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Department of Sustainable Development

Managing Climate Change

(a follow-up to our December 2010 audit)

October 2017

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MANITOBA

October 2017

The Honourable Myrna Driedger
Speaker of the House
Room 244, Legislative Building
450 Broadway
Winnipeg, Manitoba R3C 0V8

Honourable Ms. Driedger:

It is an honour to provide you with my report titled, *Managing Climate Change*, to be laid before Members of the Legislative Assembly in accordance with the provisions of Sections 14(4) and 28 of *The Auditor General Act*.

Respectfully submitted,

Norm Ricard, CPA, CA
Auditor General

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Auditor General's comments

The potential impacts of climate change pose a threat to infrastructure, human health and well-being, the economy, and our natural environment. Given the significance of these threats, we examined whether the Department of Sustainable Development was adequately leading the Province's response to climate change.

We found several gaps in the planning, monitoring, and reporting processes for initiatives aimed at reducing greenhouse gas emissions and at adapting to climate change impacts.

The Department was aware by the fall of 2009 that the greenhouse gas emissions reduction target in its 2008 plan would not be met; however, the plan wasn't updated until December of 2015. Following the April 2016 provincial election, government announced it was developing a new plan, but it has not yet been released.

We noted that past plans were not supported by comprehensive analyses of different approaches and they lacked implementation details, expected emissions reductions, and estimated costs. We also noted that progress monitoring was weak. Without targets, adequate plans, and suitable monitoring processes, the likelihood of success in reducing emissions is greatly reduced.

As required by legislation, the Department publicly reported on greenhouse gas emissions reductions achieved for 2010 and 2012, and plans to report by the end of 2017 on the results achieved to the end of 2016. But the Assembly and the public would be better informed on this important issue if the Department reported annually on the results achieved and included information on the associated costs.

The Department has been working since 2011 to identify and assess the risks associated with climate change impacts in Manitoba. This work needs to be completed so the Province can prioritize identified risks and develop a provincial adaptation plan. Government departments and agencies are generally aware of potential climate change impacts (such as increased severe weather events) and are beginning to plan for these on their own, but a more coordinated response is required.

I am pleased that the Department has acknowledged the value of our 8 recommendations to strengthen Manitoba's processes for responding to climate change. Our first follow-up of these recommendations will be as at September 30, 2019.

The audit is part of a collaborative audit initiative involving most provincial legislative audit offices and the Auditor General of Canada. A summary report is expected to be issued in early 2018.

I would like to take this opportunity to thank the many public servants we met with during our audit for their cooperation and assistance.

Norm Ricard, CPA, CA
Auditor General

Main points

What we examined

We examined whether the Department of Sustainable Development was adequately leading the Province's response to climate change. We chose to do this audit because climate-change impacts pose threats to infrastructure, human health and well-being, the economy, and the natural environment.

The audit is part of a collaborative audit initiative involving most provincial legislative audit offices and the Auditor General of Canada. The offices have agreed to work together to determine the extent to which federal, provincial, and territorial governments are meeting commitments to reduce greenhouse gas emissions and adapt to climate change.

What we found

Key message

Despite the Department's efforts and government's 2008 plan to reduce greenhouse gas emissions to 6% below the 1990 level by 2012 (the target set in *The Climate Change and Emissions Reductions Act*), there has been little change in Manitoba's greenhouse gas emission levels over the past decade. As of July 2017, Manitoba had no updated emissions reduction target or concrete plan for reducing emissions. It also had made little progress in assessing the risks posed by climate-change impacts and developing a provincial adaptation strategy for mitigating those risks. The Department publicly reported on the climate change results achieved by the end of 2010 and 2012, but it doesn't report progress on a regular annual basis or disclose the cost of government's climate change initiatives. Further details are provided below.

1. Gaps in management processes for reducing greenhouse gas emissions

The Department was aware by the fall of 2009 that the initiatives in its 2008 plan would be insufficient to meet the 2012 target enshrined in *The Climate Change and Emissions Reductions Act*. As explained in Department documents, some initial estimates of emissions reductions were too high, some expected federal actions did not occur, and some program participation rates were lower than originally anticipated. However, the Department didn't update the 2008 plan or the original emissions target until December 2015.

The December 2015 plan had only high level strategies. It lacked accompanying details, as well as estimates of expected emissions reductions and costs. It was also short-lived. After Manitoba's provincial election in April 2016, the government announced it was developing a new climate change plan and Department officials told us the targets in the 2015 plan were under review. As of July 2017, no new plan had been released.

There was no comprehensive analysis of the benefits, risks, and costs of different approaches and policy tools to support either the 2008 or the 2015 plan. Nor were the targets associated with these

plans supported by scientific and economic analyses. Department officials chose not to share any analyses done to support the development of the new (post-2015) plan, citing cabinet confidence.

The Department had processes in place to coordinate the 2008 plan across government departments and to monitor their progress against the plan, but there were weaknesses. The role of the Department (the lead department), other government departments and agencies, and Cabinet oversight committees were not well-defined. There was no regular progress reporting on whether the climate change project was on time, on budget, and going to achieve its stated goals. And there was no formal risk management process to identify and mitigate the project's risks. After the plan's 2012 target was missed, the inter-departmental progress monitoring was discontinued.

As required by *The Climate Change and Emissions Reductions Act*, the Department publicly reported on the results Manitoba had achieved by the end of 2010 and 2012. After 2012, the Act only requires reporting every fourth year. Past reporting included information about emission levels and initiatives designed to reduce emissions; however, there was no disclosure of the related costs or whether secondary stated goals (for example, job creation goals) were achieved.

2. Weak management processes for adapting to climate change impacts

In 2011, Cabinet tasked an interdepartmental working group chaired by the Department with completing a 3-phase approach to developing a plan for adapting to climate change impacts:

- Phase 1: assess climate change risks across all government departments.
- Phase 2: expand this to include other key stakeholders (such as municipalities) and make recommendations for managing identified risks.
- Phase 3: develop comprehensive adaptation strategies and a monitoring and evaluation framework.

Department documents from 2013 indicate the Department originally expected to complete all 3 phases within 3 years. However, as of July 2017, it had not yet completed the risk assessment across all government departments—a necessary first step in developing a province-wide plan for adapting to climate change impacts. It had developed a template and guide to help departments identify risks, but it had not shared these with the departments.

Despite the lack of progress on developing a provincial adaptation plan, the Department and other government departments and agencies are generally aware of and beginning to plan for potential climate-change impacts and opportunities, such as:

- greater frequency and severity of adverse events (floods, droughts, tornados, and wildfires).
- greater threats to human health from more extreme heat and more insect-borne diseases.
- related damage to infrastructure.
- changes to crop-growing conditions, water supply, and fish and wildlife habitats.
- increased demand for hydro power and other forms of green energy.

However, there has been no systematic identification of all risks and opportunities to enable coordinated prioritization, planning, and funding.

The Department's climate change report on the results achieved for 2012 noted the launch of the 3-phase approach to developing an adaptation plan, but had little other information on adapting to climate-change impacts.

Response of officials

The Department of Sustainable Development has reviewed the Office of the Auditor General`s (OAG) report examining whether the government was adequately leading Manitoba's response to climate change, which included an update of the OAG`s previous audit conducted in 2010. We concur with the OAG` s assessment of whether the department was adequately leading the Province's response to climate change.

