

## 11. Climate Change: Carbon Capture and Storage [98]

### Commitment

“We will accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology”

*G8 Leaders’ Declaration on Energy Efficiency, Diversification of the Energy Mix and Technology*

### Assessment

	Lack of Compliance	Work in Progress	Full Compliance
Canada			+1
France	-1		
Germany	-1		
Italy	-1		
Japan		0	
Russia	-1		
United Kingdom			+1
United States	-1		
European Union		0	
Average Score			-0.33

### Background

Carbon capture and storage (CCS) is a means for mitigating climate change by reducing the amount of carbon dioxide (CO<sub>2</sub>) emissions in the earth’s atmosphere.<sup>702</sup> It is the process by which CO<sub>2</sub> emissions are removed from the atmosphere, at the point of impingement, and stored.<sup>703</sup> The point of impingement refers to the site from which emissions are released. This may include various industrial and energy production facilities.<sup>704</sup> Emissions may be sequestered in geological formations both on land and under water.<sup>705</sup> The IPCC estimates that a CCS system coupled with secure storage can capture between 80-90 per cent of CO<sub>2</sub> emissions produced by a facility.<sup>706</sup> It has also been estimated that prompt implementation of CCS projects would reduce worldwide CO<sub>2</sub> emissions by 9-16 billion tonnes by 2050.<sup>707</sup>

<sup>702</sup> Carbon Capture and Storage, Pembina Institute (Ottawa) 2007. Date of Access: 31 October 2009. [climate.pembina.org/solutions/ccs](http://climate.pembina.org/solutions/ccs)

<sup>703</sup> IPCC Special Report on Carbon Dioxide Capture and Storage - Summary for Policymakers, Intergovernmental Panel on Climate Change (Montreal) 22-24 September 2005. Date of Access: 31 October 2009. [www.ipcc.ch/pdf/special-reports/srccs/srccs\\_summaryforpolicymakers.pdf](http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf)

<sup>704</sup> IPCC Special Report on Carbon Dioxide Capture and Storage - Summary for Policymakers, Intergovernmental Panel on Climate Change (Montreal) 22-24 September 2005. Date of Access: 31 October 2009. [www.ipcc.ch/pdf/special-reports/srccs/srccs\\_summaryforpolicymakers.pdf](http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf)

<sup>705</sup> IPCC Special Report on Carbon Dioxide Capture and Storage - Summary for Policymakers, Intergovernmental Panel on Climate Change (Montreal) 22-24 September 2005. Date of Access: 31 October 2009. [www.ipcc.ch/pdf/special-reports/srccs/srccs\\_summaryforpolicymakers.pdf](http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf)

<sup>706</sup> IPCC Special Report on Carbon Dioxide Capture and Storage - Summary for Policymakers, Intergovernmental Panel on Climate Change (Montreal) 22-24 September 2005. Date of Access: 31 October 2009. [www.ipcc.ch/pdf/special-reports/srccs/srccs\\_summaryforpolicymakers.pdf](http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf)

<sup>707</sup> CO<sub>2</sub> Capture and Storage - A Key Solution for Combating Climate Change (Brussels) Date of Access: 31 October 2009. [www.zeroemissionsplatform.eu/the-hard-facts.html](http://www.zeroemissionsplatform.eu/the-hard-facts.html)

Several small-scale carbon capture and storage projects have been built worldwide.<sup>708</sup> However, these facilities are largely experimental, and only four full-scale projects exist.<sup>709</sup> Regulatory activity regarding CCS has been increasing since 2005.<sup>710</sup>

Emissions reduction and climate change mitigation via carbon capture and storage has been an important issue for the G8 since the 2003 Evian Summit, at which G8 leaders pledged to “expand significantly the availability of and access to cleaner, more efficient fossil fuel technologies and carbon sequestration systems and pursue joint research and development and expanded international co-operation, including demonstration projects.”<sup>711</sup>

At the 2005 Gleneagles Summit, G8 members pledged to “accelerate the development and commercialization of Carbon Capture and Storage technology”, by supporting research on the technical, social, and economic implications of CCS.<sup>712</sup>

