Competitiveness and Greenhouse Gas Reduction Policies
A Canadian NGO Perspective

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Introduction

Competitiveness has been a significant issue in the debate over whether to ratify the Kyoto Protocol and reduce greenhouse gas (GHG) emissions.

This paper briefly explores the relationship between competitiveness and the implementation of GHG reduction policies. We begin with a look at the factors associated with competitiveness. Second, we explore the link between competitiveness and environmental performance from the perspective of the corporation and from the perspective of the policymaker. Third, we briefly discuss the Montreal Protocol as an example of ways appropriate policy drove innovation, retained competitiveness, and helped solve a global environmental challenge. Finally, we provide a brief investigation of the ineffectiveness of Canada’s approach to voluntary reductions of greenhouse gas emissions.

This paper, written for the OECD/IEA “Policies and Measures Workshop to Reduce Greenhouse Gas Emissions in Industry — Successful Approaches and Lessons Learned” (December 2–3, 2002, Berlin), has been drawn from two recent Pembina Institute publications:

- *How Ratifying the Kyoto Protocol Will Benefit Canada’s Competitiveness* by Sylvie Boustie, Marlo Raynolds, and Matthew Bramley (June 2002); and
- *The Case for Kyoto: The Failure of Voluntary Corporate Action* by Matthew Bramley (October 2002).
Factors in Competitiveness

The competitiveness of a nation depends directly on the ability of its industries to compete in their respective markets. In a global market, a nation’s competitiveness is dependent on a number of factors, including but not necessarily limited to the following:

- its exchange rate relative to its export markets;
- its political stability;
- the skill of its labour force;
- its tax policies;
- its regulations – both environmental and non-environmental;
- its relationships with both competitors and allies;
- its access to markets; and
- the level of uncertainty in its regulations (more uncertainty = less competitiveness).

When designing policies to reduce greenhouse gas emissions, the effect on competitiveness of a number of important factors must be taken into account, including the following:

1. **Direct benefits from increased efficiency.** Most GHG emission reductions result from reduced use of fossil fuels. Policies that promote energy efficiency will help companies realize operational cost savings. Companies and economies that are more energy-efficient will rely less on fossil fuel energy and will be less exposed to increasing volatility in energy prices.

2. **Benefits to human health.** Reduced use of fossil fuels also results in reduced emissions of other pollutants, notably sulphur dioxide, nitrogen oxides, and fine particulate matter. These are key contributors to local air pollution, which each year, according to the Canadian federal government, causes 5,000 premature deaths across Canada and health problems costing more than $1 billion in hospital admissions, emergency room visits, and lost working days in the Province of Ontario alone.¹ So policies that encourage the reduction of fossil fuel energy can also expect to reduce healthcare costs. Healthier, more productive people enhance a country’s competitiveness.

3. **Technological innovation.** Placing limits on GHG emissions through market measures that give emitters a choice in how they meet reduction requirements will spur innovation as emitters look for lowest-cost solutions. As an example, if Canada ratifies the Kyoto Protocol, it can expect to see a wave of technological innovation over the next few years. In the longer term (post-2012), innovative countries will be better positioned in terms of technological capacity to respond to additional requirements to reduce GHG emissions that will undoubtedly be imposed by future international agreements.² The link between competitiveness and innovation is clear: competition promotes innovation, and greater innovation helps ensure increased competitiveness. When nations design policies to reduce greenhouse gas emissions, they will be most successful if they promote greater innovation. Innovation here is broadly defined as any action taken to increase the effectiveness of a system by
   - increasing its material or energy efficiency;

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² Climate scientists agree that global GHG emissions reductions of over 50% will be needed to achieve the objective of the United Nations Framework Convention on Climate Change, which is to stabilize the concentration of GHGs in the atmosphere. See Intergovernmental Panel on Climate Change (2001), *Technical Summary of the Working Group I Report*, p. 75–76, available at http://www.ipcc.ch.
• increasing the quality or value of the output;
• reducing externalities; and
• reducing the time required to provide the service or output.

4. **Investor uncertainty.** For the past several years in many countries, there has been great uncertainty as to long-term policy orientation on climate change. In Canada, more than four years after the Kyoto Protocol was negotiated, the federal government continues to hesitate over its ratification and implementation. This hesitation significantly increases the financial risks faced by the private sector, which typically makes investments in capital stock with a lifetime measured in decades. A decision not to ratify the Protocol would simply prolong this damaging uncertainty by delaying Canada’s eventual, inevitable participation in a global agreement to reduce GHG emissions. Policy uncertainty limits the ability of companies to make strategic business decisions. On the other hand, countries providing clear policies that reduce uncertainty help their companies become more competitive in global markets. Government measures to reduce emissions must strive to minimize uncertainty for industry by incorporating clear rules and transitions.