The government will soon release its new *Made-in-Manitoba Climate and Green Plan*. To ensure government commitments to reduce greenhouse gas emissions and adapt to climate change can be achieved, Manitoba's forthcoming plan will incorporate recommendations made by Manitoba`s Office of the Auditor General in the following areas:

- frequent review, monitoring and updating of climate change policy and plans;
- use of evidence-based scientific and economic analysis to inform government policy and targets;
- comprehensive analysis of the benefits, risks and costs of different policy approaches and tools;
- documentation of expected emissions reductions and estimated costs;
- development of a process for monitoring Manitoba`s progress toward achieving stated greenhouse gas emission reduction objectives, including clearly defined roles and responsibilities across government, regular reporting, and a risk management framework;
- regular public reporting on key indicators such as greenhouse gas emissions reductions, project costs, and secondary benefits;
- coordination of departments, agencies and municipalities to identify climate change risks;
- development of a comprehensive provincial adaptation plan to address risks, including regular public reporting on climate risk, actions to address these risks, and progress toward implementing programs to minimize Manitoba's vulnerability to climate change.

As noted by the Auditor General, previous efforts to reduce greenhouse gas emissions were hampered by inadequate analysis, lack of implementation details, and weak progress monitoring. Previous efforts to identify the climate risks and develop strategies for managing risk were incomplete. The government's new plan has incorporated these issues into its development.

The Department would like to thank the Office of the Auditor General for undertaking this important audit work. Implementing these recommendations will result in improved outcomes as we work with all Manitoban's to become Canada's cleanest, greenest and most climate resilient province.

Background

Collaborative audit

The audit is part of a collaborative audit initiative involving the Office of the Auditor General of Canada and most provincial legislative audit offices. In 2016, the offices agreed to work together to determine the extent to which federal, provincial, and territorial governments in Canada are meeting commitments to reduce greenhouse gas emissions and adapt to climate change. A summary report is expected to be issued in early 2018.

Climate change

Climate change refers to the change in long-term weather patterns over decades and centuries, not day-to-day weather changes. Based on evidence supported by an overwhelming majority of climate scientists, most governments accept the findings of the Intergovernmental Panel on Climate Change that the earth's climate is warming; that much of this change is being caused by human activities; and that climate change effects will worsen if action is not taken, posing a significant risk to the environment, the economy, and human health. On this basis, the majority of governments, including Manitoba, agree on the need to respond to climate change.

Climate change impacts

Potential climate change impacts in Manitoba as a result of global warming and subsequent changes to temperature and precipitation patterns include:

- greater frequency and severity of adverse events (floods, droughts, tornados, and wildfires).
- greater threats to human health from more extreme heat and more insect-borne diseases.
- infrastructure damage, particular in northern regions where permafrost is melting.
- changes to crop-growing conditions, water supply, and fish and wildlife habitats.

This will in turn affect government programs and services, as well as government resources.

Climate change also creates potential opportunities for low carbon products, such as hydro power, biomass energy, and electric vehicles.

Responsibility for provincial climate change initiatives

The Climate Change and Air Quality branch of the Department of Sustainable Development (the Department) coordinates climate change initiatives across the provincial government. This includes initiatives to reduce greenhouse gas emissions, as well as initiatives to adapt to climate change impacts. The Department works on climate change matters in partnership with several other government departments and agencies, such as the Department of Agriculture and Manitoba Hydro. In its *2017-18 Supplementary Information for Legislative Review*, the Department listed the following expected results from its work on climate change matters:

- reduced greenhouse gas emissions.
- enhanced capacity to identify risks and adapt to the impacts of climate change.
- improved cross-department coordination of climate change activities.
- identification of low-carbon economy actions and key indicators.

- improved metrics for measuring the province's net greenhouse gas emissions and the greenhouse gas emissions reductions resulting from individual projects.

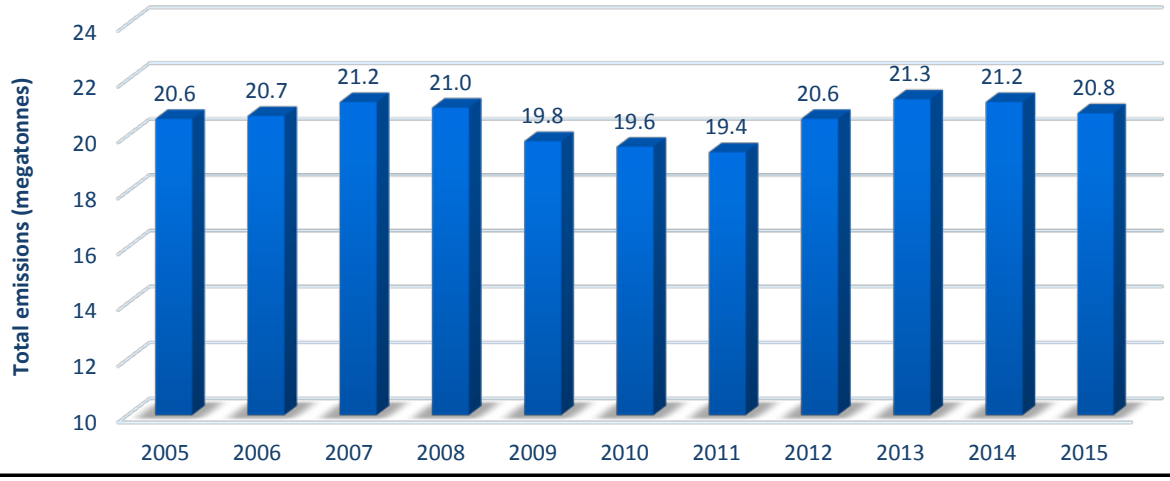
National Inventory Report

The global community works together to address and report on climate change through the United Nations Framework Convention on Climate Change (UNFCCC). As an UNFCCC member, Canada annually reports greenhouse gas emissions for each province, including Manitoba, and the country as a whole. This is done using specified and established methodologies, and the information is published in Environment and Climate Change Canada's *National Inventory Report: Greenhouse Gas Sources and Sinks in Canada* (the National Inventory Report). At the time of our audit, the most recent National Inventory Report was published in April 2017 and included data from 1990 to 2015.

Manitoba's greenhouse gas emissions

As **Figure 1** shows, there has been little change in Manitoba's greenhouse gas emissions over the past decade. The latest National Inventory Report shows that Manitoba's emissions totaled 20.6 megatonnes in 2005; 20.8 megatonnes in 2015. (One megatonne equals 1 million tonnes.) In the intervening years, emissions fluctuated within a narrow range, from 19.4 to 21.3 megatonnes.

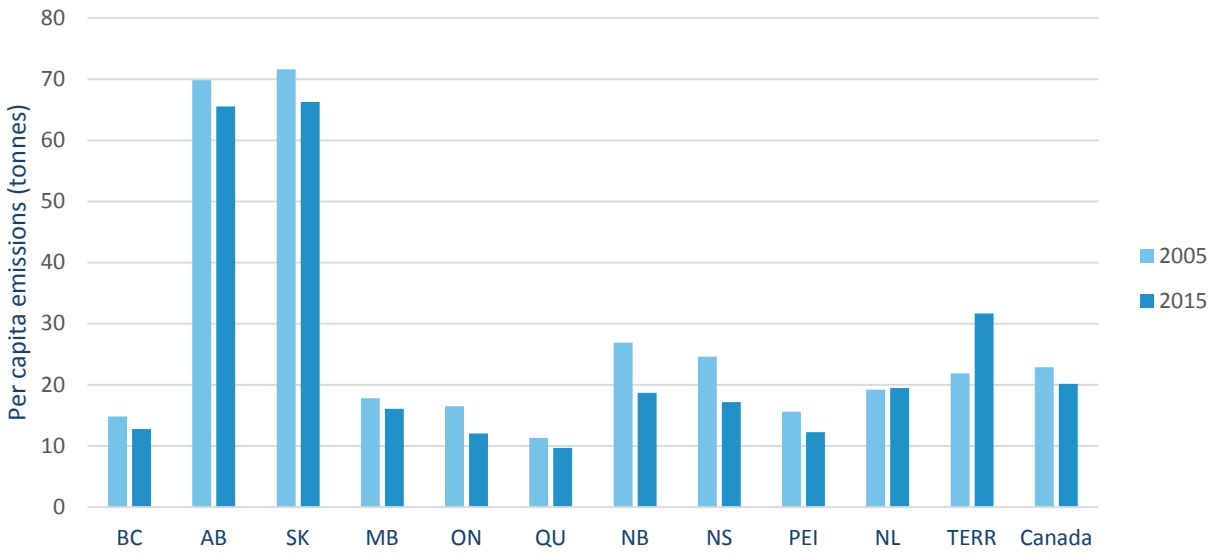
Figure 1: Little change to Manitoba's emissions over the past decade



