

Chapter

2

Kyoto Protocol Implementation Act

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Kyoto Protocol Implementation Act

Main Points

What we examined

In 2007, Parliament passed the *Kyoto Protocol Implementation Act* “to ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol and help address the problem of global climate change.” The Act requires that the Minister of the Environment prepare and implement an annual climate change plan to address sources of greenhouse gas emissions in Canada. The annual plan is to include a series of measures aimed at reducing greenhouse gas emissions as well as a report on progress made in implementing the previous year’s plan.

The Act also requires that the Commissioner of the Environment and Sustainable Development assess Canada’s progress in implementing these plans and meeting its Kyoto Protocol obligations, reporting in 2009, 2011, and 2012. This chapter is our first report under the *Kyoto Protocol Implementation Act*.

The elements to be included in the annual climate change plans are set out in subsection 5. (1) of the Act. We examined whether the 2007 and 2008 climate change plans include all the measures and the related information required under subsection 5. (1). We also selected three groups of measures included in the plans for further examination—the Regulatory Framework for Industrial Greenhouse Gas Emissions, the ecoENERGY for Renewable Power program, and the proposed renewable fuels content regulations and nine other biofuels measures. The Regulatory Framework accounts for 80 percent of the reductions in greenhouse gas emissions expected during the Kyoto period (2008–2012) under the 2008 climate change plan called for by the *Kyoto Protocol Implementation Act*. It is also the principal component of “Turning the Corner,” the government’s main plan to reduce air emissions. We examined the accuracy of the information provided about the selected measures and the adequacy of the rationale on which expected reductions in greenhouse gas emissions were based. We also examined the systems Environment Canada has in place to monitor and report on the reductions achieved by the measures.

Why it's important

Successive federal governments have indicated that climate change is one of the most important issues facing the world, representing significant risks to the environment, the economy, and human health. The government has entered into international agreements such as the Kyoto Protocol to reduce greenhouse gas emissions. Recent studies by the Government of Canada indicate that climate change will likely have major impacts on Canadian ecosystems and on the health of Canadians.

What we found

- The 2007 and 2008 climate change plans do not include all of the information required under subsection 5. (1) of the *Kyoto Protocol Implementation Act*. Required information that is missing ranges from the dates that some planned emission reduction measures come into effect, to numerical statements of expected emission reductions from some measures, to whether some measures have been implemented by the projected date.
- Environment Canada could not demonstrate that the emission reductions expected under the Regulatory Framework for Industrial Greenhouse Gas Emissions are based on an adequate rationale. The climate change plans overstate the reductions that can be reasonably expected from the Regulatory Framework during the Kyoto period (2008 to 2012).
- For all three groups of measures we examined, the plans are not fully transparent. For example, they do not disclose how expected reductions in greenhouse gas emissions might be affected by such uncertain factors as future economic conditions.
- While Environment Canada has a system in place to report on Canada's total greenhouse gas (GHG) emissions, it has no system for reporting the actual emission reductions achieved from each measure in the annual climate change plans—a requirement under the Act. Environment Canada has indicated that the monitoring of actual GHG emission reductions could be technically unfeasible and not necessarily cost effective, and that reductions could be impossible to attribute to a specific measure. However, in the plans prepared to date, the Department has not explained why expected emission reductions can be estimated in advance but actual reductions cannot be measured after the fact for individual measures.

The Department has responded. The Department accepts three out of four of our recommendations. For recommendation 2.19, the Department does not accept the recommendation at this time but has indicated that it will explain its approach more completely in the next plan.

Introduction

2.1 The risks and impacts arising from climate change are varied and significant, as several recent reports state. According to the United Nations' Intergovernmental Panel on Climate Change's latest report in 2007, likely impacts of climate change include increased frequency of severe weather events such as droughts, floods, and storms. The Panel also states that the economic and social costs of climate change are likely to be significant. Natural Resources Canada's study, *From Impacts to Adaptation: Canada in a Changing Climate 2007*, identifies likely major impacts on Canadian ecosystems. As well, Health Canada's 2007 study, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*, indicates that climate change will probably affect the health of Canadians.

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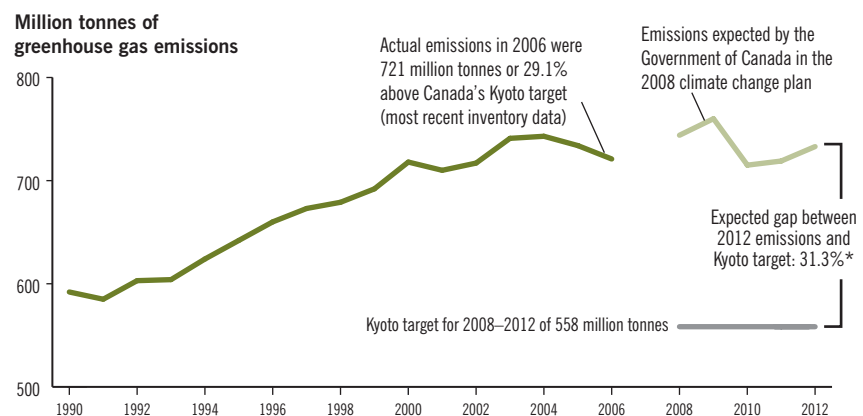
2.2 In 2002, Canada ratified the international Kyoto Protocol. In June 2007, Canada's *Kyoto Protocol Implementation Act* came into force. The Act's stated purpose is "to ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol and help address the problem of global climate change." The government's obligations under the Kyoto Protocol are to reduce Canada's greenhouse gas (GHG) emissions level by an average of 6 percent below its 1990 emission levels during the protocol's time frame of 2008 to 2012. Starting in 2007 and up to 2013, the Act requires the government to produce an annual climate change plan. It stipulates that these plans must include a variety of measures (for example, regulatory, market-based, and fiscal measures) and account for and report on the GHG emission reductions expected or already achieved through each measure. After 2007, each plan must also report on the progress in implementing the measures described in the previous year's plan. To date, Environment Canada has prepared two plans on behalf of the federal government, which were released in August 2007 and May 2008. The May 2008 plan serves as an update of the August 2007 plan. In this chapter, all references to climate change plans are to the plans prepared in response to the *Kyoto Protocol Implementation Act* unless otherwise indicated.

