

The Case for Kyoto: The Failure of Voluntary Corporate Action

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SOLUTIONS ARE IN OUR NATURE

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The Pembina Institute's Climate Change Program is working to ensure that Canada participates in the global effort to curb climate change by ratifying the Kyoto Protocol. In addition, the program advocates for the implementation, by both federal and provincial governments, of policy measures that will secure major reductions in Canada's greenhouse gas emissions. It also works to further awareness and understanding of climate change and climate change solutions among Canadian governments, businesses, other organizations and individuals.

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The David Suzuki Foundation works through science and education to protect the balance of nature and our quality of life, now and for future generations. Our climate change program promotes sustainable solutions to our energy needs, from renewable sources to energy efficiency and improved public transportation. Adopting these solutions will help slow global warming, clean our air, improve our health and boost innovation in our economy.

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Executive summary

Since 1990, Canada has been relying on industrial firms to voluntarily reduce their greenhouse gas (GHG) emissions to help slow climate change.

Opponents of making emission cuts mandatory claim Canadian industry has been taking significant action to deal with emissions on its own and will continue to do so, with no legal requirements¹ or national target or timeline. *The Case for Kyoto: The Failure of Voluntary Corporate Action* documents an entirely different reality.

The report analyzed the credibility and track record of Canada's flagship program to address industrial GHG emissions. It found that the voluntary approach to cutting Canada's industrial emissions has been wholly inadequate.

The report concludes that Canada needs the legally binding framework of the Kyoto Protocol if it is to begin reversing the emissions increases seen since 1990. Unilateral, voluntary approaches have simply failed and are thoroughly discredited by the results presented in this report.

Because Canada's largest emitters of GHGs are industrial firms, accounting for 52 to 63 per cent of Canada's GHG emissions in 2000, our success in addressing climate change depends first and foremost on what happens to the emissions of industrial firms.

The report examined the credibility of Canada's major industrial GHG emitters who are asking Canadians to trust them to act voluntarily, and in their own good time, to reduce emissions. For the past seven years, Canada's central program to address industrial GHG emissions has been the Voluntary Challenge and Registry Inc. (VCR), which encourages private and public sector organizations to limit their GHG emissions on a voluntary basis. The Pembina Institute examined all the submissions to VCR made by industrial entities up to March 31, 2002 in order to identify those reporting their emissions for 2000. The main findings are these:

Most industrial firms reporting their GHG emissions to VCR have seen those emissions increase significantly since 1990, a trend still underway at the end of the decade. A higher proportion of the largest emitters have seen significant percentage increases in emissions since 1990 than firms reporting to VCR as a whole. Many emissions increases are occurring because of shifts to more GHG-intense activities—the opposite of what one would expect from firms making meaningful efforts to address climate change. (Section 2.1.)

Two-thirds of the largest emitters are either planning, or seem very likely to be anticipating, keeping their emissions substantially or far above 1990 levels. The ease with which voluntary commitments can be altered or abandoned suggests that the “Kyoto-level” or better future emissions targets that some firms have adopted should be viewed with caution. (Section 2.2.)

¹ The “Canadian Coalition for Responsible Environmental Solutions,” representing most of Canada's largest emitters of GHGs, wants governments to abandon the Kyoto Protocol and “negotiate agreements with specific economic sectors on emissions performance targets mutually agreed upon by all stakeholders.” While in theory, “mutually agreed upon” targets could be part of a strong regulatory system, this is clearly not what the coalition has in mind.

The level of participation in the VCR, impressive at first sight, turns out on closer inspection to be mediocre. Out of 493 industrial entities registered with VCR in mid-2002, only 102 actually reported their year 2000 emissions by March 31, 2002. Entities reporting to VCR account for less than 55 per cent of emissions from industrial facilities in Canada. Fifty-two industrial entities designated as gold, silver or bronze “champion-level” reporters on the VCR web site failed to report their year 2000 emissions to VCR. (Section 2.3.)

There are a large number of major inconsistencies in the methodology used by firms in calculating the emissions they report, and data reported to VCR are rarely subject to verification by independent professional auditors. This makes it difficult to compare the performance of different firms or to have confidence in instances of progress that are reported. The use of emissions offsets present particular problems; some claimed offsets are quite misleading and amount to little more than accounting tricks. (Section 2.4.)

Some Canadian industrial firms have been quite successful in limiting GHG emissions in the voluntary context of the VCR. But their contribution has been outgunned by the more numerous companies who remain “free riders.” There is no reason to believe that this would change if the voluntary approach continued. In particular, the major emissions increases projected by several of the largest emitters severely compromise Canada’s efforts to reduce its GHG emissions.

In rejecting the legally binding Kyoto Protocol, industry associations representing most of Canada’s largest GHG emitters are proposing to continue the voluntary approach not only at the domestic level, but also at the international level, with no legal obligations to the international community. It is instructive to look at what happened last time Canada took on a target to limit emissions that was voluntary at the international level. In 1992, Canada signed an agreement to stabilize emissions at the 1990 level by 2000. Instead of mandating reductions, the government requested voluntary compliance by industry. The result has been a 24 per cent *increase* in total industrial emissions above the 1990 level.

The failure of Canada’s voluntary approach to reducing emissions underlines the need to implement a mandatory GHG emissions reduction approach immediately. For the industrial sector, including energy utilities, there are many solutions, proven in other countries, including a domestic emissions trading system that caps total industrial emissions, expansion of cogeneration, and expanded energy efficiency and low-impact renewable energy standards and incentives. These measures are a logical outcome of Kyoto ratification but will not emerge on the scale needed if Canada continues to rely on voluntary actions.

1. Introduction

There is a consensus among leading climate scientists that emissions of greenhouse gases (GHGs) from human activity are the strongest current driver of global climate change,² and that stabilization of GHG concentrations in the atmosphere will require global GHG emissions to be reduced by more than 50% over the next few decades.³

Canada's largest emitters of GHGs are industrial firms. Industrial facilities, including electricity generation, directly accounted for 52% of Canada's GHG emissions in 2000. If emissions from heavy duty and off road vehicles, domestic marine and rail transportation are added—on the grounds that these modes of transportation are used overwhelmingly by industrial operations and to take industrial products to market—the proportion rises to 63%. This figure still excludes emissions from agribusiness, commercial buildings, solid waste disposal and domestic aviation.⁴

Canada's success in addressing climate change therefore depends first and foremost on what happens to the GHG emissions of its industrial firms.

A coalition of industry associations representing most of Canada's largest emitters of GHGs is opposed to Canada's ratification of the Kyoto Protocol—the global agreement to begin curbing climate change by reducing industrialized countries' GHG emissions. Instead, Canada's largest GHG polluters are advocating an alternative so-called “Made in Canada Solution.” This, they claim, would “advance an ambitious and responsible Canadian approach to addressing... climate change”. The industry associations contend that “Canadian business has been taking significant action to deal with greenhouse gas emissions.”⁵

It must be noted at the outset that the Kyoto Protocol is to a large degree “made in Canada,” in particular as a result of the government of Canada's success in persuading the international community to accept controversial provisions demanded by industry groups and the governments of provinces such as Alberta. More generally, while the Protocol sets targets for countries' total emissions, it allows each country unlimited flexibility in designing national policies to meet those targets: Canada's Kyoto implementation plan will therefore itself be a “made in Canada solution.” The alternative to the Protocol advocated by the industry coalition would be more accurately described as a unilateral Canadian approach to climate change.

The Kyoto Protocol requires Canada to reduce its net annual GHG emissions to an average of 6% below the 1990 level during 2008–2012. In contrast, the industry coalition's “Statement of Principles for a Made in Canada Solution” includes no target for reducing GHG emissions and no timeline for reducing emissions. Instead, the Principles propose to “negotiate agreements with specific economic sectors on emissions performance targets *mutually agreed upon* by all stakeholders...”⁶ (our italics).

² Intergovernmental Panel on Climate Change (2001), *Summary for Policymakers, A Report of Working Group I of the Intergovernmental Panel on Climate Change*. Available at <http://www.ipcc.ch>.

³ Intergovernmental Panel on Climate Change (2001), *Climate Change 2001, The Scientific Basis, Summary for Policymakers and Technical Summary of the Working Group I Report*, p. 75–76.

⁴ L. Henderson et al. (June 2002), *Canada's Greenhouse Gas Inventory 1990–2000*, Environment Canada. Available at http://www.ec.gc.ca/pdb/ghg/ghg_docs_e.cfm.

⁵ Canadian Coalition for Responsible Environmental Solutions (September 26, 2002), *Coalition Formed to Advance “Made in Canada” Strategy on Climate Change*, news release.

⁶ Canadian Coalition for Responsible Environmental Solutions (September 26, 2002), *Statement of Principles for a Made in Canada Solution*.

In other words, Canada's major industrial GHG emitters:

- want to be allowed to determine their own unspecified emissions targets for unspecified dates, outside the framework of the Kyoto Protocol;⁷
- want us to believe that would represent an ambitious approach to addressing climate change; and
- say that we *should* believe them because they have taken significant action to deal with GHG emissions already.

Should we believe them?

Fortunately, there is abundant evidence to help us answer this question in the publicly available track record of Canada's industrial GHG emitters. For the past seven years, Canada's flagship program to address industrial GHG emissions has been the Voluntary Challenge and Registry Inc. (VCR), a government-industry partnership established in 1995 to encourage private and public sector organizations to limit their GHG emissions on a voluntary basis. Participating organizations, mostly industrial firms, submit publicly accessible action plans and progress reports that can be downloaded from the VCR website.⁸

Examining the success or otherwise of the VCR program is an excellent test of the credibility of Canada's major industrial GHG emitters when they ask Canadians to trust them to act voluntarily, and in their own good time, to reduce emissions—essentially what the “Principles for a Made in Canada Solution” propose.

The Pembina Institute has verified all the VCR submissions made by private sector and/or industrial entities⁹ up to March 31, 2002 in order to identify those reporting their emissions for 2000. One hundred and two such entities made submissions to VCR reporting their year 2000 emissions. We have further analyzed these submissions in order to extract additional information, where included, about emissions for 1990 and 1999 as well as production data for all three years. This report details our findings and then draws conclusions.^{10,11}

⁷ While in theory, “mutually agreed upon” targets could be arrived at in the context of a strong regulatory system, this is clearly not what the associations have in mind.

⁸ http://www.vcr-mvr.ca/home_e.cfm

⁹ For the remainder of this report, such entities will be referred to as “industrial” entities.

¹⁰ The government of Québec has its own equivalent of the VCR, the ÉcoGESTe program. As of June 25, 2002, the arrangements for providing public internet access to emissions data for the firms participating in ÉcoGESTe were still far from complete. At that date, summaries stating the year 2000 emissions of just 14 industrial entities were available on the ÉcoGESTe Web sites; and seven of these had already reported their year 2000 emissions to VCR by March 31, 2002 (as had several other entities with operations in Québec). Omission from this report of the seven entities not reporting to the VCR but for which public ÉcoGESTe summaries are available will not have significantly affected our conclusions.

¹¹ Another voluntary program, the federal government's Canadian Industry Program for Energy Conservation (CIPEC), has operated in parallel to, and overlapping with, the VCR program. CIPEC does not make public the GHG emissions of individual participating entities. Until 2001, CIPEC was limited to energy-using, as opposed to energy-producing sectors, while VCR has always covered both. Given that (i) energy-using sectors are quite well represented among entities reporting year 2000 emissions to VCR and (ii) energy-producing sectors account for more than half of Canada's industrial GHG emissions, it is appropriate to focus on the VCR in assessing Canada's voluntary approach to industrial GHG emissions.