G8 members have also supported the development of large-scale CCS demonstration projects. At the 2008 Hokkaido-Toyako Summit, Members committed to launching 20 such projects by 2010.<sup>713</sup>

In a Joint Statement by the G8 Energy Ministers on 8 June 2008, members stressed the importance of CCS in mitigating climate change, and maintaining energy security.<sup>714</sup> Further, G8 Environment Ministers stressed the importance of investment in CCS technologies at the Siracusa Environmental Ministerial Meeting, leading up to the 2009 L’Aquila Summit.<sup>715</sup>

Overall, G8 members have previously supported the development of CSS technology. They have not, however, previously pledged to develop policies, regulatory frameworks, and incentive schemes to this effect. To date, the focus of the G8 has been on research support and specific project development.

---

<sup>708</sup> CO<sub>2</sub> Capture and Storage Projects, European Commission Directorate-General for Research (Brussels) 2007. Date of Access: 30 October 2009. [ec.europa.eu/research/energy/pdf/synopses\\_co2\\_en.pdf](http://ec.europa.eu/research/energy/pdf/synopses_co2_en.pdf)

<sup>709</sup> CO<sub>2</sub> Capture and Storage: A Global Call to Action, Office of Sustainable Policy and Technology 23 April 2009. Date of Access: 30 October 2009. [www.iea.org/speech/2009/Kerr\\_NCCSA.pdf](http://www.iea.org/speech/2009/Kerr_NCCSA.pdf)

<sup>710</sup> CO<sub>2</sub> Capture and Storage: A Global Call to Action, Office of Sustainable Policy and Technology 23 April 2009. Date of Access: 30 October 2009. [www.iea.org/speech/2009/Kerr\\_NCCSA.pdf](http://www.iea.org/speech/2009/Kerr_NCCSA.pdf)

<sup>711</sup> Science and Technology for Sustainable Development - A G8 Action Plan, the Group of Eight (Evian) 2003. Date of Access: 30 October 2009.

[www.g8.fr/evian/english/navigation/2003\\_g8\\_summit/summit\\_documents/science\\_and\\_technology\\_for\\_sustainable\\_development\\_-\\_a\\_g8\\_action\\_plan.html](http://www.g8.fr/evian/english/navigation/2003_g8_summit/summit_documents/science_and_technology_for_sustainable_development_-_a_g8_action_plan.html)

<sup>712</sup> Gleneagles Plan of Action - Climate Change, Clean Energy and Sustainable Development, the Group of Eight (Gleneagles) 2005. Date of Access: 31 October 2009.

[www.g7.utoronto.ca/summit/2005gleneagles/climatechangeplan.pdf](http://www.g7.utoronto.ca/summit/2005gleneagles/climatechangeplan.pdf)

<sup>713</sup> Responsible Leadership for a Sustainable Future, the Group of Eight (L’Aquila) 8 July 2009. Date of Access: 1 November 2009. [www.g8.utoronto.ca/summit/2009laquila/2009-declaration.html](http://www.g8.utoronto.ca/summit/2009laquila/2009-declaration.html)

<sup>714</sup> Joint Statement by G8 Energy Ministers, G8 Energy Ministers (Aomori) 8 June 2008. Date of Access: 1 November 2009. [www.g8.utoronto.ca/energy/080608energy.pdf](http://www.g8.utoronto.ca/energy/080608energy.pdf)

<sup>715</sup> Chair’s Summary - Siracusa Environmental Ministerial Meeting (Siracusa) 22-24 April 2009. Date of Access: 1 November 2009. [www.g8.utoronto.ca/environment/env090424-summary.pdf](http://www.g8.utoronto.ca/environment/env090424-summary.pdf)

## Commitment Features

This commitment focuses on creating policy, regulatory frameworks and incentives, which would encourage the development of CCS technology and not on the actual creation of such projects; and represents a broader pledge than past statements, as it focuses on measures that would encourage CCS technology development in general, as opposed to developing specific projects. Therefore, a country can be considered in compliance even if no new CCS projects or technologies are developed in this compliance cycle. However, supporting specific projects or technologies does not, on its own, constitute compliance.

