

# Five Years of Failure:

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Federal and Provincial Government Inaction  
on Climate Change During a Period of  
Rising Industrial Emissions

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*March 2000*



# About the Pembina Institute

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The Pembina Institute is an independent citizen-based organization involved in environmental education, research, policy development and consulting. Its mandate is to research, develop and promote policies and programs that lead to environmental protection, resource conservation and environmentally sound and sustainable resource management. Incorporated in 1985, the Institute's head office is in Drayton Valley, Alberta. The Climate Change Program is based in the Ottawa office, and research associates are located across Canada.

The Institute's Climate Change Program works to design, develop, promote and implement actions that protect the climate through improvements in the efficiency of fossil fuel energy production and use, and through a transition to the renewable energy that will power the world's economy in the 21<sup>st</sup> century.

For more information on the Pembina Institute's work, visit our website at [www.pembina.org](http://www.pembina.org), or contact our Ottawa or Drayton Valley office.

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*Five Years of Failure: Federal and Provincial Government Inaction on Climate Change During a Period of Rising Industrial Emissions*

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## Summary

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The Pembina Institute has conducted two new studies. The first is a measure-by-measure review of what happened to the 88 measures recommended to Ministers at the conclusion of the 1993-94 national consultation process on climate change. The second study examines for the first time on a company-by-company basis how Canada's industrial greenhouse gas emissions have changed over the years during which the flagship national program to address climate change – Canada's Climate Change Voluntary Challenge and Registry Program (VCR) – has relied entirely on voluntary action by industry.

- We found that for 37 of the 88 measures, no meaningful action has been taken. Taking into account partially implemented measures, only 33 percent of the 88 measures have been implemented (29.25 out of 88). Measures involving regulatory and financial incentives, as opposed to voluntary, education or research measures, had an implementation rate of just 15 percent.
- Our analysis of the VCR shows that on average, the emissions of companies making detailed submissions to the VCR do not appear to be rising more slowly than national trends. We provide detailed information on individual companies that allows their performance to be assessed and compared.
- Our twin analyses of the measures that governments failed to implement and of the flagship national program upon which they have been relying over the past five years both point to the same conclusion: voluntary measures are wholly insufficient to meet Canada's climate change challenge.

If current policies continue, Canada's greenhouse gas emissions are projected, by 2010, to be 35 percent higher than the level to which Canada has committed to reduce them under the Kyoto Protocol, during the period 2008-2012. We offer recommendations to the federal and provincial Ministers of the Environment and Energy as to how they should address this situation.

## Context

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Climate change was recently voted the “greatest challenge facing the world at the beginning of the century” by hundreds of business and government leaders attending the World Economic Forum’s annual meeting in Davos, Switzerland. In an earlier survey conducted by the United Nations Environment Programme, 200 scientists in 50 countries identified climate change as one of the “two most worrying problems for the new millennium.”

In 1990, Canada committed to stabilize its emissions of climate-changing greenhouse gases at the 1990 level by the year 2000. This commitment was reaffirmed at the 1992 Earth Summit in Rio, where it was enshrined in the United Nations Framework Convention on Climate Change as a formal “aim.”

Following the Earth Summit, a national stakeholder consultation process was established by federal and provincial governments to identify measures that Canada could take to meet its stabilization commitment. At the end of the 18-month process, which took place during 1993 and 1994, 88 measures were recommended to Ministers.

However, instead of implementing this package, Ministers produced *Canada’s National Action Program on Climate Change* (1995). This Program contained few commitments to implement specific measures, but outlined “strategic directions” Canada would pursue in its climate change policy, in the hope that specific measures would be implemented over time. The most significant new measure to be implemented in 1995 was Canada’s Climate Change Voluntary Challenge and Registry Program (VCR). (Québec established a separate but similar program called ÉcoGEst.) VCR registrants are invited to report annually on actions they took and plan to take to reduce greenhouse gas emissions, and on the total amounts of these emissions in a base year and the most recent reporting year.

When the 1993-94 national consultation process was undertaken, it was projected that in the absence of policy changes, Canada’s greenhouse gas emissions would be 74 megatonnes<sup>1</sup> of carbon dioxide equivalents (Mt CO<sub>2</sub>E) above the 1990 level by 2000.<sup>2</sup> In comparison, even the most aggressive package of measures compiled from the recommendations of the consultation process was predicted to realize just 54 Mt of emissions reductions by 2000.<sup>3</sup>

Not only were the measures under consideration in 1993-94 insufficient, but since then Canada’s greenhouse gas emissions have actually risen faster than forecast. They are now expected to be 93 Mt, or 15 percent higher in 2000 than the 1990 level. By 1997, the most recent year for which actual emissions data are available, they were already 81 Mt or 13.5 percent higher than the 1990 level of 601 Mt.<sup>4</sup>

In December 1997, Canada committed in the Kyoto Protocol to reduce its greenhouse gas emissions to 6 percent below the 1990 level during the five-year period 2008-2012. This commitment was most recently repeated in the federal government’s 1999 throne speech. In other words, during 2008-2012, Canada’s annual emissions must be, on average, no higher than 565 Mt. This compares

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<sup>1</sup> Megatonne = million tonnes.

<sup>2</sup> Forecast Working Group of the National Air Issues Coordinating Mechanism (April 1995), *Microeconomic and Environmental Assessment of Climate Change Measures* p.11.

<sup>3</sup> Op. cit. p.22.

<sup>4</sup> National Climate Change Process Analysis and Modelling Group (December 1999), *Canada’s Emissions Outlook: An Update* p.C-25.

to the government's current policy-as-usual projection of emissions of 764 Mt in 2010 – 35 percent higher.<sup>5</sup> Putting it another way, Canada is now faced with the challenge of cutting emissions by 26 percent from the policy-as-usual level (764 Mt) in order to reach its Kyoto target (565 Mt).

In 1998, after the Kyoto conference, federal and provincial Ministers of the Environment and Energy (the joint Ministers) established another 18-month national consultation process to recommend the measures required for Canada to cut its emissions. No fewer than 450 representatives of federal and provincial governments, industry and environmental groups have participated in 16 issue tables that were asked to provide the elements of a national strategy to meet Canada's Kyoto target. Their work is now essentially complete,<sup>6</sup> and is being presented to the joint Ministers at their March 27-28, 2000 meeting in Vancouver.

The focus of the joint Ministers' meeting will be to begin once again to define Canada's National Climate Change Strategy and to begin to make commitments towards implementation. Will the Ministers act? What will be the consequences if they fail to act?

A revealing way to answer these questions is to look at what happened last time Ministers were presented with a long menu of measures they could implement to meet a national commitment to reduce greenhouse gas emissions. The Pembina Institute has therefore conducted two new studies to look at these questions. The first study is a measure-by-measure review of what happened to the 88 measures recommended to Ministers at the conclusion of the 1993-94 national consultation process. The second study examines, for the first time on a company-by-company basis, how Canada's industrial greenhouse gas emissions have actually changed over these years, during which the flagship national program to address climate change (the VCR) has relied entirely on voluntary action by industry.

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<sup>5</sup> Op. cit.

<sup>6</sup> Final "options reports" from the 16 "issue tables" making up the process are available at <http://www.nccp.ca>.

## Study #1: What happened to the 88 measures recommended to federal and provincial governments by the 1993-94 national consultation process on climate change?

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For each of the 88 measures recommended to Ministers at the conclusion of the 1993-94 national consultation process,<sup>7</sup> we have assessed whether or not any progress has been made on implementation. We have given a full mark of 1 if the measure has been largely implemented and partial marks (in steps of 1/4) if some action, even a very small amount, has been taken.

The full assessment is provided in Appendix A. The overall findings are these:

- For 37 of the 88 measures, no meaningful action has been taken (mark of 0).
- Only 17 measures have been fully implemented (mark of 1).
- Taking into account partially implemented measures, the total score obtained is 29.25/88 (33 percent).
- Of the few measures implemented, much of the work has been done at the federal level, with most provinces doing very little.

Scores broken down by sector are given in Table 1. They show that the failure to implement measures has been especially striking in transportation, which represents one-quarter of Canada's emissions and has seen the second largest increase in emissions since 1990 (see Table 2); and in the buildings sector, where huge opportunities to save money on energy bills as well as reduce greenhouse gas emissions have been squandered. In the energy supply and production sector, which saw the largest increase (20 percent) in emissions since 1990, barely one-third of the recommended measures have been implemented.

**Table 1. Scores by sector for implementing the measures recommended by the 1993-94 national consultation process on climate change**

Sector	Score
Foundation measures	4/8
Buildings	7.25/22
Industrial energy use	2.5/6
Transportation	4/22
Energy supply and production	5/14
Non-energy sector	6.5/16
total	29.25/88

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<sup>7</sup> The measures are set out in the Measures Working Group for the Climate Change Task Group of the National Air Issues Coordinating Committee (June 1994), *Measures for Canada's National Action Program on Climate Change, Final Report*. A description of agricultural measures was deferred to the Climate Change Task Group of the National Air Issues Coordinating Committee (September 15, 1994), *Report on Options for Canada's National Action Program on Climate Change, Preliminary Draft*.