2. Results

The emissions data presented in this report are expressed, as indicated, in megatonnes of carbon dioxide equivalent (Mt CO₂E) to the nearest one-tenth Mt, or kilotonnes (kt) CO₂E, to the nearest kt. An attempt has been made to highlight in footnotes the issues having the most significant or potentially significant effect on the data presented. Except where noted, emissions are the sum of:

- direct emissions from an entity's operations
- plus* "indirect" emissions defined as those associated with the generation of purchased electricity
- minus* offsets, i.e., emission reductions or enhancements to GHG "sinks"¹² realized outside a firm's normal operations but over which the firm claims ownership.¹³

2.1 Emissions increases

Table 1 shows the largest industrial emitters reporting to VCR, those with GHG emissions over 5 Mt CO₂E. The top three emitters alone account for over 9% of Canada's total emissions (which amounted to 726 Mt CO₂E in 2000¹⁴).

How has the impact of Canada's largest emitters on the climate been changing since 1990? Table 1 shows that of the 15 largest emitters reporting 2000 GHG emissions to VCR,

- seven have seen large increases in emissions since 1990 (20% or more),
- two have seen significant increases (around 10%),
- two have kept their emissions roughly stable,
- one has achieved a significant decrease (9%) and
- two have achieved large decreases (18% and 52% respectively).

In other words, three-fifths of the largest emitters have seen large or significant emissions increases. Furthermore, in 2000 the top two emitters, OPG and Transalta, achieved respectively rough stabilization and a large decrease only through massive use of offsets, of which the quality and credibility is, in some cases, clearly in doubt (see section 2.4).

Unfortunately, table 1 is incomplete because some of Canada's largest GHG emitters failed to report their year 2000 emissions to VCR by March 31, 2002 (see section 2.3). Missing firms that probably had emissions over 5 Mt CO₂E in 2000 include New Brunswick Power, Nova Scotia Power and Westcoast Energy (now part of Duke Energy). VCR submissions reporting 1998 emissions¹⁵ suggest that all three of these firms likely saw large increases in emissions between 1990 and 2000. A few other firms in the oil and gas, cement, aluminum or rail sectors may also be missing from table 1.

¹² processes in which GHGs are absorbed from the atmosphere, e.g., by growing trees or agricultural soils

¹³ Offsets claimed by firms reporting to VCR relate to the following activities: industrial process changes, landfill gas capture, fuel switching, displacement of coal-fired electricity by renewable energy, geological sequestration of carbon dioxide, various agricultural projects, sales of flyash for use in cement production; tree planting/reforestation/forest conservation, composting; recycling and mine land reclamation. Offsets were not counted in this study in a few cases when, for example, they were based on altering accepted values for global warming potentials (GWPs); appeared to represent an emissions reduction already subtracted from the entity's emissions total; or were described so vaguely as to be impossible to assess. They were, otherwise, counted, but that does not imply that the Pembina Institute draws any conclusions about their quality or credibility. Potential problems with offsets are further discussed in section 2.4.

¹⁴ L. Henderson et al., *op. cit.*

¹⁵ Matthew Bramley (October 2000), *Greenhouse Gas Emissions from Industrial Companies in Canada: 1998*, Pembina Institute. Available at http://www.pembina.org/publications_item.asp?id=26.

Table 1. GHG emissions of those industrial entities that made a VCR submission by March 31, 2002 stating their emissions for 2000, and whose emissions exceeded 5 Mt CO₂E.

Entity	Sector	2000 emissions (Mt CO ₂ E)	Base year emissions (Mt CO ₂ E)	Base year	% change base year-2000
Ontario Power Generation Inc. (OPG)	electricity	¹⁶ 31.7	30.7	1990	3
TransAlta Corporation ¹⁷	electricity	¹⁸ 21.3	26.1	1990	-18
SaskPower ¹⁹	electricity	14.5	10.9	1990	34
TransCanada ²⁰	natural gas pipelines; electricity	12.3	8.9	1990	38
Imperial Oil Ltd.	integrated oil and gas; chemicals	11.6	10.7	1990	9
ATCO Electric ²¹	electricity	9.3	7.7	1990	20
Husky Energy Inc. ²²	integrated oil and gas	9.1	6.5	1993	40
Stelco Inc.	steel	8.4	6.9	1991	21
EPCOR Utilities Inc. ²³	electricity; water	²⁴ 8.3	3.5	1990	142
Syncrude Canada Ltd. ²⁵	upstream oil and gas	8.0	7.2	1990	11
Shell Canada Limited	integrated oil and gas	8.0	8.1	1990	-1
Petro-Canada	integrated oil and gas	6.3	6.9	1990	-9
Suncor Inc.	integrated oil and gas	²⁶ 6.2	5.0	1990	25
DuPont Canada Inc. ²⁷	chemicals	²⁸ 5.4	11.2	1990	-52
Dofasco Inc.	steel	5.4	6.6	1990	-18

Table 2 shows that 14 firms reporting to VCR saw their emissions increase by more than 500 kt CO₂E between 1990 or some other base year and 2000. All but four already appeared in table 1. In contrast, only seven firms saw emissions decrease by more than 500 kt CO₂E (see table 9 in Appendix A), and in one case (TransAlta), the decrease occurred only because of massive use of offsets, of which the quality and credibility are open to question (see section 2.4).

¹⁶ figure is net of 12600 kt CO₂E of offsets, including 1581 kt of OPG's own pre-2000-vintage internal emissions reductions (see section 2.4)

¹⁷ direct emissions only (magnitude of electricity purchases unknown)

¹⁸ figure is net of 6112 kt CO₂E of offsets

¹⁹ direct emissions only (magnitude of electricity purchases unknown)

²⁰ excluding partially owned facilities (notably Foothills Pipe Lines Ltd. and Trans Quebec & Maritimes Pipeline Inc.)

²¹ direct emissions of carbon dioxide only (the company did make significant electricity purchases)

²² not clear whether downstream operations included

²³ excluding Joffre co-generation plant (joint venture); direct emissions only (magnitude of electricity purchases unknown)

²⁴ figure is net of 454 kt CO₂E of offsets

²⁵ carbon dioxide only; methane emissions were 733 kt CO₂E in 2000 but this amount is not included here to allow comparison with earlier years

²⁶ figure is net of 200 kt CO₂E of offsets

²⁷ excluding emissions associated with the generation of sold electricity

²⁸ figure includes 4000 kt CO₂E of emission reductions that were sold to Ontario Power Generation and that therefore have to be added to Dupont's emissions

Table 2. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for a base year and 2000, and whose emissions increased by more than 500 kt CO₂E between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year	Change base year-2000 (kt CO ₂ E)
EPCOR Utilities Inc. ²⁹	electricity; water	³⁰ 8346	3450	1990	4896
SaskPower ³¹	electricity	14517	10867	1990	3650
TransCanada ³²	natural gas pipelines; electricity	12290	8910	1990	3380
Husky Energy Inc. ³³	integrated oil and gas	9063	6494	1993	2569
PanCanadian Energy Corporation	upstream oil and gas	³⁴ 2760	1017	1990	1743
ATCO Electric ³⁵	electricity	9317	7746	1990	1571
Stelco Inc.	steel	8397	6926	1991	1471
BC Hydro	electricity	2274	914	1990	1360
Suncor Inc.	integrated oil and gas	³⁶ 6244	4983	1990	1261
Talisman Energy Inc.	upstream oil and gas	2180	954	1994	1226
Ontario Power Generation Inc. (OPG)	electricity	³⁷ 31700	30700	1990	1000
Imperial Oil Ltd.	integrated oil and gas; chemicals	11645	10665	1990	980
Syncrude Canada Ltd. ³⁸	upstream oil and gas	8000	7220	1990	780
BP Canada Energy Company ³⁹	upstream oil and gas; natural gas pipelines	4229	3677	1990	552

Table 3 shows the largest emissions increases in percentage terms. Twenty-one firms reporting to VCR saw their GHG emissions increase by over 50% between 1990 or some later base year and 2000. The largest emitters appearing in this list are EPCOR, PanCanadian (now part of EnCana), BC Hydro and Talisman, all four of which more than doubled their emissions between 1990 and 2000. In contrast, just four firms saw emissions decrease by more than 50%, including only one large emitter, DuPont (see table 10 in Appendix A).⁴⁰ Of the 97 firms that reported emissions for both 2000 and an earlier base year to VCR, 52 saw their emissions increase significantly (by more than 8%) between the two years.

²⁹ excluding Joffre co-generation plant (joint venture); direct emissions only (magnitude of electricity purchases unknown)

³⁰ figure is net of 454 kt CO₂E of offsets

³¹ direct emissions only (magnitude of electricity purchases unknown)

³² excluding partially owned facilities (notably Foothills Pipe Lines Ltd. and Trans Quebec & Maritimes Pipeline Inc.)

³³ not clear whether downstream operations included

³⁴ figure is net of 103 kt CO₂E of offsets

³⁵ direct emissions of carbon dioxide only (the company did make significant electricity purchases)

³⁶ figure is net of 200 kt CO₂E of offsets

³⁷ figure is net of 12600 kt CO₂E of offsets, including 1581 kt of OPG's own pre-2000-vintage internal emissions reductions (see section 2.4)

³⁸ carbon dioxide only; methane emissions were 733 kt CO₂E in 2000 but this amount is not included here to allow comparison with earlier years

³⁹ not clear whether Canadian Gas and Power business unit included

⁴⁰ Arguably it would be fairer to compare 50% increases to 33% decreases (i.e., 3/2 increases to 2/3 decreases). Fourteen firms, including the relatively large emitters Dow Chemical, ExxonMobil Canada and General Motors, saw

Table 3. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for a base year and 2000, and whose emissions increased by more than one-half between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year	% change base year-2000
Anadarko Canada Corporation	upstream oil and gas	557	86	1997	545
Bentofix Technologies Inc.	manufacturing - misc.	1	0	1992	424
Cambior inc.	mining/metals	10	2	1995	309
PrimeWest Energy Trust	upstream oil and gas	637	170	1997	275
EOG Resources Canada Inc.	upstream oil and gas	237	77	1990	208
PanCanadian Energy Corporation	upstream oil and gas	⁴¹ 2760	1017	1990	171
BC Hydro	electricity	2274	914	1990	149
EPCOR Utilities Inc. ⁴²	electricity; water	⁴³ 8346	3450	1990	142
Upton Resources Inc.	upstream oil and gas	38	16	1994	132
Honda of Canada Mfg. ⁴⁴	automobiles	98	43	1990	129
Talisman Energy Inc.	upstream oil and gas	2180	954	1994	129
Northrock Resources Ltd.	upstream oil and gas	259	123	1997	110
PCS Potash Cory Division	fertilizer	229	124	1991	84
ATCO Pipelines	natural gas pipelines	150	84	1990	79
Pioneer Natural Resources Canada Inc.	upstream oil and gas	129	74	1996	74
Manitoba Hydro ⁴⁵	electricity	910	530	1990	72
Mikro-Tek	manufacturing - misc.	0	0	1994	70
Canadian Hunter Exploration Ltd.	upstream oil and gas	631	406	1990	55
Signalta Resources Ltd. ⁴⁶	upstream oil and gas	119	77	1990	54
Albarrie Canada Limited	textiles	1	1	1990	53
Stora Enso Port Hawkesbury ⁴⁷	forest products	245	163	1990	51

Fewer conclusions can be drawn for individual firms from year-on-year changes in emissions than from changes over a decade, as short-term fluctuations in business conditions can dominate year-on-year changes. However, taking the entities that reported year 2000 emissions to VCR as a group, the changes between 1999 and 2000 meaningfully confirm that the overall trend between 1990 and 2000 was still underway at the end of the decade. Table 4 shows that nine firms reporting to VCR saw their emissions increase by more than 300 kt CO₂E between 1999 and 2000. In contrast, eight firms saw emissions decrease by more than 300 kt CO₂E (see table 11 in Appendix A). However, in two of these eight cases (OPG and TransAlta), the decreases occurred only because of massive use of offsets, of which the quality

emissions fall by more than 33% between 1990 or some other base year and 2000. This is still a significantly smaller number than the number of firms with increases of 50% or more.