2.3 Within the annual climate change plans, Environment Canada has indicated that the government will not achieve its Kyoto target. Consistent with this position, implementation of the measures in the 2008 climate change plan and achievement of their expected emission reductions will not bring Canada closer to its Kyoto target

Business-as-usual emissions—greenhouse gas emissions that would occur in the absence of new measures to reduce emissions.

(Exhibit 2.1). Compared with the most recent available data for actual emissions (2006), the plan projects a small increase in emissions as of 2012, the end of the Kyoto period. The approach Environment Canada has used to determine the expected reductions from the measures is to state them relative to a future scenario in which the measures do not exist, known as **business-as-usual emission** projections. In contrast, the Act and the Kyoto Protocol require reporting against historical emission levels.

Exhibit 2.1 Gap between Government of Canada's expected GHG emissions in the 2008 climate change plan and Canada's target under the Kyoto Protocol



* Calculation of the gap percentage uses unrounded numbers from the inventory but rounded numbers from the 2008 climate change plan, because no unrounded numbers were available.

Sources: Adapted from Environment Canada's National Inventory Report, 1990–2006: Greenhouse Gas Sources and Sinks in Canada (May 2008) and A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act* (May 2008).

Mandate of the Commissioner under the *Kyoto Protocol Implementation Act*

2.4 Subsection 10.1 (1) of the *Kyoto Protocol Implementation Act* requires the Commissioner of the Environment and Sustainable Development to undertake specific work:

At least once every two years after this Act comes into force [22 June 2007], up to and including 2012, the Commissioner of the Environment and Sustainable Development shall prepare a report that includes

- (a) an analysis of Canada's progress in implementing the Climate Change Plans;
- (b) an analysis of Canada's progress in meeting its obligations under Article 3, paragraph 1, of the Kyoto Protocol; and
- (c) any observations and recommendations on any matter that the Commissioner considers relevant.

Focus of the audit

2.5 For our first audit under the *Kyoto Protocol Implementation Act*, we sought to determine whether Environment Canada can demonstrate that its annual climate change plans meet the requirements set out in subsection 5. (1) of the Act. Our audit work included three sub-objectives:

- to determine whether Environment Canada’s annual climate change plans include all applicable elements listed in subsection 5. (1) of the *Kyoto Protocol Implementation Act*;
- to determine whether Environment Canada, in conjunction with other selected departments, can demonstrate whether the information in its annual climate change plans pertaining to selected measures is accurate or based on an adequate rationale; and
- to determine whether Environment Canada can demonstrate that it has systems in place to monitor and report on the greenhouse gas emission reductions of the selected measures in the annual climate change plans.

Pursuant to the Act, subsequent audits will be tabled in 2011 and 2012.

2.6 More details on the audit objectives, scope, approach, and criteria are in **About the Audit** at the end of this chapter.

Observations and Recommendations

Content requirements for the annual climate change plans

2.7 Subsection 5. (1) of the *Kyoto Protocol Implementation Act* requires the Minister of the Environment to prepare an annual climate change plan that includes information required by paragraphs (a) through (f) (Exhibit 2.2). We expected Environment Canada to have included all of these required elements in its plans. We reviewed the 2007 and 2008 plans against these requirements. The major part of the plans consists of a series of measures to reduce greenhouse gas (GHG) emissions. In each plan, we identified 19 measures for which the government provided expected GHG emission reductions—a key requirement. The plans also include about a dozen programs for which no numerical expected emission reductions are stated; rationales for the lack of numerical reduction statements are provided in most cases.

Exhibit 2.2 The *Kyoto Protocol Implementation Act* requires the annual climate change plan to contain specific elements

5. (1) Within 60 days after this Act comes into force and not later than May 31 of every year thereafter until 2013, the Minister shall prepare a Climate Change Plan that includes

(a) a description of the measures to be taken to ensure that Canada meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, including measures respecting

- (i) regulated emission limits and performance standards,
- (ii) market-based mechanisms such as emissions trading or offsets,
- (iii) spending or fiscal measures or incentives,
- (iii.1) a just transition for workers affected by greenhouse gas emission reductions, and
- (iv) cooperative measures or agreements with provinces, territories or other governments;

(b) for each measure referred to in paragraph (a),

- (i) the date on which it will come into effect, and
- (ii) the amount of greenhouse gas emission reductions that have resulted or are expected to result for each year up to and including 2012, compared to the levels in the most recently available emission inventory for Canada;

(c) the projected greenhouse gas emission level in Canada for each year from 2008 to 2012, taking into account the measures referred to in paragraph (a), and a comparison of those levels with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol;

(d) an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions;

(e) a report describing the implementation of the Climate Change Plan for the previous calendar year; and

(f) a statement indicating whether each measure proposed in the Climate Change Plan for the previous calendar year has been implemented by the date projected in the Plan and, if not, an explanation of the reason why the measure was not implemented and how that failure has been or will be redressed.