5. **Regional factors.** Arguably, much of the current opposition to the Kyoto Protocol does not arise from concerns about the overall macroeconomic costs, which are estimated to be modest at worst, but from the fear of individual sectors and regions that they will be asked to bear a disproportionate or inequitable share of any economic burden. It is therefore important to understand that governments have at their disposal policy options that provide great flexibility in sharing burdens. For example, under a domestic emissions trading system for large industrial emitters, governments can either provide free emission permits or can recycle the proceeds of auctioning emission permits to vulnerable sectors or regions. It is essential for policy design to carefully consider competitiveness issues at the regional/local level.

6. **Relationship with major international partners.** While the United States is Canada’s biggest trading partner, there are also major trade flows between Canada and Europe, and between Canada and Asia. Furthermore, Canada has close political relationships with both of these regions. In July 2001, Jean Chrétien sent a strong signal to the European Union and to Japan (both of which have now ratified the Kyoto Protocol) that Canada would also ratify the Protocol in 2002. Deciding now not to ratify the Protocol could seriously damage Canada’s standing with these partners and potentially have a negative impact on Canada’s ability to obtain favourable outcomes in many international processes, economic or otherwise.

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3 On July 23, 2001, following the breakthrough in international climate negotiations in Bonn, Germany, Jean Chrétien made the following statement, available at http://www.pm.gc.ca: “Canada entered this negotiation with the firm intent to bring it to a successful conclusion. And we succeeded . . . I am confident that the agreement reached this weekend in Bonn opens the way for Canada’s ratification of the Kyoto Protocol next year, following full consultations with the provinces, the territories, stakeholders, and other Canadians.”
The Link Between Environmental Performance and Competitiveness

There is growing evidence that companies and countries that take leadership on environmental performance also realize competitive advantages in their markets. We will look at this concept from both a corporate and government perspective.

From a Corporate Perspective

For a country to be competitive, its companies must be competitive and succeed. For companies to succeed, they must be able to build and operate systems to convert inputs to value-added outputs. A number of factors play a role in a company’s success. With respect to environmental performance, Figure 1, below, illustrates six market incentives for a company to be a leader in environmental/sustainability issues. Effective policies must take these factors into account and allow companies to innovate to take advantage of each of these benefits of leadership.

Briefly, the six market incentives for corporate leadership on sustainability issues are:

1. **Regulatory delay and cost of public license to operate** refers to the ability for leading companies to obtain regulatory approval for major projects faster than companies with a poor reputation and track record on environmental performance. This advantage comes through having built and maintained a strong relationship with key stakeholders through demonstrating corporate environmental responsibility.

2. **New business opportunities** emerge for leading sustainability companies through introduction to alternative and renewable technologies. Companies with a strong environmental performance are approached first by new technology developers, often giving leading companies a first right of refusal to investment in these new business opportunities.

3. **Reduced liability** is realized by reducing wastes and pollution, which pose a real or potential liability.

4. **Employee attraction** is emerging to be an important competitive advantage for many companies. Leading companies on sustainability are often the preferred employers for many young people entering the workforce and seeking employment aligned with their personal values of environmental responsibility.

5. **Green investment** is growing significantly through the rapid growth in the number of ethical and "green" mutual funds. Leading companies on sustainability are finding themselves listed in these mutual funds which both increase reputation and access to capital.

6. **Green purchasing** refers to the portion of consumers willing to pay a premium for a more environmentally friendly service or product. Companies who are leading on environmental performance can better access this market.
Leading firms worldwide are embracing environmental responsibility for competitive advantage. The strategy is simple: by being a leader in environmental protection, the firm is driven to be more innovative and create additional value for its customers and shareholders. One of the most important competitive advantages for environmentally leading firms is the identification, development, and commercialization of new business opportunities. An in-depth study of corporate action on reducing GHG emissions by Russell and Margolick\(^4\) demonstrates that an increasing number and variety of major US, Canadian, and global firms have taken on significant GHG emission reduction targets. The authors find that the primary reason the corporate sector is taking on GHG reduction targets is competitiveness:

All of the companies see targets as improving their competitive market position by reducing production costs and enhancing product sales today, and in anticipation of regulatory and market environments of the future.

