

***TomorrowNow—
Manitoba's Green Plan:
Toward a New Provincial Climate
Change and Green Economy Plan***

Consultations Background Paper

Transportation and Infrastructure:
Reducing emissions and enhancing
our resilience to climate change

August 2014

TomorrowNow—Manitoba’s Green Plan

Preface

In 2012 the Government of Manitoba released *TomorrowNow—Manitoba’s Green Plan*, which includes commitments to update its climate change plan and create the first green economy action plan for Manitoba. As an initial step in this process, the province has asked the International Institute for Sustainable Development (IISD) to host a series of consultation sessions with key stakeholders on climate change and the green economy. Each meeting focuses on a specific sector and seeks an open dialogue on Manitoba’s new climate change and green economy action plan.

The upcoming session, focusing on the province’s transportation and infrastructure sectors, reflects not only their critical role in Manitoba’s economy, but also the crucial role they play in its evolution to sustainable development. The need to adapt to climate disruptions is already strongly evident and will drive future investment choices in these sectors. Massive potential for greater resiliency, efficiencies and innovation has been shown within the transportation and infrastructure sectors—potential that will need to be unlocked as part of Manitoba’s climate change and green economy action plan.

Where Do We Stand?

Climate change threatens our social, economic and environmental systems on a global scale. Governments at every level are seeking to increase climate resilience, lower vulnerability to the impacts of climate change, reduce greenhouse gas (GHG) emissions, implement adaptive actions and participate in the newly emerging green economy. Manitoba is no exception to these efforts.

In 2008 the Government of Manitoba released its *Beyond Kyoto* climate change action plan (Government of Manitoba, 2008), which listed over 60 actions to effectively reduce GHG emissions across Manitoba’s economy and put in place initial actions to adapt to climate change. Although most of these actions were successfully implemented, Manitoba was unable to achieve the desired target level of GHG reductions. Figure 1 illustrates Manitoba’s emissions from 1990 to 2012.

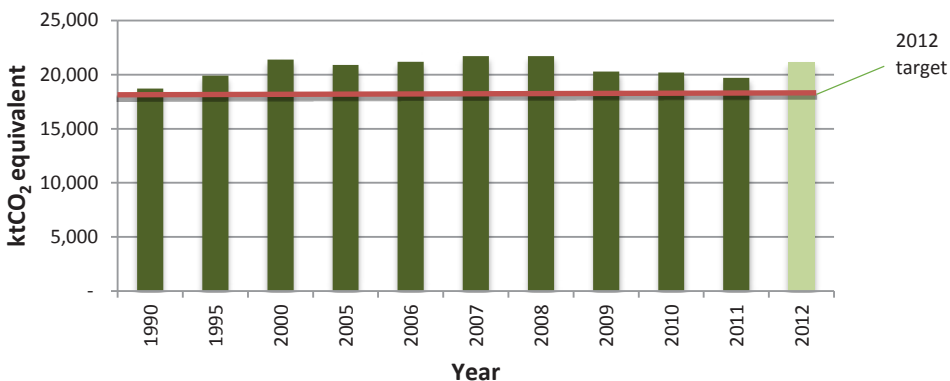


FIGURE 1: TOTAL PROVINCIAL EMISSION (IN KILOTONNES OF CO₂E) FROM 1990 TO 2012

Environment Canada (2014); Manitoba Conservation and Water Stewardship (2014).

The provincial government released *Manitoba's Report on Climate Change for 2012* (Manitoba Conservation and Water Stewardship, 2014) as the final report on performance under the Climate Change and Emissions Reductions Act (CCERA). This report noted that emissions at the end of 2012 were 500 kilotonnes (kt) lower than emissions levels in the year 2000, but failed to meet the 2012 target goal of 6 per cent below 1990 levels. The majority of GHG reductions were attributed to the energy sector through the ethanol mandate (410 kt), implementation of regulations limiting the use of Manitoba Hydro's single remaining coal-fired facility (343 kt) and Manitoba Hydro's Power Smart programs (140 kt). The report also noted that in 2012 Manitoba Hydro, through electricity exports, had contributed to 6,300 kt of GHG emissions reductions in jurisdictions outside Manitoba.