Source: National Inventory Report, April 2017

Figure 2 shows Manitoba's per capita emissions in both 2005 and 2015 compared to Canada and the other provinces and territories. On average, each person in Manitoba contributed 17.8 tonnes of emissions in 2005; 16.1 tonnes in 2015. This reflects a 10% decrease. Per capita emissions for all of Canada decreased about 12% over the same period, with some provinces decreasing their emissions more significantly than Manitoba. For example, Ontario, New Brunswick, Nova Scotia and Prince Edward Island all reduced their per capita emissions by over 20%.

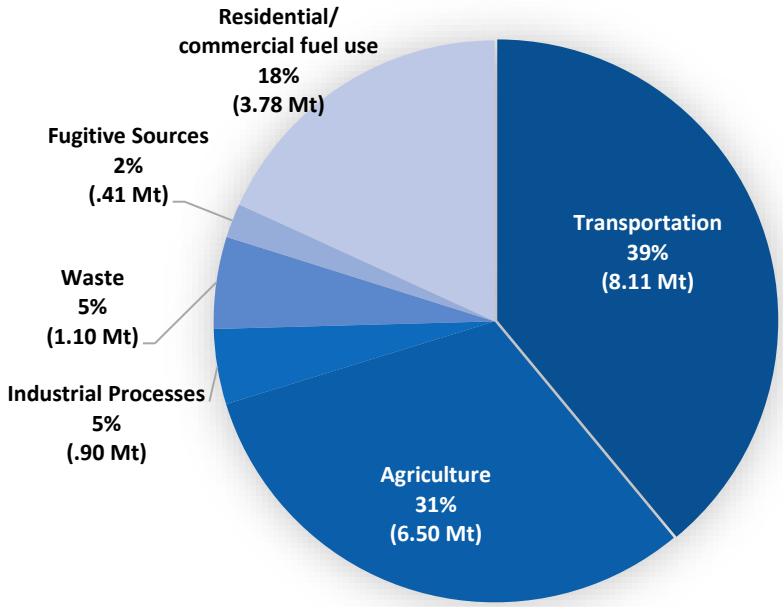
Figure 2: Per capita emissions decreasing in Manitoba and most provinces



Source: National Inventory Report, April 2017 and Statistics Canada population data, 2016

Figure 3 shows the sources of Manitoba's 2015 greenhouse gas emissions. The transportation and agriculture sectors account for 70% of Manitoba's emissions, at 39% and 31% respectively.

Figure 3: Agriculture and transportation account for 70% of Manitoba's emissions



Source: National Inventory Report, April 2017

Manitoba's agriculture emissions primarily result from livestock digestive processes, manure management, and fertilizer use. Transportation emissions are primarily from road transportation, mostly from light-duty cars and trucks, as well as heavy-duty diesel trucks. Manitoba has more emissions from agriculture and less emissions from fossil fuels than many other provinces because of its agricultural economy and hydro resources.

As of July 2017, Environment and Climate Change Canada's most recent emissions forecast for Manitoba showed emissions were expected to grow to about 22 megatonnes by 2020, and to about 23 megatonnes by 2030.

Manitoba accounts for about 3% of Canada's total emissions (together Alberta, Ontario, Quebec, and Saskatchewan account for about 80%). And Canada accounts for about 1.6% of the world's total emissions (together China, the U.S., the European Union, and India account for about 80%).

Paris Agreement

The Paris Agreement, adopted in December 2015, is the most recent agreement within the UNFCCC and has been ratified by over 140 countries, including Canada. To significantly reduce the risks and impacts of climate change, the countries agreed to pursue efforts to limit the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels. As part of this agreement, Canada has committed to reducing its emissions to 30% below 2005 levels by 2030, as well as to taking steps to adapt to a changing climate.

Pan-Canadian Framework on Clean Growth and Climate Change

The Pan-Canadian Framework on Clean Growth and Climate Change is designed to achieve Canada's commitment under the Paris Agreement. It recognizes the need for coordination between federal, provincial, and territorial governments on climate change matters and sets out Canada's plan to address climate change. As of July 2017, the Framework was signed by the federal government, all 3 territories, and all provinces except Saskatchewan and Manitoba.

Manitoba has not signed the Framework because it has objected to the carbon pricing plan (described further below) that the federal government intends to implement as part of the Framework. Manitoba has stated that the plan fails to recognize the province's investment in its hydro resources and the unique differences between jurisdictions. Manitoba is also seeking a legal opinion on the constitutionality of the federal government's proposed plan.

Under the Framework, provinces and territories are required to implement some form of carbon pricing. They can do this by implementing a carbon tax, adopting a cap and trade system, or both. Cap and trade systems set limits on certain companies' emissions and then provide a marketplace where companies reducing their emissions below their cap can sell their excess capacity to those above the cap. The federal government has stated it will impose a federal carbon pricing system in provinces and territories that don't have systems aligned with its *Technical Paper on the Federal Carbon Pricing Backstop*, issued in May 2017. The planned federal carbon pricing system has 2 elements: a minimum carbon levy to be applied to fossil fuels as of 2018, plus an output-based pricing system for large emitters (industrial facilities with 50,000 or more tonnes of emissions) that will come into effect in 2019.

Starting in 2018, the federal government plans to set a minimum carbon price of $10 per tonne that will rise by $10 annually until it reaches $50 per tonne in 2022. This equates to an initial levy of 2.33 cents per litre of gas that will eventually increase to 11.63 cents per litre.

Manitoba has estimated that the levy would initially yield about $100 million in provincial revenue, which would then increase to $500 million by 2022. There are no restrictions on how this carbon-pricing revenue can be used. For example, it could be given back to consumers or used to help vulnerable groups, support innovation, or create jobs.

As part of the Framework, the federal government has launched a $1.4 billion Low Carbon Economy Leadership fund for those provinces and territories that have signed the Framework. Eligible provinces will receive $30 million, plus additional funding based on population size. Manitoba will be eligible for about $66 million from this fund if it signs the Framework.

Climate change legislation in Manitoba

The Climate Change and Emissions Reductions Act, passed in 2008, is the most significant piece of Manitoba legislation related to climate change. The stated purpose of the Act is "to address climate change, to encourage and assist Manitobans in reducing emissions, to set targets for emissions, and to promote sustainable economic development and energy security". The Act set an initial emissions reduction target for 2012 and on-going reporting requirements. It also required Manitoba Hydro to phase out its use of coal to generate power, except for emergency operations, by December 31, 2009.