⁴¹ figure is net of 103 kt CO₂E of offsets

⁴² excluding Joffre co-generation plant (joint venture); direct emissions only (magnitude of electricity purchases unknown)

⁴³ figure is net of 454 kt CO₂E of offsets

⁴⁴ "year x" emissions are for April year x to March year x+1

⁴⁵ excluding Centra Gas Manitoba Inc.; direct emissions only (the company did make significant electricity purchases); "2000" and "1999" emissions are for 2000/01 and 1999/2000 respectively (start/end months undefined)

⁴⁶ emissions from purchased fuel excluded

⁴⁷ direct emissions only (magnitude of electricity purchases unknown)

and credibility is, in some cases, clearly in doubt (see section 2.4). Of the 92 firms that reported emissions for both 2000 and 1999 to VCR, 53 saw their emissions increase between the two years.

Table 4. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for 1999 and 2000, and whose emissions increased by more than 300 kt CO₂E between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Change 1999-2000 (kt CO ₂ E)
Gulf Canada Resources Ltd.	upstream oil and gas	2390	1118	1272
BC Hydro	electricity	2274	1387	887
Talisman Energy Inc.	upstream oil and gas	2180	1613	567
Husky Energy Inc. ⁴⁸	integrated oil and gas	9063	8570	493
Anadarko Canada Corporation	upstream oil and gas	557	101	456
Imperial Oil Ltd.	integrated oil and gas; chemicals	11645	11215	430
NOVA Chemicals ⁴⁹	chemicals	4871	4483	388
PrimeWest Energy Trust	upstream oil and gas	637	275	362
Nexen Canada Ltd.	upstream oil and gas	2586	2279	307

Although what counts for protecting the climate is reducing absolute emissions, emissions intensity (emissions per unit of production) is a good indicator of how much effort firms are making to lessen their impact on the climate, independently of whether their level of commercial activity is rising or falling. Emissions intensity tends to fall “naturally” over time as technologies improve, even while emissions increase. For example, Canada’s overall GHG emissions intensity (emissions per dollar of gross domestic product, adjusted for inflation) fell by 10% between 1990 and 2000, and US national GHG emissions intensity fell by 17% over the same period.⁵⁰

Of the 102 industrial entities reporting year 2000 emissions to the VCR, 83 also reported emissions for a base year as well as the production figures for both years that are necessary to calculate emissions intensities.⁵¹ Table 5 shows that 19 of these entities—nearly one-quarter—actually saw their emissions intensity increase between 1990 or a later base year and 2000. The largest emitters in this list (those with emissions over 1 Mt CO₂E) are Imperial Oil, ATCO Electric, PanCanadian (now part of EnCana), BC Hydro and Talisman. Emissions increases among these firms are occurring not only because of economic growth, but also because of shifts to more GHG-intense activities.

In contrast, 13 entities (see table 12 in Appendix A) achieved average annual reductions in emissions intensity between 1990 and 2000 of at least 4%, roughly the rate of reduction in emissions intensity that Canada’s economy as a whole needs to achieve between 2000 and 2012 to meet our Kyoto emissions target through domestic emission reductions. But most of these entities are relatively small emitters: only one, Enbridge, has emissions over 1 Mt CO₂E.

⁴⁸ not clear whether downstream operations included

⁴⁹ including the Ethylene 3 and cogeneration facilities at Joffre (joint ventures) and a fraction of the Sarnia cogeneration facility in proportion to fuel supplied to it by NOVA; excluding emissions associated with the generation of sold electricity

⁵⁰ Matthew Bramley (May 2002), *A Comparison of Current Government Action on Climate Change in the U.S. and Canada*, Pembina Institute, p.51. Available at http://www.pembina.org/publications_item.asp?id=129.

⁵¹ For entities with multiple products that cannot meaningfully be added together, intensities have been calculated using the emissions and production figures corresponding to the product with largest associated emissions.

Table 5. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions and production for a base year and 2000, and whose emissions intensity increased between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year	% change in emissions intensity base year-2000
BC Hydro	electricity	2274	1990	121
Rife Resources Ltd.	upstream oil and gas	72	1992	94
Cambior inc.	mining/metals	10	1995	91
Signalta Resources Ltd. ⁵²	upstream oil and gas	119	1990	54
Pioneer Natural Resources Canada Inc.	upstream oil and gas	129	1996	43
PrimeWest Energy Trust	upstream oil and gas	637	1997	37
Imperial Oil Ltd.	integrated oil and gas; chemicals	11645	1990	31
Talisman Energy Inc.	upstream oil and gas	2180	1994	29
Northrock Resources Ltd.	upstream oil and gas	259	1997	27
Novotel Ottawa	hospitality	1	1999	13
ATCO Pipelines	natural gas pipelines	150	1990	13
Chevron Canada Resources	upstream oil and gas	1346	1990	11
Upton Resources Inc.	upstream oil and gas	38	1994	8
PanCanadian Energy Corporation	upstream oil and gas	⁵³ 2760	1990	5
Manitoba Hydro ⁵⁴	electricity	910	1990	5
ARC Resources Ltd.	upstream oil and gas	238	1999	1
Stora Enso Port Hawkesbury ⁵⁵	forest products	245	1990	1
ATCO Electric	electricity	9317	1990	1
Pacifica Papers Company	forest products	⁵⁶ 419	1990	1

Overall, tables 1-5 (compared to tables 9-12 in Appendix A) illustrate in different ways three facts:

- most industrial firms reporting their GHG emissions to VCR have seen those emissions increase significantly since 1990, a trend still underway at the end of the decade;
- a higher proportion of the largest emitters have seen significant percentage increases in emissions since 1990 than firms reporting to VCR as a whole;
- many emissions increases are occurring because of shifts to more GHG-intense activities—the opposite of what one would expect from firms making meaningful efforts to address climate change.⁵⁷

These facts shed important light on the claim, made by associations representing most of Canada's major industrial GHG emitters, that the latter have been taking "significant action" to address GHG emissions.

⁵² emissions from purchased fuel excluded

⁵³ figure is net of 103 kt CO₂E of offsets

⁵⁴ excluding Centra Gas Manitoba Inc.; direct emissions only (the company did make significant electricity purchases); "2000" and "1999" emissions are for 2000/01 and 1999/2000 respectively (start/end months undefined)

⁵⁵ direct emissions only (magnitude of electricity purchases unknown)

⁵⁶ figure includes 214 kt CO₂E of emission reductions that were retained by MacMillan Bloedel (former parent company) and that therefore have to be added to Pacifica's emissions

⁵⁷ While some firms may feel they have serious business reasons for such shifts, a serious commitment to address climate change would see them accompanied by more aggressive action to reduce GHG emissions elsewhere in firms' own operations or through the use of credible, high quality offsets.

Clearly, the action taken has not been “significant” in the sense of generating the kind of emissions reductions required by the Kyoto Protocol—or to even begin to face the challenge of stabilizing atmospheric concentrations of GHGs.

2.2 Further increases are planned

What additional light can VCR submissions shed on the industry associations’ demand that major industrial GHG emitters be allowed to determine their own targets for future emissions, outside the framework of the Kyoto Protocol?

In addition to the information on past emissions presented in section 2.1, VCR submissions often provide firms’ projections of, or targets for, future emissions.⁵⁸ Table 6 shows the emissions targets/projections provided in the VCR submissions reporting the year 2000 emissions of the 15 largest emitters, previously listed in table 1. The future year used in each case is the furthest one for which the VCR submission provides a target/projection that is comparable to historical emissions.

Table 6 shows that of the 15 largest emitters reporting year 2000 emissions to VCR, 12 have adopted future emissions targets/projections for years ranging between 2005 and 2011. Of these 12,

- four are planning to keep their emissions far (32-87%) above the 1990 level,
- three are planning to keep their emissions substantially (13-18%) above the 1990 level,
- two are planning “Kyoto-level” reductions (3-6%) below the 1990 level,
- three are planning larger reductions (13-87%) below the 1990 level.

It should be added that the three large emitters in table 6 without targets all had large emission increases (20%, 21% and 142%) between their base years and 2000 (see table 1). This, together with their failure to adopt emissions targets, does not bode well for their future intentions to limit their emissions.

In sum, two-thirds (seven plus three out of 15) of the largest emitters are either planning, or seem very likely to be anticipating, keeping their emissions substantially or far above 1990 levels. It should also be recalled (see text preceding table 1) that three large emitters would probably have been added to tables 1 and 6 had they reported year 2000 emissions to VCR, and that they all saw large increases in emissions between 1990 and 1998.

In addition, the example of EPCOR, highlighted in the case study below, is instructive as to the credibility of voluntary corporate GHG emissions targets: it suggests that the five targets in table 6 that are “Kyoto-level” or better should be viewed with caution.

In a number of cases in table 6, firms are planning to make some use of offsets to achieve their targets. An assessment of the quality and credibility of such offsets cannot be undertaken until they are identified. Potential problems with offsets are discussed in section 2.4.

It should be noted that Canada’s industrial GHG emissions, net of offsets, could increase even while Canada complied with the Kyoto Protocol. However, this would require responsibility for achieving the Kyoto emissions target to be allocated in such a way that other emitters make emission reductions beyond the Kyoto level to offset the industrial emission increases. The federal government has not yet set a target for industrial emissions under the Kyoto Protocol.

⁵⁸ The projections discussed in this section are firms’ “with measures” estimates of future emissions, not “business as usual” projections. In a context of voluntary action, there is little to distinguish such projections from “targets.”

Table 6. Future GHG emission targets/projections by industrial entities that made a VCR submission by March 31, 2002 stating their emissions for 2000, and whose emissions exceeded 5 Mt CO₂E.

Entity	Sector	Emissions target for future year (Mt CO ₂ E)	Future year	2000 emissions (Mt CO ₂ E)	1990 emissions (Mt CO ₂ E)	% change 2000-future year	% change 1990-future year
Ontario Power Generation Inc. (OPG)	electricity	⁵⁹ not comparable	2006	⁶⁰ 31.7	30.7	-19	-19
TransAlta Corporation ⁶¹	electricity	25.4	2005	⁶² 21.3	26.1	19	-3
SaskPower ⁶³	electricity	14.4	2005	14.5	10.9	-1	32
TransCanada ⁶⁴	natural gas pipelines; electricity	⁶⁵ not comparable	2006	12.3	8.9	0	36
Imperial Oil Ltd.	integrated oil and gas; chemicals	12.5	2005	11.6	10.7	8	18
ATCO Electric	electricity	none	n/a	9.3	7.7	n/a	n/a
Husky Energy Inc. ⁶⁶	integrated oil and gas	⁶⁷ 10.1	2006	9.1	⁶⁸ 6.5	11	⁶⁹ 56
Stelco Inc.	steel	⁷⁰ none	n/a	8.4	n/a	n/a	n/a
EPCOR Utilities Inc. ⁷¹	electricity; water	none	n/a	⁷² 8.3	3.5	n/a	n/a
Syncrude Canada Ltd. ⁷³	upstream oil and gas	13.5	2011	8.0	7.2	69	87
Shell Canada Limited	integrated oil and gas	9.4	2008-10 ⁷⁴	8.0	8.1	17	16
Petro-Canada	integrated oil and gas	7.8	2006	6.3	6.9	24	13
Suncor Inc.	integrated oil and gas	4.7	2010	⁷⁵ 6.2	5.0	-25	-6

⁵⁹ OPG's target and the % changes given in the table are for direct emissions, while the historical emissions given here include indirect emissions.