Manitoba is continuing its efforts to reduce GHG emissions, pursue green economic development and adapt to climate change. Public participation is integral to the policy development process, ensuring future policies and programs will motivate action to reduce emissions and compel us to take proactive steps to adapt. Moreover, it allows for the policy development process to be built from the bottom up¹ for an inclusive policy development process and a climate change and green economy framework that all Manitobans have a hand in creating.

Manitoba's Emissions by Sector

Manitoba has unique characteristics that drive emissions, adaptation needs and green economic opportunities. These characteristics shape the way that Manitobans respond to climate change and pursue resilient, low-carbon economic development.

Manitoba's **energy mix** presents opportunities as well as some challenges. Manitoba is blessed with abundant, stable, clean energy resources. The province has achieved a standard of approximately 98 per cent of locally generated electricity from clean, renewable sources with significant export capacity. This abundance allows Manitoba to adopt a flexible approach to the integration of new sources of energy to provide a backstop, such as geothermal, wind and biomass.

Manitoba provides a significant service to GHG mitigation in North America through clean energy exports that allow customers to switch from GHG-intensive fuels (such as coal) to hydroelectricity. While hydroelectricity exports cannot be counted against provincial GHG targets, they are a significant contribution to emissions reductions in other jurisdictions, as they displace coal and natural gas-fired electricity.

The province's single largest source of GHGs is the **transportation sector**, which generates 38 per cent of total emissions in 2012 (see Figure 2). A large portion of these GHGs are from the on-road light- and heavy-duty fleet, which is regulated for tailpipe emissions at a North American level between Environment Canada and the United States

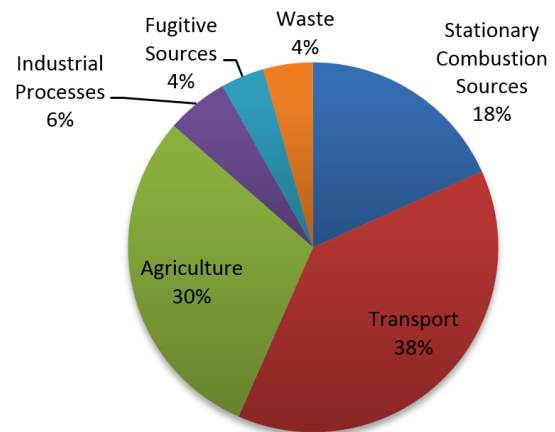


FIGURE 2: MANITOBA 2012 GHG EMISSIONS BY SECTOR
Source: Environment Canada (2014).

¹ Through a "bottom-up" approach, stakeholders' views and policy suggestions feed into the decision-making process for the Government of Manitoba, including priorities to be pursued under each plan.

Environmental Protection Agency regulation. Currently, these regulations are already proposed or set through the 2025 model year for light-duty vehicles and 2018 for heavy-duty vehicles. Although provinces can and do lobby for stronger standards, these regulations are largely federally driven.



A number of complementary measures to tailpipe standards are available to drive GHG mitigation in the transportation sector. These include research and development of alternative technology and fuels (e.g., biofuels, natural gas and electricity), incentivizing uptake of low- and zero-emission vehicles, improving transportation infrastructure, increasing access to mass-transit options, strengthening green procurement and inter-modal integration. These and other options could be considered when looking at ways to reduce transportation emissions at the provincial level, while developing low-carbon economic growth opportunities in the transportation and infrastructure sectors—a fundamental goal of the ongoing consultation process.