**Table 2. Canada's greenhouse gas emissions in 1997<sup>8</sup>**

	<b>Emissions (Mt CO<sub>2</sub>E, nearest Mt)</b>	<b>Emissions (percent of total for Canada)</b>	<b>Increase since 1990</b>
<b>Buildings</b>			
Fossil fuel burning (fixed sources, residential)	44	6.4 %	8 %
Fossil fuel burning (fixed sources, commercial/institutional)	31	4.5 %	18 %
Wood burning (residential)	6	0.9 %	12 %
<i>Total for buildings</i>	81	11.9 %	12 %
<b>Industrial energy use</b>			
Fossil fuel burning (industrial fixed sources other than electricity and steam generation and fossil fuel production and distribution)	71	10.3 %	7 %
<b>Transportation</b>			
Fossil fuel burning (vehicles other than heavy-duty, off-road diesel, propane and natural gas)	87	12.8 %	6 %
Fossil fuel burning (heavy-duty, off-road diesel, propane and natural gas vehicles)	59	8.6 %	43 %
Fossil fuel burning (aircraft)	13	1.9 %	22 %
Fossil fuel burning (rail)	6	0.9 %	-10 %
Fossil fuel burning (ships)	6	0.9 %	1 %
<i>Total for transportation</i>	171	25.1 %	17 %
<b>Energy supply and production</b>			
Fossil fuel burning (electricity and steam generation, mainly utilities)	112	16.4 %	17 %
Fossil fuel production and distribution (excluding combustion)	53	7.8 %	40 %
Fossil fuel burning (for fossil fuel production and distribution)	50	7.3 %	9 %
<i>Total for energy supply and production</i>	214	31.4 %	20 %
<b>Non-energy sector</b>			
Agricultural soils	35	5.2 %	-7 %
Livestock	28	4.1 %	15 %
Landfills	21	3.1 %	11 %
Miscellaneous industrial processes (excluding combustion)	14	2.1 %	40 %
Nylon and adipic acid production	11	1.6 %	0 %
Aluminum production (excluding combustion)	10	1.4 %	13 %
Cement, lime and soda ash production (excluding combustion)	8	1.2 %	1 %
Iron and steel production (excluding combustion)	8	1.2 %	7 %
Ammonia production (excluding combustion)	4	0.6 %	32 %
Human-induced forest fires	2	0.3 %	-13 %
Magnesium production	1	0.2 %	-52 %
Municipal sewage treatment	1	0.2 %	9 %
HFC use (main uses: air conditioning, refrigeration)	1	0.1 %	v. large
Other	1	0.1 %	10 %
<i>Total for non-energy sector</i>	145	21.3 %	6 %
<b>Total for Canada</b>			
All sources	682	100 %	14 %

**Notes:**

1. Carbon dioxide from forest fires and wood burning is not included in Canada's inventory.
2. Fossil fuel burning (industrial fixed sources) includes pipelines, agricultural and forestry fixed sources. Methane and nitrous oxide from industrial wood burning, which are not disaggregated in the inventory, have also been assigned to this category.
3. All methane and nitrous oxide from residential fuel combustion have been assigned to wood burning. This is true to a good approximation.
4. Totals may not add due to rounding.

<sup>8</sup> Data compiled from F. Neitzert, K. Olsen and P. Collas (1999), *Canada's greenhouse gas inventory: 1997 emissions and removals with trends*, Environment Canada, ISBN 0-662-27783-X

Scores by type of measure (regulatory, voluntary etc.) are given in Table 3. The first observation to make is that over half of the 88 measures were voluntary or limited to education or research. The second observation is that these “soft” types of measures were the ones that had the highest implementation rate (23.25/48.5 or 48 percent). Regulatory and financial incentives measures, on the other hand, had a truly dismal implementation rate of only 6/39.5 or just 15 percent.

**Table 3. Scores by type of measure for implementing the measures recommended by the 1993-94 national consultation process on climate change**

Type of measure	Score
Regulation	2.75/13
Financial incentive	3.25/26.5
Voluntary	10.25/18.5
Education	7/19.5
Research	6/10.5
total	29.25/88

Note: partial marks arise from measures that are split between two types

The two main conclusions of this study are these:

- Only one-third of the package of measures recommended to federal and provincial governments over five years ago has been implemented, even though over half the package consisted of voluntary, education or research measures that could have been put in place at little political cost. Governments have exhibited a breathtaking lack of leadership and interest in this issue of compelling global and national importance. This cannot be allowed to continue.
- Most of the one-third of the package that was actually implemented consisted of voluntary, education or research measures. Despite their implementation, Canada’s greenhouse gas emissions rose even faster than had been forecast. In other words, the measures implemented apparently had little or no impact on emissions. It is therefore abundantly clear that voluntary, educational and research measures are wholly insufficient to meet Canada’s climate change challenge when they are not backed up by regulatory standards and positive financial incentives.



## Study #2: A closer look at the effectiveness of voluntary action on climate change in Canada

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The flagship national program for the voluntary action, upon which governments have relied over the past five years, is Canada's Climate Change Voluntary Challenge and Registry Program (VCR), established in 1995 and mainly targeted at industry. (Québec also established a separate but similar program called ÉcoGESSte.) At the end of 1999, the VCR had 980 registrants.<sup>9</sup> Registrants are invited to report annually on actions they took and plan to take to reduce greenhouse gas emissions and on the total amounts of those emissions in a base year and the most recent reporting year.<sup>10</sup>

Just how effective has the VCR been?

A general idea of its effectiveness can be gained by looking at Canada's greenhouse gas emissions trends, which are compiled by Environment Canada. As shown in table 2, most kinds of industrial emissions increased between 1990 and 1997. Emissions from the energy supply and production sector (consisting of oil and gas companies and electric utilities), which accounts for almost one-third of Canada's emissions, grew by 20 percent over this period. Emissions from energy use by other industrial sectors rose by a more modest 7 percent, while emissions from heavy-duty vehicles increased by 43 percent.

But in order to probe the effectiveness of the VCR in more depth, company-specific information is needed, and this is not provided by Environment Canada's greenhouse gas emission inventory reports. It turns out that the VCR itself is the only public source of greenhouse gas emissions data on a company-by-company basis.<sup>11</sup>

The Pembina Institute has therefore compiled information on companies' greenhouse gas emission trends over the period 1990-97 by searching the VCR's own database. To our knowledge, this is the first time such a compilation has been conducted.<sup>12</sup> We have identified all the private sector and other industrial entities who, during 1998, submitted to the VCR a statement or inventory of their greenhouse gas emissions for the year 1997.<sup>13</sup>

We found that only 106 private sector/industrial entities (as opposed to governments, public institutions etc.) made submissions to the VCR during 1998 stating their 1997 emissions – another general measure of the effectiveness of the VCR. (This is consistent with the VCR's own admission that only 98 of its 980 registrants in 1999 met the VCR's "Champion Level" reporting requirements,<sup>14</sup> which the Pembina Institute considers to be a minimal standard of reporting.)

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<sup>9</sup> Voluntary Challenge and Registry Inc. (2000), *Annual Report 1999*.

<sup>10</sup> Further information on the VCR and access to companies' submissions can be obtained at <http://www.vcr-mvr.ca>.

<sup>11</sup> Environment Canada's National Pollutant Release Inventory, the only legislated national program requiring companies to report their emissions, does not include any of the six main greenhouse gases covered by the Kyoto Protocol.

<sup>12</sup> In March 2000, the Pembina Institute published a review of electric and natural gas utilities' climate change performance, drawing on VCR submissions for 1997 emissions, but the review did not cover any other industrial sectors. Reference: Pembina Institute (2000), *Corporate Action on Climate Change: An Independent Review focusing on Canada's Electric Utilities and Natural Gas Utilities*, ISBN 0-921719-29-9.

<sup>13</sup> Although submissions covering 1998 emissions are already available in the VCR database, our analysis of them will only be completed later this year. It is, moreover especially relevant to analyse 1997 emissions at this time because this is the most recent year for which Canada's national greenhouse gas emission inventory is available (see table 2).

<sup>14</sup> Voluntary Challenge and Registry Inc. (2000), *Annual Report 1999*.

Of these 106 companies, only 71 also stated their emissions for 1990 – the universally recognized base year for assessing greenhouse gas emissions trends and commitments. Table 4 summarizes the overall emissions<sup>15</sup> trends by industrial sector and compares them to Canada as a whole.

**Table 4. Greenhouse gas emissions in 1990 and 1997 by industrial sector from companies who, during 1998, made a VCR submission stating their emissions for both years**

Sector	Number of companies	1990 emissions (Mt CO <sub>2</sub> E)	1997 emissions (Mt CO <sub>2</sub> E)	% change 1990-97
Electric Utilities	9	88.3	92.9	5
Integrated Oil and Gas	5	36.0	39.4	8
Chemical	6	21.0	20.6	-2
Upstream Oil and Gas	10	14.6	17.2	18
Pipeline / Natural Gas Utilities	12	16.5	22.5	37
Forest Products	17	6.6	5.5	-17
All except electric utilities	62	106.1	113.5	7
Canada as a whole		601.0	682	13

Notes:

1. The vast majority of emissions reported by companies other than electric utilities already include the emissions from the generation of the electricity that they purchase from utilities. Emissions from electric utilities cannot therefore be added to those from other companies.
2. The Pipeline and Natural Gas Utilities sectors have been combined because the largest emitter from these sectors operates in both of them; and because there are only four pure natural gas utilities. Total emissions from these four actually fell by 2 percent between 1990 and 1997.

Table 4 confirms that even the most assiduous participants in the VCR from the oil and gas production and distribution sectors (i.e., those who made submissions including both 1990 and 1997 emissions) have seen their emissions rise considerably. The pipeline sector has seen the most spectacular increase, and the upstream oil and gas sector has also seen its emissions rise faster than the national average. The only sectors to show a decrease in emissions between 1990 and 1997 are the chemical and forest products sectors. In the case of forest products, emissions reported according to the international guidelines<sup>16</sup> exclude carbon dioxide from burning biomass such as wood waste.<sup>17</sup> By replacing fossil fuels with biomass fuels, many forest products companies have been able to reduce their greenhouse gas emissions.

Although Tables 2 and 4 cannot be compared precisely, it appears that on average, the emissions of companies making detailed submissions to the VCR are not rising more slowly than national trends.

<sup>15</sup> Emissions data in table 4 and all subsequent tables are net of offsets, which can include activities such as tree-planting, utilities' sales of flyash as a cement substitute (thereby avoiding emissions from cement production), or investments in agricultural practices favouring carbon storage in soil. At this time, there is no government-sanctioned certification of greenhouse gas offsets. The Pembina Institute therefore makes no assumptions about the quality and credibility of the offsets included here.

<sup>16</sup> that is, those published by the Intergovernmental Panel on Climate Change.

<sup>17</sup> On the assumption that this carbon dioxide forms part of a closed cycle of forest harvest and re-growth and therefore does not contribute to climate change. This is, of course, valid only if the wood waste is derived from sustainable forestry.

Tables 5 and 6 show the companies that saw the largest increases in emissions between 1990 and 1997 in absolute and relative terms respectively. Increases in absolute terms are most relevant regarding the impact on the climate. On the other hand, increases in relative terms relate more closely to countries' emission reduction commitments under the Kyoto Protocol (which are expressed as percentages) and are useful in drawing attention to smaller companies with lower total emissions but who nonetheless are increasing their emissions rapidly.

**Table 5. Companies who, during 1998, made a VCR submission stating their emissions for 1990 and 1997, and whose emissions increased by more than 1 Mt CO<sub>2</sub>E between those two years**

Company	Sector	1990 emissions (kt CO <sub>2</sub> E)	1997 emissions (kt CO <sub>2</sub> E)	change 1990-97 (kt CO <sub>2</sub> E)
SaskPower	Electric Utility	10,595	14,367	3,771
Husky Oil	Integrated Oil and Gas	3,718	6,556	2,838
Alberta Power	Electric Utility	7,733	9,798	2,065
NOVA Gas Transmission	Pipeline	2,664	4,422	1,758
TransCanada Pipelines	Pipeline	4,942	6,643	1,701
Westcoast Energy	Natural Gas Utility; Pipeline	4,361	6,011	1,650
Syncrude Canada	Upstream Oil and Gas	7,200	8,500	1,300

Note: kt = kilotonne = 1000 tonnes.

