmental governance. For more information about the Pembina Institute, visit www.pembina.org or contact info@pembina.org.

About ISEEE

ISEEE, the Institute for Sustainable Energy, Environment and Economy, develops cost-effective solutions to the environmental challenges of energy production and use. Created in 2003 at the University of Calgary, ISEEE provides the institutional leadership and the integrated, multidisciplinary research and education programs required for "Leading Innovation in Energy and the Environment," a top academic priority for the U of C as it drives to become a recognized world leader in this area. For more information, visit www.iseee.ca or contact info@isee.ca.

About the Author

Jacqueline Sharp, MRM, is an energy economist and consultant specializing in carbon capture and storage (CCS). She conducted the first Canadian research into public attitudes toward CCS, and is a frequent speaker on the topic of evaluating and incorporating stakeholder concerns into CCS and other power sector projects. Jacqueline has a Bachelor of Commerce from Queen's University, and a Master's degree in Resource and Environmental Management from Simon Fraser University.

Acknowledgements

The Carbon Capture and Storage forum was made possible through the generous support of our sponsors.

1. Introduction

Carbon capture and storage (CCS) is a method for reducing greenhouse gas (GHG) emissions to the atmosphere by capturing carbon dioxide (CO_2) from large stationary emitters and disposing of it in deep geological formations. CCS has the potential to play a central role in managing carbon emissions from the Canadian power sector and from industry. However, there are economic costs associated with the use of CCS, and it presents various risks to the environment and to human health. As a result, the public acceptability of CCS is not certain.

To understand current public views of CCS, as well as to anticipate future public attitudes and understand the key determinants that will shape perceptions of the technology, two major Canadian public surveys have been conducted. The first survey was undertaken in early 2005, and the second was conducted in late 2007. The results of the two surveys are discussed in this report. Overall, the survey results suggest that the public supports the inclusion of CCS in a Canadian climate change strategy.

2. Methodologies

The two Canadian public surveys that have been conducted are:

- Public Attitudes Toward Geological Disposal of Carbon Dioxide in Canada, Jacqueline Sharp, Mark Jaccard, and David Keith. Simon Fraser University: Burnaby, British Columbia, 2005.
- Public Views on Carbon Capture and Storage: Draft Report. Ipsos-Reid Corporation, ecoENERGY Carbon Capture and Storage Task Force: Calgary, Alberta, 2007.

Both surveys were administered by market research firms to statistically significant and randomly selected national sample populations. The 2005 survey was developed based on data from two focus groups conducted in 2004 in Edmonton and Toronto, and was administered online by Synovate to a representative sample drawn from its online panel of 70,000 Canadian households. The survey sample was weighted so that 40% of the respondents came from Alberta and Saskatchewan, in order that the sub-sample would be large enough to yield statistically significant results. The survey sample was 1,972 respondents, including 775 respondents in Alberta and Saskatchewan.

The 2007 survey was conducted by including questions about CCS on the Canadian Ipsos-Reid Express, a weekly national omnibus poll of both English and French-speaking Canadian adults. The survey questions were asked over two consecutive weeks, with 1,000 Canadians surveyed the first week, and an additional 300 Canadians surveyed in Western Canada the second week in order to obtain a statistically significant sample size in that region. The final survey sample was 1,300 respondents, including 600 respondents in British Columbia, Alberta, Saskatchewan and Manitoba.

Both surveys included questions to determine public awareness of CCS and opinions about environmental issues in general. Neutral descriptions of CCS were provided to respondents, followed by questions about support for CCS, reasons for support or opposition, and support relative to other energy or climate change technologies.

3. Results

3.1 Awareness of CCS

In the 2005 study, knowledge of CCS was low, with 15.4% of those in Alberta and Saskatchewan and 10.5% of those in the rest of Canada expressing awareness of CCS. Only approximately 6% of Canadians in both regional samples were able to correctly describe CCS. In the 2007 survey, 31% of Canadians expressed at least some awareness of CCS, although 40% of that group could not provide even a roughly accurate description of CCS. Albertans were the most aware of CCS (39%), while those in Atlantic Canada were the least aware of CCS (22%).