Manitoba’s built environment, transportation network, energy infrastructure and agriculture sectors are not only emissions sources—they are also vulnerable to the impacts of climate change. Extreme climate events threaten our transportation system, affecting the well-being of individuals and communities. These concerns apply notably to our infrastructure, where extreme events such as ice storms and floods affect delivery of goods and services to communities in need. This is a particularly acute concern for the province’s winter road network, where shorter and more unpredictable seasons have led the government to transition to all-weather roads as much as possible. This decision has extended the winter roads season on the east side of Lake Winnipeg by as much as two weeks (Government of Manitoba, 2012).

Just as concerning is the impact of flooding. Increasingly regular extreme flood events have shut down roads in southern and western Manitoba, isolated towns and caused significant economic difficulty for companies that rely on our road network to deliver their goods and services to markets. The 2011 flood alone is estimated to have cost the province CAD\$1.2 billion (Manitoba Infrastructure and Transportation, 2013). The financial cost of extreme events is growing across Canada, with insured losses caused primarily by extreme weather events amounting to CAD\$1.6 billion in 2011 and CAD\$3.2 billion in 2013 (Insurance Bureau of Canada, 2012; Calamai, 2014). These insurance losses, while significant all on their own, still do not capture the full negative economic impact that climatic extremes can create as they do not cover all economic losses, such as lost economic opportunities, nor the toll on the health and well-being of individuals and communities.

The Intergovernmental Panel on Climate Change (IPCC) outlined some of its key findings on transportation in its Fifth Assessment Report (AR5) earlier this year. The IPCC notes that transport accounts for roughly 25 per cent of global emissions, a segment rising faster than any other energy end-use sector. It also identified the impacts of climate change on the transportation sector, including the following that are relevant to Manitoba (Farrag-Thibault, 2014):

- More intense droughts, floods and melting of permafrost could damage transport infrastructure such as roads, railways and ports, requiring extensive adaptation and changes to routing in some regions.
- Extreme heat can soften paved roads, while frequent freeze-thaw intervals intensify damage to pavement in cold weather regions.
- Bridges are particularly exposed to flooding, requiring upgraded design specifications. It is suspected that adapting bridge infrastructure in the United States will cost US\$140 billion to \$250 billion over the next 50 years, while the same task in Europe is estimated at US\$350 million to \$500 million.
- Higher mean annual temperatures can reduce fuel and energy efficiency as the demand for cooling increases, notably increasing the energy needed to refrigerate perishable freight.
- Noting that the winter road season has already been reduced by half in some areas of Alaska, thawing of permafrost and shorter winters are projected to contract the global winter road network by 14 per cent across polar nations by 2050, while northern railways will continue to face instability from melting permafrost.

The IPCC's findings and similar Canadian and provincial studies demonstrate the potential for conflicting outcomes from climate change for Manitoba. For example, longer, warmer summers could create a longer shipping season for the port of Churchill, while these same longer, warmer summers could cause havoc for the rail network to Churchill as permafrost melts and ground becomes unstable, requiring more investment in rail line repair and adaptive measures, and potentially hindering freight transport to the port.

Developing the Next Climate Change Plan: What Have Other Jurisdictions Done?

The development of Manitoba’s next climate change plan will take into account how other jurisdictions are proceeding on climate change policy development, and what influences external policies will have on Manitoba. The table below illustrates some of these policies.

TABLE 1. CLIMATE CHANGE POLICIES IMPLEMENTED IN OTHER JURISDICTIONS

JURISDICTION	ACTIONS	YEAR IMPLEMENTED
Federal Government	Regulations for both heavy-duty and light-duty vehicle tailpipe emissions	2012
	Coal-fired electricity sector regulations	2012
Quebec	New climate change action plan and adaptation strategy	2012-2020
	Launched emissions trading to be linked with California	2014
	First auction of its cap-and-trade system	2013
British Columbia	Review of Revenue-Neutral Carbon Tax completed; tax retained at \$30 per tonne	2013
	City of Vancouver Electric Vehicles program	2012
Nova Scotia	Finalized federal equivalency agreement for electricity sector GHG regulations	2012
Other Jurisdictions	Released a climate change progress report and a report from the environmental commissioner	2013
	Emissions mitigation discussion paper	2013
	Phase out of coal-fired power	Completed in 2014
Newfoundland & Labrador and Nova Scotia	Finalized hydroelectric link	2012
Alberta	Policy review of the Specified Gas Emitter Regulation	Expected completion 2014
Several jurisdictions	Measures to strengthen green procurement	2012-2013