**Table 6. Companies who, during 1998, made a VCR submission stating their emissions for 1990 and 1997, and whose emissions increased by more than one-half between those two years**

Company	Sector	1990 emissions (kt CO <sub>2</sub> E)	1997 emissions (kt CO <sub>2</sub> E)	% change 1990-97
Producers Pipelines	Pipeline	14	36	160
Enron Oil Canada	Upstream Oil and Gas	77	170	120
Methanex	Chemical	509	1,070	110
Murphy Oil	Upstream Oil and Gas	218	414	90
Husky Oil	Integrated Oil and Gas	3,718	6,556	76
NOVA Gas Transmission	Pipeline	2,664	4,422	66
Stora Port Hawksbury <sup>a</sup>	Forest Products	126	196	55
Malette Kraft Pulp & Power Division	Forest Products	152	235	55

<sup>a</sup>It is not clear whether Store Port Hawksbury's emissions include emissions from the generation of the electricity it purchases from utilities.

Tables 7 and 8 show the companies that saw the largest decreases in emissions between 1990 and 1997, in absolute and relative terms respectively. Once again, decreases in absolute terms are most relevant regarding the impact on the climate, but decreases in relative terms are useful in drawing attention to smaller companies with lower total emissions but who nonetheless performing well in decreasing their emissions rapidly.

**Table 7. Companies who, during 1998, made a VCR submission stating their emissions for 1990 and 1997, and whose emissions decreased by more than 0.5 Mt CO<sub>2</sub>E between those two years**

Company	Sector	% change in production 1990-97	1990 emissions (kt CO <sub>2</sub> E)	1997 emissions (kt CO <sub>2</sub> E)	change 1990-97 (kt CO <sub>2</sub> E)
Ontario Hydro	Electric Utility	27	26,000	23,500	-2,500
Dofasco <sup>a</sup>	Iron and Steel	-1	5,989	4,376	-1,614
St. Lawrence Cement <sup>b</sup>	Cement		2,428	1,669	-759
NOVA Chemicals <sup>a</sup>	Chemical	0.61	4,358	3,636	-722
DuPont Canada	Chemical	61	11,048	10,416	-632

<sup>a</sup>These companies' emissions exclude, or appear to exclude, emissions from the generation of the electricity that they purchase from utilities.

<sup>b</sup>It is not clear whether St. Lawrence Cement's emissions include emissions from the generation of the electricity that they purchase from utilities.

**Table 8. Companies who, during 1998, made a VCR submission stating their emissions for 1990 and 1997, and whose emissions decreased by more than one-third between those two years**

Company	Sector	% change in production 1990-97	1990 emissions (kt CO <sub>2</sub> E)	1997 emissions (kt CO <sub>2</sub> E)	% change 1990-97
Bowater Mersey Paper <sup>a</sup>	Forest Products	15	148	0	-100
Newfoundland Power	Electric Utility		3	1	-62
Fort James-Marathon <sup>a</sup>	Forest Products		190	92	-52
IBM Canada	Manufacturing		60	34	-44
Spruce Falls	Forest Products		158	97	-39
Abitibi-Consolidated <sup>a</sup>	Forest Products	-17	277	170	-39
Kruger <sup>a</sup>	Forest Products		543	337	-38

<sup>a</sup>It is not clear whether these companies' emissions include emissions from the generation of the electricity that they purchase from utilities.

Table 9 in Appendix B shows the largest-emitting companies who reported their 1997 emissions to the VCR during 1998, regardless of the extent to which their emissions are increasing or decreasing.

Although what counts for protecting the climate is reducing emissions, emissions intensity – that is, emissions per unit of production – is a good indicator of how much effort companies are making to become less greenhouse gas intensive. Of the 106 companies who reported their 1997 emissions to the VCR during 1998, only 50 also reported their 1990 emissions as well as the production figures for both years that are necessary to calculate emissions intensities. Tables 10 and 11 in Appendix B show the worst and best performers among this relatively small set of 50 companies in terms of emissions intensity – that is, the companies whose intensity actually increased between 1990 and 1997, and those whose intensity decreased between those two years at an average of more than four percent per year.

Where the information is available, Tables 7 and 8 and Tables 10 and 11 (in Appendix B) also show percentage changes in production between 1990 and 1997 in case this helps to shed light on the companies' emissions or emissions intensity changes. (Blank spaces indicate that this information is not available.)

Table 12 in Appendix B gives full emissions and production change information reported by the 106 companies who stated their 1997 emissions to the VCR during 1998, including projections for 2000 when these were also reported to the VCR.

The main conclusions of this study are as follows:

- On average, the emissions of companies making detailed submissions to the VCR do not appear to be rising more slowly than national trends.<sup>18</sup>
- There are large variations between the increases or decreases recorded by individual companies in their emissions and emissions intensities. This suggests that considerable opportunities remain for those performing less well to do more to curb emissions.
- The VCR has been wholly ineffective in helping Canada to meet its greenhouse gas emissions reduction commitments. The data and analysis presented here reinforce the conclusion that voluntary measures are wholly insufficient to meet Canada's climate change challenge.

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<sup>18</sup> An explanation for this might be that in contrast to the strong media coverage received by the National Pollutant Release Inventory reports and the similar reports published by the Commission for Environmental Cooperation (NAFTA), data reported to the VCR does not receive a significant public airing. The VCR therefore fails to act as a "shaming" mechanism bringing public pressure to bear on major greenhouse gas emitters to reduce their emissions.

## Conclusions and Recommendations

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Ministers are once again about to be presented with a long menu of measures they could implement to meet Canada's Kyoto commitment to reduce greenhouse gas emissions. But on the basis of their previous performance, there is a grave danger that they will fail to implement a package capable of meeting that commitment. Indeed, there is a striking resemblance between the situation in 1995 and the situation now. On both occasions, Ministers are presented with an array of policy changes needed to meet Canada's international commitment at the conclusion of an 18-month consultation process.

Last time, they failed. This is broadly evident in view of the way Canada's emissions have continued to rise, faster even than forecast. But our examination of exactly how and to what extent governments failed to implement the measures recommended to them by the very process they had set up reveals – in stark detail – a damning record of inaction.

In addition, our twin analyses of the measures that governments failed to implement and of the flagship national program upon which they have been relying over the past five years both point to the same conclusion: voluntary measures are wholly insufficient to meet Canada's climate change challenge.

What can Ministers do to demonstrate they will not fall again into the same trap?

At their March 27-28, 2000 meeting in Vancouver, the joint Ministers of the Environment and Energy must:

- publicly commit to implement a comprehensive package of measures in their governments' 2001 budgets that will represent the first phase of Canada's National Climate Change Strategy;
- announce immediate measures to starting cutting greenhouse gas emissions now. Immediate measures chosen in Vancouver could include:
  - a major program to help finance energy-efficiency retrofits of residential, commercial and public buildings;
  - production credits or rebates for electricity generated from green energy sources like wind;
  - increased spending for public transit and alternative modes of transportation;
  - implementation of new or strengthened energy efficiency standards for buildings, vehicles, appliances and other energy-using equipment;
  - mandating the capture of landfill gas;
  - meaningful financial incentives to encourage industry to start cutting emissions now;
- implement immediately an unprecedented public education program capable of bringing climate change to the attention of all Canadians. There is an urgent need for increased public understanding and support for the series of major emissions-cutting measures that Ministers will have to take over the next decade to meet Canada's Kyoto commitment;
- announce that Canada will use a major economic instrument such as emissions trading or ecological tax reform to meet its Kyoto Protocol emissions reduction commitment—and that detailed design work is a high priority.

Canada is falling behind other countries in putting policies in place to meet the Kyoto targets. In January 2000, the French government adopted a national strategy describing the measures it will take to meet its Kyoto commitment, and announced that a bill to ratify the Kyoto Protocol will be tabled in parliament before the end of its current session. The French national strategy, like those in Norway, Germany, Sweden and the Netherlands, includes a gradually-increasing carbon tax balanced by reductions in other taxes. Other countries like Denmark and the UK are planning, or have already put into place, domestic greenhouse gas emissions trading systems.

As a purely practical consideration, if Canada fails to put in place substantive domestic emissions-cutting measures before the 6<sup>th</sup> Conference of the Parties to the United Nations Framework Convention on Climate Change in November 2000, it will have next to no credibility in seeking its desired outcomes regarding issues that will be decided there: definitions of forestry and agricultural sinks and the extent to which countries will be allowed to use the Kyoto “flexibility mechanisms” that provide for international transfer of emissions reduction credits.

More fundamentally, the Kyoto targets are just the first step towards curbing climate change. If global emissions of greenhouse gases are not reduced drastically, there is little doubt among scientists that Canada’s natural environment will undergo a radical transformation associated with major economic and social costs. The chief meteorologists of the US and the UK recently warned of the “likely consequences [of human emissions of greenhouse gases]: more extreme weather, rising sea levels, changing precipitation patterns, ecological and agricultural dislocations and the increased spread of human disease... To slow future change, we must start taking action soon... Ignoring climate change surely will be the most costly of all possible choices – for us and our children.”<sup>19</sup>

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<sup>19</sup> *U.S.A. Today*, January 6, 2000.

## Appendix A:

Detailed assessment of what happened to the 88 measures recommended to federal and provincial governments by the 1993-94 national consultation process on climate change<sup>20</sup>

## A. Foundation measures

4 / 8

Measure	Status	Mark
1. “Develop a program to encourage, facilitate and manage voluntary commitments by industry and governments [to]... reduce greenhouse gas emissions” ( <i>Voluntary</i> )	Canada’s Climate Change Voluntary Challenge and Registry Program (VCR) was established in 1995. (Québec also established a separate but similar program called ÉcoGEsté.) At the end of 1999, the VCR had 980 registrants. Unfortunately, governments have provided no meaningful incentives to support their call for voluntary action. As a result, there have been relatively few new actions over and above business-as-usual activity generated through this program, i.e., most participants have done little more than report annually on actions they took (and would have taken anyway) that just happened also to reduce greenhouse gas emissions.	1
2. “Establish a national registry... to record voluntary actions to reduce net emissions of greenhouse gases” ( <i>Voluntary</i> )	The VCR serves as a registry for voluntary actions. In 1999, however, only 98 of 980 VCR registrants met the VCR’s minimal “Champion-Level” reporting requirements.	1
3. “Develop a comprehensive and action-oriented public education program for Canadians on climate change” ( <i>Education</i> )	Despite universal acknowledgement of the important role public education must play on this issue, no such program has been implemented. The federal government’s Climate Change Action Fund has taken some initial steps through its support of a number of individual public education projects, but this falls significantly short of what has been recommended by the Public Education and Outreach Table of the current national climate change consultation process.	0.5

<sup>20</sup> Descriptions of measures in these tables are quoted from: Measures Working Group for the Climate Change Task Group of the National Air Issues Coordinating Committee (June 1994), *Measures for Canada’s National Action Program on Climate Change, Final Report*; and, for agricultural measures, Climate Change Task Group of the National Air Issues Coordinating Committee (September 15, 1994), *Report on Options for Canada’s National Action Program on Climate Change, Preliminary Draft*.