Source: *Kyoto Protocol Implementation Act*

The annual climate change plans do not fully meet the requirements of the Act

2.8 The 2007 and 2008 climate change plans were prepared by Environment Canada with input from other departments responsible for measures included in the plans. The annual climate change plans do not fully meet subsection 5. (1) of the Act. Our findings are as follows:

- **Description of the measures [paragraph 5. (1)(a)]:**

The plans include measures falling under each category specified in paragraph 5. (1)(a), except that there are no measures respecting “a just transition for workers affected by GHG reductions.”

The 2007 and 2008 plans note that significant worker adjustment will not be required, but they do not cite or summarize any analyses to explain how the government came to this conclusion.

- **Effective date and expected GHG emission reductions**
[paragraph 5. (1)(b)]: The dates (month, year) on which a measure will come or has come into effect are provided for 8 of 19 measures in the 2008 plan. This is an improvement from the 2007 plan, which included a date for only one of the 19 measures reported. In reviewing the expected emission reductions for the measures, we found that some of the estimates had been revised from the first plan (2007) to the next (2008). Explanations of these revisions were not provided for most of these cases. Paragraph 5. (1)(b) also requires that the expected GHG reductions for each measure be compared with the most recently available emissions data for Canada. This was not done in the plans. Environment Canada indicated that it had addressed this requirement by incorporating the most recent data into the Department's business-as-usual projections against which expected reductions are stated. However, this approach does not allow for a clear and direct comparison of expected results with historical emission levels.
- **Projected total national GHG emission levels compared with Canada's Kyoto target** **[paragraph 5. (1)(c)]:** The plans present the projected total GHG emission levels for Canada during the Kyoto period. However, the plans do not compare these emission levels with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol (the Kyoto target).
- **Equitable distribution of GHG emission reductions**
[paragraph 5. (1)(d)]: The plans do not describe how they address the requirement to include an equitable distribution of GHG emission reductions among the sectors of the economy that contribute to GHG emissions.
- **Description of implementation** **[paragraph 5. (1)(e)]:** Information about implementation is provided for all 19 measures. However, the amount of information provided in the 2008 plan on the implementation of the measures for the previous year is inconsistent across the 19 measures, ranging from sparse to detailed.
- **Timeliness of implementation** **[paragraph 5. (1)(f)]:** A clear statement of whether a measure has been implemented by the date projected is provided for about 20 percent of the measures.

2.9 Recommendation. Environment Canada should ensure that the next annual climate change plan fulfills all the requirements of subsection 5. (1) of the *Kyoto Protocol Implementation Act* by addressing the findings in paragraph 2.8, including providing summaries of relevant analyses that were conducted to support departmental positions.

The Department's response. Environment Canada accepts this recommendation.

Beginning with the 2009 climate change plan, Environment Canada will request responsible departments—and will undertake itself—to provide further detail regarding effective dates, timelines, and descriptions of program implementation.

Further, beginning with the next plan, Environment Canada will more clearly provide a direct comparison of the projected greenhouse gas emission levels for the Kyoto period with Canada's obligations under the Kyoto Protocol.

Environment Canada believes that the plans it has published are consistent with the requirement that they reflect an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions, and will state this clearly in subsequent plans.

Finally, as a potentially useful practice, Environment Canada, in drafting the next plan, will consider providing additional information on how it arrived at the conclusions on measures regarding just transition for workers and equitable distribution among sectors, though providing this information is not itself required by the Act.

Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.

Selected measures in the annual climate change plans

2.10 We examined three significant groups of measures to reduce greenhouse gas (GHG) emissions in the annual climate change plans:

- the Regulatory Framework for Industrial Greenhouse Gas Emissions (regulations and compliance mechanisms)
- renewable fuels measures (proposed regulations and nine related measures)
- the ecoENERGY for Renewable Power program

2.11 In the 2008 plan, we expected that Environment Canada would have reported accurate information on progress in implementing the selected measures since the 2007 plan. Environment Canada put in place a process to collect information from responsible departments and obtain sign-offs from deputy ministers on the information included in the plan. These sign-offs were obtained.

2.12 We also expected that the federal organizations responsible for the selected measures would have stated expected GHG emission

reductions that are based on adequate rationale. The following sections present our findings for the measures we examined.

Expected emission reductions are overstated for the Regulatory Framework for Industrial Greenhouse Gas Emissions

2.13 In 2006, emissions from all industrial sources accounted for about half of Canada's total GHG emissions. The proposed Regulatory Framework for Industrial Greenhouse Gas Emissions is the major component of the government's approach to reducing GHGs and other air emissions (the "Turning the Corner" plan). In addition, in the 2008 climate change plan prepared under the *Kyoto Protocol Implementation Act*, the framework accounts for about 80 percent of the total amount of expected GHG emission reductions for the 2008 to 2012 Kyoto period. According to the 2007 and 2008 plans, firms covered by the regulatory framework will be able to comply with their regulated **emissions intensity** targets through in-house projects such as improvements in energy efficiency or by using the framework's six proposed compliance mechanisms (Exhibit 2.3).

Emissions intensity—amount of greenhouse gas emissions (in carbon dioxide equivalents) per unit of production.

