

# IPAC CO2 Research Inc.

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## Public Awareness and Acceptance of Carbon Capture and Storage in Canada (Executive Summary)

November 2011



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# Executive Summary

## Introduction

In September 2011, IPAC CO2 Research Inc. contracted Inshtrix Research, Inc. to conduct an online survey of Canadian residents. Overarching objectives of this research include:

- To measure the awareness and knowledge levels of Carbon Capture and Sequestration technologies,
- To understand Canadian residents' opinions on various aspects of climate change and policy, and,
- To compare the results from the survey from the European Eurobarometer study conducted in early 2011.

Responses were collected between September 27<sup>th</sup> and October 28<sup>th</sup>, 2011. Additional survey completions were sought in Saskatchewan so that differences in opinion of residents of the province could be compared with those of residents of other parts of the country. Throughout the report, a random, representative sample of Canadian residents is used for the Canadian results (total of 1548 responses) but the full dataset is used for regional comparisons. The sample distribution is as follows:

	Representative Sample		Population	Additional Completions
	Count	Percent		
British Columbia	203	13%	13%	0
Alberta	162	10%	10%	0
Saskatchewan	47	3%	3%	849
Manitoba	54	3%	4%	0
Ontario	594	38%	38%	0
Quebec	372	24%	24%	0
Atlantic Canada	116	7%	7%	0
Total	1548	100%	100%	0

## Study Results

### *Climate Change*

Canadians commonly believe that they are at fairly or very informed about the different causes of climate change (71%) the different consequences of climate change (72%) and the different ways in which we can fight climate change (67%). Just more than one in ten in each case believe that they are very well informed about each of these areas (13%, 13% and 12% respectively). Perceived knowledge levels are fairly consistent across the country, with the exception of the self-assessed knowledge level of the ways in which we can fight climate change, which is much lower in Quebec (61% believe they are fairly or very informed). The results are quite different from the Eurobarometer study, where only about one half of Europeans believe they are as informed about these three factors (49%, 49% and 46%, respectively feel they are fairly or very informed). Demographically, men, younger respondents and those who have completed university are the most likely to believe they are very well informed compared to their counterparts.

Overall, most (57%) Canadians believe that climate change is occurring partially due to human activity and partially due to natural climate variation and three in ten (31%) believe that climate change is occurring as a result of human activity. About one in ten (8%) believe that climate change is occurring due to natural climate variation and 1% that climate change is not occurring at all. The remaining 4% of Canadians are unsure. Regionally, residents of Alberta (15%) and Saskatchewan (14%) are most likely to believe that climate change is occurring due to natural climate variation, while respondents in of Ontario (6%), Quebec (6%) and Atlantic Canada (3%) are least likely to hold this belief.

As in Europe, television is also the most commonly cited source of information about climate change among Canadians (79% in Canada, 81% in Europe). Many Canadians also mention online sources (63%), newspapers (56%), radio (31%) and magazines (30%). Demographically, younger respondents most often cited the Internet as a source for information about climate change (76%), slightly higher than the proportion who mention television as a source (73%) and are much less likely to cite newspapers (51%) as a source. Respondents aged 55 or older most commonly indicated that television is a major information source about climate change for them (84%) and two thirds mention newspapers (64%) as a source. About one half (54%) indicate that the Internet is a source of information.

When asked to choose two priorities from a list of eight potential actions that they believe should be prioritized in Canada in order to fight climate change, respondents are divided, which is consistent with the results from the Eurobarometer study. While the most common selected priority is to promote cleaner cars running on electricity or low-carbon fuels (38%), the next four priorities are chosen by nearly the same proportion of respondents. A total of 29% believe that stimulating the development of industries that supply environmentally friendly technologies and services should be a priority, 28% raising the energy efficiency or industrial processes, 25% encouraging the building of energy efficient homes and the insulation of existing homes, and 24% securing a reliable energy supply for Canada. Less commonly chosen are the priorities to reduce CO2 emissions from electricity generation (15%), taxing CO2 emissions across the whole economy (11%) and

reducing greenhouse gas emissions from the agricultural sector (11%). Generally, the proportion who chose each as a priority was very different across the country; however, this said, no priority was chosen by a majority of respondents in any province, indicating that the division in beliefs is prevalent across the nation.

### *Carbon Dioxide*

More than half (58%) of respondents are able to correctly identify CO<sub>2</sub> as carbon dioxide. When asked which of a list of statements apply to carbon dioxide, two thirds (65%) indicated that they believe that it is unhealthy. These results mirror those of the Eurobarometer study (50% and 74%, respectively).

When asked which of a list of five sources they believe produces the most carbon dioxide globally, respondents are divided in their opinions. A total of 29% believe that power plants that burn fossil fuels produce the most carbon dioxide, while 26% chose passenger or freight transport and 23% chose factories. Less commonly chosen are farming (8%) and heating or cooling homes (3%). Respondents in the Eurobarometer study were also divided in their opinions. A higher proportion of European respondents believe that the most CO<sub>2</sub> comes from factories (35% vs. 23%), while a lower proportion believe that passenger or freight transport (15% vs. 26%) produce the most carbon dioxide.

Many (30%) respondents believe that carbon dioxide has a very high impact on climate change, while a further five in ten (51%) believe that it has a fairly high impact, mirroring the results from the Eurobarometer study (35% and 48%, respectively) Respondents in the prairies, including Alberta (17%), Saskatchewan (19%) and Manitoba (15%), are least likely to believe that carbon dioxide has a very high impact while those in Atlantic Canada (46%) and Quebec (38%) are most likely.