**A. Foundation measures (cont.)**

Measure	Status	Mark
4. “Establish a pilot Joint Implementation (JI) initiative” ( <i>Voluntary</i> )	Under the United Nations Framework Convention on Climate Change, an “activities implemented jointly pilot phase” was established to encourage countries or corporate entities to invest in greenhouse gas emissions reductions in other countries. A Canadian Joint Implementation Initiative (CJII) was established to facilitate Canadian participation in this pilot phase. It is now run out of Canada’s Clean Development Mechanism / Joint Implementation Office in the Department of Foreign Affairs and International Trade. After several years of operation, however, the CJII has only seen two projects approved by the Canadian government.	1
5. “Exploring opportunities for reducing, redirecting or removing subsidies which encourage greenhouse gas emitting activities... as the first step in the development of a measure” ( <i>Financial incentive</i> )	The federal government has significantly reduced its direct investments in fossil fuel energy megaprojects and some small steps have been taken to improve the tax treatment of renewable energy investments.  But at the same time, developments in Alberta’s oil sands have been given extremely favourable federal and provincial tax treatment, facilitating an investment boom that represents 25 percent of the projected increase in Canada’s emissions between 1997 and 2010. Moreover, no steps have been taken to eliminate the current bias in the tax system against energy efficiency investments that has been identified by the departments of Natural Resources Canada and Finance Canada. <sup>21</sup>	0.25
6. “Assess a harmonized continental carbon charge among the NAFTA countries” ( <i>Research</i> )	Prime Minister Jean Chrétien long ago indicated that a carbon charge would not be part of Canada’s climate change strategy: it was neither discussed, considered nor assessed in the current national climate change consultation process.  Meanwhile, Norway, Sweden, Finland, Germany, France, the United Kingdom and the Netherlands have all implemented carbon or energy charges as part of a broader ecological tax reform that has reduced other taxes.	0

<sup>21</sup> Natural Resources Canada and Finance Canada (September 1996), *The Level Playing Field – the Tax Treatment of Competing Energy Investments*.

**A. Foundation measures (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
<p>7. “Design a tradeable permits program for Canada, and... estimate the corresponding impacts” (<i>Research</i>)</p>	<p>The Tradeable Permits Working Group of the current national climate change consultation process has examined issues related to emissions trading and offered a very preliminary evaluation of the role such a system could play in Canada’s climate protection strategy. It has made no effort to undertake the detailed design work required to establish a tradeable permits system, but it has made recommendations in support of such work. Some broad preliminary assessments of economic impacts are being made by the Analysis and Modelling Group that is part of the same consultation process.</p> <p>While some countries (Denmark) have implemented an emissions trading system and others (the United Kingdom) are on the verge of implementing one, Canada has still not made a commitment to use emissions trading as part of its response to climate change. Two small-scale pilot emission reduction credit trading programs are underway in Canada.</p>	0.25
<p>8. “Create a motivation fund... to support projects to reduce greenhouse gas emissions, on a low-bid basis” (<i>Financial incentive</i>)</p>	<p>No such fund has been created. Federal and provincial Ministers of Energy and Environment did agree in 1998 to establish a “Credit for Early Action” system in Canada by early 1999. This did not occur and it is no longer clear whether this commitment still stands.</p> <p>The federal government has established a Technology Early Action Measures program and a Sustainable Development Technology Fund to support projects that demonstrate technologies that may help to reduce greenhouse gas emissions over the long term.</p>	0

**B. Buildings (residential)**

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Measure	Status	Mark
1. "Facilitate the accelerated adoption... of the 'National Energy Code for Houses'... For provinces and territories, the Code will be promoted for mandatory adoption" (Regulation)	This energy-efficient building code has not yet been adopted by any province. Québec is, however, planning to adopt the code in 2000. In 1995, Ontario standards were actually equivalent to the code but have subsequently been watered down. It is important to note that the homes constructed under this code would still use approximately 15 percent more energy than homes built to the 20-year-old voluntary R-2000 standard.	0
2. "Promote energy efficiency mortgages for residential buildings... [via] the provision of preferential mortgage interest and term conditions" (Financial incentive)	Preferential mortgages for energy efficient homes are offered by Canada Trust and the Yukon Housing Corporation, but the differential is small. The Bank of Montreal once provided such an incentive but no longer does so.	0
3. "Develop a National Home Energy Rating System [for] new homes" (Education)	A national home energy rating system (EnerGuide for Houses) has been established, but it has not yet been applied to any extent in the area of new home construction.	0.5
4. "Establish a National Builder Training Program... to train builders and related trades in the design and construction of high efficiency new homes" (Education)	Such training continues to be made available through the R-2000 program, but no new funding has been provided to expand the scope of this initiative.	0.25
5. "Create a National Low Income Energy Efficiency Retrofit Program... offering financial support for comprehensive upgrades that embody energy efficiency" (Financial incentive)	No such program has been created.	0
6. "Establish residential retrofit building standards... which will stipulate that housing renovations meet prescribed energy performance requirements... upon adoption, conforming to the standards will be mandatory" (Regulation)	No provinces have adopted building standards incorporating such requirements.	0

**B. Buildings (residential) [cont.]**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
7. “Enhance financing mechanisms for home energy retrofit” ( <i>Financial incentive</i> )	No financing mechanisms have been developed to leverage energy efficiency retrofits of existing homes. It is important to note that private sector Energy Service Companies have not met this need as these retrofits are less profitable than those that can be undertaken in the commercial building sector.	0
8. “Develop a national home energy rating system [for] existing homes” ( <i>Education</i> )	A national home energy rating system (EnerGuide for Houses) has been established, and it is being made available across Canada for the assessment of existing homes.	1
9. “Establish a National Green Communities Program [to support]... community based approaches to energy efficiency and water and waste management” ( <i>Education</i> )	Two years of seed funding were provided by the federal government to facilitate the development of Green Communities across the country, but no sustained or comprehensive commitment has been made to establishing a national program.	0.25
10. “Develop a national program to train the renovation/retrofit industry in the application of energy efficiency retrofit techniques” ( <i>Education</i> )	No such program has been established.	0

**C. Buildings (commercial/institutional)****3.5 / 9**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
<p>1. “Using financial instruments, the federal government will accelerate the application of district energy systems” (<i>Financial incentive</i>)</p>	<p>District energy systems distribute cooling or heat, in the form of chilled or hot water or steam, to a network of neighbouring buildings. Several of these systems have been installed in Canada in the last few years in first nations communities and in some major cities in Ontario. A productive relationship has been developed between the Federation of Canadian Municipalities and the federal government to promote increased use of such systems.</p> <p>The federal government’s Technology Early Action Measures fund has supported a number of these projects, and the 2000 federal budget improved the tax treatment for investments in district energy equipment. Funding provided for municipalities in the 2000 federal budget may also be used to support the development of these systems. Much potential remains untapped, however, and Canada is still far behind many European countries in the use of such systems.</p>	0.75
<p>2. “Facilitate the accelerated adoption of the National Energy Code for Buildings... For provinces and territories, the Code will be promoted for mandatory adoption” (<i>Regulation</i>)</p>	<p>Ontario has mandated that either the National Energy Code for Buildings or ASHRAE 90.1 (a similar standard) must be met in new commercial building construction. No other province has adopted the standard, although it has been adopted by the city of Vancouver.</p> <p>Several governments (federal and provincial) have adopted the standard for use in their own buildings. A Commercial Building Incentive Program has also been established by the federal government to provide a financial incentive to those who design buildings that exceed the performance requirements of the National Energy Code for Buildings.</p>	0.25
<p>3. “Promote energy efficiency mortgages [for] commercial buildings... similar to the proposed ‘Energy Efficiency Mortgage’ for residential construction” (<i>Financial incentive</i>)</p>	<p>To the best of our knowledge, no financial institution provides such preferential mortgages for energy efficient commercial buildings.</p>	0
<p>4. “Develop a national ‘energy efficiency’ training program for professionals and trades involved in the new construction of commercial buildings” (<i>Education</i>)</p>	<p>No such program has been put in place. Some private sector entities provide training in this area, but not in a comprehensive fashion and not on a national scale.</p>	0

**C. Buildings (commercial/institutional) [cont.]**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
5. "Establish retrofit standards for commercial buildings... which will stipulate that building renovations meet prescribed energy performance requirements. For provinces and territories, adoption of the standards will be encouraged as a mandatory requirement" <i>(Regulation)</i>	No provinces have adopted building standards incorporating such requirements.	0
6. "Improve financing mechanisms for retrofitting commercial buildings" <i>(Financial incentive)</i>	In its 2000 budget, the federal government did provide funding that may help municipalities finance energy efficiency retrofits in municipal operations. Also, the Renewable Energy Deployment Initiative (REDI) is supporting the adoption of renewable energy technologies in commercial buildings.  Toronto's Better Buildings Partnership has demonstrated the environmental and economic benefits of a major retrofit program, but no such initiative has yet been established at a national level. Independently, private sector Energy Service Companies are also retrofitting a significant number of commercial buildings.	0.5
7. "Develop a national 'energy efficiency' training program for professionals and trades involved in the renovation, and retrofit of commercial buildings" <i>(Education)</i>	To the best of our knowledge, no such program has been established.	0
8. "Expand the Federal Buildings Initiative (FBI) to facilitate energy management investments in facilities under other jurisdictions" <i>(Voluntary)</i>	The FBI, which promotes the financing and implementation of energy management projects in government buildings, has expanded its reach significantly since 1995. Similar programs are now in place in several provinces: New Brunswick, B.C., Nova Scotia, Newfoundland, Manitoba and Alberta.  At a municipal level, the Toronto Better Buildings Partnership is similar in several respects to the FBI. The Federation of Canadian Municipalities is trying to replicate some elements of the program throughout Canada.	1
9. "Expand the 'Energy Innovators' Initiative to increase participation in the municipal, institutional and corporate sectors" <i>(Voluntary)</i>	The number of commercial and institutional participants in this program, which promotes energy efficiency measures in corporate, institutional and municipal facilities, has increased from 204 in 1995 to 502 as of March 1999. The 502 current participants represent 21 percent of total energy bills in these sectors.	1