There are a number of regulations under the Act. The *Prescribed Landfills Regulation* requires owners and operators of landfills with 750,000 or more tonnes of waste to develop and implement plans for reducing landfill emissions. The *Greening of Government Vehicles Regulation* sets a fuel efficiency standard of 15.41 litres per 100 kilometres for the government fleet. And the *Green Building Regulation* requires large government and government-funded construction projects, plus large government leases of new buildings, to meet minimum energy efficiency requirements.

Other Manitoba legislation related to climate change includes the following:

- the ethanol and biodiesel regulations under *The Biofuels Act*, which reduce the carbon intensity of fuel by requiring a minimum percentage of ethanol to be blended in gasoline and a minimum percentage of biodiesel to be blended in diesel fuel.
- the *Emissions Tax on Coal and Petroleum Coal Act*, which sets rates roughly equivalent to $10 per tonne of carbon for different grades and types of coal. (Note: Coal has been estimated to represent less than 1% of Manitoba's total energy production.)
- the *Coal and Petroleum Coke Ban for Space Heating Regulation* under *The Environment Act* bans coal and petroleum coke for space heating effective July 2017.

In addition, *The Efficiency Manitoba Act* (passed in June 2017, but not yet proclaimed into law at the time of our audit) established Efficiency Manitoba, a stand-alone energy-efficiency agency. The agency is mandated to help reduce the demand for electrical energy and natural gas in Manitoba and achieve resulting greenhouse gas emissions reductions.

Large emitters in Manitoba

Environment and Climate Change Canada's Greenhouse Gas Emissions Reporting Program requires all facilities emitting more than 50,000 tonnes of greenhouse gases to report their emissions annually, and at the time of our audit was considering lowering this reporting threshold to 10,000 tonnes. **Figure 4** shows the information gathered for Manitoba in 2015. Ten Manitoba facilities reported emissions greater than 50,000 tonnes, together totalling about 2 megatonnes (2,000,000 tonnes).

Figure 4: Ten Manitoba facilities emitted > 50,000 tonnes of emissions in 2015

Facility	Location	Emissions (tonnes)
Koch Fertilizer plant	Brandon	744,564
Brady Road residential and commercial waste facility	Winnipeg	394,296
TransCanada PipeLines Ltd	Winnipeg	311,024
Graymont lime production plant	Faulkner	134,609
Summit Road landfill	Winnipeg	101,541
Manitoba Hydro generating station	Brandon	99,718
Vale Canada mining operations	Thompson	84,047
Husky Oil ethanol plant	Minnedosa	76,206
Tolko Industries, Kraft Papers division	The Pas	59,751
Kilcona landfill	Winnipeg	59,094
Total		**2,064,850**

Source: Facility-reported greenhouse gas emissions in Canada, Environment and Climate Change Canada (2015 data)

Audit approach

We examined whether the Department of Sustainable Development was adequately leading the Province's response to climate change. This included examining its processes and progress with respect to:

- reducing greenhouse gas emissions.
- adapting to climate change impacts.

We conducted the audit by updating our December 2010 audit report, *Managing Climate Change.* The 2010 report examined the management processes supporting Manitoba's response to climate change between April 1, 2007 and April 30, 2010.

As part of our standard follow-up process, we reviewed the status of the recommendations made in our 2010 report in 2012, 2013, and 2014. Under this process, we ask department management to tell us the status of our recommendations and then we assess the plausibility of the status reported; we do not conduct further audit work. At the time of the 2014 follow-up, Department management told us most recommendations were not yet implemented.

We conducted the current audit between January 2016 and July 2017. We primarily examined processes and events between April 2010 and July 2017. Our audit was conducted in accordance with the value-for-money auditing standards established by the Chartered Professional Accountants of Canada and, accordingly, included such tests and other procedures as we considered necessary in the circumstances.

The audit included review and analysis of legislation, policies and practices, files, records, plans, data, records, reports, and minutes. We also interviewed staff from the Department of Sustainable Development and other government departments and agencies. In addition, we reviewed publicly available information on other jurisdiction's climate change plans and reports.

Findings and recommendations

1. Gaps in management processes for reducing greenhouse gas emissions

1.1 Plans inadequate

1.1.1 2008 plan and related 2012 target not updated promptly

The Department did not promptly review and update its 2008 climate change plan and related 2012 target once it became apparent that the plan needed updating. A brief history of the Department's various plans and targets follows.

Both Manitoba's 2008 climate change plan (Beyond Kyoto) and Climate Change Act (*The Climate Change and Emissions Reductions Act*) set a target of reducing Manitoba's greenhouse gas emissions to 6% below the 1990 level by 2012. However, this target was not met. As reported in the National Inventory Report, Manitoba's greenhouse gas emissions for 2012 were 20.6 megatonnes—18% higher than the target.

The Department was aware by the fall of 2009 that the initiatives in the 2008 plan would be insufficient to meet the 2012 target. As explained in Department documents, some initial estimates of emissions reductions were too high, some expected federal actions did not occur, and some program participation rates were lower than originally anticipated. Our 2010 audit report found that weaknesses in planning and project management also contributed to the shortfall.

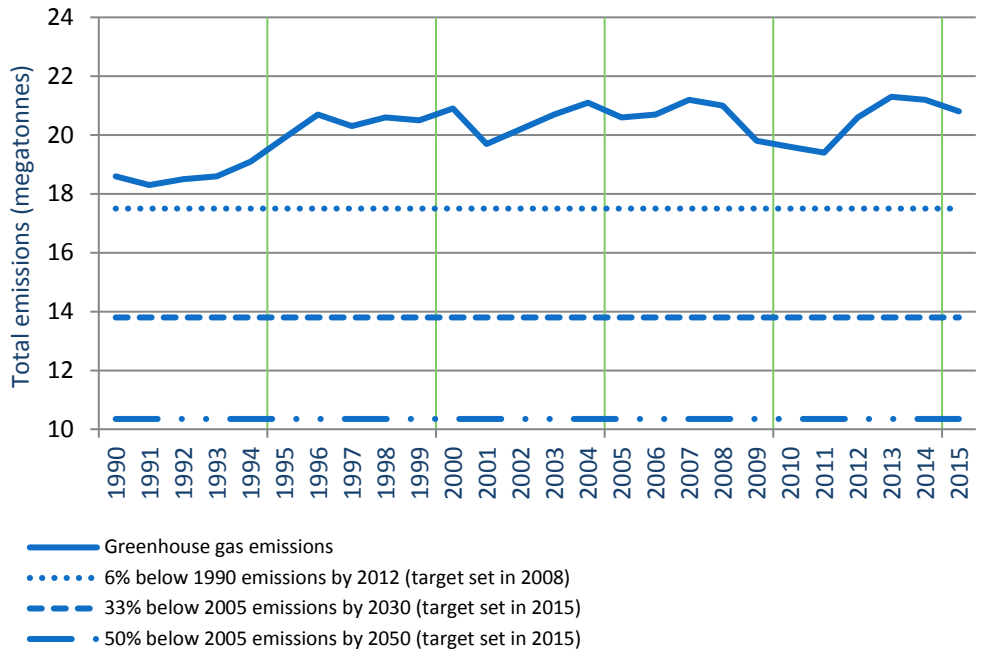
Our 2010 report recommended that the Department update its 2008 plan to address the shortfall. However, the Department didn't update the 2008 plan until December 2015, when it publicly released *Manitoba's Climate Change and Green Economy Action Plan.* The 2015 plan set a target of reducing Manitoba's emissions to 33% below the 2005 level by 2030 and 50% below the 2005 level by 2050. It also set a goal of being carbon neutral by 2080.