Table 2 provides brief examples of climate change actions being taken in jurisdictions within and outside of Canada in the transportation and infrastructure sectors.

TABLE 2. POLICIES REGARDING THE TRANSPORTATION AND INFRASTRUCTURE SECTORS IN OTHER JURISDICTIONS

JURISDICTION	ACTIONS
Vancouver	The City of Vancouver’s electric vehicle program is an initiative that supports Vancouver’s goal to become the greenest city by 2020, and is an intricate part of the city’s efforts towards cleaner air. The program is a partnership between the City of Vancouver and Rocky Mountain Institute’s Project Get Ready, and includes a number of actions that support and facilitate the increase in electric vehicle use, namely: building public charging stations, increasing charging access in residences, partnering with telecommunication companies to provide charging facilities at their sites, increasing the number of electric vehicles in car-sharing programs, increasing Vancouver’s electric vehicle fleet and providing a fast charger for electric vehicles. By its 2012–2013 reporting period, Vancouver had installed 40 electric vehicle-charging stations, required that all new developments provide charging stations for electric vehicles; and reported the largest municipal fleet of electric vehicles in Canada. In February 2014 Vancouver was awarded a Sustainable Communities Award in transportation by the Federation of Canadian Municipalities.
Other Jurisdictions	<p>A number of jurisdictions have adopted various measures related to procurement of government products and services aimed at “walking the talk” with regards to support for GHG mitigation, sustainable development and environmental protection, as well as fostering growth of local business and investment in green economic solutions.</p> <ul style="list-style-type: none"> • Quebec has adopted an eco-responsible procurement policy that is applied by employees and extends to clients and suppliers, looking to favour integration of environmental and social parameters. Performance evaluation in relation to the policy is carried out periodically. • Nova Scotia’s sustainable procurement policy commits to a number of principles in procurement including sustainability, efficiency and effectiveness. Considerations relating to environmental, economic and social impacts must be integrated into the procurement process. • Industry Canada has set green procurement targets to reduce the environmental impact of goods and services. With regards to transportation, 30 per cent of Industry Canada’s executive and light-duty vehicles must show “environmental leadership” (alternative and hybrid fuels).
British Columbia	The Government of B.C. has worked to strengthen the capacity of local governments and professionals to respond to the threat posed by rising sea levels. The government completed projections of sea-level rise to the year 2100 in 2008, and subsequently undertook a series of technical studies to inform the integration of sea-level rise into coastal flood plain mapping, sea dike design and land-use planning. Case studies were been completed in 2013 that explore what has motivated decision-makers to integrate sea-level rise into B.C. government policy (Sustainability Solutions Group & MC3, 2013).
United Kingdom	The Government of the United Kingdom undertook a comprehensive interdepartmental Infrastructure and Adaptation project between 2009 and 2011 that examined the risks and potential solutions for increasing the resilience of new and existing infrastructure. Outcomes of this project fed into the 2011 update of the U.K.’s National Infrastructure Plan and subsequent updates (Boyle, Cunningham & Dekens, 2013)
The Netherlands	Following high water levels along the Rhine, Waal and Meuse rivers in 1993 and 1995 that led to the evacuation of about 250,000 people, and considering projected higher water flows due to climate change, the Netherlands initiated the Room for the River program in 2006. Breaking with the traditional approach of building taller and stronger dikes, the program is creating more land on which water can flow though the implementation of 30 projects along branches of the Rhine. These projects include actions such as deepening riverbeds, lowering floodplains and moving dikes further back from end-of-river channels. The Ministry of Infrastructure and the Environment is leading implementation of the new flood protection measures.*
Quebec	Quebec has established a green trucking program titled <i>Écocamionnage</i> (roughly translated as Eco-Trucking). The program is consistent with the 2013–2020 climate change action plan goal to reduce the emissions profile and environmental footprint of road transport. The program will run from 2014–2017, funded by the provincial <i>Fonds vert</i> (Green Fund), with a total budget of CAD\$28.3 million designated for the use of equipment and technologies to improve energy efficiency and reduce GHG emissions. The program offers financial supports for acquisition, approval and demonstration of technology, as well as logistics. Applicants can receive up to CAD\$1 million in financial assistance per calendar year.