⁶⁰ figure is net of 12600 kt CO₂E of offsets, including 1581 kt of OPG's own pre-2000-vintage internal emissions reductions (see section 2.4)

⁶¹ direct emissions only (magnitude of electricity purchases unknown)

⁶² figure is net of 6112 kt CO₂E of offsets

⁶³ direct emissions only (magnitude of electricity purchases unknown)

⁶⁴ excluding partially owned facilities (notably Foothills Pipe Lines Ltd. and Trans Quebec & Maritimes Pipeline Inc.)

⁶⁵ TransCanada's projection and the % changes given in the table are for its pipelines business only. But the firm has now also launched a "major expansion" of its electricity generation business, which suggests that growth in its total emissions will be higher still.

⁶⁶ not clear whether downstream operations included

⁶⁷ Husky's projection emissions for 2006, including "planned and potential" emissions reduction measures, are 10.1 Mt. However, its VCR submission also states a target of 5 Mt CO₂E below business as usual, equivalent to 9.0 Mt.

⁶⁸ 1993 emissions

⁶⁹ % change 1993-2006

⁷⁰ Stelco's two facilities that account for the vast majority of its emissions both have targets for reducing energy consumption per unit of production by 2010, but these have not been converted into emissions targets, nor is there an emissions target for the firm as a whole.

⁷¹ excluding Joffre co-generation plant (joint venture); direct emissions only (magnitude of electricity purchases unknown)

⁷² figure is net of 454 kt CO₂E of offsets

⁷³ carbon dioxide only; methane emissions were 733 kt CO₂E in 2000 but this amount is not included here to allow comparison with earlier years

⁷⁴ target is a combination of a 2010 target for the Athabasca Oil Sands Project and a 2008 target for the company's other operations

⁷⁵ figure is net of 200 kt CO₂E of offsets

Entity	Sector	Emissions target for future year (Mt CO ₂ E)	Future year	2000 emissions (Mt CO ₂ E)	1990 emissions (Mt CO ₂ E)	% change 2000-future year	% change 1990-future year
DuPont Canada Inc. ⁷⁶	chemicals	1.5	2010	⁷⁷ 5.4	11.2	-72	-87
Dofasco Inc.	steel	5.7	2005	5.4	6.6	7	-13

Case study: EPCOR's disappearing targets

The interesting evolution of targets announced by EPCOR in successive submissions to VCR provides a cautionary tale regarding the credibility of voluntary corporate GHG emissions targets.

In EPCOR's October 31, 1999 submission to VCR, the company stated:⁷⁸

Subsequent to obligations that Canada made in Kyoto, EPCOR established an additional target of achieving a 6% reduction below our 1990 levels in net greenhouse gas emissions from our operations by the first Kyoto budget period (2008-2012). This commitment includes a 100% offset or reduction of emissions from new generation projects.

In the company's November 8, 2000 submission to VCR, the first part of the the commitment was retained, but the second part had mysteriously disappeared:

Subsequent to obligations that Canada made in Kyoto in 1997, EPCOR established an additional target of achieving a 6% reduction below our 1990 levels in net greenhouse gas emissions from our existing operations by the first Kyoto budget period (2008-2012). [with no mention of new projects]⁷⁹

In EPCOR's most recent, September 27, 2001 submission to VCR, the reference to a 6% reduction below 1990 levels has been completely dropped. In fact, the submission contains no emissions targets or projections at all. Instead, it says:⁸⁰

As circumstances, guidelines, regulations, expectations, knowledge or technologies change, so do our targets and strategies.

By a curious coincidence, earlier in 2001 EPCOR applied to build a major new coal-fired power plant (Genesee Generating Station Phase 3) that has now been approved and is expected to add 1.6 Mt CO₂E^{81,82} to the company's net GHG emissions. This amount of new net emissions is equivalent to 46% of EPCOR's total 1990 emissions.

⁷⁶ excluding emissions associated with the generation of sold electricity

⁷⁷ figure includes 4000 kt CO₂E of emission reductions that were sold to Ontario Power Generation and that therefore have to be added to Dupont's emissions

⁷⁸ EPCOR (1999), *EPCOR Voluntary Action Plan 1999, produced for Canada's Climate Change Voluntary Challenge & Registry Inc., October 31, 1999*, p.1. Available at <http://www.vcr-mvr.ca/ClientDetail.cfm?No=651>.

⁷⁹ EPCOR (2000), *EPCOR Voluntary Action Plan 1999, produced for Canada's Climate Change Voluntary Challenge & Registry Inc., Updated November 8, 2000*, p.1. Available at <http://www.vcr-mvr.ca/ClientDetail.cfm?No=651>.

⁸⁰ EPCOR (2001), *Voluntary Action Plan Progress Report 2000, produced for Canada's Climate Change Voluntary Challenge & Registry Inc.*, p.3. Available at <http://www.vcr-mvr.ca/ClientDetail.cfm?No=651>.

⁸¹ EPCOR (2001), *Alberta Energy and Utilities Board/Alberta Environment Integrated Application*, Volume 1, Section 1.8, Table 1.8.1.

⁸² This figure is net of offsets equivalent to just over 50% of the new plant's actual, physical emissions. The company volunteered, and Alberta Environment has now required, the purchase of these offsets. An assessment of their quality and credibility cannot be undertaken until they are identified.

2.3 Who's really participating?

The VCR program has been repeatedly held up by participating firms and their industry associations as evidence for the success of the voluntary approach to addressing climate change. Inherent in this rhetoric is the notion of a high level of participation in the VCR. The VCR itself proudly advertizes on its home page, in red highlighting, the large number of organizations that have registered with the program.

The reality is different. On June 25, 2002, 813 organizations were registered with VCR. Of these, 78 were governments (federal, provincial, municipal), 222 were educational or healthcare institutions, and 20 were industry associations, leaving 493 industrial entities. Of these 493,

- fully 248 made no submission whatsoever to VCR between January 1, 2001 and March 31, 2002;
- a further 54 (almost all from the chemicals sector) simply submitted a generic industry association report lacking company-specific emissions data;
- 89 made unique submissions, but without reporting emissions for the year 2000;
- one made a submission identical to that of another entity (that it had presumably recently acquired).

Only 101 industrial entities, therefore, made submissions reporting year 2000 emissions by March 31, 2002. One of these entities made two submissions, one for itself and one for a recently acquired subsidiary, making a total of 102 submissions providing emissions data for this report.

In other words, barely one-fifth of the 493 industrial entities registered with VCR reported their emissions for the year 2000 to the program within 15 months of the end of that year. (At most, only a handful more will have reported year 2000 emissions after March 31, 2002, as the vast majority of submissions are made in the fall of the year following the year for which emissions are reported.)

It could be argued that this analysis is unfair, as many of the entities failing to report emissions to VCR likely do not have very large emissions. An alternative approach, then, is to estimate the proportion of Canada's industrial GHG emissions that are reported to VCR. The total year 2000 emissions of the 102 industrial entities reporting emissions for that year to VCR by March 31, 2002 were 209.7 Mt CO₂E. (This total was compiled, wherever possible, using entities' direct actual emissions, not net of offsets, but in the several cases where entities reported only the sum of direct plus indirect emissions, indirect emissions had to be included; as a result, the 209.7 Mt total is an overestimate as it includes some double counting of emissions associated with electricity generation.)

In comparison, Canada's aggregate GHG inventory shows that in 2000 industrial facilities, including electricity generation, directly accounted for 52% of Canada's GHG emissions, or 382 Mt CO₂E.⁸³ Entities reporting to VCR therefore account for less than 55% of emissions from industrial facilities in Canada.⁸⁴

A third way to assess the success of the VCR program in terms of participation is to identify major emitters who are failing to report their emissions. Drawing on the Pembina Institute's previous reviews of VCR submissions,⁸⁵ table 7 shows the industrial entities with emissions over 500 kt CO₂E that reported their 1997 or 1998 emissions to VCR but then failed to report their year 2000 emissions. As noted in the text preceding table 1, three of these—New Brunswick Power, Nova Scotia Power and Westcoast Energy—are among Canada's largest emitters, with emissions over 5 Mt CO₂E.

⁸³ L. Henderson et al. (June 2002), *op. cit.*

⁸⁴ $209.7 \div 382 \times 100 = 55$

⁸⁵ Matthew Bramley (October 2000), *op. cit.*

Table 7. Industrial entities that made a VCR submission stating 1997 or 1998 emissions exceeding 500 kt CO₂E by December 31, 1998 or June 30, 2000 respectively but failed to make a VCR submission by March 31, 2002 stating their emissions for 2000.

Entity	Sector	1998 emissions (kt CO ₂ E)	1997 emissions (kt CO ₂ E)
Abitibi-Consolidated	forest products	1531	
Agrium	chemicals	2851	
Alberta Energy ⁸⁶	upstream oil and gas; natural gas pipelines	2277	
Canadian Natural Resources	upstream oil and gas		2593
Celanese Canada	chemicals		1448
Domtar	forest products		504
Kruger	forest products	564	
Methanex	chemicals		1070
Murphy Oil	upstream oil and gas	628	
New Brunswick Power	electricity	9700	
Nova Scotia Power	electricity	7969	
Penn West Petroleum	upstream oil and gas	645	
St. Lawrence Cement	cement		1669
Teck	mining/metals		659
Westcoast Energy ⁸⁷	natural gas pipelines; natural gas distribution; electricity	5218	

Beyond the omissions identified in table 7, it is notable that:

- no cement producers or rail operators,
- only one trucking firm,
- only one small commercial real estate firm;
- only two relatively small aluminum smelters and
- only a few of Canada's numerous chemicals producers

reported their year 2000 emissions to VCR. Cement, rail, trucking, commercial buildings, aluminum and chemicals are all important GHG-emitting sectors.

Finally, although the comparison is imperfect because of varying time periods and changes in numbers of entities as a result of mergers and acquisitions, the number of industrial entities reporting emissions to VCR is certainly not growing:

- 100 industrial entities reported their 1997 emissions to VCR in the 12 months following the end of that year;⁸⁸
- 115 industrial entities reported their 1998 emissions to VCR in the 18 months following the end of that year;⁸⁹ and, as shown in this report,
- 102 industrial entities reported their year 2000 emissions to VCR in the 15 months following the end of that year.

⁸⁶ Alberta Energy is now part of EnCana Corporation. We have verified that EnCana did not file a VCR submission for year 2000 emissions on behalf of Alberta Energy by March 31, 2002.

⁸⁷ Westcoast Energy is now part of Duke Energy. We have verified that Duke did not file a VCR submission for year 2000 emissions on behalf of Westcoast by March 31, 2002.

⁸⁸ Matthew Bramley (October 2000), *op. cit.*

⁸⁹ Matthew Bramley (October 2000), *op. cit.*

Case study: failing “champions”

Another way the VCR gives an excessively rosy picture of the level of participation achieved is through its gold, silver and bronze “champion” reporting levels. While these designations sound impressive, quantification of current-year GHG emissions is only a “required element” for the gold level; an organization can achieve silver or bronze designations without actually reporting emissions.

The VCR home page proudly announces the current number of champion-level reporters. Our suspicions were aroused by the fact that there seemed to be many more champion-level reporters than organizations that had actually reported their year 2000 emissions. A check undertaken on July 15, 2002 revealed that while only 102 industrial entities reported their year 2000 emissions to VCR by March 31, 2002, an additional 52 industrial entities were being advertized as champion-level reporters on the VCR Web site. It turned out that 29 of these 52 had made no submission whatsoever to VCR since January 1, 2001: their champion level designations were based, in some cases, on submissions made as long ago as November 1998. The other 23 had made submissions since January 1, 2001 but those submissions did not actually report year 2000 emissions. The 52 failing “champions” are listed below.