The word ‘accelerate’ can be taken to mean increasing the amount and scope of policy, regulatory frameworks, and incentive schemes focused on the development and deployment of CCS technology. Therefore, compliance can include creating new policy, regulatory frameworks and incentive schemes, or strengthening old ones.

## Scoring

-1	Member reduces the scope of existing policy, regulatory frameworks, and incentive schemes focused on the development and deployment of CCS technology; OR does not take any action towards creating new policy, regulatory frameworks, and incentive schemes.
0	Member takes some action towards accelerating the design of policies, regulatory frameworks, and incentive schemes focused on the development and deployment of CCS technology. This may include releasing whitepapers or draft policies on CCS technology development, or holding legislative committee meetings on the issue.
+1	Member increases the scope of existing policy, regulatory frameworks, and incentive schemes focused on the development and deployment of CCS technology; OR creates new policy, regulatory frameworks, and incentive schemes.

*Lead Analyst: Natalie Antonowicz*

## Canada: +1

Canada has fully complied with its commitment to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

On 15 January 2010, the Government of Canada announced a CAD4 million dollar grant for the International Performance Assessment Centre for Geologic Storage of CO<sub>2</sub> (IPAC-CO<sub>2</sub>) in Regina, Saskatchewan.<sup>716</sup>

As well, the government has promised to consult with stakeholders to identify specific assets used in CCS with a view to provide accelerated capital cost allowance in respect to such investments.<sup>717</sup> A carbon capture and storage system known as ICO<sub>2</sub>N has also been

<sup>716</sup> Canadian Government invests \$4 million in Carbon Capture and Storage Research, The Regina Leader-Post (Regina) 15 January 2010. Date of Access: 15 January 2010. [www.leaderpost.com/technology/Canadian+government+invests+million+carbon+capture+storage+research/2447550/story.html](http://www.leaderpost.com/technology/Canadian+government+invests+million+carbon+capture+storage+research/2447550/story.html)

<sup>717</sup> Canada’s Economic Action Plan: Budget 2009, Department of Finance Canada (Ottawa) 27 January 2009. Date of Access: 3 December 2009. [www.budget.gc.ca/2009/plan/bpc3e-eng.asp](http://www.budget.gc.ca/2009/plan/bpc3e-eng.asp)

proposed for Canada. ICO<sub>2</sub>N, which consists of numerous corporations such as Shell Canada and Agrium Inc., has been communicating with the federal government and the Government of Alberta to develop a comprehensive regulatory framework for carbon capture and storage.<sup>718</sup>

Thus, Canada receives a score of +1 for investment in CCS technology and work towards the enhancement of existing policy, regulatory frameworks, and incentive schemes.

*Analyst: Alex Ognibene*

### **France: -1**

France has not complied with its commitment to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

Although France is introducing a carbon tax in January 2010 as a policy incentive to reduce emissions, it has not put forward a policy to comprehensively move towards carbon capture technology. This year France became the first country to retrofit a power plant with carbon capture and storage technology.<sup>719</sup> However, this individual project cannot be counted as compliance, as it did not come as an increase in scope or creation of a new policy, regulatory framework and incentive scheme focused on the development and deployment of CCS technology. As well, this project occurred well before the L'Aquila summit.