* More information about this program may be found here: <http://www.pmi.org/Knowledge-Center/PM-Network/2014/making-room-for-the-river.aspx>; and here: <http://www.ruimtevoorderivier.nl/english/room-for-the-river-programme>

Building Blocks for Manitoba's Climate Change and Green Economy Plan

The Government of Manitoba recognizes that a concerted effort is required to meet Manitoba's responsibility to adapt to climate change and mitigate GHG emissions. Manitoba has committed to actions on climate change in a number of strategy documents, including *Tomorrow Now: Manitoba's Green Plan* and *Focused on What Matters Most: Manitoba's Clean Energy Strategy* (Manitoba Innovation, Energy and Mines, 2012), as well as following up on the recommendations in the Auditor General's 2010 Performance Audit on Managing Climate Change (Manitoba Office of the Auditor General, 2010).

Manitoba's next plan will also require a consideration of the types of principles that are important for addressing climate change policy in Manitoba. These principles are expected to evolve and could include elements such as:

- Achieve GHG emissions targets in a cost-effective way that considers competitiveness
- Promote simplicity, policy coherence, transparency and administrative efficiency
- Treat sectors and facilities equitably
- Account for early action by industry leaders
- Use accurate and verified emissions data to support policy development
- Promote development and deployment of clean technologies
- Align with emissions reduction programs in other jurisdictions (linking)
- Integrate with other provincial environmental policies where possible

These principles are open to input, and their discussion will be part of the consultation process for the new climate change and green economy plan. Manitobans are encouraged to share their views regarding which principles should be embedded in climate change action in the province.

Integrating Adaptation and Mitigation

The next climate change plan will integrate both adaptation and mitigation strategies, with an increased focus on adaptation. It will be important for the coming plan to consider the adaptation impacts of mitigation actions (and vice versa), as well as identify areas where co-benefits can be achieved and negative side effects avoided regarding mitigation or adaptation actions. The consultation process with stakeholders will seek input on how best to integrate a more balanced approach for adaptation and mitigation.

For adaptation, capacity building in key areas can assist Manitobans in undertaking meaningful, informed action with regards to adaptation to climate change. Some examples of areas where capacity may be lacking include those related to climate data and risk mitigation—both of which are important for the assessment of vulnerabilities and potential impacts.

Green Economy and Green Jobs

The development of a green economy action plan is one of the core pillars for the achievement of *TomorrowNow*'s goal of protecting the environment while ensuring a prosperous and environmentally conscious economy. The vision is of a resilient, low-carbon economy that respects environmental sustainability and supports social well-being. Sector-specific consultations are an important element in shaping Manitoba's green economy and green jobs by identifying opportunities and actions that feed into sector-specific comparative advantages within a sustainable development pathway.