Exhibit 2.3 The Government of Canada's proposed Regulatory Framework for Industrial Greenhouse Gas Emissions has six compliance mechanisms

- 1. Technology fund:** Purchasing credits by contributing to a fund, administered by an independent third party, that will invest in future technological development to reduce GHG emissions across industry. Investment decisions will be made to maximize the emission reductions achieved. As proposed by Environment Canada, firms would pay \$15 per tonne of GHG emissions to the fund until the end of 2012.
- 2. Pre-certified investments:** Purchasing credits by investing directly in either a firm's own or joint-venture projects that are part of a list of projects already approved by the government. Carbon capture and storage are an example of such projects. As proposed by Environment Canada, pre-certified investments are also made at a rate of \$15 per tonne of GHG emissions until the end of 2012.
- 3. Offset system:** Obtaining emission reduction credits from projects that result in domestic reductions or the removal of GHG emissions from activities not covered by the regulations.
- 4. Clean Development Mechanism:** Firms will be able to purchase emission reduction credits for compliance purposes from this Kyoto Protocol mechanism up to a maximum of 10 percent of each firm's regulated target.
- 5. Domestic emissions trading system:** Purchasing emission reduction credits from firms that have exceeded their required emissions intensity reduction target or selling emission reduction credits by firms that have reduced their emission levels below their target.
- 6. Credit for early action:** Receiving one-time credits for verified emission reductions that occurred between 1992 and 2006. The total allowance to be divided among eligible firms would be 5 million tonnes per year between 2010 and 2012. The data provided by Environment Canada indicates that this option would not contribute to reductions during the Kyoto period of 2008 to 2012. However, as proposed by Environment Canada, credits could be used for compliance purposes during this period.



In 2006, industrial sources accounted for about half of Canada's total greenhouse gas emissions.

2.14 The proposed regulatory framework is complex, covering 14 sectors and several hundred facilities. Each compliance mechanism will require its own rules and institutional arrangements. Environment Canada indicated the framework would be in place by 1 January 2010, but there have been delays in publishing the associated draft regulations for the framework. These delays raise some doubt as to whether the Department will be able to meet its target date.

2.15 The GHG emission reductions expected from the regulatory framework were estimated by Environment Canada using the Department's Energy-Economy-Environment Model for Canada. In the plans, expected reductions from the framework are stated for each year of the Kyoto compliance period (2008–2012) against the business-as-usual scenario. Exhibit 2.4 provides the regulatory framework's expected sources and amounts of emission reductions from the analyses conducted by Environment Canada. We found that within the Kyoto period, these expected reductions are overstated, because they include emission reductions unlikely to occur under the proposed technology fund and anticipated regulated codes of practice before 2012. Exhibit 2.5 shows the 2008 plan's expected GHG emissions compared with the case in which reductions for the technology fund and regulated codes of practice do not occur before the end of 2012.

2.16 The proposed regulatory framework's technology fund constitutes the largest source of expected GHG emission reductions during the Kyoto period. According to Environment Canada's analyses, at \$15 per tonne of GHGs emitted, payments to the fund would represent the cheapest compliance option available to companies until the end of the Kyoto period in 2012. Therefore, the Department assumes that companies will maximize their use of this option during the Kyoto period. Based on the time required for technology development, deployment, and adoption, contributions made before the end of 2012 are likely to result in GHG emission reductions after 2012 and not in the year the payment is made. During the course of the audit, Environment Canada indicated that it did not consider it necessary to state expected GHG emission reductions in terms of real reductions to be achieved in the year they are most likely to occur.

2.17 The framework's second largest source of projected GHG emission reductions is through the implementation of codes of practice that would be required by regulations. These codes aim to reduce unintentional **fugitive emissions** as well as **hydrofluorocarbons**. However, to estimate the expected GHG emission reductions, Environment Canada has assumed a best-case scenario with an initial

Fugitive emissions—greenhouse gases released into the air as a result of small leaks from plant equipment, such as valves, pump seals, and sampling connections, or leaks from other sources, such as pipelines and storage facilities.

Hydrofluorocarbon—a chemical with a high global warming potential when released into the atmosphere; uses include refrigeration.

compliance rate of 100 percent even though regulations require time to promote and enforce.

2.18 In our view, based on the above observations, the expected annual GHG emission reductions for the regulatory framework are overstated.

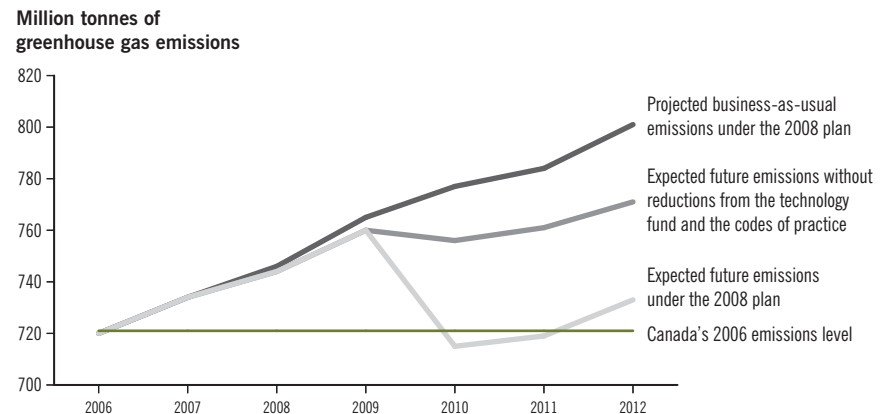
Exhibit 2.4 The 2008 climate change plan's Regulatory Framework sources and amounts of expected greenhouse gas emission reductions

Source of expected emission reductions	Amount of expected emission reductions (million tonnes)				
	2008	2009	2010	2011	2012
Internal reductions	0	0	3	4	4
Compliance mechanisms					
Technology fund	0	0	30	28	24
Offset system	0	0	4	5	7
Clean Development Mechanism	0	0	4	4	7
Codes of practice to reduce fugitive emissions and hydrofluorocarbons	0	0	11	14	14
Total expected reductions stated in the 2008 climate change plan	0	0	52	55	56

Note: In the analysis conducted by Environment Canada, no expected emission reductions were specifically attributed to the domestic emissions trading system, credit for early action, and pre-certified investments.