There is abundant literature demonstrating corporate examples of saving money and becoming more competitive by implementing innovative environmental initiatives.\(^5\) Table 1 summarizes the initiatives of just a few firms.

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### Table 1: Examples of Innovative Corporate Environmental Initiatives

<table>
<thead>
<tr>
<th>Firm</th>
<th>GHG and Environmental Positioning, Initiatives, and Reductions</th>
<th>Financial Performance</th>
<th>Specific Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemicals Sector</strong></td>
<td></td>
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<tr>
<td>DuPont</td>
<td>• Environmental and safety “goal is zero”</td>
<td></td>
<td>• Since the early 1990 initiatives, shareholder return has increased fourfold</td>
</tr>
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<td></td>
<td>• Target is to reduce global GHG emissions by 65% from 1990 levels by 2010, hold total energy use flat from 1990, and source 10% of global energy use from renewable resources by 2010</td>
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<td>• From 1993 to 1997, DuPont’s New Jersey Chambers Works achieved reductions per unit of product of</td>
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<tr>
<td></td>
<td>• Since the early 1990s, over $50 million has been spent on GHG emission reductions</td>
<td></td>
<td>• 30% for energy use</td>
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<tr>
<td></td>
<td>• From 1990 to 2000, energy use remained constant, production increased by 10%, and there were reductions of</td>
<td></td>
<td>• 50% for CO2 emissions</td>
</tr>
<tr>
<td></td>
<td>• GHG emissions by 60%</td>
<td></td>
<td>• During the same period, production increased by 9% and energy bill savings exceeded $17 million per year</td>
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<td></td>
<td>• air toxics by 70%</td>
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<td></td>
<td>• air carcinogens by 90%</td>
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<td></td>
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<tr>
<td>Dow Chemical Company</td>
<td>• 2000 sector leader for the Dow Jones Sustainability Index</td>
<td></td>
<td>• In 2000, earnings before interest and income taxes rose 8% to $2.8 billion on sales of $23 billion, achieved in very difficult industry conditions (including a more than 50% increase in energy costs)</td>
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<tr>
<td></td>
<td>• Goals for 2005 include a reduction of global emissions below 1994 levels by</td>
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<td></td>
<td>• 75% for priority compounds</td>
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<td>• 50% for chemicals</td>
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<td>• 50% for the amount of waste and waste water generated per unit of production</td>
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<tr>
<td></td>
<td>• 20% for energy use per unit of production</td>
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<tr>
<td></td>
<td>• Between 1981 and 1993, 575 energy-saving projects were implemented in Dow’s Louisiana Division with an average annual rate of return of 204%, representing a total cost savings of $110 million per year; these projects became larger and more profitable as the years progressed</td>
<td></td>
<td></td>
</tr>
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</table>
## Manufacturing Sector

### 3M

- From 1990 to 2000, pollution prevention and control programs have reduced:
  - volatile organic air emissions by 88%
  - releases to water by 82%
  - solid waste by 24%
- From 1975 to 1999, 3M’s Pollution Prevention Pays (3P) program:
  - prevented 807,000 tons of pollutants
  - saved $827 million
- Also from 1975 to 1996, 3M achieved an energy efficiency improvement of 58% per unit of production.
- Over the last three years, net sales, operating income, and diluted earnings per share have all increased.
- Savings of over $500 million were achieved between 1990 and 2000 due to cutting costs of raw materials, compliance, disposal, and liability.
- A 1994 initiative to improve motor efficiency opportunities in 3M headquarters brought about four key improvements for the system; together, these improvements reduced electricity consumption by 41%, which resulted in a total savings of $77,600.

### Interface (flooring products)

- Goal is to be a zero-waste company.
- Target is to reduce non-renewable energy use per unit of production by 15% from 1996 levels, and to source 10% of total energy supply from renewable energy by 2005.
- The 10% renewable energy target was achieved in 2001, four years early.
- From 1996 to 2001, there was a reduction of non-renewable process energy (weighted average unit consumption) of over 18%.
- Between 1996 and 2001, there was a 26% decrease of average water consumption per unit of product.
- Between 1995 and 2001, the waste reduction program saved the company over $185 million.
- Sales grew from $600 million in 1993 to $1.1 billion in 1997.
- From 1994 to 1998 costs were cut by $76 million and the savings reinvested in green power and other sustainable technologies.
- In the Canadian operations, energy use per unit of production was reduced by 57% from 1996 to 2001 and GHG emissions per unit of production were reduced by 64% from 1995 to 2001.
From a Government Regulatory Perspective

There is a wealth of literature demonstrating that government action on the environment can be a means to enhance competitiveness. According to Michael Porter of the Harvard Business School, a country’s prosperity is created — not inherited from endowments of natural resources — and it therefore depends on the capacity of its industry to innovate and upgrade. Innovation comes from individual firms, but is also fostered by judicious government regulation that reflects the specificities of the country. Porter and van der Linde⁶ have demonstrated that properly designed environmental standards can trigger innovation that may partially or more than fully offset the costs of complying with them.