**D. Buildings (appliances and equipment)****1.75 / 3**

Measure	Status	Mark
1. “Standards for appliances and equipment... adopt, where feasible, technology-leading levels for regulated standards to the extent that such levels are adopted in the U.S.” <i>(Regulation)</i>	The number of products regulated by energy efficiency standards has increased since 1995 to include lights, motors and commercial heating, ventilation and air conditioning equipment. Canada’s standards are now comparable to those in the United States.	1
2. “Labelling for appliances and equipment... facilitate efforts to enhance the scope of product performance labelling” <i>(Education)</i>	Canada’s Energy Efficiency Act requires new major household appliances and air conditioners to bear an EnerGuide label. No effort has been made, however, to identify the most energy efficient products with a label like the “Energy Star” label adopted in the United States.	0.75
3. “Implement a golden carrot program [involving]... actions to encourage manufacturers of energy using equipment to develop and commercialize products that are ‘advanced’ in terms of energy performance” <i>(Financial incentive)</i>	This recommendation was designed to mimic a successful U.S. program that provided a large financial reward to the first manufacturer of a specific product (refrigerators) that could meet enhanced energy efficiency performance standards. No similar program was ever established in Canada.	0

**E. Industrial energy use****2.5 / 6**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
1. “Establish industrial energy efficiency indicators” ( <i>Research</i> )	Since 1995, a tremendous amount of work has been done to improve our understanding of energy use in Canada’s industrial sector and to develop new indicators that underpin the Canadian Industry Program for Energy Conservation. Much of this work has been done through the Canadian Industrial Energy Efficiency and Data Analysis Centre.	1
2. “Promote benchmarking/ best practices [via] work with industrial energy consumers to rank... their energy use in major industrial processes against domestic and international results” ( <i>Research</i> )	Until recently, little work of this kind was done in Canada. Now, however, three pilot studies are being completed for Natural Resources Canada on the dairy, cement, and pulp and paper sectors. It is hoped that further studies will follow that address other sectors.	0.25
3. “Establish an Industrial Energy Innovators Program [to]... support expanded energy efficiency penetration through the provision of a comprehensive set of services” ( <i>Voluntary</i> )	Such a program has been established and has more than 250 members. At this time, more than 300 companies (representing 75 percent of greenhouse gas emissions in the mining and manufacturing sectors) have adopted voluntary energy efficiency targets. The Canadian Industry Program for Energy Conservation also works with a large number of industrial sectors in support of similar goals.	1
4. “Coordinate and promote an Electric Drivepower Challenge... to increase the market penetration of efficient industrial electric drivepower systems” ( <i>Voluntary</i> )	This recommendation was designed to mimic a successful U.S. program. No such “challenge” was ever initiated in Canada. However, educational materials on the efficient implementation and use of electric motors are to be published in 2000 by Natural Resources Canada.	0.25
5. “[Development of] National Emission Guidelines for new and modified electric utility and commercial/industrial boilers as well as heaters and cement kilns, will be expanded to include energy efficiency standards” ( <i>Voluntary/Regulation</i> )	To the best of our knowledge, no such standards have been developed. Some educational initiatives have been undertaken to encourage the efficient use of boilers.	0
6. “Provide a special tax incentive for prescribed investments to increase energy efficiency in industrial processes” ( <i>Financial incentive</i> )	Work by Natural Resources Canada and Finance Canada has concluded that the current tax system actually penalizes investments in energy efficiency relative to a neutral tax system that eliminated all incentives. <sup>22</sup> Despite this, the federal government has taken no action to put in place tax incentives that favour the purchase and installation of energy efficient processes and equipment over less efficient alternatives.	0

<sup>22</sup> Op. cit.



**F. Transportation**

4 / 22

Measure	Status	Mark
1. "A National Green Transportation Strategy will be developed... [to] promote and demonstrate least-cost transport options that fully incorporate environmental externalities" ( <i>Financial incentives</i> )	This recommendation was inspired by the U.S. Intermodal Surface Transportation Efficiency Act. It envisioned the establishment of a national fund to support a wide range of measures to improve the environmental efficiency of transportation both within and between cities. No strategy has been developed, and no significant national fund has been established. The 2000 federal budget does provide a small amount of funding that could support efforts by municipal governments in this area.	0
2. "Adopt a national inspection and maintenance program within urban areas... for vehicle emissions... participation at the municipal level would be mandatory" ( <i>Regulation</i> )	British Columbia and Ontario have established mandatory vehicle inspection and maintenance programs in major urban centres. No other province has similar mandatory requirements.	0.5
3. "Apply a gas guzzler tax... The federal government will [apply]... a tax on new automobiles that are less fuel efficient than a nominal fleet target efficiency" ( <i>Financial incentive</i> )	The federal government has made no changes in the tax system that would increase the tax rate on "gas guzzlers" when compared to fuel-efficient vehicles.	0
4. "Institute a national feebate scheme... to influence consumer choices toward increasingly efficient vehicles" ( <i>Financial Incentive</i> )	Ontario has put in place a feebate scheme (taxes on inefficient vehicles, rebates for efficient vehicles), but its effectiveness has been severely limited by the fact that the vast majority of vehicles sold are subject to only a small tax or rebate. No national scheme has been established.	0
5. "Institute a provincial Vehicle Scrapage Program to provide an incentive for the retirement of the oldest, most polluting vehicles from the road" ( <i>Financial incentive</i> )	To the best of our knowledge, no province has implemented a significant program of this kind.	0
6. "Institute a fuel efficiency premium as part of provincial vehicle registrations... Those vehicles with higher emissions would be charged a higher rate" ( <i>Financial incentive</i> )	To the best of our knowledge, no province has established such a surcharge.	0

**F. Transportation (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
7. "Institute a Fleet Procurement and Management Program... to improve the vehicle efficiencies of government and corporate fleets" ( <i>Voluntary</i> )	The federal government has established the voluntary Fleet Smart program to help vehicle fleet managers reduce fuel costs and emissions through energy efficient practices.	1
8. "Improve fuel efficiency standards for new vehicles" ( <i>Voluntary/Regulation</i> )	The average fuel efficiency of new vehicles sold in Canada has not improved since 1982. Nonetheless, no steps have been taken to improve fuel efficiency standards, whether on a voluntary or mandatory basis. At the same time, auto manufacturers serving the European and Japanese markets have voluntarily agreed to improve the average fuel efficiency of new vehicles sold in those markets by 25 percent over the next 10 years.	0
9. "Increase motor fuel taxes and prices... Revenue from the tax will be available through the National Green Transport Program" ( <i>Financial incentive</i> )	The federal government increased gasoline taxes by 1.5 cents per litre in 1995 as a deficit reduction measure. No plans have been announced, however, to increase taxes steadily on a planned basis over time to send a clear signal to consumers of motor fuels encouraging energy conservation and energy efficiency. Some European countries (e.g., Norway, the United Kingdom) have put in place several tax increases over this same time period as a climate protection measure.	0
10. "Subsidies and incentives to alternative transportation fuels will be set [including] developing a staged target for a gasoline blended with 10 percent ethanol" ( <i>Financial incentives</i> )	The federal government has put in place financial incentives to support the use of natural gas and ethanol as alternative transportation fuels. It has also helped support the construction of ethanol production facilities.  It has not, however, acted on the recommendation to phase in the use of 10 percent ethanol blend gasoline.	0.5
11. "Implement a Vehicle Emissions Labelling Program... to show their emissions performance" ( <i>Education</i> )	One component of the Energuide for Vehicles program is the placement of an Energuide Label on all new cars, vans and light-duty trucks sold in Canada. A Fuel Consumption Guide that provides a complete listing of fuel consumption information for all new vehicles is also produced.	1
12. "Using federal mechanisms such as investment tax credits and research funding, stimulate R&D in advanced vehicle technologies which use alternative non-fossil fuels" ( <i>Research</i> )	The federal government has provided support for the development of the Ballard fuel cell. The recently announced Sustainable Development Technology Fund may provide additional funding for non-fossil fuel vehicle technologies. The federal government also supports the development of electric vehicles, hybrids and vehicles that use alternative transportation fuels through the Transportation Energy Technologies Program.	0.5

**F. Transportation (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
13. “Promote increased density in urban areas... by revising zoning codes and traditional urban planning practices” <i>(Regulation/education)</i>	This recommendation called for the development of a national urban growth management strategy and a national model for transit friendly zoning by-laws and ordinances. These tools have not been developed.	0
14. “Encourage telecommuting and alternative work strategies... as part of the national Urban Transport Demand Management Program” <i>(Education)</i>	There is no national program to encourage such strategies. A few companies in the private sector (e.g., Nortel) have, however, successfully implemented them.	0
15. “Improve cycling and walking environment... by redesign of bicycle routes, and redesign of cities to be pedestrian friendly” <i>(Voluntary/Regulation)</i>	The 2000 federal budget included some funding for municipalities that could be directed toward investments that would improve the cycling and walking environment. A Moving on Sustainable Transportation Fund (MOST) has also been established by Transport Canada.	0.25
16. “Increase Transit Ridership... through integrated municipal transportation plans” <i>(Mainly financial incentives)</i>	Provincial funding cutbacks to municipalities have affected public transit. In most major urban centres, public transit use is declining on both a per capita basis and as a percentage of overall urban transport. The federal government continues to be the only national government in an industrialized country that provides no support for urban public transit.	0
17. “Promote Ridesharing [including action to]... provide free parking for ridesharing vehicles [and] develop a national rideshare pilot project” <i>(Financial incentives/ Education)</i>	A national rideshare pilot project has never been developed.	0
18. “Promote regulatory full-cost road pricing” <i>(Financial incentive)</i>	Some toll highways have been established in Canada to help cover costs associated with construction. However, there are no examples of tolls being designed to cover the full environmental and economic costs of the resulting road traffic.	0