3.2 Opinions about Environmental Issues

In 2005, survey respondents rated health care, crime and education as the most important national issues. Reducing climate change was ranked the second lowest of 11 national issues, and was the lowest ranked environmental issue. Despite this, nearly 70% of respondents in Alberta and Saskatchewan and nearly 80% of respondents in the rest of Canada thought that immediate action or some action was warranted on climate change. Although the questions asked in the two surveys were not directly comparable, it appears that environmental concern had increased by the 2007 survey. In the 2007 survey, 93% of respondents expressed at least some concern about environmental issues, with 49% saying that they were very concerned about the environment. Concern ranged from 100% of respondents in Atlantic Canada to 86% of respondents in Saskatchewan and Manitoba.

3.3 Opinions about CCS

In 2005, respondents indicated very slight support for CCS development in Canada. On a scale of 1 (strong opposition) to 7 (strong support), respondents rated their support at 4.29 (Alberta and Saskatchewan) and 4.44 (rest of Canada). Respondents indicated that they were somewhat certain of their opinions, but not completely set on them. CCS was perceived as having a slightly better than neutral impact on the environment, indicating that there is still substantial concern about the potential environmental impacts of CCS. However, over half of respondents indicated that they would include CCS in a climate change strategy, while just over a quarter of respondents indicated that they would likely not include it.

A different type of question was asked on the 2007 survey, so the results of the two surveys are not directly comparable. However, the results of the 2007 survey suggest that support for CCS is now higher than it was in 2005. In 2007, 62% of respondents supported CCS (19% of respondents strongly supported CCS and 43% somewhat supported CCS), 16% were somewhat opposed to CCS, and 13% were strongly opposed. Ten per cent of respondents were unable to say whether they supported or opposed CCS. Regionally, Alberta and Saskatchewan/Manitoba

had the highest support for CCS (69% and 67% respectively). Atlantic Canada had the lowest support, with 53% of respondents in the region either strongly or somewhat supportive of CCS.

In the 2005 survey, several questions were asked to determine support for CCS under different conditions. The results of these questions showed that respondents become moderately supportive of CCS if most other countries in the world are using the technology and have declared it safe, while they become slightly opposed if most other countries have rejected it as an unsafe option. Additionally, respondents who were given a very negatively-biased newspaper article to read at the end of the survey became slightly opposed to CCS, while those who were given a very positively-biased newspaper article to read became moderately supportive of CCS. This illustrates the importance of the media's portrayal of CCS and information about the use of CCS in other countries in determining the Canadian public's support for the technology.

Support was analyzed in both surveys to determine if demographics or opinions about environmental issues were determinants of support for CCS. In the 2005 survey, support for CCS was found to be proportional to respondents' perceptions of the seriousness of climate change: low belief that climate change is occurring led to low support for CCS, while a high importance placed on climate change corresponded with higher support for CCS. In the 2007 survey, awareness of CCS was a strong determinant of support, with those who claimed at least some awareness of CCS being twice as likely to strongly support it (29%), compared with those who were not aware of it. Concern about the environment was also strongly correlated with support, with 24% of those who are very concerned about the environment supporting CCS, compared with 11% support among those not very or not at all concerned about the environment.

In the 2007 survey, younger respondents, males, and university graduates were more supportive of CCS than older respondents, females, and those with less than a university education. In the 2005 survey, being female, having a higher education, and having a higher income were associated with higher support for CCS. In both surveys these demographic characteristics played only a small role in determining overall support.

3.4 Positively Viewed Attributes of CCS

Both surveys included several questions to identify the reasons behind public support of CCS, and to identify the perceived benefits. In the 2005 survey, respondents were given a number of statements about CCS to evaluate. The results showed that the top rated benefit of CCS was its potential to be a bridging technology to achieve short-term reductions in GHG emissions while long-term alternatives are being developed. The use of CCS in conjunction with enhanced oil and gas recovery was the second most positively viewed benefit, followed by the belief that CCS may allow GHG emissions to be reduced more quickly and at a lower cost than alternatives. In the 2007 survey, those who supported CCS were asked for their reasons. The most common response (by 24% of those in favour of CCS) was because CCS would reduce global warming, with the next most common response (17%) being that CCS would improve the environment. Several other questions on the 2007 survey asked specific questions about the benefits of CCS. The results showed that 67% of respondents agreed that CCS sounds like a good option for Canadian industry sectors to contribute to solving the climate change problem; 64% agreed that CCS provides an opportunity for Canada to become a clean energy "superpower"; and 52% agreed that CCS sounds like a good way to address the issue of climate change.