Entity	Champion level	Entity	Champion level
Abitibi-Consolidated Inc.	silver	McLeod Harvest Inc.	bronze
Agrium	silver	Moosehead Breweries Ltd.	bronze
Alberta Energy Company	gold	Norske Skog Canada	silver
Archean Energy Ltd.	silver	Nova Scotia Power Inc.	gold
Bison Transport	gold	Novotel Canada Inc.	silver
Bowater Mersey Paper Company Limited	silver	Oxy Vinyls Limited	gold
Business Depot Ltd.	bronze	Panasonic Canada Inc. ⁹⁰	gold
Cadillac Fairview Corporation Ltd - Ontario Portfolio	bronze	Paramount Resources Ltd.	silver
Canadian Natural Resources Limited	gold	Pembina Pipeline Corporation	silver
Canlan Ice Sports Corp.	silver	Petresa Canada Inc.	gold
Celanese Canada Inc.	silver	Sabre Energy Ltd.	bronze
Chinook Group Limited	gold	SGT 2000 inc.	gold
DaimlerChrysler Canada Inc.	gold	Shiningbank Energy Ltd.	gold
Delta Meadowvale Resort & Conference Centre	gold	St Marys Cement Co.	gold
Express Pipeline Ltd.	silver	St. Lawrence Cement Co.	bronze
Fording Coal Limited	bronze	St. Lawrence Corp.	silver
Gaz Métropolitain	gold	Summit Resources Limited	gold
Genesis Exploration Ltd.	silver	Teck Cominco Limited	silver
Grand & Toy Limited	silver	Tembec Inc. ⁹¹	silver
Husky Injection Molding System Ltd.	gold	The Body Shop	silver
Imperial Tobacco Canada Limited	silver	Toronto Dominion Centre Leaseholds Ltd.	silver
Irving Oil Limited	gold	Triumph Energy Corporation	silver
Koch Canada, L.P.	silver	VanCity Savings Credit Union	gold
Kruger Inc.	silver	Volvo Canada Ltd.	bronze
London Life Insurance Company	bronze	Westcoast Energy Inc.	silver
M & I Heat Transfer Products	bronze	Weyerhaeuser Canada Ltd.	bronze

⁹⁰ reported Panasonic’s global emissions for 2000 but not its Canadian emissions

⁹¹ reported for one facility (Spruce Falls Operations) only

2.4 Can we believe the numbers?

A fundamental ingredient of any effective program to limit emissions is reliable, meaningful emissions quantification. Without good quantification, certainty about progress (or the lack of it) is undermined, and program assessment quickly becomes mired in doubts about data quality and comparability.

Clearly, the VCR program generates reams of emissions numbers, but can we believe them?

The Pembina Institute obviously believes that the data contained in VCR submissions are useful enough to generate some important conclusions. But it is also clear that the data have many flaws, and must be treated with care. One outstanding concern is that very few VCR submissions are subject to verification by independent professional auditors. While several submissions assert that the information they contain is “verifiable,” this is not the same thing as “verified.” The numbers have to be taken on trust.

Beyond that overriding concern, there are a large number of major inconsistencies in the methodology used by firms in calculating the emissions they report to VCR. They are presented here roughly in descending order of their potential impact on emissions data.

- Some firms use established industry-standard methodologies and emission factors (although there can be more than one of these even for a single sector); others use non-standard and typically poorly documented methodologies.
- Methodologies for quantifying offsets (see below) are rarely described or referenced, but it is certain that they vary widely.
- Some firms arbitrarily exclude certain of their facilities or wholly-owned subsidiaries from their emissions calculations.
- Some firms report 100% of emissions from facilities they own, while others report 100% of emissions from facilities they operate (but do not necessarily wholly own), and a few report emissions from joint ventures on an equity-share basis.
- Some firms adjust a given year’s emissions to include operations subsequently acquired and/or exclude operations subsequently divested; others do not, or else leave the question unclear.⁹²
- However, a few firms make so many adjustments to their actual emissions to account for acquisitions, divestitures, internal emissions reduction projects, offsets etc., without clearly documenting them, that it becomes difficult or impossible to tell what their actual emissions are.
- Most firms include in their emissions total the emissions associated with the generation of the electricity they purchase, but some, especially electricity producers, do not.⁹³
- Firms often use a single emissions factor for indirect emissions from purchased electricity for all years reported, despite significant changes from year to year in the average carbon intensity of electricity supply in some provinces.
- There are wide discrepancies in the kinds of activities included in emissions calculations. Some firms include emissions associated with their buildings, vehicles and other mobile equipment, on-site contractors’ equipment and internal waste disposal operations; many do not.
- A few firms adjust reported emissions for past years to eliminate the effects of “unrepresentative” conditions (e.g. weather, labour dispute) and fail to state actual emissions for those years.

⁹² Such adjustments are desirable and help to clarify emissions trends, because adjusted data for all years then apply to the entity’s *current* operations, even if the entity’s actual operations were different in the past. Emissions from divested operations should be accounted for by the new owners.

⁹³ It is common for electricity producers to purchase large amounts of electricity (relative to their own production) for resale.

- A few firms do not report emissions of methane and nitrous oxide. Emissions of the three fluorinated gases covered under the Kyoto Protocol⁹⁴ are likely, in many cases, to be small or zero, but most firms do not appear even to have considered them.
- A few firms report emissions for fiscal rather than calendar years.
- Firms in the same industrial sector sometimes use different and irreconcilable measures of production, preventing a comparison of their emissions intensities.

In addition to the preceding list, there are also many variations in the manner and level of detail of reporting (as opposed to calculating) emissions and production data. These variations further undermine data comparability. In some cases, VCR submissions present information in a highly misleading way, as illustrated by the Imperial Oil case study below.

Offsets present particular problems, the first of which, as noted above, is that methodologies for quantifying them are rarely described or referenced. In addition, quantification of offsets tends to be difficult and controversial, raising key issues such as:

- **Additionality.** Do the reductions depend on the purchasing firm's investment in an offset project, or would they have happened anyway? If the reductions would have happened anyway, and the offset project is in a sector that is not subject to any kind of emissions limitation for the period during which the offsets are generated, then the offsets do not represent genuine reductions.
- **Ownership.** Does the firm claiming offsets have clear ownership over the corresponding emissions reductions? If ownership is unclear, then the reductions may be being counted by more than one entity. Some offsets claimed in VCR submissions result from a formal emissions trade, in which case there will have been a contractual transfer of ownership, but others do not, and consequently run the risk of double counting.
- **Leakage.** Might the reductions achieved in one project or locality be causing an increase in emissions elsewhere?
- **Permanence.** In the case of enhancement to GHG sinks,⁹⁵ what guarantee exists that the carbon stored in trees or soil will not be released back to the atmosphere at a later date?

Compounding these problems of quantification is the fact that there is currently no government-sanctioned certification of offsets. The Pembina Institute encourages firms that have exhausted reasonable opportunities to reduce emissions from their own operations to purchase offsets, but only if satisfactory answers can be provided to the kinds of questions raised in the preceding list of key issues. The Ontario Power Generation case study below shows just how misleading some claimed offsets can be.

⁹⁴ perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride

⁹⁵ processes in which GHGs are absorbed from the atmosphere, e.g., by growing trees or agricultural soils

Case study: Imperial Oil tries to blame the consumer

Imperial Oil is Canada's fifth largest GHG emitter, and its emissions rose by 9% between 1990 and 2000 (see table 1). In Imperial's VCR submission reporting its year 2000 emissions, Chairman R.B. Peterson writes:

We continue to pursue economic opportunities to improve the energy efficiency of our operations... We have reduced flaring and venting from our upstream operations and have achieved one of the highest solution gas conservation rates in the industry. However, these gains have been more than offset by higher production to meet growing demand for energy in the North American economy.⁹⁶

To paraphrase: "our emissions have risen because we have upped production to satisfy consumer demand."

Imperial's VCR submission does not actually state production levels. Instead, it gives emissions and emissions intensity (emissions per unit production) numbers for each of five business units, three in upstream oil and gas production, and two in downstream refining and chemicals. But using the emissions and intensity figures, it is easy to calculate production levels for each of the five business units and then combine these to obtain two sets of emissions and production figures, one for the upstream and one for the downstream business.

The results are shown in the table below, with emissions in kt CO₂E and production in thousands of barrels of oil equivalent (upstream) and kilotonnes (downstream). They reveal that between 1990 and 2000, Imperial's production actually fell in both the upstream and downstream. But upstream emissions intensity increased by a hefty 31% while downstream intensity also rose slightly (by 4%).

Between 1999 and 2000, there was a modest production increase in the downstream but a sharper production fall in the upstream. Emissions intensities continued to rise in both businesses.

What Mr. Peterson should have said in his Chairman's Message is that Imperial's emissions have increased since 1990 mainly because falling production in its upstream operations has been more than offset by much higher emissions intensity. The consumer doesn't seem to have had much to do with it.

		1990	1999	2000	% change 1990-2000	% change 1999-2000
Upstream	Emissions	4980	5665	5830	17	3
	Production	129.6	122.9	115.8	-11	-6
	Intensity	38.44	46.09	50.33	31	9
Downstream	Emissions	5685	5550	5815	2	5
	Production	22.96	21.80	22.61	-2	4
	Intensity	247.6	254.6	257.2	4	1

⁹⁶ Esso/Imperial Oil (October 2001), *Climate Change Voluntary Challenge and Registry Program 2000 Update*, p.3.

Case study: Ontario Power Generation's emissions accounting tricks

As well as being Canada's largest GHG emitter, Ontario Power Generation (OPG) relies more heavily on GHG offsets than any other Canadian company (see table 1). OPG's net emissions in 2000 were 31.7 Mt CO₂E, but its actual emissions, including indirect emissions from purchased electricity, were 44.3 Mt CO₂E. The difference was made up by 12.6 Mt CO₂E of offsets. These offsets alone are equivalent to 1.7% of Canada's total GHG emissions (726 Mt CO₂E⁹⁷).

Offsets are typically defined as emission reductions or enhancements to GHG sinks⁹⁸ realized outside a firm's normal operations but over which the firm claims ownership, ideally through a formal contract. OPG has been enormously active in the emerging unregulated GHG emissions trading market, buying offsets relating to activities as diverse as process changes in chemical manufacture, landfill gas capture, geological sequestration of carbon dioxide, geothermal energy and small hydro power projects. Many of these activities took place in the U.S., and some in Europe.⁹⁹

The Pembina Institute regards the purchase of offsets that correspond to genuine emission reductions as an appropriate, flexible strategy that can help firms to further reduce their net emissions once they have exhausted low- or negative-cost opportunities to reduce emissions from their own operations. Unfortunately, we are unable to assess the quality of OPG's various offsets—in particular, the extent to which they correspond to emissions reductions that would not have occurred anyway, without OPG's intervention—because the company's VCR submission has nothing to say about the methodologies used to quantify them.

Beyond these initial concerns, OPG has taken the flexibility provided by offsets two stages further than is the norm—and well into the domain where offset-based emissions accounting loses touch with reality.

First, OPG has relied mainly on offsets banked from years prior to 2000 to reduce its net year 2000 emissions. In other words, emission reductions that physically occurred in the years from 1991 to 1999 have been subtracted from OPG's own emissions that physically occurred in 2000. This banking might have been acceptable in the framework of a formal, government-regulated emissions trading scheme under which OPG faced a limit on its emissions in those earlier years. But OPG faced no such limit, and it did not even have a voluntary emissions target for those years. As a result, the company saved up all the 1990s-vintage offsets it had acquired and used them all at once in the year for which it had a target: 2000. This resulted in OPG's dramatic but quite artificial 6.1 Mt CO₂E reduction in net emissions between 1999 and 2000 (see table 11 in Appendix A).