The Role of the Transportation and Infrastructure Sectors in the New Climate Change and Green Economy Action Plan

Manitoba's geographically central location in North America; its presence as a multi-modal transport hub (including elements such as CentrePort and access to a deep-water port); and being home to a number of companies that have become industry leaders in transportation make the sector vital to a Manitoba green economy supported by the work under *TomorrowNow*. The sector creates jobs and Manitoba's transportation network, and its associated infrastructure, allows for the provision of goods and services to remote communities. At the same time, the transport sector is the highest GHG emitter in Manitoba and our road and rail network is vulnerable to extreme weather events (blizzards, floods, early melting of ice roads) and future climate change, which can negatively affect livelihoods and the provincial economy. Climate change can even pose a risk for air travel beyond just the standard delays due to storms, as a U.S. carrier demonstrated in 2013 when it refused to fly to Winnipeg during an extreme cold period (highlighted as the second coldest December on record in over 100 years), creating havoc for leisure and business travellers (Batchelor & Schroder, 2013).

The province has already taken steps to reduce GHGs and increase resilience to climate variability and change in the transportation and infrastructure sectors. Commitments under *TomorrowNow* targeted at reducing emissions include establishing Manitoba as a leader in electric vehicle technology, efforts to expand the production and use of biofuels in Manitoba, developing a capital region transportation master plan and facilitating the move to greener infrastructure. At the same time, the province has worked to increase the resilience of its infrastructure through actions such as expanding the Winnipeg Floodway and strengthening the provincial winter road system by upgrading the winter road network, progressively relocating roads away from water bodies and constructing new roads on overland routes. Additionally, the provincial Sustainable Drainage Strategy, when completed, is anticipated to contribute to adaptation in Manitoba.

Questionnaire

The questions below will feed into transportation and infrastructure sector-specific needs and opportunities in the new climate change plan as well as Manitoba's first green economy action plan. Written or verbal responses are welcomed. Written responses may be sent to tomorrownow@iisd.ca.

Action Plan Goals and Strategy

1. What are the current sector approaches and good practices in Manitoba to address climate change that need to be built upon and enhanced over time?
2. What are the broad and specific barriers you see to the achievement of deeper emissions reductions in the transportation and infrastructure sectors in Manitoba?
3. What are the unrealized opportunities in Manitoba to achieve deeper emissions reductions and create capacities to deal with extreme weather events and long-term climate change?
4. In the transportation sector, how can Manitobans increase collaboration with other jurisdictions to advance on climate change/green economy goals?

Science, Information and Capacity Building

5. What types of information, capacity and tools are required by Manitobans to identify the actions they need to take in preparation for climate change? What mechanisms could be used to enable access to this knowledge?
6. How can we provide better access to Manitoba-specific climate data and climate projections, and better use this data to provide benefits for the sector?
7. What are the metrics to assess progress on actions taken?

Encouraging Action Among Manitobans

8. In terms of actions responding to climate change adaptation and GHG mitigation, what are the responsibilities of citizens, the government and private sector/industry when responding to climate change adaptation and mitigation?