Source: Environment Canada

Exhibit 2.5 When reductions are counted in the year in which they are most likely to occur, greenhouse gas emission levels are expected to be higher than stated in the 2008 climate change plan



Source: Environment Canada

2.19 Recommendation. In accordance with the *Kyoto Protocol Implementation Act*, the projected greenhouse gas emission levels in Canada for each year from 2008 to 2012 should be reported for each measure in the annual climate change plan. Environment Canada should state its expected greenhouse gas emission reductions for the Regulatory Framework for Industrial Greenhouse Gas Emissions in the years that they are most likely to actually occur, rather than in the years that the payment is made to the technology fund and other compliance mechanisms. If this is not done, the Department should explain why in the next plan.

The Department's response. Environment Canada does not accept the recommendation at this time and will explain its approach more completely in the next plan.

Environment Canada is committed to transparency in the way that emission reductions are estimated. Expected reductions from the Regulatory Framework presented in the report *A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act 2008* represent the total emission reduction obligations required of industry under the Regulatory Framework.

The Regulatory Framework provides a number of options to industry for meeting these obligations. Environment Canada's modelling indicates that the choice of compliance option is influenced by differences in marginal costs that they present to regulated industries and therefore, actual in-year reductions may vary from the plan's estimates, depending on the specific compliance options chosen by individual firms. Because the Framework is market-based, it is not possible to establish with certainty which options will be most used by industry, and any such estimate would be so heavily dependent on a variety of technical assumptions that it would be inappropriate for use for the purpose of compliance with the *Kyoto Protocol Implementation Act*.

However, beginning with the 2009 climate change plan, Environment Canada proposes to explore providing a range of estimates for actual in-year reductions. As experience is gained with implementation, it will be possible to provide improved estimates, and approximately 15 months after implementation of the framework, the actual use of each compliance option by individual firms will be known.



The federal government provides support to farmers who grow corn, wheat, canola, and soy that is used to make biofuels.

The descriptions of the renewable fuels and renewable power measures are not fully transparent

2.20 Renewable fuels measures. Renewable fuels (or biofuels) include products ranging from ethanol and biodiesel to “next generation” bio-based fuels. According to Environment Canada, they can be blended into conventional petroleum-based fuels and can reduce GHG emissions from fuel combustion.

2.21 In December 2006, the Government of Canada announced its intention to implement federal regulations requiring an average renewable content of 5 percent in gasoline by 2010 and 2 percent in diesel fuel and heating oil by 2012. According to the 2008 climate change plan, the government expects the proposed regulations to lead to reductions of annual GHG emissions of 1.9 million tonnes by 2012. The Notice of Intent to Develop a Federal Regulation Requiring Renewable Fuels set a release date for the draft regulations in fall 2008. Environment Canada has since indicated that it expects the draft regulations to be released in late 2009.

2.22 In addition to the proposed regulations, the annual climate change plans present nine measures for biofuels economic development, research, and commercialization of technology. As elements of the government’s Renewable Fuels Strategy, the measures are described as supporting the regulatory actions and their expected resulting emission reductions. However, the connection between these nine measures, the regulations, and GHG emission reductions is not made clear in the plans.

2.23 In the 2008 plan, the expected emission reductions from the proposed regulations were revised and decreased from those in the 2007 plan by an average of about 65 percent. This is because the government originally included expected results from provincial and other independent actions in its own expected GHG emission reductions. This practice was adjusted in the 2008 plan, and the new estimates are supported by adequate rationale. However, the plan does not clearly explain that the reductions from the regulations are stated relative to a hypothetical business-as-usual scenario and thus do not represent reductions relative to historical emissions levels.

2.24 ecoENERGY for Renewable Power program. The program, under the responsibility of Natural Resources Canada, is a measure designed to increase Canada’s supply of clean electricity from low-impact renewable sources such as wind, biomass, small hydro, geothermal, solar photovoltaic, and ocean energy. The program was launched in April 2007. It provides an incentive of one cent per kilowatt hour for up



The ecoENERGY for Renewable Power program provides a financial incentive to encourage the development of renewable energy projects, such as wind turbines.

Absolute emissions—the amount of greenhouse gas emissions (in carbon dioxide equivalents).

to 10 years to eligible renewable energy projects that are commissioned by 31 March 2011. By 2011 the program is expected to result in the reduction of greenhouse gas emissions equivalent to 6.67 million tonnes annually as a result of displacing emissions that otherwise would have been produced by the burning of fossil fuels.

2.25 We found that the expected emission reductions for the ecoENERGY for Renewable Power program are based on an adequate rationale. However, factors that could affect the estimate of these expected reductions—for example, wind flow variability affecting the achievement of production targets for the wind power projects—are not clearly explained in the plans. In addition, the plans do not clearly explain that the reductions attributable to the program on its own may be less when calculated by Environment Canada’s model, which integrates all of the other measures in the plan.

The annual climate change plans do not disclose uncertainties about expected emission reductions

2.26 The Act does not require that the government report underlying assumptions and related uncertainties about the expected GHG emission reductions presented in the climate change plans. However, reporting such information is an accepted practice in modelling and in the reporting of results. For example, the Intergovernmental Panel on Climate Change has guidelines on the need for communicating uncertainty.