Worse, 1.6 Mt CO₂E of the banked 1990s-vintage offsets that OPG made use of in 2000 came from its own operations. In other words, OPG formally quantified emission reductions from a large range of internal projects carried out between 1994 and 1999 and then subtracted those reductions from its year 2000 emissions. To avoid double counting, the company should have correspondingly added those reductions back onto its 1994-99 emissions, but it is far from clear whether it did so. But even if double counting is avoided, use of banked internal reductions amounts to reallocating a company's emissions from one year to another. In financial markets, artificial reallocation of a firm's profits from one year to another would be rightly dismissed as an accounting trick.

⁹⁷ L. Henderson et al., *op. cit.*

⁹⁸ processes in which GHGs are absorbed from the atmosphere, e.g., by growing trees or agricultural soils

⁹⁹ Ontario Power Generation (2001), *Greenhouse Gas Action Plan - 2000, Submitted to Canada's Climate Change Voluntary Challenge and Registry Inc., October 2001*, p.36.

3. Conclusions

This report has examined the publicly available track record of Canada's industrial firms in addressing climate change via their participation in the VCR, Canada's flagship program to address industrial GHG emissions for the past seven years. The VCR aims to encourage firms to limit their GHG emissions on a voluntary basis. The main findings arrived at in chapter 2 were these:

- Most industrial firms reporting their GHG emissions to VCR have seen those emissions increase significantly since 1990, a trend still underway at the end of the decade. A higher proportion of the largest emitters have seen significant percentage increases in emissions since 1990 than firms reporting to VCR as a whole. Many emissions increases are occurring because of shifts to more GHG-intensive activities—the opposite of what one would expect from firms making meaningful efforts to address climate change. (Section 2.1.)
- Two-thirds of the largest emitters are either planning, or seem very likely to be anticipating, keeping their emissions substantially or far above 1990 levels. The ease with which voluntary commitments can be altered or abandoned suggests that the “Kyoto-level” or better future emissions targets that some firms have adopted should be viewed with caution. (Section 2.2.)
- The level of participation in the VCR, impressive at first sight, turns out on closer inspection to be mediocre. Out of 493 industrial entities registered with VCR in mid-2002, only 102 actually reported their year 2000 emissions by March 31, 2002. Entities reporting to VCR account for less than 55% of emissions from industrial facilities in Canada. Some of Canada's largest GHG emitters are failing to report to VCR, and the cement, rail, trucking, commercial buildings, aluminum and chemicals sectors are particularly under-represented. Fifty-two industrial entities designated as gold, silver or bronze “champion-level” reporters on the VCR Web site failed to report their year 2000 emissions to VCR. (Section 2.3.)
- There are a large number of major inconsistencies in the methodology used by firms in calculating the emissions they report, and data reported to VCR are rarely subject to verification by independent professional auditors. This makes it difficult to compare the performance of different firms or to have confidence in instances of progress that are reported. The use of emissions offsets present particular problems; some claimed offsets are quite misleading and amount to little more than accounting tricks. (Section 2.4.)

In advocating a unilateral Canadian approach as an alternative to the Kyoto Protocol, Canada's major industrial GHG emitters are asking Canadians to trust them to act voluntarily, and in their own good time, to reduce emissions outside the framework of the Protocol. The track record of the VCR, summarized above, shows clearly that this would be a very poor bet.

Our findings show that action taken to date by Canada's industrial sector as a whole to limit GHG emissions has been wholly inadequate. It is worth recalling that the objective of the United Nations Framework Convention on Climate Change (UNFCCC), which Canada ratified a decade ago along with almost the entire international community (including the US), is to stabilize GHG concentrations in the atmosphere. This will require global GHG emissions to be reduced by more than 50%¹⁰⁰ over the next

¹⁰⁰ Intergovernmental Panel on Climate Change (2001), *Climate Change 2001, The Scientific Basis, Summary for Policymakers and Technical Summary of the Working Group I Report*, p. 75–76.

few decades. Canada, as the world's second largest emitter on a per-capita basis,¹⁰¹ needs to be embarking on major emission reductions now.

Certainly, some Canadian industrial firms have been quite successful in limiting GHG emissions in the voluntary context of the VCR (see, for example, Appendix A). But their contribution has been outgunned by the more numerous companies who remain "free riders." There is no reason to believe that this would change if the voluntary approach continued. In particular, the major emissions increases seen by several of the largest emitters severely compromise Canada's efforts to reduce its GHG emissions. If Canada is merely to stabilize its emissions, every major increase by a large emitter must be matched by major decreases by several smaller emitters. This is next to impossible to achieve when action is voluntary.

In rejecting the legally binding Kyoto Protocol, industry associations representing most of Canada's largest GHG emitters are essentially proposing to continue indefinitely the voluntary approach to addressing climate change. It would be voluntary on not one, but two levels. At the domestic level, the associations want "emissions performance targets mutually agreed upon by all stakeholders..."¹⁰² (While in theory, "mutually agreed upon" targets could be arrived at in the context of a strong regulatory system, this is clearly not what the associations have in mind.) At the international level, the associations say that Canada should adopt a unilateral approach to GHG emissions involving no legal obligations to the international community.

It is instructive to look at what happened last time Canada took on a target for limiting GHG emissions that was voluntary at the international level. This was the "aim," formalized in the UNFCCC in 1992, to stabilize our national GHG emissions at the 1990 level by 2000. How did we do? Federal and provincial governments put in place very few measures to significantly reduce emissions, and Canada's GHG emissions in 2000 ended up 20% higher than in 1990.¹⁰³ Table 8 shows our performance at the national level between 1990 and 2000 using the figures in Canada's aggregate GHG inventory.

Table 8 confirms at the national level the increases in industrial GHG emissions that this report has examined at the level of individual firms. It shows that industrial emissions rose faster than the national total. Emissions for which individual Canadians are directly responsible—emissions from homes and private vehicles, representing less than one-fifth of the national total—rose by 7% between 1990 and 2000 while industrial emissions rose by 24-26% (depending on how they are defined). This undermines the assertion frequently made by industry association representatives that GHG emissions are "mostly a consumer problem."¹⁰⁴

¹⁰¹ H. Turton and C. Hamilton (August 2002), *Updating Per Capita Emissions for Industrialized Countries*, The Australia Institute. Available at <http://www.tai.org.au>.

¹⁰² Canadian Coalition for Responsible Environmental Solutions (September 26, 2002), *Statement of Principles for a Made in Canada Solution*.

¹⁰³ L. Henderson et al., *op. cit.*

¹⁰⁴ It could be argued that individuals share in the responsibility for the rapid rising emissions from electricity generation, as a significant proportion of electricity is consumed in homes. The Pembina Institute takes the view that electricity generators bear the lion's share of this responsibility. It is electricity generators who are best placed to cut the GHG intensity of their production (e.g., by moving to low-impact renewable sources) and to help consumers to achieve energy savings (demand side management).

Table 8. Canada's GHG emissions, 1990-2000.¹⁰⁵

Source	Proportion of emissions in 2000 (%)	% change 1990-2000	% change 1999-2000
Electricity generation	17.6	34.3	5.8
Other industrial stationary sources	35.0	18.8	2.9
Industrial stationary subtotal	52.6	23.6	3.9
"Industrial" ¹⁰⁶ vehicles	10.9	40.2	4.4
Industrial stationary + mobile subtotal	63.5	26.1	3.9
Agriculture	8.3	1.7	-1.6
Commercial buildings	4.4	23.6	10.4
Solid waste disposal	3.2	21.1	4.5
Domestic aviation	1.9	28.0	0.7
Residential buildings and "private"¹⁰⁷ vehicles	18.1	6.9	1.1
Other	0.7		
<i>Total</i>	<i>100</i>	<i>19.6</i>	<i>3.3</i>

Canada clearly needs the the legally binding framework of the Kyoto Protocol if it is to begin reversing the emissions increases seen since 1990. The poor performance of the voluntary approach to addressing industrial GHG emissions documented in this report shows that Canada's domestic Kyoto implementation plan needs to place a regulated and declining cap on these emissions. This could be done as part of a domestic emissions trading system combined with financial incentives, where justified, and a rigorous emissions measurement and reporting system. The major gaps and inconsistencies evident in the voluntary reporting of emissions via the VCR—flaws that persist seven years after the program was launched—underline the need to implement a mandatory GHG emissions reporting system immediately as an elementary measure to prepare the way for effective emissions reduction policies including a domestic emissions trading system. This should be done using the existing National Pollutant Release Inventory, starting with reporting year 2003.

The industry associations advocating a unilateral Canadian approach to climate change have suggested that the Kyoto Protocol would "destroy the economy."¹⁰⁸ This over-the-top rhetoric is belied by the performance of the minority of firms that have been quite successful in limiting GHG emissions in the voluntary context of the VCR. In addition, the most recent detailed economic modelling study by federal and provincial governments found that implementing the Protocol in Canada would, at worst, barely make a dent in projected GDP growth; at best it would actually increase the rate of national GDP growth. Canada's GDP was projected to grow by between 30.3% and 31.5% between 2000 and 2012 if Canada implements the Kyoto Protocol, compared to 31.0% if it does not.¹⁰⁹ In the context of the forecast overall economic expansion, these are very minor impacts, and they neglect benefits such as improved human health resulting from less air pollution and the taking of an important first step towards climate stability.

¹⁰⁵ L. Henderson et al., *op. cit.*

¹⁰⁶ heavy duty, off-road, marine and rail

¹⁰⁷ light duty cars and trucks, motorcycles and alternatively-fuelled vehicles

¹⁰⁸ Nancy Hughes-Anthony, President of the Canadian Chamber of Commerce (September 26), speaking at a news conference in Ottawa to launch the Canadian Coalition for Responsible Environmental Solutions.

¹⁰⁹ Government of Canada (May 2002), *A Discussion Paper on Canada's Contribution to Addressing Climate Change*, p. 41. These results exclude the cases that assumed an improbably high price of international emissions units (\$50/tonne CO₂E).

It is also worth noting that the economic modelling of GHG reductions carried out in Canada in the mid-1990s, following the adoption of the UNFCCC, produced very similar results.¹¹⁰

The reality is that Canada has been implementing unilateral approaches to climate change since 1990. We have had the National Action Strategy on Climate Change (November 1990), Canada's National Action Program on Climate Change (February 1995) and the National Implementation Strategy on Climate Change (October 2000). Throughout, governments have relied on the voluntary approach to limiting industrial GHG emissions, embodied since 1995 in the VCR program.

These unilateral, voluntary approaches have failed. They are thoroughly discredited by the results presented in this report. The only credible way for Canada to address climate change is through the Kyoto Protocol.

¹¹⁰ According to C.A. Sonnen and M.C. Justus (April 1995), *Impact of GHG Initiatives on the National and Provincial Economies, final report prepared for Forecast Working Group of the National Air Issues Co-ordinating Mechanism*, volume I, Infrometrica Ltd.: "In the period of 1995 to 2010, the overall size of the Canadian economy, and its growth, are unlikely to be significantly changed by initiatives designed to reduce emissions of greenhouse gases." The same document stated: "Increased costs of production from added real capital costs are generally offset by reduced energy costs. Accordingly, there should be little impact on annual changes in unit costs of production for individual industries, or aggregate prices."