More specifically, the December 2015 plan was to reduce emissions to just under 14 megatonnes by 2030, and to about 10 megatonnes by 2050. As Manitoba's reported emissions for 2015 were almost 21 megatonnes, this would require about a 7 megatonne reduction over the next 15 years, plus a further reduction of just over 3 megatonnes during the next 20 years. This would require more emissions reductions than could be obtained by taking every gasoline or diesel-powered vehicle in Manitoba off the road.

The December 2015 plan was short-lived. After Manitoba's provincial election in April 2016, government announced it was developing a new climate change plan. As of July 2017, this plan was still under development and Department officials told us the targets in the December 2015 plan were under review.

Figure 5 compares the targets set in 2008 and 2015 to Manitoba's emissions profile since 1990.

Figure 5: Targets set in 2008 and 2015 compared to historical emission levels



Source: National Inventory Report, April 2017 and Department documents

Recommendation 1: We recommend that the Department promptly review and update its plan for reducing greenhouse gas emissions whenever progress monitoring shows established targets will not be met, and at a minimum every 3 years.

1.1.2 Better practices needed in setting targets

We expected the Department to set both short-term and long-term targets, and that these targets would be supported by economic and scientific analysis. However, this was not the case.

The 2008 plan had a short-term target that was legislated; the targets in the 2015 plan were longer-term and were not legislated. While the Climate Change Act set an initial target for 2012, it doesn't require the government to set any future targets—although it states the government may do so. Our 2010 audit noted both short and long-term targets are important to making progress in reducing emissions.

The Department conducted no economic or scientific analyses in setting the 2008 and 2015 targets. The 2008 target was adopted to reflect Canada's national commitment at the time under the Kyoto Protocol, which was an international agreement to reduce emissions. Department officials told us the 2015 targets were arrived at by considering the long-term targets of other jurisdictions at that time, including Canada's national target.

Recommendation 2: We recommend that the Department use scientific and economic analyses to help it set short, medium, and long-term targets for reducing greenhouse gas emissions.

1.1.3 Stakeholder input sought in developing plans

Stakeholder input was obtained for both the 2008 and 2015 climate change plans. In addition, to support development of a new plan, in early March of 2017 the Department launched an online survey seeking Manitobans' views on climate change issues—with submissions to be accepted until March 31, 2017. Department officials told us they also planned additional consultations.

2008 stakeholder input

Most consultation for the 2008 plan occurred through a series of roundtable workshops with stakeholders from the agriculture, transportation, municipal, and business sectors. There were also discussions with representatives from Indigenous and northern communities, non-government organizations, and academic institutions.

2013-2015 stakeholder input

In July 2013, the Department announced it would gather stakeholder views for a new climate change and green economy plan. Department documents show it met individually with 67 stakeholders and held 9 group sessions (with an average of 45 people at each session) between October 2013 and January 2015. The 9 group sessions included a pre-consultations workshop and 8 sessions exploring:

- buildings and energy.
- agriculture and water.
- transportation and infrastructure.
- peatlands and forestry.
- large greenhouse gas emitters and mandatory emissions reporting.
- green jobs and the green economy.
- bio-products (such as bio-fuels and biomass) and the bio-economy.
- engagement of civil society (not-for-profit organizations and the general public).

Reports on the results of these consultations stated there was broad consensus for:

- **better governance**: making policy science-based; developing rigorous, credible economic analyses integrating reduction of greenhouse gases and adaptation to climate change effects; systematically reviewing and reporting on plans, policies, programs, revenue sources, and expenditures.
- **more partnerships**: partnering with municipalities for climate-resilient infrastructure and with post-secondary institutions for green jobs training; bringing together government, private, not-for-profit, and academic institutions.
- **regulatory reform**: identifying regulations no longer suitable to or hindering the green economy, including those impeding adaptation to climate change impacts.
- **performance indicators**: establishing indicators for environmental protection, economic prosperity, and social well-being.

- **improved energy use**: increasing access to clean technology, expanding biomass energy, and establishing clean-energy procurement targets.
- **better climate data**: increasing the collection, generation, and accessibility of climate data and projections (for example, temperature and precipitation mapping at regional levels).
- **provincially-mandated emissions reporting**: requiring organizations with 25,000-50,000 tonnes of emissions to report provincially, supplementing the federal reporting requirement at the time, which was for organizations emitting more than 50,000 tonnes.

March 2017 stakeholder input

The Department's March 2017 online survey used a series of multiple choice questions to explore perspectives on carbon pricing. For example, respondents were asked how carbon pricing would affect them and how high any carbon tax should be set, as well as how the Province should spend any revenue raised from carbon pricing. There were also questions exploring various potential water, land-use, and conservation measures. For example, respondents were asked about preferred options for reducing agricultural emissions, with potential choices including financial incentives for better farm management practices, or a tax or levy on agricultural inputs producing emissions (such as fertilizer).

In addition, there were a series of questions on living more sustainably. For example, respondents were asked to indicate their level of support for stronger clean fuel standards, subsidizing purchases of zero emission vehicles, expanding public transit, creating more bike lanes and paths, electrifying public-transit bus fleets, and providing rebates to retrofit heavy duty vehicles (such as commercial trucks) with energy efficient technologies.

1.1.4 No comprehensive analyses of different approaches and policy tools

We expected strategies and plans for meeting established targets to be based on comprehensive analyses of the benefits, risks, and costs of different approaches and policy tools. However, this was not the case for either the 2008 or the 2015 plan.

As outlined in the Premier's May 2016 mandate letter to the Minister of Sustainable Development, the post-2015 plan (still under development as of July 2017) was to include carbon pricing and measures to encourage innovation in clean energy, adaption to climate change, and reduced emissions from commercial buildings and the transportation sector. Department officials chose not to share any analyses done to support the development of the new (post-2015) plan as it was not yet finalized or released, citing cabinet confidence. As a result, we did not assess the comprehensiveness of these analyses.

Examples of different approaches and policy tools

As our 2010 audit report noted, various approaches can be taken to reduce greenhouse gas emissions. For example, approaches to reduce emissions from personal transportation might include initiatives to alter any of the following:

- the number of vehicle kilometres travelled by individuals.
- driver choice of vehicle.
- driver speed and idling behavior.
- vehicle fuel efficiency.
- the carbon intensity of the fuel.

As another example, approaches to reduce emissions from the agriculture sector might include promoting a wide variety of better farming practices, such as more precise fertilizer application, converting marginal land from annual crops to permanent cover, or developing better manure management technologies.

There are also a number of different types of policy tools that can be used to implement selected approaches. These include regulations and standards, taxation policies, subsidization, public awareness and education initiatives, financial incentives, and investment in research and development.

The chosen approach and policy tool will also affect the per-tonne cost of emissions reductions. For example, a 2016 report on policy options to reduce emissions (prepared to support the work of the Canadian Council of Ministers of the Environment) estimated that converting marginal land from annual crops to permanent cover would cost $0-$50 per tonne and that developing manure management technologies would cost more than $250 per tonne.

Analysis supporting the 2008 and 2015 plans

The Department developed its 2008 climate change plan after considering existing provincial programs, the results of stakeholder consultations, discussions with other government departments and Manitoba Hydro, and an informal and undocumented assessment of different approaches and policy tools.

The Department developed its 2015 plan after considering the results of the 2013-2015 stakeholder consultations (described in further detail in **section 1.1.3**), discussions with other government departments and Manitoba Hydro about what they were currently doing to address climate change and what more they could do, and discussion papers prepared by an external consultant.

The discussion papers briefly described the following policy tools: direct injection of financial support into projects and programs; fiscal policy instruments, such as taxation, subsidies, fees and levies, and emissions trading; regulations and standards; and measures to increase education and engagement. The papers were not sector-specific or Manitoba-specific.