**F. Transportation (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
19. “Promote full cost parking and parking management [involving] policies or programs that reflect the full environmental and social cost of driving a personal vehicle into the urban central business district” <i>(Financial incentive/Regulation)</i>	A key element of this recommendation was to make employer-provided transit passes a tax-free benefit. This has not happened. The Greater Vancouver Regional District, as part of its transportation strategy, is increasing parking charges to discourage use of the automobile. This is not yet, however, a common practice in Canada.	0
20. “Develop high speed rail systems... Make funding available for capital improvements and demonstrations” <i>(Financial incentives)</i>	There has been no development of high speed rail systems in Canada.	0
21. “Introduce full-cost accounting and user-pay principles to passenger and freight transport [by acting to]... remove subsidies [and]... implement full-cost road use charges” <i>(Financial incentives)</i>	The federal government has reduced its ownership of airports and ports, and sold off Canadian National Railways and Air Canada. This has helped to apply user-pay principles in these sectors. User-pay principles remain, however, largely absent from our roads. Moreover, no steps have been taken to reflect full cost accounting in transportation.	0.25
22. “Enforce speed limits and regulate provincial highway speeds at a national level of 80 kph” <i>(Regulation)</i>	No province has reduced highway speeds to 80 kph. In Ontario, an effort was made to increase enforcement through the application of photoradar, but this project was abandoned.	0

**G. Energy supply and production****5 / 14**

<b>Proposed measure</b>	<b>Status</b>	<b>Mark</b>
1. “Establish a voluntary Electric Utility Climate Challenge Program to implement greenhouse gas emission reduction measures” ( <i>Voluntary</i> )	This measure is the same as the measure proposing the creation of the VCR. It is worth noting that electric utilities have consistently produced the best submissions to the program.	N/A
2. Integrated Resource Planning... [to] be adopted voluntarily [or]... mandated by provincial agencies” ( <i>Voluntary/Regulation</i> )	Integrated Resource Planning (IRP) is a process used by some utilities to identify and provide the least cost mix of options such as demand side management, renewable energy and non-utility generation. Three provinces have put in place some limited requirements with respect to IRP for electric utilities: Nova Scotia, British Columbia and Québec.	0.25
3. “Electric utilities will accelerate the implementation of cost-effective supply side efficiency improvements... in generation efficiency” ( <i>Voluntary</i> )	Most electric utilities have taken actions to improve supply side energy efficiency and have reported on those actions to the VCR.	1
4. “Extend demand side management programs” ( <i>Voluntary</i> )	Utilities use demand side management to influence customer use of electricity. Few electric utilities have expanded their demand-side management programs since 1995. In fact, resources dedicated toward demand-side management have fallen in most utilities during this period.	0
5. “Targets and schedules will be established to increase cost-effective combined heat and power opportunities” ( <i>Voluntary</i> )	No such targets or schedules have ever been established. While a growing number of co-generation facilities are being established in Canada (particularly in Alberta and Ontario), the number of facilities still falls far short of what is possible and few steps have been taken to remove barriers to implementation.	0.25
6. “Investigate generation fuel switching... Implementation targets and schedules will be established for utilities” ( <i>Voluntary</i> )	Electric utilities have done little fuel switching (e.g. replacing coal by natural gas) in existing facilities. One plant in Nova Scotia (Tuft’s Cove) now plans to switch from oil to natural gas. There is also some limited investigation of opportunities to co-fire coal with biomass in electricity generation.	0
7. “Evaluate increased availability of existing hydro and nuclear generation capacity” ( <i>Research</i> )	Electric utilities that operate hydroelectric and nuclear facilities have implemented supply side generation efficiency improvements and have assessed the potential for expanding production from these energy sources.	1
8. “Commit to increased non-utility generation” ( <i>Voluntary</i> )	There has been a small increase in non-utility electricity generation in Canada, particularly in Alberta. Further increases are likely to take place in the near future in Ontario. In most parts of Canada, however, electric utilities continue to have a virtual monopoly on electricity production.	0.25

**G. Energy supply and production (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
9. "Assess new low emission generation capacity" ( <i>Research</i> )	Research has been done in Canada to assess the potential for new natural gas, hydroelectric and nuclear generating capacity.	1
10,11. "Upstream oil and gas... Establish a voluntary Challenge Program to implement emissions reduction measures" ( <i>Voluntary</i> )	These two measures (one for carbon dioxide, one for methane) are the same as the measure proposing the creation of the VCR. While upstream oil and gas companies are active participants in the program, the quality of their submissions and action plans varies widely from company to company, with the majority in need of significant upgrading.	N/A
12. "Downstream gas distribution sector... Establish a voluntary Challenge Program to implement methane emission reduction measures" ( <i>Voluntary</i> )	This measure is the same as the measure proposing the creation of the VCR. In general, submissions from natural gas distribution utilities rank among the better submissions to the VCR.	N/A
13. "Provincial governments will require that natural gas distribution utilities implement Integrated Resource Planning" ( <i>Regulation</i> )	Integrated Resource Planning (IRP) is a process to identify and provide the least cost mix of supply and demand-side options to the utility system and its customers. The following provinces have mandated some form of IRP for natural gas utilities: Ontario, British Columbia and Québec. Ontario's requirements are the most stringent in Canada.	0.25
14. "Develop supporting government policies to achieve an increase in the supply of energy from renewable sources by the year 2005" ( <i>Voluntary</i> )	The primary measure called for was the establishment of provincial renewable energy targets for 2005. No such target has been established in any province or territory. It is worth noting, however, that Environment Canada and Natural Resources Canada have made a commitment to purchase 15-20 percent of their electricity from renewable energy sources by 2010.  The federal government and several electric utilities have established programs to support the use of renewable energy technologies in remote locations.	0.25
15. "Stimulate renewable energy markets [with]... funding support for field trials (large scale demonstration) of emerging renewable energy technologies" ( <i>Financial incentive</i> )	No large scale demonstration projects for renewable energy have been implemented in Canada. Québec's Le Nordais windfarm, however, was preceded by a small-scale field trial involving three wind turbines. The federal government has provided some support to adapt foreign renewable energy technologies to Canadian conditions.	0

**G. Energy supply and production (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
16. “Develop Renewable Energy Infrastructure [including] training and certification programs... safety and performance standards... adopt these into provincial building and electrical codes... Provide information to the general public” <i>(Education/Regulation)</i>	The Eco-Logo program provides formal certification of “green power” and the Canadian Standards Association has created and updated several relevant standards. Some formal training programs have been provided through the Canadian Solar Industries Association.	0.25
17. “Encourage utility adoption of renewable energy [via] programs and policies which support the demonstration and commercialization of renewable energy” <i>(Voluntary/Financial incentives)</i>	There is still relatively little being done in Canada by electric utilities to adopt renewable energy technologies. Only a handful of utilities offer “green power” choices for their customers.  Hydro-Québec has established a “set-aside” identifying a specific percentage of electricity generation that must come from renewable energy sources. While Ontario Power Generation and SaskPower have made small requests for new renewables capacity, these have had a limited impact.	0.25
18. “Revitalize R&D to accelerate the development of Canadian renewable energy technologies” <i>(Research)</i>	This recommendation urged the federal government to increase its R&D support for renewable energy in the year 2000 to the level of support fossil fuels received in 1990. This has not happened. However, while funding for renewables has actually declined significantly since 1990, it now accounts for a larger portion of the (smaller) energy R&D funding pie than it did in 1990.	0.25

**H. Non-energy sector****6.5 / 16**

<b>Proposed measure</b>	<b>Status</b>	<b>Mark</b>
1. “Reduce emissions from waste landfills... by voluntarily installing landfill gas systems or by installation due to provincial regulations” ( <i>Voluntary/Regulation</i> )	While 33 Canadian landfills have put in place landfill gas management systems, the pace of implementation has been slow. The federal government has prepared a technical “how-to” document, but it appears that action will not occur without some additional incentives.  The Ontario government has put in place regulations mandating landfill gas recovery at landfills above a certain size. B.C. has voluntary guidelines in this area. No other province has acted. Voluntary installation of such systems hinges largely on the establishment of a government sanctioned greenhouse gas emission reduction credit trading system—still far from certain in Canada.	0.25
2. “Reduce methane emissions from coal mines [via]... an evaluation of the technical and economic feasibility of retrofitting methane recovery systems... [and] provinces and coal mine operators will be encouraged to recover methane” ( <i>Research/Voluntary</i> )	This recommendation sought to mimic a U.S. voluntary program targetted at producing emissions reductions in this sector. No such program has been created. Nonetheless, a significant amount of research is underway in this area.	0.25
3. “Control emissions of HFCs and other substitutes for ozone layer depletion substances... Provinces will develop regulations as appropriate” ( <i>Regulation</i> )	British Columbia introduced such a regulation in November 1999. Manitoba introduced similar legislation in 1999. But to the best of our knowledge, Ontario, Québec and Alberta have not yet done so.	0.25
4. “Reduce emissions from aluminum smelters [via]... [work to] evaluate the technical and economic feasibility of developing new low-emission PFC technology [and]... the development of an ‘Aluminum Industry Challenge Program’ aimed at securing voluntary agreements for emission reductions” ( <i>Research/Voluntary</i> )	This measure is essentially the same as the measure proposing the creation of the VCR. While the aluminum industry has not been the most active participant in the VCR, it has taken actions that have reduced its emissions of perfluorocarbons (PFCs) by 40 percent since 1990.	N/A



**H. Non-energy sector (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
5. "Formulate in a voluntary agreement the commitment by DuPont Canada to reduce the nitrous oxide emissions from their Maitland, Ontario adipic acid plant by 95 percent by 1996" ( <i>Voluntary</i> )	DuPont Canada began this abatement initiative in 1997 and was expecting to complete it by 1999.	0.75
6. "Investigate opportunities to sequester and utilize carbon dioxide" ( <i>Research</i> )	A significant research effort is underway in Canada to investigate opportunities to sequester (and possibly use) carbon dioxide in a number of ways (e.g., geological sequestration). Federal and provincial governments are involved, as well as the private sector.	1
7. "Promote tree planting in urban and agricultural settings" ( <i>Financial incentives</i> )	Programs have been established to encourage tree planting in agricultural (Shelterbelt Program) and urban (Tree Canada Foundation) settings.  While the Shelterbelt Program is not a major afforestation program, the Tree Canada Foundation planted more than 52 million trees between 1992 and 1997. It is worth noting that federal government support for the Tree Canada Foundation has declined, and it has become more reliant on private sector funding.	0.5
8. "Substitute wood products for steel and concrete in the commercial building sector" ( <i>Education</i> )	This recommendation called for the implementation of a federal-led substitution program. While no government program has been established, it is worth noting that the forest industry has continued to actively promote such a shift.	0
9. "Reduction in summer fallow acreage... shift to continuous cropping" ( <i>Education</i> )	Continuous ground cover enhances the carbon storage capacity of soil. Summer fallow acreage is decreasing as a result of education programs supported by Agriculture Canada and soil conservation organizations. The simple sharing of experiences within the farming community has also played an important role. At this point, however, it is unclear whether or not such activities will be recognized under the Kyoto Protocol.	1
10. "Soil tillage reduction and elimination" ( <i>Education</i> )	No-till seeding practices reduce carbon dioxide emissions from soil. A shift to no-till seeding practices is actively promoted as a low-cost greenhouse gas emission reduction measure by farmers, governments and some major greenhouse gas emitters. At this point, however, it is unclear whether or not such activities will be recognized under the Kyoto Protocol. Nonetheless, significant work (research, education and implementation) in support of this objective is underway in the Prairies.	1