Thus, France has been assigned a score of -1 for failing to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

*Analyst: Jasmine Hamade*

### **Germany: -1**

Germany has not complied with its commitment to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

In 2008, Germany became the first country in the world to install a coal power plant that is “ready to capture and store its own carbon dioxide emissions.”<sup>720</sup> So far, however, “only demonstration projects are operational.”<sup>721</sup> Additionally, the German public is

---

<sup>718</sup> Integrated CO<sub>2</sub> Network: A Canadian CO<sub>2</sub> Capture and Storage Initiative, ICO<sub>2</sub>N (Calgary) 2007. Date of Access: 3 December 2009. [www.ico2n.com/index.php](http://www.ico2n.com/index.php)

<sup>719</sup> New era for fossil fuels as first carbon capturing power plant begins work, The Guardian (London) 8 April 2009. Date of Access: 17 November 2009. [www.guardian.co.uk/environment/2009/apr/08/first-carbon-capture-power-plant-lacq](http://www.guardian.co.uk/environment/2009/apr/08/first-carbon-capture-power-plant-lacq)

<sup>720</sup> Carbon Capture Plant Opens in Germany Amid Reservations, Deutsche Welle (Berlin) 9 September 2008. Date of Access: 16 November 2009. [www.dw-world.de/dw/article/0,2144,3628912,00.html](http://www.dw-world.de/dw/article/0,2144,3628912,00.html)

<sup>721</sup> Carbon Capture courts Copenhagen, United Nations Climate Change Conference (Copenhagen) 14 October 2009. Date of Access: 5 December 2009. [en.cop15.dk/news/view+news?newsid=2354](http://en.cop15.dk/news/view+news?newsid=2354)

resisting the use of the plant to store carbon underground<sup>722</sup> because they are concerned that the technology will harm crops.<sup>723</sup> As a result, no new policies were planned or implemented.

Therefore, Germany receives a score of -1 for its failure to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

*Analyst: Jasmine Hamade*

### **Italy: -1**

Italy has not complied with its commitment to accelerate the design of policies and regulatory frameworks for the development of CCS technologies.

The National Action Plan for greenhouse gas emission reduction is expiring in 2010 and, for the period of 2010-2020, the only existing legislation is the 2007 Position Paper of the Italian Government, which sets out a number of targets for the next decade but fails to spell out any concrete measures to attain these goals.<sup>724</sup> Italy has shown willingness to support many emerging economies, such as China and India, to make the technological ‘leap’ through the diffusion of CCS technologies.<sup>725</sup> However, there is no apparent or specific policy strategy for the attainment of these goals.

Thus, Italy has been awarded a score of -1, since it has not undertaken any action to accelerate the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology

*Analyst: Joelle Westlund*

### **Japan: 0**

Japan has partially complied with its commitment to accelerate the design of policies, regulatory frameworks and incentive schemes for the development of CCS technology.

On 7 August 2009, Japan’s Ministry of Economy, Trade and Industry released guidelines on safety and environmental standards that must be implemented while conducting a number of CCS pilot projects. Under the Government Action Plan for Achieving a Low

---

<sup>722</sup> Not under our backyard, say Germans, in blow to CO2 plans, The Guardian (London) 29 July 2009.

Date of Access: 5 December 2009. [www.guardian.co.uk/environment/2009/jul/29/germany-carbon-capture](http://www.guardian.co.uk/environment/2009/jul/29/germany-carbon-capture)

<sup>723</sup> Locals Try Sinking Plan to Store CO2 Underground, Wall Street Journal (Brandenburg) 6 October 2009.

Date of Access: 6 December 2009. [online.wsj.com/article/SB125476964655765445.html](http://online.wsj.com/article/SB125476964655765445.html)

<sup>724</sup> CCS Deployment in Italy at cross roads of stop-and-go and full-stream ahead in climate change battle, Bellona (Rome) 1 September 2009. Date of Access: 3 December 2009.

[www.bellona.org/articles/articles\\_2009/italian\\_ccs](http://www.bellona.org/articles/articles_2009/italian_ccs)

<sup>725</sup> Major Interventions, National level actions, Ministry of Foreign Affairs Italy (Rome) Date of Access: 3 December 2009. [www.esteri.it/MAE/Templates/GenericTemplate.aspx?NRMODE=Published&NRNODEGUID=%7b629813FA-71F8-4BCC-8514-764B7DEF8D54%7d&NRORIGINALURL=%2fMAE%2fEN%2fPolitica\\_Estera%2fTemi\\_Globali%2fEnergia%2fInterventi\\_Importanti&NRCACHEHINT=Guest#3](http://www.esteri.it/MAE/Templates/GenericTemplate.aspx?NRMODE=Published&NRNODEGUID=%7b629813FA-71F8-4BCC-8514-764B7DEF8D54%7d&NRORIGINALURL=%2fMAE%2fEN%2fPolitica_Estera%2fTemi_Globali%2fEnergia%2fInterventi_Importanti&NRCACHEHINT=Guest#3)