> **Recommendation 3:** We recommend that the Department support plans for reducing emissions with comprehensive analyses of the benefits, risks, and costs of different approaches and policy tools.

1.1.5 Initiatives in 2015 plan lacked details, expected emissions reductions and costs

The 2015 plan noted that over 7 megatonnes of emissions reductions would be needed to achieve its stated target of reducing emissions to 33% below the 2005 level by 2030. But most of the initiatives proposed in the plan were high-level strategies lacking details and estimates of their expected emissions reductions and costs. Therefore, it was unclear how they would provide the reductions needed to meet the stated targets. Department officials told us that, prior to the change in government that put the plan on hold, the intention had been to develop the details later. The

more significant proposed high-level strategies lacking details included:

- moving forward on a cap and trade system for large emitters.
- consulting with the federal government, industry, non-government organizations, and the public on the detailed implications of different carbon pricing mechanisms.
- requiring certain industry sectors to establish environmental levies to be used to reduce sector emissions.
- transitioning to emission-free public transit vehicles.
- reducing emissions from heating and cooling buildings by promoting greater use of geothermal, solar, and biomass energy.
- creating an independent demand-side management subsidiary of Manitoba Hydro, mandated to achieve legislated reductions in the provincial demand for electricity and natural gas.
- working with municipalities on programs to divert waste materials from landfills and to capture methane from existing landfills.
- promoting better farm management practices to reduce agricultural emissions.
- committing to a 5-year, $5 million ($1 million per year) Climate Change Action Fund "to kick start emissions reduction".

Recommendation 4: We recommend that the Department develop plans for reducing emissions that show each significant initiative's expected emissions reduction and estimated cost.

1.2 Weaknesses in monitoring and publicly reporting on progress

1.2.1 No inter-departmental process to regularly monitor progress

The Department had processes in place to coordinate the 2008 plan for reducing emissions across various government departments and to monitor their progress against the plan, but our 2010 audit found some weaknesses in these processes. The role of the Department (the lead department), other government departments and agencies, and Cabinet oversight committees needed to be better defined. There was no regular progress reporting on whether the climate change project was on time, on budget, and going to achieve its stated goals. And there was no formal risk management process to identify and mitigate the project's risks.

After the 2012 target was missed, the Department discontinued its inter-departmental progress monitoring. After the December 2015 climate change plan was publicly announced, it developed a proposal for a new inter-departmental committee to oversee plan implementation. However, following the change in government in April 2016, the proposal was put on hold because the Department began working on a new climate change plan for the new government. Department officials told us an appropriate climate-change governance structure would be developed with the new plan.

Recommendation 5: We recommend that the Department implement processes for monitoring Manitoba's progress in reducing greenhouse gas emissions that include:

(a) clearly defined roles and responsibilities for the Department, partner departments and agencies, and Cabinet committees.
(b) regular reporting on whether the overall plan and significant initiatives are on time, on budget, and going to achieve expected emissions reductions and any other stated secondary goals (for example, job creation goals).
(c) on-going risk management to identify and mitigate risks to achieving expected emissions reductions.

1.2.2 Public reporting mostly complies with legislation, but not annual and excludes costs

As required by the Climate Change Act, the Department publicly reported on the climate change progress achieved by the end of 2010 and 2012. In doing so, it mostly complied with the Act's related reporting requirements, as further outlined below. However, the Department isn't reporting on climate change progress annually or disclosing the cost of the progress being reported, neither of which is required under the Act.

Information in the 2010 and 2012 reports on climate change progress

As required by the Climate Change Act, the Department's 2010 and 2012 reports on climate change progress included:

- assessments of current and predicted impacts of climate change.
- descriptions of various initiatives directly or indirectly related to reducing emissions.
- emissions reductions achieved in Manitoba and other jurisdictions as a result of Manitoba actions.
- emissions reductions likely to be achieved in Manitoba and other jurisdictions in the future.

The assessments of current and predicted impacts of climate change were not rigorous or detailed. Also, the Climate Change Act requires Manitoba to report on the emissions reductions likely to be achieved by 2020 and 2025, but what was reported was for different years and only included reductions likely to be achieved through Manitoba Hydro's Power Smart program (which aims to reduce demand for both electricity and natural gas). This reflected the Department's lack of internal capacity for producing more sophisticated assessments and forecasts.

Both the 2010 and 2012 progress reports listed individual initiatives achieving significant measurable reductions. As **Figure 6** shows, the Department reported project emissions reductions of about 1,000 kilotonnes (1 megatonne) by the end of 2012, with 6 accounting for over 90% of the reductions reported. However, the emissions reductions achieved by these projects were insufficient to reduce the trend in Manitoba's total emissions, as shown in **Figure 1**.

Manitoba's biofuel legislation was the most significant policy tool, accounting for almost half of the total reduction. It requires a minimum percentage of ethanol to be blended in gasoline and a minimum percentage of biodiesel to be blended in diesel fuel.

Figure 6: Six initiatives accounted for > 90% of the project emissions reductions reported for 2012

Project description	Policy tool	Emissions reductions (kilotonnes)
Ethanol mandate	Legislation requiring minimum % of ethanol in gasoline	410
Limiting Manitoba Hydro's coal-fired Brandon facility to emergency service	The Climate Change Act	343
Manitoba Hydro's Power Smart program	Loans/rebates for home modifications leading to natural gas savings	140
Biodiesel mandate	Legislation requiring minimum % of biodiesel in diesel fuel	74
Manitoba Sustainable Agriculture Practices Program	Payments to producers adopting better farm management practices	22
Brandon landfill carbon capture	Regulation to The Climate Change Act	19
Other miscellaneous	Various financial incentives	10.5
Total		**1,018.5**

Source: Manitoba's 2012 Report on Climate Change

The 2012 report noted that the legislated 2012 target was not met. It also stated that Manitoba had fully implemented its 2008 to 2012 climate change plan, with over 60 actions carried out over multiple sectors.

No disclosure of related costs and secondary impacts

In advance of the Department's first public report on climate change progress, our 2010 audit report recommended that the Department publicly disclose not just the emissions reductions achieved, but also the cost of achieving those reductions and whether stated secondary goals (for example, related job creation goals) were achieved. However, neither the 2010 nor the 2012 report disclosed this information.

Without the fuller disclosure, members of the legislature and the general public have incomplete information for assessing climate change progress. For example, it would be useful to know that the ethanol initiative shown in **Figure 6** cost the provincial government approximately $150 million, in the form of a production incentive grant paid to a single licensed ethanol producer. It would also be useful to know the actual number of jobs created by the 2 biofuel initiatives as they both had job creation goals, as well as emissions reduction goals. And it would be useful to know the cost of initiatives that were originally expected to produce significant emissions reductions, but failed to do so.

No requirement for annual reporting

While the Climate Change Act required Manitoba to publicly report on the climate change results achieved for 2010 and 2012, it only requires Manitoba to publicly report further progress every fourth year. Since the Act also requires Manitoba to issue its progress reports by one year after the year to which the reports relate, Manitoba must issue its next progress report—which will be on its progress to December 2016—by the end of 2017. Annual reporting would be more timely.

Recommendation 6: We recommend that the Department publicly report on Manitoba's progress in reducing greenhouse gas emissions annually and that, for each significant initiative, this include reporting the emissions reductions realized, related costs, and whether any secondary goals (such as job creation goals) were achieved.