2.27 For each of the measures we selected for further examination, the plans do not discuss quantitative and qualitative uncertainties relevant to understanding the estimates of expected GHG emission reductions. For example, the ability of the Regulatory Framework for Industrial Greenhouse Gas Emissions to achieve **absolute emission** reductions by regulating emissions intensity depends on future economic trends. Environment Canada’s Energy-Economy-Environment Model for Canada, used to estimate the expected reductions for the regulatory framework, requires making assumptions about these future trends. Although Environment Canada has disclosed most of its initial assumptions for this measure, it has not assessed how future economic conditions that differ from the assumptions might affect the expected emission reductions stated in the annual climate change plans.

2.28 Recommendation. Environment Canada and other responsible departments should describe in the annual climate change plans the quantitative or qualitative uncertainties related to the expected GHG

emission reductions of each measure. A range of potential emission reduction levels should be presented for the annual plans as a whole and for the individual measures where possible.

The Department's response. Environment Canada accepts this recommendation.

The Government of Canada has met the requirements of the *Kyoto Protocol Implementation Act* by providing expected emission reductions for each of the measures, which are individually expected to produce emission reductions. To comply with the Act's reporting requirements, the government uses internationally accepted methods and approaches.

While uncertainty analysis is not required under the Act, the Commissioner of the Environment and Sustainable Development has advanced this recommendation as a potentially useful practice to improve the plans prepared for the purposes of the Act.

The federal government is committed to continuously improving the way that the impacts of greenhouse gas reduction measures are estimated. In response to this recommendation, Environment Canada will work with other responsible departments to investigate options for presenting a range of expected emissions reductions where feasible and will consider including this information in the plans, beginning with the next plan in 2009.

Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.

Monitoring and reporting greenhouse gas emissions

2.29 The *Kyoto Protocol Implementation Act* requires that, for each measure identified in the annual climate change plans, the government report on the amount of greenhouse gas (GHG) reductions that have resulted or are expected to result for each year of the Kyoto period, 2008 to 2012. For the measures selected, we expected Environment Canada to have systems in place for monitoring and reporting on their reductions for the Kyoto period. A system for monitoring is necessary to be able to report credible results.

A monitoring system has not been developed

2.30 According to Environment Canada, it is not possible to have a monitoring system capable of tracking actual GHG emission reductions for each of the individual measures reported in the plans. The Department has indicated that the monitoring of actual GHG emission reductions could either be technically unfeasible, not necessarily cost-effective, or impossible to attribute to a specific measure.

2.31 Environment Canada currently manages a system for tracking Canada's overall GHG emissions through the national greenhouse gas inventory, a type of reporting mechanism used by countries participating in the United Nations Framework Convention on Climate Change. The inventory estimates sectoral and overall emissions for Canada using standard international monitoring and reporting methods. The inventory does not subdivide emissions according to policy measures such as those found in the climate change plans.

2.32 Some measures in the plans will require highly credible monitoring of emissions and emission reductions in order to function and to be able to report on actual emission reductions. For example, the Regulatory Framework for Industrial Greenhouse Gas Emissions, accounting for a significant proportion of expected GHG emission reductions in the plans, will require rules for the quantification, reporting, and verification of each company's emissions in order to ensure that the credits awarded, purchased, and sold for compliance purposes will represent real reductions. Environment Canada has indicated that the framework's associated regulations will establish these rules.

2.33 According to the Act, the climate change plans have to include expected and actual emission reductions as they become available. Yet, the Department has indicated that there are difficulties in addressing this requirement. In the plans prepared to date, these difficulties have not been explained.

2.34 Recommendation. Environment Canada should clearly indicate how it will measure actual emission reductions for each of the GHG emission reduction measures in the plans. Where no such measurement takes place, the rationale should be provided for why expected emission reductions can be estimated in advance but corresponding actual reductions cannot be measured after the fact.

The Department's response. Environment Canada accepts this recommendation.

The Government of Canada recognizes the need for monitoring to determine the impact and effectiveness of its programs. However, no country has a comprehensive system in place to measure the direct and verifiable emissions reductions for individual programs.

For many of the programs that target a range of behaviours and sectors, such as the ecoACTION programs, emission reductions cannot be measured directly; they can only be estimated. The most practical and cost-effective way to calculate greenhouse gas emission reductions from individual measures is to take program data (e.g., reduction in

energy used by households or vehicles, increases in renewable energy) and apply reasonable assumptions and methods to estimate the impact of the program on greenhouse gas emissions. This is the method currently used by the government for these programs.

However, it will be possible to measure the emission reductions that result from the Regulatory Framework for Industrial Greenhouse Gas Emissions. The regulations implementing the Framework will establish rigorous rules for the quantification, reporting, and verification of each company's emissions, allowing emission reductions due to the Framework to be estimated with some confidence.

Beginning with the 2010 plan, when the first results are known for the Kyoto period (2008–2012), the Government of Canada will provide the estimated emissions reductions achieved for the measures in the plan where it is possible, clearly indicating the methodology used.

Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.

Conclusion

2.35 Environment Canada cannot demonstrate that the Government of Canada's annual climate change plans for 2007 and 2008 fully meet all of the requirements set out in subsection 5. (1) of the *Kyoto Protocol Implementation Act*.

2.36 The 2007 and 2008 climate change plans do not include all applicable elements in subsection 5. (1) of the *Kyoto Protocol Implementation Act*. Required information that is missing ranges from the dates that some planned emission reduction measures come into effect, to numerical statements of expected emission reductions from some measures, to whether some measures have been implemented by the date projected.