Appendix A. Supplementary results tables

Table 9. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for a base year and 2000, and whose emissions decreased by more than 500 kt CO₂E between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year	Change base year-2000 (kt CO ₂ E)
DuPont Canada Inc. ¹¹¹	chemicals	¹¹² 5407	11239	1990	-5832
TransAlta Corporation ¹¹³	electricity	¹¹⁴ 21346	26060	1990	-4714
Dofasco Inc.	steel	5356	6553	1990	-1197
Dow Chemical Canada Inc. ¹¹⁵	chemicals	1512	2624	1990	-1112
Newfoundland and Labrador Hydro ¹¹⁶	electricity	839	1620	1990	-782
ExxonMobil Canada Ltd. ¹¹⁷	upstream oil and gas	1043	1690	1994	-647
Petro-Canada	integrated oil and gas	6298	6909	1990	-611

Table 10. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for a base year and 2000, and whose emissions decreased by more than one-half between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year	% change base year-2000
Bowater Canadian Forest Products Inc.	forest products	34	197	1990	-83
Yukon Development Corporation	electricity	13	36	1990	-65
Enviros RIS Canada	professional services	0	0	1990	-54
DuPont Canada Inc. ¹¹⁸	chemicals	¹¹⁹ 5407	11239	1990	-52

¹¹¹ excluding emissions associated with the generation of sold electricity

¹¹² figure includes 4000 kt CO₂E of emission reductions that were sold to Ontario Power Generation and that therefore have to be added to Dupont's emissions

¹¹³ direct emissions only (magnitude of electricity purchases unknown)

¹¹⁴ figure is net of 6112 kt CO₂E of offsets

¹¹⁵ excluding emissions associated with the generation of sold electricity

¹¹⁶ direct emissions only (magnitude of electricity purchases unknown)

¹¹⁷ excluding Sable Island and Hibernia projects (operated by other parties)

¹¹⁸ excluding emissions associated with the generation of sold electricity

¹¹⁹ figure includes 4000 kt CO₂E of emission reductions that were sold to Ontario Power Generation and that therefore have to be added to Dupont's emissions

Table 11. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions for 1999 and 2000, and whose emissions decreased by more than 300 kt CO₂E between those two years.

Entity	Sector	2000 emissions (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Change 1999-2000 (kt CO ₂ E)
Ontario Power Generation Inc. (OPG)	electricity	¹²⁰ 31700	¹²¹ 37800	-6100
TransCanada ¹²²	natural gas pipelines; electricity	12290	14360	-2070
TransAlta Corporation ¹²³	electricity	¹²⁴ 21346	22876	-1530
Dow Chemical Canada Inc. ¹²⁵	chemicals	1512	2486	-974
Syncrude Canada Ltd. ¹²⁶	upstream oil and gas	8000	8900	-900
BP Canada Energy Company ¹²⁷	upstream oil and gas; natural gas pipelines	4229	4714	-485
Petro-Canada	integrated oil and gas	6298	6641	-343
PanCanadian Energy Corporation	upstream oil and gas	¹²⁸ 2760	3086	-326

¹²⁰ figure is net of 12600 kt CO₂E of offsets, including 1581 kt of OPG's own pre-2000-vintage internal emissions reductions (see section 2.4)

¹²¹ not clear whether or not the 898 kt CO₂E of OPG's own 1999-vintage internal emissions reductions used to offset its year 2000 emissions have been included in this figure as they should (see section 2.4).

¹²² excluding partially owned facilities (notably Foothills Pipe Lines Ltd. and Trans Quebec & Maritimes Pipeline Inc.)

¹²³ direct emissions only (magnitude of electricity purchases unknown)

¹²⁴ figure is net of 6112 kt CO₂E of offsets

¹²⁵ excluding emissions associated with the generation of sold electricity

¹²⁶ carbon dioxide only; methane emissions were 733 kt CO₂E in 2000 but this amount is not included here to allow comparison with earlier years

¹²⁷ not clear whether Canadian Gas and Power business unit included

¹²⁸ figure is net of 103 kt CO₂E of offsets

Table 12. Industrial entities that made a VCR submission by March 31, 2002 stating their emissions and production for a base year and 2000, and whose emissions intensity decreased between those two years at an average rate of more than 4% per year.¹²⁹

Entity	Sector	2000 emissions (kt CO ₂ E)	Base year	% change per year in emissions intensity base year-2000
F.F. Soucy Inc.	forest products	22	1990	-9.1
Alberta-Pacific Forest Industries Inc.	forest products	153	1994	-9.0
Nexfor Inc. ¹³⁰	forest products	295	1990	-8.1
General Motors of Canada Ltd.	automobiles	650	1990	-7.4
Newfoundland and Labrador Hydro ¹³¹	electricity	839	1990	-6.9
Northwest Territories Power Corporation ¹³²	electricity	61	1990	-6.5
Tembec Paper Group - Spruce Falls Operations ¹³³	forest products	92	1990	-6.2
Burlington Resources Canada Energy Ltd.	upstream oil and gas	789	1994	-6.2
Enbridge Inc. ¹³⁴	oil pipelines; natural gas distribution	1100	1990	-5.8
Alcoa - Aluminerie de Deschambault	aluminum	410	1993	-5.7
Aluminerie Alouette inc.	aluminum	438	1993	-5.2
Yukon Development Corporation	electricity	13	1990	-5.0
Weldwood of Canada Ltd. ¹³⁵	forest products	535	1990	-4.2

¹²⁹ Mikro-Tek experienced an almost 100% decrease in its emissions intensity between 1990 and 2000 but has not been included in this table because the fall in intensity resulted from an 820-fold increase in production. In other words, production in 1990 was so low that emissions intensity for that year has little meaning.

¹³⁰ not clear whether indirect emissions included (magnitude of electricity purchases unknown)

¹³¹ direct emissions only (magnitude of electricity purchases unknown)

¹³² "year x" emissions are for fiscal year x/x+1

¹³³ direct emissions only (magnitude of electricity purchases unknown)

¹³⁴ excluding joint ventures such as the Alliance and Vector pipelines and AltaGas Services

¹³⁵ emissions intensity changes calculated with direct emissions only

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

The following table summarizes all the data gathered for this study. Emissions are expressed to the nearest kilotonne of carbon dioxide equivalent (kt CO₂E) and, except where noted, are the sum of direct emissions from an entity's operations plus indirect emissions associated with the generation of purchased electricity. For entities with multiple products that cannot meaningfully be added together, emissions intensities have been calculated using the emissions and production figures corresponding to the product with largest associated emissions. Gaps in the table (except in the base year column) indicate that information was not available in, or could not be calculated from, an entity's VCR submission. The database of which the table is a summary was compiled by the Pembina Institute under contract to Environment Canada, and is copyright © 2002 Her Majesty the Queen in Right of Canada, as represented by the Minister of the Environment.

As outlined in section 2.4, there are many inconsistencies between different firms' methodologies for calculating their emissions. An attempt has been made to highlight in footnotes the issues having the most significant or potentially significant effect on the data presented here. Inclusion or exclusion of major jointly-owned operations has been noted only for a few entities that included specific information in their VCR submissions, but it likely has a significant effect on the data for many other entities too. Probably the most significant remaining data quality issue that it has not been practical to address through footnotes is the existence of variations in the way firms adjust, or do not adjust, a given year's emissions to include operations subsequently acquired and/or exclude operations subsequently divested.

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
20 Vic Management Inc.	commercial real estate	20	3			2000						
Albarrie Canada Limited	textiles	1	0	1	1		0	7	8	0	53	
Alberta-Pacific Forest Industries Inc.	forest products	153	152	177	219	1994	-25	-14	-19	-66	-30	-43
Alcoa - Aluminerie de Deschambault	aluminum	410		405	535	1993	5	1	2	-125	-23	-34
Aluminerie Alouette inc.	aluminum	438		441	561	1993	-4	-1	-3	-124	-22	-31
Anadarko Canada Corporation	upstream oil and gas	557	541	101	86	1997	456	450	16	471	545	-49

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
ARC Resources Ltd.	upstream oil and gas	238	146	181	181	1999	58	32	1	58	32	1
ATCO Electric ¹³⁶	electricity	9317	9317	9231	7746		86	1	0	1571	20	1
ATCO Gas	natural gas distribution; natural gas pipelines	499	485	512	529		-13	-2	-17	-30	-6	-12
ATCO Pipelines	natural gas pipelines	150	143	144	84		6	4	-10	66	79	13
ATOFINA Canada Inc.	chemicals	1	1	1	2		0	5		-1	-45	
Atomic Energy of Canada Limited (AECL)	professional services	77	49	80	151		-3	-4		-74	-49	
Bayer Inc. - Rubber Division	chemicals	505		509	521		-4	-1	-12	-16	-3	-19
BC Gas Utility Ltd.	natural gas distribution; natural gas pipelines	98	100	98	101		1	1	6	-3	-3	-10
BC Hydro	electricity	2274	1995	1387	914		887	64	62	1360	149	121
Bentofix Technologies Inc.	manufacturing - misc.	1	0	1	0	1992	0	30	-15	1	424	-65
Bowater Canadian Forest Products Inc.	forest products	34	34	31	197		3	9	1	-163	-83	-89
BP Canada Energy Company ¹³⁷	upstream oil and gas; natural gas pipelines	4229	3030	4714	3677		-485	-10		552	15	
Burlington Resources Canada Energy Ltd.	upstream oil and gas	789	615	757	601	1994	32	4	8	188	31	-32
Calpine Canada Resources Ltd. ¹³⁸	upstream oil and gas	230	189									

¹³⁶ direct emissions of carbon dioxide only (the company did make significant electricity purchases)

¹³⁷ not clear whether Canadian Gas and Power business unit included

¹³⁸ excluding Quintana Minerals Canada Corporation

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Cambior inc.	mining/metals	10	10	12	2	1995	-3	-20	29	7	309	91
Canadian Forest Products Ltd. (Canfor) ¹³⁹	forest products	717	663	728	750		-11	-1	3	-33	-4	-29
Canadian Hunter Exploration Ltd.	upstream oil and gas	631	408	521	406		110	21	-11	225	55	-12
Centra Gas Manitoba Inc.	natural gas distribution	44		43	37		1	1	-5	7	18	-1
Chevron Canada Resources	upstream oil and gas	1346	904	1359	1282		-13	-1	-14	64	5	11
Conoco Canada Limited	upstream oil and gas	618	500									
Consoltex Inc.	textiles	53	33	50	64		4	8	15	-11	-17	-7
Devon Canada	upstream oil and gas	1023	854	1048	1026	1995	-25	-2	4	-3	0	-3
Dofasco Inc.	steel	5356	4609	5394	6553		-38	-1	0	-1197	-18	-20
Dow Chemical Canada Inc. ¹⁴⁰	chemicals	1512	1792	2486	2624		-974	-39		-1112	-42	
DuPont Canada Inc. ¹⁴¹	chemicals	¹⁴² 5407	1365		11239					-5832	-52	-65
Enbridge Inc. ¹⁴³	oil pipelines; natural gas distribution	1100	376	1218	1341		-118	-10	-23	-241	-18	-45
Enviros RIS Canada	professional services	0		0	0		0	-11	-5	0	-54	-14
EOG Resources Canada Inc.	upstream oil and gas	237	225	213	77		24	11	12	160	208	-15
EPCOR Utilities Inc. ¹⁴⁴	electricity; water	¹⁴⁵ 8346	8800	¹⁴⁶ 8056	3450		290	4	-4	4896	142	-4

¹³⁹ excluding Howe Sound Pulp and Paper Limited Partnership; excluding emissions associated with the generation of sold electricity

¹⁴⁰ excluding emissions associated with the generation of sold electricity

¹⁴¹ excluding emissions associated with the generation of sold electricity

¹⁴² figure includes 4000 kt CO₂E of emission reductions that were sold to Ontario Power Generation and that therefore have to be added to Dupont's emissions

¹⁴³ excluding joint ventures such as the Alliance and Vector pipelines and AltaGas Services

¹⁴⁴ excluding Joffre co-generation plant (joint venture); direct emissions only (magnitude of electricity purchases unknown)