References

- Batchelor, M. & Schroder, L., (2013, December 31). United Airlines cancels Winnipeg flights due to cold. *Global News*. Retrieved from: <http://globalnews.ca/news/1055467/united-airlines-cancels-flights-into-winnipeg-due-to-cold/>
- Boyle, J., Cunningham, M. & Dekens, J. (2013). *Climate change adaptation and Canadian infrastructure: A review of the literature*. Winnipeg, MB: IISD. Retrieved from <http://www.iisd.org/publications/climate-change-adaptation-and-canadian-infrastructure-review-literature>
- Calamai, L. (2014, June 3). *Adapting to severe weather*. Paper presented at Energy and the Built Environment: Reducing emissions, improving efficiency, and enhancing our resilience to climate change, Winnipeg, Canada.
- Environment Canada. (2014). *National inventory report 1990–2012: Greenhouse gas sources and sinks in Canada*. Retrieved from <http://www.ec.gc.ca/ges-ghg/>
- Farrag-Thibault, A. (2014). *Climate change: Implications for transport*. Cambridge: University of Cambridge & BSR.
- Government of Manitoba. (2008). *Beyond Kyoto*. Winnipeg: Government of Manitoba. Retrieved from http://www.gov.mb.ca/beyond_kyoto/
- Government of Manitoba. (2012). New bridges extend winter road season as construction of permanent roads to east-side communities continues. Retrieved from: <http://news.gov.mb.ca/news/?archive=2012-2-01&item=13224>
- Insurance Bureau of Canada. (2012). *Telling the weather story*. Retrieved from http://www.abc.ca/en/natural_disasters/documents/mcbean_report.pdf
- Intergovernmental Panel on Climate Change. (2014). *Fifth Assessment Report (AR5)*. Retrieved from <http://www.ipcc.ch/report/ar5/>
- International Institute for Sustainable Development. (2012). *Manitoba's involvement in the Prairies Adaptation Collaborative: Synthesis report*. Retrieved from http://www.parc.ca/rac/fileManagement/upload/MB_PRAC_Synthesis_report.pdf
- Manitoba Conservation and Water Stewardship. (2014). *Manitoba's report on climate change for 2012*. Retrieved from http://gov.mb.ca/conservation/climate/pdf/2012_climate_change_web.pdf
- Manitoba Infrastructure and Transportation. (2013). *Manitoba 2011 Flood Review Task Force report*. Winnipeg: Government of Manitoba. Retrieved from http://www.gov.mb.ca/asset_library/en/2011flood/flood_review_task_force_report.pdf
- Manitoba Innovation, Energy and Mines. (2012). *Focused on what matters most: Manitoba's clean energy strategy*. Winnipeg: Government of Manitoba. Retrieved from <http://www.gov.mb.ca/ia/MobilePages/energy/cleanenergy.html>
- Manitoba Office of the Auditor General. (2010). *Report to the Legislative Assembly: Performance audits*. Winnipeg: Office of the Auditor General Manitoba. Retrieved from http://www.oag.mb.ca/wp-content/uploads/2011/06/rtl_performance_audits_2010.pdf
- Nova Scotia Department of Energy. (2012, December 17). Lower Churchill Project sanctioned by Emera and Nalcor Energy. Retrieved from <http://novascotia.ca/news/release/?id=20121217005>

Ontario Ministry of Agriculture, Food and Rural Affairs. (2014, January 30). Best management practices series. Retrieved from <http://www.omafra.gov.on.ca/english/environment/bmp/series.htm>

Prairie Adaptation Research Collaborative. (2012). *Manitoba Prairies Regional Adaptation Collaborative final forum*. Retrieved from http://www.parc.ca/rac/fileManagement/upload/MB_Forum_Report_Mar_22_2012.pdf

Sustainability Solutions Group & MC3. (2013). *Sea level rise in BC: Mobilizing science into action*. Prepared for the BC Ministry of the Environment. Retrieved from http://www.retooling.ca/_Library/docs/bc_sea_level_rise_en.pdf

Viafara, J. & Larson, P. (2013). *A comparison of five green trucking programs across Canada*. Paper prepared for the 2013 Conference of the Transportation Association of Canada. Retrieved from: <http://conf.tac-atc.ca/english/annualconference/tac2013/session3/larson.pdf>

Published by the International Institute for Sustainable Development.

International Institute for Sustainable Development

Head Office

161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, Canada R3B 0Y4

Tel: +1 (204) 958-7700 | Fax: +1 (204) 958-7710 | Web site: www.iisd.org

About IISD

The International Institute for Sustainable Development (IISD) contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change and energy, and management of natural and social capital, as well as the enabling role of communication technologies in these areas. We report on international negotiations and disseminate knowledge gained through collaborative projects, resulting in more rigorous research, capacity building in developing countries, better networks spanning the North and the South, and better global connections among researchers, practitioners, citizens and policy-makers.

IISD's vision is better living for all—sustainably; its mission is to champion innovation, enabling societies to live sustainably. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the International Development Research Centre (IDRC), from the Danish Ministry of Foreign Affairs and from the Province of Manitoba. The Institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations and the private sector.