Carbon Society, carbon capture and storage will be put into use by 2020.<sup>726</sup> Furthermore, a report was released by the Carbon Dioxide Capture and Storage Study Group examining safety standards, candidate sites for CCS demonstrations, transport, and storage and remedies for potential problems.<sup>727</sup>

Thus, Japan has been awarded a score of 0 for taking some plenary actions towards accelerating the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

*Analyst: Poorva Misra*

**Russia: -1**

Russia has failed to comply with the commitment on development and deployment of CCS technology.

On 12-14 October 2009, the delegation of the Russian Federal Agency for Science and Innovation (Rosnauka) participated in the meeting of the Carbon Sequestration Leadership Forum (CSLF) held in London. The main topic of discussion was methods of accelerating development and commercial adoption of carbon sequestration technologies.<sup>728</sup>

Russia has not taken steps to accelerate the design of policies, regulatory frameworks and incentive schemes towards the development and deployment of CCS technology during the compliance cycle. Therefore, the score of Russia for the fulfillment of this commitment is -1.

*Analyst: Natalia Churkina*

**United Kingdom: +1**

The United Kingdom has fully complied with its commitment to accelerate policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

On 15 July 2009, the Department of Energy and Climate Change published the UK Low Carbon Transition Plan<sup>729</sup> and the Low Carbon Industrial Strategy (LCIS).<sup>730</sup> The former

---

<sup>726</sup> Report by the Carbon Dioxide Capture and Storage (CCS) study Group, Ministry of Environment, Technology and Industry (Tokyo) 7 August 2009. Date of access: 3 December 2009  
[www.meti.go.jp/english/press/data/20090807\\_02.html](http://www.meti.go.jp/english/press/data/20090807_02.html)

<sup>727</sup> Report by the Carbon Dioxide Capture and Storage (CCS) study Group, Ministry of Environment, Technology and Industry (Tokyo) 7 August 2009. Date of access: 3 December 2009.  
[www.meti.go.jp/english/press/data/20090807\\_02.html](http://www.meti.go.jp/english/press/data/20090807_02.html)

<sup>728</sup> Deputy head of Rosnauka A.V. Klimenko participated in the meeting of the Carbon Sequestration Leadership Forum, Federal Agency for Science and Innovation of the Russian Federation 28 October 2009. Date of access: 30 December 2009. [www.fasi.gov.ru/news/press-c/1927/](http://www.fasi.gov.ru/news/press-c/1927/)

<sup>729</sup> Press Release – UK at forefront of a low carbon economic revolution, Department of Energy and Climate Change (London) 15 July 2009. Date of Access: 4 December 2009.  
[www.decc.gov.uk/en/content/cms/news/pn081/pn081.aspx](http://www.decc.gov.uk/en/content/cms/news/pn081/pn081.aspx)

<sup>730</sup> The UK Low Carbon Industrial Strategy, Department for Business, Innovation and Skills and Department of Energy and Climate Change (London) 15 July 2009. Date of Access: 4 December 2009.  
[www.berr.gov.uk/files/file52002.pdf](http://www.berr.gov.uk/files/file52002.pdf)



sets out a clear plan for the introduction of a new financial incentive scheme funded by a levy on electricity suppliers and for the government's provision of financial support for up to four commercial-scale CCS demonstrations in Britain.<sup>731</sup> The LCIS also requires any new coal power station in England and Wales to retrofit CCS to their full capacity within five years of CCS becoming technically and economically viable.<sup>732</sup>

The United Kingdom has taken definite action towards accelerating the design of policies, regulatory frameworks and incentive schemes and has thus been assigned a score of +1.