There is a recurring tendency for targeted industries to significantly overestimate the costs of complying with environmental regulations prior to implementation. Major initiatives whose costs were significantly overestimated include the Montreal Protocol, adopted to phase out ozone-depleting compounds, and the US Acid Rain Program to reduce emissions of sulphur dioxide (SO₂) from fossil fuel-burning power plants. During the negotiations leading to the establishment of the Acid Rain Program, the targeted utilities argued strenuously that the program would jeopardize their competitiveness. Estimates of marginal compliance costs and allowance prices were in the range of $300 to $1,000 per ton of SO₂.⁷ In comparison, a typical SO₂ allowance price in 2000 was $150 per ton, while electricity prices remained stable through the 1990s.⁸ Innovation was of key importance to the success of the program. Hodges⁹ conducted an extensive literature survey of comparisons between prior cost projections and actual costs of compliance with twelve environmental regulatory initiatives in the US between the 1970s and the 1990s. He found that,

In all cases except one, the early estimates were at least double the later ones, and often much greater… The evidence shows a clear pattern of overestimation. Case studies and retrospective analyses conducted for a variety of regulations show that, in all cases, emission reduction at the source is much cheaper than is generally expected. However, cleanup beyond the source [i.e., in the case of GHGs, trying to deal with the impacts of climate change] is often much more expensive than predicted.

While there is a great deal of evidence that regulatory environmental initiatives can enhance competitiveness, it is obvious that this depends, at least to some extent, on the design of the initiatives in question. According to Porter and van der Linde,¹⁰ “properly designed” regulation is regulation that motivates firms to innovate, since innovation is the fundamental driver of competitiveness. These authors list eleven criteria for innovation-friendly regulation:

1. focusing on outcomes, not technologies;
2. strict rather than lax;
3. as close to the end user as practical, while encouraging upstream solutions;
4. phased in;
5. using market incentives;

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6. harmonized or in convergence with regulations in associated fields;
7. developed at the same time as other countries or slightly ahead of them;
8. in the context of a regulatory process that is stable and predictable;
9. with industry participation in setting standards from the beginning;
10. requiring strong technical capabilities on the part of regulators; and
11. minimizing the time and resources consumed in the regulatory process itself.

It is striking how well a “cap and trade” emissions trading system — the central policy instrument envisaged by federal and provincial governments in Canada to reduce GHG emissions from large industrial emitters under the Kyoto Protocol — satisfies these criteria, while giving governments essentially unlimited flexibility in addressing regional and sectoral vulnerabilities.

The Montreal Protocol as an Example

The Montreal Protocol, adopted in 1987 and amended in 1990, aims to phase out worldwide production and consumption of chlorofluorocarbons (CFCs) and other ozone-depleting compounds. The Protocol entered into force in 1989 and was amended in 1990. The following discussion refers to the 1989 Protocol, including its 1990 amendment.

The Montreal Protocol sets timetables for a staged phase-out of the production and consumption of CFCs (Group I) and halons (Group II), with different timing for developed and developing countries. The Protocol also bans the import of ozone-depleting products from non-parties, and “discourages” the export of technologies used in producing and utilizing ozone-depleting substances to non-parties.11

Opposition to the Montreal Protocol by industry groups was characterized by claims of negative impacts on the economy and on competitiveness. Governments also overestimated these impacts. Hodges12 reports studies conducted by the US Environmental Protection Agency on the cost of compliance with the Montreal Protocol targets:

In 1988, the agency estimated it would cost $2.7 billion to reduce U.S. consumption [of CFCs] by 50% within 10 years. By 1992 the estimate to totally phase out CFCs within eight years was only $3.8 billion . . . the estimated average cost of cleaning up CFCs fell by approximately 38%.