2.37 For the Regulatory Framework for Industrial Greenhouse Gas Emissions, Environment Canada could not provide evidence that the information in the annual climate change plans was based on adequate rationale. The expected emission reductions claimed in the plans are overstated, and the uncertainties related to these reductions are not disclosed.

2.38 The statements of expected GHG emission reductions from the renewable fuels content regulations and the ecoENERGY Renewable Power program are based on adequate rationale. However, there are

shortcomings in the manner of presenting the expected reductions in the annual climate change plans. For example, known uncertainties about the expected reductions are not disclosed.

2.39 Environment Canada does not have a system in place to monitor and report, as required by the Act, on the greenhouse gas emission reductions for the measures in the annual climate change plans. Environment Canada has indicated that the monitoring of actual GHG emission reductions could be technically unfeasible and not necessarily cost effective, and that reductions could be impossible to attribute to a specific measure. However, in the plans prepared to date, the Department has not explained why expected emission reductions can be estimated in advance but actual reductions cannot be measured after the fact.

About the Audit

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objectives

Our overall audit objective was to determine whether Environment Canada can demonstrate that its annual climate change plans meet the requirements set out in subsection 5. (1) of the *Kyoto Protocol Implementation Act*. Our audit work included three sub-objectives:

1. to determine whether Environment Canada's annual climate change plans include all applicable elements listed in subsection 5. (1) of the *Kyoto Protocol Implementation Act*;
2. to determine whether Environment Canada in conjunction with other selected departments can demonstrate whether the information in its annual climate change plans pertaining to selected measures is accurate or based on an adequate rationale; and
3. to determine whether Environment Canada can demonstrate that it has systems in place to monitor and report on the greenhouse gas emission reductions of the selected measures in the annual climate change plans.

Scope and approach

The audit is conducted pursuant to the requirements of the *Kyoto Protocol Implementation Act*, which came into force 22 June 2007. These requirements are described in subsection 10.1 (1) of the Act.

For each audit sub-objective, we interviewed key departmental officials in the National Capital Region. In addition, we undertook reviews of documentation supplied to us by the departments. Federal organizations addressed in this audit included Environment Canada, Natural Resources Canada, Agriculture and Agri-Food Canada, and Sustainable Development Technology Canada.

For sub-objective 1, we focused our analyses on those measures (19) for which expected GHG emission reductions were provided.

For sub-objective 2, we selected the following 12 measures in 3 key areas:

- Regulating industrial emissions through the Regulatory Framework for Industrial Greenhouse Gas Emissions;
- Renewable fuels through
 - proposed regulations for renewable fuels content,
 - scientific research and analysis on biofuels emissions,
 - ecoENERGY for Biofuels Initiative,
 - ecoAGRICULTURE Biofuels Capital Initiative,

- Biofuels Opportunities for Producers Initiative,
- NextGen Biofuels Fund,
- Pilot program to demonstrate E85 (85 percent ethanol) fuelling infrastructure,
- Agricultural Bioproducts Innovation Program,
- Agri-Opportunities Program, and
- Co-operative Development Initiative, and
- Renewable Power, through the ecoENERGY for Renewable Power program

These audited measures were selected based on the amounts of expected greenhouse gas emission reductions and the amount of money allocated.

We did not audit Environment Canada’s Energy-Economy-Environment Model for Canada.

Criteria

Listed below are the criteria that were used to conduct this audit and their sources.

Criteria	Sources
Content requirements for the annual climate change plans	
We expected that Environment Canada has included all applicable elements (a through f) listed in subsection 5. (1) of the <i>Kyoto Protocol Implementation Act</i> .	<i>Kyoto Protocol Implementation Act</i> , 2007, subsection 5. (1)
Selected measures in the annual climate change plans	
<p>We expected that Environment Canada can demonstrate that it has reported accurate information on the implementation of selected measures from the previous calendar year.</p> <p>We expected that selected organizations</p> <ul style="list-style-type: none"> • have established clear and concrete expected greenhouse gas emission reductions for the individual measures, • have established expected emission reductions that are supported by adequate rationale, • have systems in place to monitor and report on the performance of the individual measures with regard to expected emission reductions, • have a quality assurance/quality control system in place for addressing the quality of the data, and • have established clear roles and responsibilities for implementing the measures and achieving results. 	<ul style="list-style-type: none"> • <i>Kyoto Protocol Implementation Act</i>, 2007, subsection 5. (1) • Treasury Board of Canada Secretariat, Management Accountability Framework, 2003, page 3 • Treasury Board of Canada Secretariat, Results for Canadians: A Management Framework for the Government of Canada, 2000, page 5 • Treasury Board of Canada Secretariat, Preparing and Using Results-based Management and Accountability Frameworks, 2005, page 2 • Statistics Canada, Statistics Canada’s Quality Assurance Framework, 2002, pages 2–3
Monitoring and reporting greenhouse gas emissions	
We expected that Environment Canada has systems in place to monitor and report the greenhouse gas emission reductions of the measures in its climate change plans.	<ul style="list-style-type: none"> • <i>Kyoto Protocol Implementation Act</i>, 2007, subsection 5. (1) • Treasury Board of Canada Secretariat, Preparing and Using Results-based Management and Accountability Frameworks, 2005, pages 11–12

Audit work completed

Audit work for this chapter was substantially completed on 9 January 2009.

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 2. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate the paragraph numbers where the topic is discussed.