**H. Non-energy sector (cont.)**

<b>Measure</b>	<b>Status</b>	<b>Mark</b>
11. “Increased perennial forage crop production” ( <i>Financial incentive</i> )	Shifting from grain and oilseed to perennial forage crop production enhances the carbon storage capacity of soil. This measure suggested the establishment of a new Permanent Cover / National Soil Conservation program. While such a program has not been established, some programs like Agriculture Canada’s Community Pasture Program contribute to this objective.	0.25
12. “Improved crop yields” ( <i>Research</i> )	Higher crop yields result in greater absorption of carbon dioxide. Ongoing research and development activities in this area have been enhanced through the creation of a Market Incentives Initiative that helps leverage private sector funds to complement government activity in this area.	0.5
13. “Reduction in methane emissions from ruminant farm animals... through improvements in feeding technology” ( <i>Education</i> )	Agriculture Canada is supporting R&D initiatives in this area. Up to now, however, educational work has been limited.	0
14. “Reduction in emissions of methane and carbon dioxide from livestock manure [via]... improved manure storage and utilization” ( <i>Education</i> )	Agriculture Canada is supporting R&D initiatives in this area. To this point, however, educational work has been limited.	0
15. “Reduction in emissions of greenhouse gas associated with production of mineral nitrogen fertilizers [via]... increased use of perennial forage legumes and livestock manure” ( <i>Education</i> )	While not climate change motivated, efforts have been made to promote the use of livestock manure as a source of nitrogen fertility through programs like the Hogs Environment Management Strategy.  Agriculture Canada is also supporting research into a variety of technologies and practices that can help improve fertilizer management.	0.5
16. “Reduction in fossil fuel usage for farm operations” ( <i>Education</i> )	Efforts to reduce fossil fuel use in farming operations have been limited up to now. A major problem is the absence of good data on fossil fuel use in this sector. Steps have been taken to improve data availability.	0
17. “Expanded production and usage of grain-source fuel ethanol [via a]... lower federal government fuel tax on retail sales of ethanol-blended gasoline” ( <i>Financial incentive</i> )	A small pilot production facility has been developed in Saskatchewan and work is underway to assess the feasibility of “biodiesel” products from feedstocks like canola. The federal government has also supported the development of a ligno-cellulose ethanol production process in Ottawa. Nonetheless, ethanol from grain based sources has failed to make significant inroads in the marketplace as a gasoline additive or substitute, and the existing tax differential has not changed.	0.25

**Total score****29.25 / 88**

## Appendix B:

Additional analysis of emissions from the 106 companies who, during 1998, made a submission to the Voluntary Challenge and Registry stating their 1997 emissions

**Table 9. Greenhouse gas emissions of those companies who, during 1998, made a VCR submission stating their emissions for 1997, and had emissions exceeding 5 Mt CO<sub>2</sub>E**

Company	Sector	1990 emissions (Mt CO <sub>2</sub> E)	1997 emissions (Mt CO <sub>2</sub> E)	% change 1990-97
TransAlta	Electric Utility	27.6	<b>27.2</b>	-1
Ontario Hydro	Electric Utility	26.0	<b>23.5</b>	-10
SaskPower	Electric Utility	10.6	<b>14.4</b>	36
Imperial Oil	Integrated Oil and Gas	12.2	<b>12.0</b>	-1
DuPont Canada	Chemical	11.0	<b>10.4</b>	-6
Alberta Power	Electric Utility	7.7	<b>9.8</b>	27
NB Power	Electric Utility	8.3	<b>8.6</b>	4
Amoco Canada <sup>a</sup>	Integrated Oil and Gas		<b>8.5</b>	
Syncrude Canada	Upstream Oil and Gas	7.2	<b>8.5</b>	18
Nova Scotia Power	Electric Utility	6.8	<b>7.8</b>	14
Petro-Canada	Integrated Oil and Gas	8.1	<b>7.6</b>	-6
Shell Canada	Integrated Oil and Gas	7.5	<b>7.5</b>	0
TransCanada Pipelines	Pipeline	4.9	<b>6.6</b>	34
Husky Oil	Integrated Oil and Gas	3.7	<b>6.6</b>	76
Westcoast Energy	Natural Gas Utility; Pipeline	4.4	<b>6.0</b>	38
Suncor Energy	Integrated Oil and Gas	5.0	<b>5.7</b>	14

<sup>a</sup>It is not clear whether Amoco's emissions include emissions from the generation of the electricity that it purchases from utilities.

**Table 10. Companies who, during 1998, made a VCR submission stating their emissions and production for 1990 and 1997, and whose emissions intensity increased between those two years**

Company	Sector	% change in production 1990-97	1997 emissions (kt CO <sub>2</sub> E)	% change in emissions intensity 1990-97
Stora Port Hawksbury <sup>a</sup>	Forest Products	5	196	47
Canadian Hunter Exploration	Upstream Oil and Gas	-8	538	37
BC Hydro	Electric Utility	13	1,244	28
Chevron Canada Resources	Upstream Oil and Gas	-14	1,629	27
Murphy Oil	Upstream Oil and Gas	59	414	19
Imperial Oil	Integrated Oil and Gas	-12	12,025	11
SaskPower	Electric Utility	25	14,367	8
Pine Falls Paper <sup>a</sup>	Forest Products	0	145	7
Nova Scotia Power	Electric Utility	7	7,793	7
NOVA Gas Transmission	Pipeline	59	4,422	5
Alberta Power	Electric Utility	26	9,798	1

<sup>a</sup> It is not clear whether these companies' emissions include emissions from the generation of the electricity that they purchase from utilities.

**Table 11. Companies who, during 1998, made a VCR submission stating their emissions and production for 1990 and 1997, and whose emissions intensity decreased between those two years at an average of more than four percent per year**

Company	Sector	% change in production 1990-97	1997 emissions (kt CO <sub>2</sub> E)	% change in emissions intensity 1990-97	% change per year in emissions intensity 1990-97
Bowater Mersey Paper <sup>a</sup>	Forest Products	15	0	-100	-14.3
Canadian Forest Products <sup>b</sup>	Forest Products	84	493	-57	-8.1
Weldwood of Canada <sup>b</sup>	Forest Products	47	341	-46	-6.6
Donohue Forest Products <sup>a</sup>	Forest Products	25	399	-45	-6.4
General Motors of Canada	Manufacturing	21	770	-44	-6.2
DuPont Canada	Chemical	61	10,416	-41	-5.9
Nexfor <sup>a</sup>	Forest Products	34	629	-40	-5.7
Manitoba Hydro	Electric Utility	33	350	-36	-5.1
Northwestern Utilities	Natural Gas Utility	56	444	-33	-4.7
Enbridge Consumers Gas	Natural Gas Utility	4	256	-32	-4.6
Ontario Hydro	Electric Utility	27	23,500	-29	-4.1

<sup>a</sup> It is not clear whether these companies' emissions include emissions from the generation of the electricity that they purchase from utilities.

<sup>b</sup> These companies' emissions exclude, or appear to exclude, emissions from the generation of the electricity that they purchase from utilities.

Table 12. All 106 companies who, during 1998, made a VCR submission stating their emissions for 1997

Company	Sector	Base year emissions (kt CO <sub>2</sub> E)	base year if not 1990	1997 emissions (kt CO <sub>2</sub> E)	Change in emissions base year -1997 (kt CO <sub>2</sub> E)	% change in emissions base year -1997 (%)	2000 emissions (projected, kt CO <sub>2</sub> E)	Change in emissions base year - 2000 (projected, kt CO <sub>2</sub> E)	% change in emissions base year - 2000 (projected)	% change in production base year - 1997	% change in emissions intensity base year -1997	% change in production base year - 2000 (projected)	% change in emissions intensity base year - 2000 (projected)
Abitibi-Consolidated <sup>a</sup>	Forest Products	277		170	-107	-39				-17	-26		
Agrium <sup>a</sup>	Chemical	2,163		2,801	638	29	3,000	837	39	29	0	39	0
Alberta Energy	Upstream Oil and Gas; Pipeline	1,113	1994	2,041	928	83				111	-9		
Alberta Natural Gas	Pipeline	1,331		1,795	464	35	1,742	411	31	89	-27	118	-40
Alberta Power	Electric Utility	7,733		9,798	2,065	27	9,045	1,312	17	26	1	17	0
Amoco Canada <sup>a</sup>	Integrated Oil and Gas	9,284	1993	8,528	-756	-8				-10	2	-10	-10
Anderson Exploration	Upstream Oil and Gas	1,620	1994	1,694	74	5				7	-2		
Apache Canada	Upstream Oil and Gas	117	1995	140	24	20				23	-2		
Archean Energy	Upstream Oil and Gas	13	1995	5	-7	-57				-58	3		
Archer Resources	Upstream Oil and Gas	101	1994	123	22	22				-32	80		
BC Gas Utility	Natural Gas Utility	300		360	59	20	363	63	21	26	-5	36	-11
BC Hydro	Electric Utility	863		1,244	381	44	2,837	1,974	229	13	28	16	183
Bowater Mersey Paper <sup>a</sup>	Forest Products	148		0	-148	-100	0	-148	-100	15	-100	17	-100
Cabre Exploration	Upstream Oil and Gas	97	1996	118	21	22				4	17		
Canadian Forest Products <sup>b</sup>	Forest Products	558		493	-65	-12	468	-90	-16	84	-57		
Canadian Hunter Exploration	Upstream Oil and Gas	427		538	111	26	493	66	15	-8	37	-16	38
Canadian Natural Resources	Upstream Oil and Gas	1,441	1996	2,593	1,152	80	3,040	1,599	111	47	23	105	3
Canadian Western Natural Gas	Natural Gas Utility	365		367	2	1	355	-10	-3	38	-27	34	-27
Celanese Canada <sup>a</sup>	Chemical	906	1988	1,448	542	60							
Chevron Canada Resources	Upstream Oil and Gas	1,494		1,629	134	9	1,599	105	7	-14	27		
Chinook Group <sup>a</sup>	Chemical	46	1994	44	-2	-5	59	14	30	50	-37	173	-53
Conoco Canada	Upstream Oil and Gas	144		113	-30	-21							
Crestar Energy	Upstream Oil and Gas	1,185	1994	1,685	500	42	2,100	915	77	58	-10	110	-16
Crestbrook Forest Industries <sup>b</sup>	Forest Products	409		349	-60	-15	252	-157	-38				
Devon Energy Canada	Upstream Oil and Gas	99	1995	59	-39	-40				-17	-28		
Dofasco <sup>b</sup>	Iron and Steel	5,989		4,376	-1,614	-27	4,547	-1,443	-24	-1	-26		
Domtar <sup>a</sup>	Forest Products	499		504	5	1	469	-29	-6	16		29	
Donohue Forest Products <sup>a</sup>	Forest Products	576		399	-177	-31				25	-45		
Dow Chemical Canada	Chemical	2,600		2,240	-360	-14	2,273	-327	-13				
DuPont Canada	Chemical	11,048		10,416	-632	-6				61	-41		
Enbridge Consumers Gas	Natural Gas Utility	364		256	-108	-30	236	-128	-35	4	-32	12	-42
Enron Oil Canada	Upstream Oil and Gas	77		170	93	120	200	123	159	140	-8	190	-11
Federated Co-operatives <sup>b</sup>	Downstream Oil and Gas	1,019	1994	1,057	38	4				5	2		
Fletcher Challenge Energy Canada	Upstream Oil and Gas	149	1991	504	355	237	525	376	251	369	-28	441	-35
Fort James-Marathon <sup>a</sup>	Forest Products	190		92	-98	-52							
General Motors of Canada	Manufacturing	1,130		770	-360	-32				21	-44		
Genesis Exploration	Upstream Oil and Gas			10									
Gulf Canada Resources	Upstream Oil and Gas	2,171		2,381	210	10				12	-2		
Highridge Exploration	Upstream Oil and Gas			22			46						
Husky Oil	Integrated Oil and Gas	3,718		6,556	2,838	76	6,958	3,240	87				