As early as 1991, a technological and economic assessment of the impact of the Montreal Protocol conducted by the United Nations Environment Programme (UNEP)13 was finding that alarmist claims of economic damage were unfounded. According to the UNEP assessment,

- “Innovation to replace CFCs has been rapid, effective, and economical. Previous fears have largely been groundless. . . . it has . . . been generally true that scientific, engineering, and entrepreneurial innovations have been sufficient to overcome the losses of Ozone Depleting Substances (ODS). Not only has it been technically possible to replace CFCs in a continuous expanding range of applications, but in many cases it also has been relatively inexpensive or even profitable to do so.”
- Private sector firms and governments in the developed countries had moved faster than required by the formal regulatory structure of the Montreal Protocol.

12 Hart Hodges (November 1997), op. cit.
• A spirit of partnership and cooperation in sharing information widely had greatly accelerated the process of substituting for CFCs and lowered the economic costs.

Parallels are already evident between these findings and the case of climate change and the Kyoto Protocol. Regarding the unexpectedly fast pace of innovation, the Third Assessment Report of the Intergovernmental Panel on Climate Change (2001) found that,14

Significant technical progress relevant to greenhouse gas emissions reduction has been made since the [Second Assessment Report] in 1995 and has been faster than anticipated. Advances are taking place in a wide range of technologies at different stages of development, e.g., the market introduction of wind turbines, the rapid elimination of industrial by-product gases such as N₂O from adipic acid production and perfluorocarbons from aluminium production, efficient hybrid engine cars, the advancement of fuel cell technology, and the demonstration of underground carbon dioxide storage.

Returning to the Montreal Protocol, Environment Canada’s report *The Right Choice at the Right Time*15 presents estimates of global economic costs of compliance with the Protocol compared to economic benefits over the period from 1987 to 206016 (by which time ozone depletion is expected to have been reversed). Costs are estimated to be $235 billion (in 1997 US dollars), while benefits (resulting from reduced damage to fisheries, agriculture, and materials) are estimated at $459 billion, resulting in a net benefit of $224 billion. This benefit does not take into account health benefits, including an estimated 333,000 fewer skin cancer fatalities.

**Voluntary Initiatives, Competitiveness, and the Reduction of Greenhouse Gas Emissions: A Look at the Voluntary Challenge and Registry in Canada**

Since 1990, Canada has been relying on industrial firms to voluntarily reduce their GHG emissions to help slow climate change. 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 report their GHG management initiatives in an effort to reduce emissions on a voluntary basis.

Like many voluntary initiatives, VCR has a very low potential to directly affect the competitiveness of a company or country. For industry to become more competitive, it must have an incentive to innovate. Not only does VCR fail to provide this incentive, but it provides a very limited incentive to take any action at all to reduce GHG emissions. As a result, there is no expected positive impact on competitiveness.

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


16 Using a 5% discount rate.
The Pembina Institute examined all submissions to VCR made by industrial entities up to March 31, 2002, to identify those reporting their emissions for 2000.17 Here are our main findings:

- 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.
- 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.
- The level of participation in 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 had 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.
- There are a large number of major inconsistencies in the methodology used by firms to calculate 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 reported progress.
- The use of emissions offsets presents particular problems. Some claimed offsets are quite misleading and amount to little more than accounting tricks.
- Some Canadian industrial firms have been quite successful in limiting GHG emissions in the voluntary context of VCR. However, their contribution is dwarfed by the more numerous companies who remain “free riders.” There is no reason to believe that this will change if the voluntary approach continues. In particular, the major emissions increases projected by several of the largest emitters severely compromise Canada’s efforts to reduce its GHG emissions.

It is instructive to look at what happened the last time Canada committed to 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.18

In short, voluntary initiatives such as the Canadian VCR are ineffective at creating an incentive for innovation and increased competitiveness, and fail to realize significant reductions in emissions.

Conclusion

From a Canadian perspective, policies to reduce greenhouse gas emissions will be most successful if they provide incentives and resources for innovation, which helps to ensure corporate and national competitiveness. Historically, it has been shown that the costs of meeting environmental performance targets have been overestimated because assessments failed to account for the positive impact of innovation. Companies will be able to realize multiple benefits by adopting a leadership position on reducing greenhouse gas emissions and other environmental issues. Finally, the Canadian experience of a voluntary reporting approach for reducing GHG emissions has shown very limited success. The Canadian voluntary approach has not successfully reduced emissions because it provides:

- No real threat to take action,
- No real reason to commit to emission reductions,
- No real competitive benefit to take action, and
- No real incentive to innovate.