*Analyst: Ren Hui Yoong*

### **United States: -1**

The United States has failed to comply with its commitment to accelerate policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

On 4 December 2009, the US Department of Energy announced that the American government would contribute USD979 million to co-fund three projects to develop and deploy carbon capture and storage technologies,<sup>733</sup> as part of the Clean Coal Power Initiative.<sup>734</sup> However, the Clean Coal Power Initiative is not new and does not increase the scope of the current incentive scheme and, thus, does not constitute new action.

The United States has not taken any new action in creating policies, regulatory frameworks or incentive schemes for CCS technologies. Thus, the United States has been awarded a score of -1.

*Analyst: Ren Hui Yoong*

### **European Union: 0**

The European Union has made various efforts to increase the scope of existing policy, regulatory frameworks, and incentive schemes focused on the development and deployment of carbon capture and storage technology.

The European Union has made noticeable, but slow, progress towards achieving its carbon capture and storage commitments. The EU has outlined two major tasks for

---

<sup>731</sup> Government impose 'carbon capture levy' to fund coal-fired power plants, The Times (London) 10 November 2009. Date of Access: 16 November 2009.

[www.timesonline.co.uk/tol/news/environment/article6910275.ece](http://www.timesonline.co.uk/tol/news/environment/article6910275.ece)

<sup>732</sup> Clean coal push marks reversal of UK energy policy, The Guardian (London) 23 April 2009. Date of Access: 16 November 2009. [www.guardian.co.uk/environment/2009/apr/23/clean-coal-energy-policy](http://www.guardian.co.uk/environment/2009/apr/23/clean-coal-energy-policy)

<sup>733</sup> Secretary Chu Announces \$3 Billion Investment for Carbon Capture and Sequestration, \$979 million to support new commercial-scale CCS technologies, U.S. Department of Energy (Washington) 4 December 2009. Date of Access: 4 December 2009. [www.energy.gov/news2009/8356.htm](http://www.energy.gov/news2009/8356.htm)

<sup>734</sup> Clean Coal Technology & The Clean Coal Power Initiative, U.S. Department of Energy (Washington) 4 December 2009. Date of Access: 4 December 2009.

[www.fossil.energy.gov/programs/powersystems/cleancoal/](http://www.fossil.energy.gov/programs/powersystems/cleancoal/)

deployment of CSS: the demonstration of CCS technology at plants across Europe, and the development of a legal framework and economic incentives.<sup>735</sup>

Keeping the above objective in mind, on 16 October 2009, the EU pledged to operate at least 12 carbon capture and storage projects by 2015.<sup>736</sup>

On 3 November 2009, it was announced at the 2009 US-EU Summit that the European Union and United States will establish an Energy Council to foster collaboration in a number of key areas, including CCS development and demonstration.<sup>737</sup>

Therefore, the European Union receives a score of 0 for its progress towards accelerating the design of policies, regulatory frameworks and incentive schemes focused on the development and deployment of CCS technology.

*Analyst: Alex Ognibene*

---

<sup>735</sup> CSS in Europe, Europa (Brussels) 20 November 2008. Date of Access: 3 December 2009. [ec.europa.eu/environment/climat/ccs/work\\_en.htm](http://ec.europa.eu/environment/climat/ccs/work_en.htm)

<sup>736</sup> Commission unveils support for European carbon capture and storage schemes, EurActive (Brussels) 16 October 2009. Date of Access: 16 November 2009. [pr.euractiv.com/press-release/commission-unveils-support-european-carbon-capture-and-storage-schemes-11645](http://pr.euractiv.com/press-release/commission-unveils-support-european-carbon-capture-and-storage-schemes-11645)

<sup>737</sup> US, EU to establish Energy Council, Business Standard (Washington) 4 November 2009. Date of Access: 16 November 2009. [www.business-standard.com/india/news/us-eu-to-establish-energy-council/77510/on](http://www.business-standard.com/india/news/us-eu-to-establish-energy-council/77510/on)