3.5 Negatively Viewed Attributes of CCS

In the 2005 survey, respondents also rated several negative statements about CCS. In general, respondents agreed more with the negative statements about CCS than the positive statements. The top rated concern about CCS was that there may be unknown future impacts. The second-rated concern was potential contamination of groundwater, followed by concern about the potential safety risks of a large CO_2 leak, and concern about potential harm to plants and animals near the disposal site or to underground organisms. In 2007, those who opposed CCS were asked for their reasons, and the most common response (by 16% of those opposed) was concern about the risks of a leak or other problems from storing CO_2 underground. The next most common responses were:

- CO_2 is too dangerous (13%);
- respondents didn't know enough about CCS (12%);
- better options exist *or* respondents prefer to reduce emissions rather than store CO_2 (9%);
- CCS doesn't solve the real problem of CO_2 emissions (6%);
- uncertainty about the long-term effects (6%); and
- CCS will harm the environment (6%).

When asked later in the survey if CCS sounds like it would endanger the environment, 67% of respondents agreed. Sixty-nine per cent of respondents also agreed with the statement that CCS sounds like sweeping a problem under the rug, not solving the problem.

3.6 Relative Support for Different Energy Technologies

Both surveys show that CCS is a less popular alternative for mitigating climate change than energy efficiency and renewable energy technologies, but is more popular than nuclear energy. In the 2005 survey, over 90% of respondents indicated that they would include energy efficient appliances, energy efficient cars, solar energy, and wind energy in a climate change plan, while 56% would use CCS, 36%–40% would use nuclear energy (Alberta/Saskatchewan respondents and respondents in the rest of Canada respectively), and 16%–22% would use iron fertilization of the oceans. In the 2007 survey, support for all climate change technologies was higher than in 2005, with over 90% of respondents supporting energy efficient appliances, solar energy, wind energy, carbon sinks, energy efficient cars, hydroelectricity, and conservation as methods for reducing climate change; 67% supporting CCS; 49% supporting nuclear power; and 38% supporting iron fertilization of the oceans.

CCS is perceived as being less risky than many conventional energy technologies. In the 2005 survey, respondents were asked to place a number of different energy technologies along a continuum ranging from "very large risk" to "no risk at all." CCS was rated as having a slight risk, while nuclear power, coal-burning power plants, and normal oil and gas industry operations (production and refining), were all rated as having moderate risks. Wind power was included for comparison purposes, and was rated as having virtually no risk.

3.7 Government Funding and Next Steps

The 2007 survey asked respondents if they believe that the government should provide financial support for CCS. Fifty-four per cent of respondents responded "yes" that the government should provide some financial support for CCS, and an additional 10% responded "maybe." Among respondents who had earlier indicated that they support CCS, 75% responded "yes" or "maybe" that the government should provide financial support for CCS. Among those who were opposed to CCS, 45% responded "yes" or "maybe" to government support for CCS.

On the 2005 survey there were no questions about government financial support for CCS. However, those who were opposed to CCS were asked what actions would reduce their opposition. Over 75% of opposed respondents indicated that more information (both more research and more information shared with the public) would reduce their opposition. Other actions that would reduce opposition among more than half of those opposed to CCS include involvement of independent experts and non-governmental organizations, no reduction in spending on renewable energy and energy efficiency, and strong regulation and monitoring.

4. Conclusion

A number of the results from both of these surveys suggest positive public attitudes toward CCS in Canada. The public became more aware of CCS between 2005 and 2007, although more than half of Canadians are still unaware of CCS. The public also appears to have become more supportive of CCS (coincident with increasing concern about climate change and environmental issues), and to favour the use of CCS to reduce GHG emissions and address the threat of climate change. However, support for conservation, energy efficiency, and renewable energy technologies remains much higher, so any climate change package must include those options to obtain public support. The public remains concerned about the potential risks associated with CCS, particularly the risk of a CO_2 leak, and unknown risks. Despite this, CCS is viewed as less risky than conventional energy technologies such as nuclear power, coal-burning power plants, and normal oil and gas industry operations. There is public support for the government to provide some financial support for CCS, even among those who are opposed to CCS. Lack of information is a recurrent theme. There is a need for more research into CCS, and for better sharing of information with the public, to address public concerns as CCS is developed and implemented in Canada.