2. Weak management processes for adapting to climate change impacts

2.1 Comprehensive and coordinated planning not in place

2.1.1 Little progress on assessing risks and developing a provincial adaptation plan

Our 2010 audit report noted the main focus of the 2008 climate change plan was on reducing emissions and that the Department needed to also develop a plan for adapting to climate change impacts. As a first step, we recommended that the Department work with other government departments and entities to conduct a risk assessment and document the likely impacts of climate change on government services, programs, and resources. The Province would then be able to prioritize identified risks, develop adaptation strategies and plans, and allocate funding. However, as of July 2017, our 2010 recommendation had not yet been implemented.

In August of 2011, Cabinet approved the creation of an inter-departmental adaptation working group, which was to include representatives from various government departments and Manitoba Hydro and be chaired by the Department. Cabinet tasked this group with implementing a planned 3-phase approach to developing an adaptation plan. This adaptation plan pathway was publicly announced in 2012. However, as of July 2017, none of the planned 3 phases had been completed.

The interdepartmental working group on adaptation was set up in May of 2013. The group met twice in 2013, once in 2014, and once in 2015. The group shared experiences and information on adaptation-related risks, opportunities, and initiatives. However, there was no indication in the group's minutes that it was steering the implementation of the planned 3-phase approach.

Further details on the planned 3-phase approach and the Department's progress on this initiative are provided below.

Planned 3-phase approach

In 2012, the Department issued *Tomorrow Now: Manitoba's Green Plan*, a plan to protect the environment while ensuring a prosperous and environmentally-conscious economy. It had a 3-phase approach to developing a strategy for adapting to climate change impacts:

- Phase 1: conduct climate change risk assessments across provincial government departments to identify and assess vulnerabilities that could impede the delivery of essential programs and services.
- Phase 2: expand Phase 1 to a province-wide risk assessment that includes key stakeholders, such as municipalities, and make recommendations for managing all identified risks.
- Phase 3: develop comprehensive adaptation strategies, including a monitoring and evaluation framework to evaluate progress on adaptation.

Progress in implementing planned 3 phases

As of March 31, 2017, the Department had not yet completed Phase 1—even though Department documents from 2013 indicate the Department originally expected to complete all 3 phases within 3 years.

The Department had developed a template and guide to help provincial government departments complete the Phase 1 assessment. But it had not yet shared these with other government departments and agencies. The guide has basic information on climate change, plus predicted future temperature and precipitation values under different carbon emission scenarios for different regions of the province.

The Department internally pilot-tested the template and guide in 5 of its own branches in February 2016. Feedback from pilot participants indicated a desire for more one-on-one support in completing the risk assessment and/or a less complex template. As a result, the Department subsequently amended the guide to show a sample completed template, based on one completed in the pilot.

Following the change in government in April 2016, rollout of the tool was put on hold.

> **Recommendation 7:** We recommend that the Department work with other provincial government departments and agencies, as well as with municipalities, to:
>
> (a) identify and assess potential risks associated with climate change impacts in Manitoba.
> (b) based on the significant risks identified, develop a provincial adaptation plan with clearly defined actions, timeframes, and budget.

2.1.2 Some adaptation activity underway

The Department and other government departments and entities are generally aware of several potential climate change impacts and opportunities. These include:

- warmer temperatures and changes in seasonal precipitation patterns, including more frequent and intense heat waves and more severe precipitation events.

- thawing permafrost, reduced sea ice, and northern coastal degradation.
- increased frequency and severity of adverse events, such as flooding, droughts, and wildfires.
- negative effects on winter ice roads and infrastructure built on permafrost.
- greater problems with northern food security and energy supply.
- more heat-related illnesses, plus more insect and rodent-borne diseases.
- adverse effects on plants, animals, fish, and their habitats.
- adverse effects on water supply and quality.
- beneficial effects on agriculture and forestry resulting from longer and warmer growing seasons, but also greater risks from drought, wildfires, excess moisture, pests, and insects.
- increased demand for hydro power (for greater use of air conditioning and electric vehicles within Manitoba, and to replace fossil fuels in other jurisdictions) and other forms of green energy (such as biomass).

In addition, some departments and other government entities have started to identify and plan for risks resulting from climate change—independent of the 3-phase initiative described in **section 2.1.1**. Some of this adaptation activity was described in the December 2015 climate change plan.

Our audit work in this area did not include preparing a comprehensive list of all adaptation activities across government; we believe gathering this information is the Department's responsibility. However, we have listed several examples below in order to illustrate the types of activities being undertaken. We did not assess the adequacy of these activities.

Department of Health, Seniors and Active Living

Officials from the Department of Health, Seniors and Active Living told us they have started assessing potential health-related impacts from a changing climate and identifying opportunities for adaptation. The Department has recognized that climate change may lead to an increased demand for health care services, as further explained below.

The Department has recognized that climate change may lead to more people incurring heat-related illnesses and that more frequent and severe wildfires may adversely affect people's health if they already suffer from allergies, asthma, heart disease, chronic bronchitis, emphysema, or pneumonia. It has also been working with federal and provincial partners, health care providers, and local stakeholders to establish a Heat Alert and Response System. In addition, it has noted that a changing climate may result in a higher incidence of insect-borne diseases, such as West Nile virus and Lyme disease, and it is working with the federal government to track these diseases. Department staff also told us that they work with federal and provincial partners to monitor and manage disease outbreaks secondary to emerging food-borne pathogens affected by climate change.

This activity regarding climate-related hazards reflects on-going work in planning and preparing to respond and recover from all health hazards and health emergencies.

Emergency Measures Organization

The Emergency Measures Organization (EMO) within the Department of Infrastructure similarly plans and prepares for future emergencies as part of its ongoing work. It also reviews and approves municipal emergency plans.

EMO and municipalities have not specifically incorporated climate change adaptation in their planning; however, they are nonetheless already responding to changes in the frequency and severity of flooding. Manitoba has upgraded its flood infrastructure and flood-fighting equipment over the last several years and is working on developing a permanent Lake St. Martin/Lake Manitoba outlet channel to address flooding. However, EMO officials told us more could be done. For example, they said that although it is costly, a more expansive flood-risk mapping program would provide a better understanding of the risk environment.

Manitoba Hydro

Manitoba Hydro officials told us they have been assessing the impacts of climate change over the past several years and that they are preparing for potential changes in water supply, electricity demand, and threats to infrastructure from more frequent and severe forest fires, flooding, and ice storms. As noted in Manitoba Hydro's 2014/15 climate change report, several key inputs to what it refers to as its "integrated resource planning process" may be sensitive to a changing climate or the human response to climate change.

With support from external consultants, Manitoba Hydro has modelled the potential effects of a wide range of climate scenarios. The results have helped it to better understand the potential impact of various carbon emission levels on precipitation, temperature, wind, snowpack, and ice melt. It has also noted potential changes to weather-affected energy and peak demand based on climate change projections. And it has identified the opportunities presented by climate change: for example, greater demand for greener energy from jurisdictions still using coal, plus greater interest in electric vehicles.

Department of Agriculture

The Department of Agriculture has started working on its own draft climate change adaptation plan. Department documents note producers have always had to adapt to changing and challenging weather conditions, but the rate of climate change may require them to adapt much more quickly. The documents suggest building adaptive capacity will require increased research, education, technological and infrastructure development, policy changes, better regional and on-farm water management, detailed climate and weather data, tools for producers, and incentive programs to encourage adoption of farming practices with adaptation advantages.

Departmental documents also note several agriculture-specific impacts as a result of climate change. Expected negative impacts include:

- increased overwintering of pests and increased presence of invasive weed species, coupled with decreased pesticide and herbicide effectiveness.
- decreased feed quality and possibly quantity, plus decreased forage and crop productivity.
- increased heat stress to livestock, coupled with decreased water availability and quality.
- increased costs for pesticides, herbicides, feed, and veterinary services.