¹⁴⁵ figure is net of 454 kt CO₂E of offsets

¹⁴⁶ figure is net of 334 kt CO₂E of offsets

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
ExxonMobil Canada Ltd. ¹⁴⁷	upstream oil and gas	1043	616	1080	1690	1994	-37	-3	-6	-647	-38	-57
F.F. Soucy Inc.	forest products	22	22	19	41		3	14	11	-19	-47	-62
Falconbridge Limited	mining/metals	699	373		611					88	14	-4
Famz Foods	restaurants	3	2	3	3	1999	0	-2	-2	0	-2	-2
Federated Co-operatives Limited (FCL) ¹⁴⁸	downstream oil and gas; warehousing; trucking; lumber	1124	1124									
Ford Motor Company of Canada, Ltd.	automobiles	722	528	695	621	1995	27	4	-4	102	16	-8
General Motors of Canada Ltd.	automobiles	650	463	683	1030		-33	-5	-10	-380	-37	-54
Gulf Canada Resources Ltd.	upstream oil and gas	2390	1489	1118	2202		1272	114	10	188	9	-18
Honda of Canada Mfg. ¹⁴⁹	automobiles	98	67	86	43		11	13	0	55	129	-28
Howe Sound Pulp and Paper Limited Partnership	forest products	177	167	201	203		-24	-12	-17	-26	-13	-77
Husky Energy Inc. ¹⁵⁰	integrated oil and gas	9063	7317	8570	6494	1993	493	6		2569	40	
IBM Canada Ltd.	manufacturing - misc.; professional services	67	17	75	94		-8	-11		-26	-28	
Imperial Oil Ltd.	integrated oil and gas; chemicals	11645		11215	10665		430	4	9	980	9	31
Inco Limited	mining/metals	943	522	926	998		16	2	-5	-56	-6	-5

¹⁴⁷ excluding Sable Island and Hibernia projects (operated by other parties)

¹⁴⁸ excluding the lumber operations; direct emissions only (magnitude of electricity purchases unknown)

¹⁴⁹ "year x" emissions are for April year x to March year x+1

¹⁵⁰ not clear whether downstream operations included

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Kraft Canada Inc.	manufacturing - misc.	86		88	99	1996	-1	-1		-13	-13	
Luscar Ltd. ¹⁵¹	coal mining	689		730	799		-41	-6	3	-110	-14	-19
Manitoba Hydro ¹⁵²	electricity	910	910	730	530		180	25	15	380	72	5
Metroland Printing, Publishing and Distributing - Tempo Division	printing	1	0	1	1		0	-5	-4	0	-5	-10
Metroland Printing, Publishing and Distributing - Wolfedale Division	printing	2		2	2		0	-2	-6	-1	-29	
Mikro-Tek	manufacturing - misc.	0	0	0	0	1994	0	26	-31	0	70	-100
Newfoundland and Labrador Hydro ¹⁵³	electricity	839	839	836	1620		2	0	-4	-782	-48	-51
Newmont Canada Limited	mining/metals	40	14		35					5	15	
Nexen Canada Ltd.	upstream oil and gas	2586		2279	2350		307	13	15	236	10	
Nexfor Inc. ¹⁵⁴	forest products	295			424					-129	-30	-57
Noranda Inc. ¹⁵⁵	mining/metals	1141	859	1078	1159	1989	63	6	-3	-18	-2	-22
Northrock Resources Ltd.	upstream oil and gas	259	246	265	123	1997	-6	-2	14	136	110	27
Northwest Territories Power Corporation ¹⁵⁶	electricity	61	60	59	115		2	3	6	-54	-47	-49
NOVA Chemicals ¹⁵⁷	chemicals	4871	4044	4483			388	9	3			

¹⁵¹ excluding the Highvale mine, owned by TransAlta but operated by Luscar

¹⁵² excluding Centra Gas Manitoba Inc.; direct emissions only (the company did make significant electricity purchases); “2000” and “1999” emissions are for 2000/01 and 1999/2000 respectively (start/end months undefined)

¹⁵³ direct emissions only (magnitude of electricity purchases unknown)

¹⁵⁴ not clear whether indirect emissions included (magnitude of electricity purchases unknown)

¹⁵⁵ excluding Falconbridge (55% owned by Noranda) but including Métallurgie Magnola (80% owned by Noranda) on a 100% basis

¹⁵⁶ “year x” emissions are for fiscal year x/x+1

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Novotel Ottawa	hospitality	1	1	1	1	1999	0	13	13	0	13	13
NRI Industries	manufacturing - misc.	12		9	9	1996	2	23	36	2	24	-2
Ontario Power Generation Inc. (OPG)	electricity	¹⁵⁸ 31700	38600	¹⁵⁹ 37800	30700		-6100	-16	-16	1000	3	-6
Orenda Aerospace Corporation	manufacturing - misc.	11	6	10	8		1	12	3	2	29	-32
Pacifica Papers Company	forest products	¹⁶⁰ 419		¹⁶¹ 222	477		196	88	88	-59	-12	1
PanCanadian Energy Corporation	upstream oil and gas	¹⁶² 2760	2151	3086	1017		-326	-11	-13	1743	171	5
Papiers Stadacona	forest products	134	133	125	169		9	7	5	-35	-21	-24
PCS Potash Corporation Allan Division	fertilizer	135		110	101		26	23	-20	34	34	-15
PCS Potash Cory Division	fertilizer	229	131	215	124	1991	14	6	-1	105	84	-19
PCS Potash New Brunswick Division	fertilizer	127		112	96	1993	15	13	-2	31	32	-4
PCS Potash Patience Lake Division	fertilizer	92		92	113	1991	-1	-1	-2	-22	-19	-21
PCS Potash Rocanville Division	fertilizer	224		206	168		18	9	0	56	34	-8

¹⁵⁷ including the Ethylene 3 and cogeneration facilities at Joffre (joint ventures) and a fraction of the Sarnia cogeneration facility in proportion to fuel supplied to it by NOVA; excluding emissions associated with the generation of sold electricity

¹⁵⁸ figure is net of 12600 kt CO₂E of offsets, including 1581 kt of OPG's own pre-2000-vintage internal emissions reductions (see section 2.4)

¹⁵⁹ not clear whether or not the 898 kt CO₂E of OPG's own 1999-vintage internal emissions reductions used to offset its year 2000 emissions have been included in this figure as they should (see section 2.4).

¹⁶⁰ figure includes 214 kt CO₂E of emission reductions that were retained by MacMillan Bloedel (former parent company) and that therefore have to be added to Pacifica's emissions

¹⁶¹ figure does not include any of the emission reductions retained by MacMillan Bloedel (former parent company) and that therefore should have been added to Pacifica's emissions

¹⁶² figure is net of 103 kt CO₂E of offsets

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Petro-Canada	integrated oil and gas	6298	5468	6641	6909		-343	-5	1	-611	-9	-17
Pioneer Natural Resources Canada Inc.	upstream oil and gas	129	108	94	74	1996	35	37		55	74	43
PrimeWest Energy Trust	upstream oil and gas	637	468	275	170	1997	362	131	24	467	275	37
Richland Petroleum Corporation	upstream oil and gas	39	28	29	27	1998	10	34	-42	12	45	-22
Rife Resources Ltd.	upstream oil and gas	72	57	62	51	1992	10	17	43	21	40	94
Riverside Forest Products, Armstrong Plywood	forest products	3	2	3	2		0	-4	-2	1	31	-10
SaskEnergy	natural gas distribution; natural gas pipelines	773		800	703		-27	-3	-10	71	10	-15
SaskPower ¹⁶³	electricity	14517	14591	14769	¹⁶⁴ 10867		-252	-2		3650	34	-4
Shell Canada Limited	integrated oil and gas	7966	6582		8050					-84	-1	
Shell Chemicals Canada Ltd. ¹⁶⁵	chemicals	531	480	508	424		23	5	-5	107	25	-7
Signalta Resources Ltd. ¹⁶⁶	upstream oil and gas	119	114		77					42	54	54
Solutia Canada Inc.	chemicals	11	11	11	17		0	2		-6	-37	
Star Oil & Gas Ltd.	upstream oil and gas	196	174	179	275	1991	18	10	-6	-79	-29	-20
Stelco Inc.	steel	8397		8146	6926	1991	251	3		1471	21	

¹⁶³ direct emissions only (magnitude of electricity purchases unknown)

¹⁶⁴ figure adjusted upwards "to account for favourable hydro conditions that resulted in less thermal production" (actual 1990 emissions not available)

¹⁶⁵ including plants at Scotford operated by Air Liquide Canada Inc. but excluding facilities in Sarnia operated by Basell; excluding emissions associated with the generation of sold electricity

¹⁶⁶ emissions from purchased fuel excluded

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Stora Enso Port Hawkesbury ¹⁶⁷	forest products	245	245	247	163		-2	-1	-13	82	51	1
Suncor Inc.	integrated oil and gas	¹⁶⁸ 6244	5842	6269	4983		-25	0	-4	1261	25	-28
Syncrude Canada Ltd. ¹⁶⁹	upstream oil and gas	8000		8900	7220		-900	-10	-1	780	11	-15
Talisman Energy Inc.	upstream oil and gas	2180	1650	1613	954	1994	567	35	11	1226	129	29
Tembec Paper Group - Spruce Falls Operations ¹⁷⁰	forest products	92	92	83	152		9	11	4	-61	-40	-47
TransAlta Corporation ¹⁷¹	electricity	¹⁷² 21346	27458	¹⁷³ 22876	26060		-1530	-7	-12	-4714	-18	-29
TransCanada ¹⁷⁴	natural gas pipelines; electricity	12290	11630	14360	8910		-2070	-14	-14	3380	38	-11
Unocal Canada Limited ¹⁷⁵	upstream oil and gas	95	95	85	67	1995	9	11	-4	27	41	-45
Upton Resources Inc.	upstream oil and gas	38	28	31	16	1994	7	23	9	22	132	8
Weldwood of Canada Ltd. ¹⁷⁶	forest products	535	475	530	537		5	1	0	-2	0	-35
West Fraser Timber Co. Ltd. ¹⁷⁷	forest products	434		455	344		-21	-5	-11	90	26	-24
Williams Energy (Canada) Inc.	upstream oil and gas	1010	755	1017	842		-7	-1	-8	168	20	-62

¹⁶⁷ direct emissions only (magnitude of electricity purchases unknown)

¹⁶⁸ figure is net of 200 kt CO₂E of offsets

¹⁶⁹ carbon dioxide only; methane emissions were 733 kt CO₂E in 2000 but this amount is not included here to allow comparison with earlier years

¹⁷⁰ direct emissions only (magnitude of electricity purchases unknown)

¹⁷¹ direct emissions only (magnitude of electricity purchases unknown)

¹⁷² figure is net of 6112 kt CO₂E of offsets

¹⁷³ figure is net of 3725 kt CO₂E of offsets

¹⁷⁴ excluding partially owned facilities (notably Foothills Pipe Lines Ltd. and Trans Quebec & Maritimes Pipeline Inc.)

¹⁷⁵ excluding Northrock Resources Ltd. (subsidiary)

¹⁷⁶ emissions intensity changes calculated with direct emissions only

¹⁷⁷ excluding various joint ventures

Appendix B. All 102 industrial entities that made a VCR submission stating their emissions for 2000 by March 31, 2002

Entity	Sector	2000 emissions (kt CO ₂ E)	2000 direct emissions, not net of offsets (kt CO ₂ E)	1999 emissions (kt CO ₂ E)	Base year emissions (kt CO ₂ E)	Base year if not 1990	Change in emissions 1999-2000 (kt CO ₂ E)	Change in emissions 1999-2000 (%)	Change in emissions intensity 1999-2000 (%)	Change in emissions base year - 2000 (kt CO ₂ E)	Change in emissions base year - 2000 (%)	Change in emissions intensity base year - 2000 (%)
Yukon Development Corporation	electricity	13	13	22	36		-9	-40	-40	-24	-65	-40