Table 12 (cont.)

Company	Sector	Base year emissions (kt CO <sub>2</sub> E)	base year if not 1990	1997 emissions (kt CO <sub>2</sub> E)	Change in emissions base year -1997 (kt CO <sub>2</sub> E)	% change in emissions base year -1997 (%)	2000 emissions (projected, kt CO <sub>2</sub> E)	Change in emissions base year - 2000 (projected, kt CO <sub>2</sub> E)	% change in emissions base year - 2000 (projected)	% change in production base year - 1997	% change in emissions intensity base year -1997	% change in production base year - 2000 (projected)	% change in emissions intensity base year - 2000 (projected)
IBM Canada	Manufacturing	60		34	-26	-44							
Imperial Oil	Integrated Oil and Gas	12,173		12,025	-148	-1	12,820	647	5	-12	11	-15	30
Interprovincial Pipe Line	Pipeline	876		1,195	319	36	1,114	238	27				
Kimberly-Clark Nova Scotia	Forest Products	724		731	7	1							
Kodak Canada	Manufacturing	34		32	-2	-6							
Kruger <sup>a</sup>	Forest Products	543		337	-205	-38							
Luscar	Mining	485		615	130	27	473	-12	-2	48	-14	46	-33
MacMillan Bloedel <sup>b</sup>	Forest Products	732		556	-176	-24	700	-32	-4	0	-27		
Malette Kraft Pulp & Power Division	Forest Products	152		235	84	55	137	-14	-10	78	-13	111	-57
Manitoba Hydro	Electric Utility	410		350	-60	-15	370	-40	-10	33	-36	33	-32
Methanex	Chemical	509		1,070	561	110	1,046	537	106	151	-16	147	-17
Metroland Printing, Publishing & Distributing	Commercial	2		2	0	-16							
Mobil Oil Canada	Upstream Oil and Gas	1,040	1994	1,027	-13	-1	1,070	30	3	12	-12	0	3
Murphy Oil	Upstream Oil and Gas	218		414	196	90	350	132	61	59	19	76	-9
NB Power	Electric Utility	8,300		8,600	300	4							
Newfoundland Power	Electric Utility	3		1	-2	-62							
Newport Petroleum	Upstream Oil and Gas	108	1996	129	21	19				40	-15		
Nexfor <sup>a</sup>	Forest Products	770		629	-141	-18				34	-40		
Noranda <sup>b</sup>	Mining	772	1992	741	-31	-4							
Northstar Energy	Upstream Oil and Gas	927	1995	991	64	7							
Northwestern Utilities	Natural Gas Utility	424		443	19	4	423	-1	0	56	-33	52	-34
NOVA Chemicals <sup>b</sup>	Chemical	4,358		3,636	-722	-17	4,160	-198	-5	1	-17	17	-18
NOVA Gas Transmission	Pipeline	2,664		4,422	1,758	66	3,900	1,236	46	59	5		
Nova Scotia Power	Electric Utility	6,830		7,793	963	14	7,850	1,020	15	7	7	20	-4
Ocelot Energy	Upstream Oil and Gas	226	1995	210	-16	-7				-16	10		
Ontario Hydro	Electric Utility	26,000		23,500	-2,500	-10	25,200	-800	-3	27	-29	12	-13
Paramount Resources <sup>a</sup>	Upstream Oil and Gas	261		334	73	28	410	149	57	33	-4	56	1
Penn West Petroleum	Upstream Oil and Gas	494	1996	516	22	5	713	219	44	11	-5	54	-6
Petro-Canada	Integrated Oil and Gas	8,115		7,616	-499	-6	7,900	-215	-3	6	-8		
Pine Falls Paper <sup>a</sup>	Forest Products	135		145	10	7	113	-23	-17	0	7		
Pioneer Natural Resources Canada	Upstream Oil and Gas	213		250	37	17				57	-25		
Placer Dome North America <sup>a</sup>	Mining	117		95	-23	-19	82	-35	-30				
Potash Corporation of Saskatchewan Inc., Rocanville Division <sup>a</sup>	Mining	194	1996	211	17	9				13	-4		
Potash Corporation of Saskatchewan, Cory Division <sup>a</sup>	Mining	118	1991	187	69	58				97	-20		
PrimeWest Energy	Upstream Oil and Gas			143									
Producers Pipelines	Pipeline	14		36	22	160	38	24	174	193	-11	182	-3

Table 12 (cont.)

Company	Sector	Base year emissions (kt CO <sub>2</sub> E)	base year if not 1990	1997 emissions (kt CO <sub>2</sub> E)	Change in emissions base year -1997 (kt CO <sub>2</sub> E)	% change in emissions base year -1997 (%)	2000 emissions (projected, kt CO <sub>2</sub> E)	Change in emissions base year - 2000 (projected, kt CO <sub>2</sub> E)	% change in emissions base year - 2000 (projected)	% change in production base year - 1997	% change in emissions intensity base year -1997	% change in production base year - 2000 (projected)	% change in emissions intensity base year - 2000 (projected)
Ranger Oil	Upstream Oil and Gas	1,226	1995	1,430	204	17				25	-7		
Remington Energy	Upstream Oil and Gas	39	1996	81	43	111				138	-11		
Renata Resources	Upstream Oil and Gas			72									
Repap New Brunswick <sup>a</sup>	Forest Products	239		256	17	7	274	35	15	31	-19	37	-17
Resource Integration Systems	Commercial	0		0	0	14							
Rife Resources	Upstream Oil and Gas	30	1992	41	11	37				13	21		
SaskEnergy/TransGas	Natural Gas Utility; Pipeline	760		887	127	17				25	-7		
SaskPower	Electric Utility	10,595		14,367	3,771	36	14,073	3,477	33	25	8	39	-5
Shell Canada	Integrated Oil and Gas	7,487		7,516	29	0	7,716	229	3				
Shell Chemicals Canada	Chemical	424		458	34	8	458	34	8	15	-6	15	-6
Signalta Resources	Upstream Oil and Gas	68	1994	92	24	35				5	28		
Spruce Falls	Forest Products	158		97	-61	-39	62	-96	-61				
St. Lawrence Cement <sup>a</sup>	Cement	2,428		1,669	-759	-31	1,803	-625	-26				
Star Oil and Gas	Upstream Oil and Gas	163	1991	175	13	8				27	-15		
Stora Port Hawkesbury <sup>a</sup>	Forest Products	126		196	70	55				5	47	70	
Suncor Energy	Integrated Oil and Gas	4,969		5,678	709	14	7,181	2,212	45	44	-19	110	-24
Sunoma Energy	Upstream Oil and Gas	96	1994	303	208	217	557	461	482	198	6	415	13
Synchrude Canada	Upstream Oil and Gas	7,200		8,500	1,300	18	9,000	1,800	25	33	-11	62	-23
Tarragon Oil and Gas	Upstream Oil and Gas	90	1993	359	270	300				181	42		
Teck	Mining	565		659	94	17	520	-45	-8	40	-17	16	-21
Trans Mountain Pipe Line	Pipeline	49		66	17	34				38	-3		
TransAlta	Electric Utility	27,554		27,216	-338	-1	23,135	-4,419	-16	10	-10	8	-22
TransCanada Pipelines	Pipeline	4,942		6,643	1,701	34	6,458	1,515	31	66	-19	78	-27
Triumph Energy	Upstream Oil and Gas	6	1995	21	15	228				403	-35		
Upton Resources	Upstream Oil and Gas	22	1995	48	27	122				127	-2		
Vision Quest Windelectric	Electric Utility			26									
Wascana Energy	Upstream Oil and Gas	2,400		2,856	456	19				47	-19		
Weldwood of Canada <sup>b</sup>	Forest Products	410		341	-70	-17				47	-46		
Westaim <sup>a</sup>	Chemical			4									
Westcoast Energy	Natural Gas Utility; Pipeline	4,361		6,011	1,650	38	7,191	2,830	65	71	-19	96	-18

<sup>a</sup> It is not clear whether these companies' emissions include emissions from the generation of the electricity that they purchase from utilities.

<sup>b</sup> These companies' emissions exclude, or appear to exclude, emissions from the generation of the electricity that they purchase from utilities.

Other notes:

1. Blank spaces in the table indicate that information was not available in the company's 1998 submission to the VCR, or could not be calculated as a result of missing information in that submission.
2. Projections for 2000 are those contained in submissions made to the VCR during 1998. Companies are likely to have updated these projections in the submissions they made during 1999.