Recommendation	Response
Content requirements for the annual climate change plans	
<p>2.9 Environment Canada should ensure that the next annual climate change plan fulfills all the requirements of subsection 5. (1) of the <i>Kyoto Protocol Implementation Act</i> by addressing the findings in paragraph 2.8, including providing summaries of relevant analyses that were conducted to support departmental positions. (2.7–2.8)</p>	<p>Environment Canada accepts this recommendation.</p> <p>Beginning with the 2009 climate change plan, Environment Canada will request responsible departments—and will undertake itself—to provide further detail regarding effective dates, timelines, and descriptions of program implementation.</p> <p>Further, beginning with the next plan, Environment Canada will more clearly provide a direct comparison of the projected greenhouse gas emission levels for the Kyoto period with Canada’s obligations under the Kyoto Protocol.</p> <p>Environment Canada believes that the plans it has published are consistent with the requirement that they reflect an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions, and will state this clearly in subsequent plans.</p> <p>Finally, as a potentially useful practice, Environment Canada, in drafting the next plan, will consider providing additional information on how it arrived at the conclusions on measures regarding just transition for workers and equitable distribution among sectors, though providing this information is not itself required by the Act.</p> <p>Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.</p>

Recommendation	Response
Selected measures in the annual climate change plans	
<p>2.19 In accordance with the <i>Kyoto Protocol Implementation Act</i>, the projected greenhouse gas emission levels in Canada for each year from 2008 to 2012 should be reported for each measure in the annual climate change plan. Environment Canada should state its expected greenhouse gas emission reductions for the Regulatory Framework for Industrial Greenhouse Gas Emissions in the years that they are most likely to actually occur, rather than in the years that the payment is made to the technology fund and other compliance mechanisms. If this is not done, the Department should explain why in the next plan. (2.13–2.18)</p>	<p>Environment Canada does not accept the recommendation at this time and will explain its approach more completely in the next plan.</p> <p>Environment Canada is committed to transparency in the way that emission reductions are estimated. Expected reductions from the Regulatory Framework presented in the report A Climate Change Plan for the Purposes of the <i>Kyoto Protocol Implementation Act</i> 2008 represent the total emission reduction obligations required of industry under the Regulatory Framework.</p> <p>The Regulatory Framework provides a number of options to industry for meeting these obligations. Environment Canada’s modelling indicates that the choice of compliance option is influenced by differences in marginal costs that they present to regulated industries and therefore, actual in-year reductions may vary from the plan’s estimates, depending on the specific compliance options chosen by individual firms. Because the Framework is market-based, it is not possible to establish with certainty which options will be most used by industry, and any such estimate would be so heavily dependent on a variety of technical assumptions that it would be inappropriate for use for the purpose of compliance with the <i>Kyoto Protocol Implementation Act</i>.</p> <p>However, beginning with the 2009 climate change plan, Environment Canada proposes to explore providing a range of estimates for actual in-year reductions. As experience is gained with implementation, it will be possible to provide improved estimates, and approximately 15 months after implementation of the framework, the actual use of each compliance option by individual firms will be known.</p>

Recommendation	Response
<p>2.28 Environment Canada and other responsible departments should describe in the annual climate change plans the quantitative or qualitative uncertainties related to the expected GHG emission reductions of each measure. A range of potential emission reduction levels should be presented for the annual plans as a whole and for the individual measures where possible. (2.26–2.27)</p>	<p>Environment Canada accepts this recommendation.</p> <p>The Government of Canada has met the requirements of the <i>Kyoto Protocol Implementation Act</i> by providing expected emission reductions for each of the measures, which are individually expected to produce emission reductions. To comply with the Act’s reporting requirements, the government uses internationally accepted methods and approaches.</p> <p>While uncertainty analysis is not required under the Act, the Commissioner of the Environment and Sustainable Development has advanced this recommendation as a potentially useful practice to improve the plans prepared for the purposes of the Act.</p> <p>The federal government is committed to continuously improving the way that the impacts of greenhouse gas reduction measures are estimated. In response to this recommendation, Environment Canada will work with other responsible departments to investigate options for presenting a range of expected emissions reductions where feasible and will consider including this information in the plans, beginning with the next plan in 2009.</p> <p>Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.</p>
<p>Monitoring and reporting greenhouse gas emissions</p>	
<p>2.34 Environment Canada should clearly indicate how it will measure actual emission reductions for each of the GHG emission reduction measures in the plans. Where no such measurement takes place, the rationale should be provided for why expected emission reductions can be estimated in advance but corresponding actual reductions cannot be measured after the fact. (2.29–2.33)</p>	<p>Environment Canada accepts this recommendation.</p> <p>The Government of Canada recognizes the need for monitoring to determine the impact and effectiveness of its programs. However, no country has a comprehensive system in place to measure the direct and verifiable emissions reductions for individual programs.</p> <p>For many of the programs that target a range of behaviours and sectors, such as the ecoACTION programs, emission reductions cannot be measured directly; they can only be estimated. The most practical and cost-effective way to calculate greenhouse gas emission reductions from individual measures is to take program data (e.g., reduction in energy used by households or vehicles, increases in renewable energy) and apply reasonable assumptions</p>

Recommendation	Response
	<p>and methods to estimate the impact of the program on greenhouse gas emissions. This is the method currently used by the government for these programs.</p> <p>However, it will be possible to measure the emission reductions that result from the Regulatory Framework for Industrial Greenhouse Gas Emissions. The regulations implementing the Framework will establish rigorous rules for the quantification, reporting, and verification of each company's emissions, allowing emission reductions due to the Framework to be estimated with some confidence.</p> <p>Beginning with the 2010 plan, when the first results are known for the Kyoto period (2008–2012), the Government of Canada will provide the estimated emissions reductions achieved for the measures in the plan where it is possible, clearly indicating the methodology used.</p> <p>Environment Canada consulted with Transport Canada and Natural Resources Canada to develop this response.</p>

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