### *CCS and Energy Sources*

Overall, 14% of Canadians have heard of CCS and know what it is, while a further 30% have heard of CCS but don't know what it is. These results are much higher than in the Eurobarometer results which found that 10% have heard of CCS and know what it is while a further 18% have heard of it but aren't sure what it is. Provincially, respondents from Saskatchewan (40%) and Alberta (27%) are the most likely to have heard of CCS and know what it is, while respondents from Atlantic Canada (10%) and Ontario (9%) are least likely.

Respondents were asked whether or not they have heard of each of a list of ten different energy sources. Nearly all respondents have heard of solar energy (93%) and nuclear energy (87%), and a majority have heard of geothermal energy (65%), biogas/biodiesel (58%) and ocean energy (51%). Generally, Canadian respondents are more likely than European respondents to have heard of many of the different energy sources especially solar energy (93% vs. 58%), nuclear energy (87% vs. 51%), geothermal energy (65% vs. 47%) and hydrogen energy (50% vs. 32%). When asked whether they are in favour of the different energy sources, respondents commonly indicated that they favour solar (95%), wind (95%) and hydroelectric (90%) energy. Coal is the least favoured (19%) energy source. Canadians tend to be slightly less likely to favour natural gas (71% vs. 80%), biomass energy (45% vs. 60%) and coal (18% vs. 35%) compared to Europeans.

Respondents are in disagreement with how effective they believe that CCS could be in fighting climate change. Overall, 42% believe it could be fairly (35%) or very (7%) effective, while 34% believe it would be not very (26%)

or not at all effective (8%). A total of one quarter (24%) are unsure. Despite differences in knowledge levels about CCS, about the same proportion (39%) of European respondents believe that CCS would be fairly (33%) or very (6%) effective in fighting climate change. In line with this finding, respondents are also divided on whether they believe that they would (32%) or would not (26%) benefit if carbon capture and storage technology was used in their province. Respondents in the Eurobarometer study were also divided in this area, with one quarter (23%) believing that they would benefit while four in ten (38%) do not believe that they would benefit. Improvement in air quality (62%) is by far the most common reason that respondents believe that CCS would benefit them, while the most common mention that CCS would not benefit them is potential adverse effects on the environment (36%). Three in ten (30%) are aware of other chemicals that are injected or stored in the ground and the most commonly mentioned is nuclear or radioactive waste (25%).

When directly asked how worried they would be if a CO<sub>2</sub> storage site between 1.5 and 3 kilometers below the ground was located within 5 kilometers of their home, 28% responded that they would be very worried and 35% indicated that they would be fairly worried. A minority would be not very worried (20%) or not at all worried (5%). Respondents in Ontario (29%) and Quebec (36%) are most likely to be very worried while those in Saskatchewan (19%), Manitoba (17%) and British Columbia (22%) are least likely. Looking at the results by demographics revealed several distinct differences. Women (33% vs. 23% of men) and those between the ages of 35 and 54 (32% vs. 24% of those between the ages of 18 and 34) are significantly more likely to indicate that they would be very worried at the prospect at having a CO<sub>2</sub> storage facility near them. Respondents who have children under 18 in the household are more likely to be fairly worried (41% vs. 33%) but are not more likely to be very worried (30% vs. 28%) than those who do not have children under 18 in their household. Results are quite close to the Eurobarometer results, where 24% indicated that they would be very worried and 37% that they would be fairly worried. Most commonly, the reasons for concern are the possible negative effects on the environment, groundwater, wildlife and health (52%), followed by risk of leaks (33%), the two most common concerns in the Eurobarometer study.

If an underground CO<sub>2</sub> storage site were to be proposed 5 kilometers from their home, respondents generally agree that they would like to be directly consulted (83%) and participate in the decision-making process, that they would like non-governmental organizations to be consulted and to participate in the decision-making process (83%) and that they would like the government to be consulted and to participate in the decision-making process (80%).

Respondents were asked to indicate which of three different storage options they prefer, and approximately the same percentage of respondents favoured each: 20% prefer that it be stored underground and onshore, but near the power plant or industrial plant which generates CO<sub>2</sub>, 16% prefer it be stored underground and onshore, but only where human population is very low and 15% prefer it be stored offshore under the seabed. These results are similar to the Eurobarometer results, where respondents were also divided.

The most trusted source of information about CCS is from scientists and researchers (71%), which was rated by a much higher percentage of respondents than any other source. Non-governmental sources are trusted by 46% and 21% trust information from journalists about CCS.

Respondents were asked their level of agreement on each of eight different statements regarding various aspects of CCS and power generation. A large majority (80%) of respondents agree that public authorities should be able to monitor carbon capture and storage operations. Many also agree that harmonized and consistent methodologies should be developed within Canada to manage the capture and storage of CO<sub>2</sub> (67%) and that capturing and storing CO<sub>2</sub> should be compulsory when building a new natural gas (57%) or coal-fired (60%) power plant. Agreement is also fairly common that the storage of CO<sub>2</sub> will help to combat climate change (49%). However, respondents were also in disagreement that CCS will ensure lower and more stable energy prices (29%) and many (56%) also believe that the storage of CO<sub>2</sub> represents a safety risk in the future. About one half (51%) of respondents believe that fossil fuels will still be used after the year 2050 for electricity production in Canada.