However, expected positive impacts include longer growing and grazing seasons, less cold stress on animals, decreased heating costs, and new market opportunities.

Together with the federal government, the Department of Agriculture funded and facilitated an Agriculture Risk Management Task Force that examined the pressures and opportunities in the agriculture sector created by climate change. The Task Force released its report and 25 recommendations for coping with a changing climate in January 2016. These recommendations will provide a foundation for future federal-provincial agriculture agreements. The current agreement, *Growing Forward 2*, expires in 2018.

Department of Sustainable Development

The Department of Sustainable Development has developed several documents linked to the *Tomorrow Now* plan described in **section 2.1.1**. Many of these have information on adapting to climate change impacts. Examples from 2 of the documents are provided below.

The *Surface Water Management Strategy* document was publicly issued in 2014. It lists needed actions for more sustainable water management. This includes the need to support municipalities, planning districts, conservation districts, communities, and landowners in building climate change capacity and resiliency. The document also notes the need to limit development on land vulnerable to extreme weather-related events and to provide tools for community planning processes. In addition, it discusses the importance of wetlands and the many reasons why wetlands need to be preserved and enhanced, with one reason being their ability to store carbon.

The *Drought Management Strategy* document was publicly released in early 2016. It notes the need to study the long-term effects of climate change on river-basin water supply and demand. It also notes the need for emergency plans to include specific guidance for drought-related emergencies, such as wildfires.

The Department was not tracking its progress in addressing action items listed in *Tomorrow Now* documents. In addition, Department officials told us that, following the change in government in April 2016, all *Tomorrow Now* plans were under review.

Together with other provincial government departments (Agriculture, Municipal Relations, and Infrastructure), the Department has also participated in Prairie Regional Adaptation Collaborative (PRAC) initiatives. These research-based initiatives included vulnerability assessments of specific ecosystems and wetlands, water-demand studies, consideration of climate change impacts on the mining sector and northern transportation, and identification of policy enablers and barriers for natural resource sectors adapting to climate change. PRAC members included Manitoba, Saskatchewan, Alberta, and the federal government.

Department of Municipal Relations

The Department of Municipal Relations is responsible for provincial land use policies. A stated goal of the *Provincial Planning Regulation*, a regulation enacted in 2011 under *The Planning Act*, is "to promote sustainable land use patterns and innovative development practices that minimize pollution, protect resources, and reduce greenhouse gas emissions". Municipalities are encouraged—but not required—to include climate change considerations in their development plans, as explained below.

Part 4 of the regulation concerns development plans. It states that "in preparing, amending, or replacing a development plan, a planning authority must undertake the analysis and surveys of the planning areas that are appropriate and necessary, including analysis and surveys of" (amongst a list of several items), "the existing and forecasted amounts and sources of greenhouse gas emissions" and "vulnerabilities of the planning areas to climate change".

Department officials told us they interpreted the regulation to mean that analysis and surveys of greenhouse gas emissions and climate change vulnerabilities only had to be done when deemed appropriate and necessary, not that such analysis and surveys were deemed appropriate and necessary in all cases. They were unable to provide examples of analyses or surveys of greenhouse gas emissions or climate change vulnerabilities undertaken to support development plans. However, they noted that some development plans had guiding principles or broadly stated goals related to climate change. Examples included "work towards reducing greenhouse gas emissions and take advantage of programs and funding to modernize municipal buildings and operations where it makes sense" and "encourage development on soil with the least permafrost".

To assist municipalities wanting to better integrate climate change and land use planning, in 2011 the Department developed 2 related guides: one for reducing greenhouse gases and one for adapting to climate change impacts.

2.2 Minimal processes to track and report progress on adaptation

2.2.1 Little public reporting on adaptation

The Department's 2012 public report on climate change progress (described in greater detail in **section 1.2.2**) mostly focused on progress in reducing greenhouse gas emissions. It had only a small section devoted to Manitoba's progress in adapting to climate change impacts.

Ideally, public reporting on adaptation should focus on the significant risks identified and the progress made in successfully eliminating or reducing those risks. The 2012 report did not do this. It noted related Prairie Regional Adaptation Collaborative activities, the development of guides to help municipalities integrate adaptation strategies into their land use planning, flood-proofing programs, and the launch of the 3-phase process for developing an adaptation plan. Public reporting might also include a discussion of the work being done to capitalize on identified opportunities.

Recommendation 8: We recommend that the Department develop processes to publicly report on an annual basis:

(a) the significant risks identified for Manitoba as a result of climate change impacts.
(b) planned actions and timelines to address those risks.
(c) progress in implementing planned actions.
(d) the degree to which planned actions have successfully reduced identified risks.
(e) related costs.

2.2.2 Draft performance measures developed, but improvement needed

Although the interdepartmental working group on adaptation had made little progress on identifying risks and developing a province-wide adaptation plan, the Department had developed a draft set of over 40 adaptation performance measures. While too many to list, these included:

- number of "climate-proofed" municipal development and land-use plans.
- number and dollar value of adaptation investments, by the Province and by the private sector.
- number and types of adaptation guidance materials developed.
- number of policies and regulations developed to support adaptation.
- number of climate modelling outputs.
- number of interdepartmental working group members and meetings.
- number and types of vulnerability risk assessments completed.

Performance measurement should also focus on whether significant risks have been identified, whether specific actions have been planned and executed to successfully reduce those risks, and the related costs incurred. This would be consistent with our recommendation in **section 2.2.1**. Department officials told us the performance measures were being reviewed as part of the development of a new climate change plan.

Summary of recommendations

Reducing greenhouse gas emissions

1. We recommend that the Department promptly review and update its plan for reducing greenhouse gas emissions whenever progress monitoring shows established targets will not be met, and at a minimum every 3 years.

2. We recommend that the Department use scientific and economic analyses to help it set short, medium, and long-term targets for reducing greenhouse gas emissions.

3. We recommend that the Department support plans for reducing emissions with comprehensive analyses of the benefits, risks, and costs of different approaches and policy tools.

4. We recommend that the Department develop plans for reducing emissions that show each significant initiative's expected emissions reduction and estimated cost.

5. We recommend that the Department implement processes for monitoring Manitoba's progress in reducing greenhouse gas emissions that include:
   (a) clearly defined roles and responsibilities for the Department, partner departments and agencies, and Cabinet committees.
   (b) regular reporting on whether the overall plan and significant initiatives are on time, on budget, and going to achieve expected emissions reductions and any other stated secondary goals (for example, job creation goals).
   (c) on-going risk management to identify and mitigate risks to achieving expected emissions reductions.

6. We recommend that the Department publicly report on Manitoba's progress in reducing greenhouse gas emissions annually and that, for each significant initiative, this include reporting the emissions reductions realized, related costs, and whether any secondary goals (such as job creation goals) were achieved.

Adapting to climate change impacts

7. We recommend that the Department work with other provincial government departments and agencies, as well as with municipalities, to:
   (a) identify and assess potential risks associated with climate change impacts in Manitoba.
   (b) based on the significant risks identified, develop a provincial adaptation plan with clearly defined actions, timeframes, and budget.

8. We recommend that the Department develop processes to publicly report on an annual basis:
   (a) the significant risks identified for Manitoba as a result of climate change impacts.
   (b) planned actions and timelines to address those risks.
   (c) progress in implementing planned actions.
   (d) the degree to which planned actions have successfully reduced identified risks.
   (e) related costs.

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