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The Myth of North American Carbon Reduction Laggards

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Note to reader: Some words in this document may appear in blue and are underlined. Clicking on these words will direct the reader to relevant sites or documents using your associated web-browser.

Key Points

- In the current global narrative, Canada and the United States are often portrayed as climate change villains when compared with “greener” and more “environmentally virtuous” European countries. This portrayal is an artifact of the demographic and economic differences between North America and Europe.
- Canada and the United States have experienced significantly greater population and economic growth than most European countries have over the past two decades. When economic growth, or even just population growth, is taken into account, it becomes apparent that Canada and the United States have performed as well as, or better than, many European countries in reducing greenhouse gas (GHG) emissions.
- Many European countries have achieved seemingly impressive territorial GHG emissions reductions by “outsourcing” carbon-intensive economic activity to developing countries. Many of these reductions are partially offset by the increasing emissions in China and elsewhere when they produce carbon-intensive products for consumption in “green” European countries.

...Many European countries have achieved seemingly impressive territorial GHG emissions reductions by “outsourcing” carbon-intensive economic activity...

Executive Summary

In the current global narrative, Canada and the United States are villains when it comes to addressing climate change. The United States, in particular, is condemned for its refusal to sign the Kyoto Protocol, a binding international regime to reduce GHG emissions. Canada comes in for vilification from its environmental leaders for having high per capita GHG emissions and for having failed to achieve its GHG reductions targets under the Kyoto Protocol. In contrast, the affluent countries in Western and Northern Europe are often cast as the heroes in this global climate change narrative, and they are lauded for ratifying the Kyoto Protocol and for achieving significant emissions reductions.

But is the current narrative correct? This paper reviews the data on GHG emissions reductions, population growth and economic growth in affluent countries in the Kyoto era and concludes that Canada and the United States have performed as well as many of the developed countries that ratified the Kyoto Protocol, including some affluent European countries that enjoy sterling reputations for environmental leadership. In fact, we show that many of the countries that have achieved the steepest emissions reductions over the past two decades have largely done so because of some combination of sluggish economic growth, slower population growth and “outsourcing” emissions to developing countries such as China through international trade.

...Canada and the United States have performed as well as many of the developed countries that ratified the Kyoto Protocol...

Introduction

The Kyoto Protocol to the United Nations Framework Convention on Climate Change is an international environmental treaty, the objective of which is to stabilize the concentration of GHGs in the atmosphere in order to reduce the likelihood of dangerous anthropogenic interference with the climate system. The Protocol was adopted in 1997 and set GHG emissions reductions targets for 40 countries including 26 developed countries and 14 countries designated “economies in transition” (EIT).

The 14 EITs are Eastern and Central European countries that had formerly been in the economic orbit of the Soviet Union. The targets assigned to those countries were largely symbolic, as most saw their industrial economies collapse in the early 1990s, which resulted in large reductions in greenhouse gas emissions between the treaty’s baseline date (1990) and the signing of Kyoto. Kyoto targets for the EITs exceeded expected emissions under “business as usual” projections at the time, and it was therefore widely understood that the Eastern European EIT participants would likely be able to meet their Kyoto targets without any conscious effort at emissions reduction.¹ Since Kyoto was signed, Turkey has been designated as an EIT, and does not have a binding Kyoto target.

This left the 26 remaining Annex I parties as the only countries for which the Kyoto Protocol set meaningful emissions reductions targets.² This policy study will examine the performance of the 26 economically developed Annex I countries³ in terms of GHG reductions since the signing of the Kyoto Protocol. More specifically, it will offer a reassessment of the performance of the two North American Annex I countries—

Canada and the United States—relative to comparably affluent European countries.

In sections two and three of this paper, we examine economic and demographic factors that complicate the simplistic narrative of poor North American performance compared with other affluent countries. Although critics of recent and existing Canadian and U.S. governments have suggested that these countries’ increases in total emissions are due primarily to poor environmental policy or a lack of environmental virtue, we will show that GHG emissions growth in developed countries has largely been a function of population and economic growth. The emissions reductions record of both North American countries, and especially the United States, compares favourably with most other developed Annex I countries with comparable growth rates.

In section four, we examine the phenomenon of affluent countries “outsourcing” GHG emissions to developing countries. The most frequently used accounting system for national GHG emissions assigns emissions to the country where these emissions actually occur, without reference to the fact that the goods produced during the generation of these emissions are often consumed in another country. Under current accounting rules, countries can appear to be reducing their emissions when they import a large number of the carbon-intensive products that they consume rather than produce them domestically. We show that when we use a consumption-based accounting method that assigns emissions based on which country consumes carbon-intensive goods, the apparent performance gap between North America and Europe becomes even smaller.

Adjusting for population growth

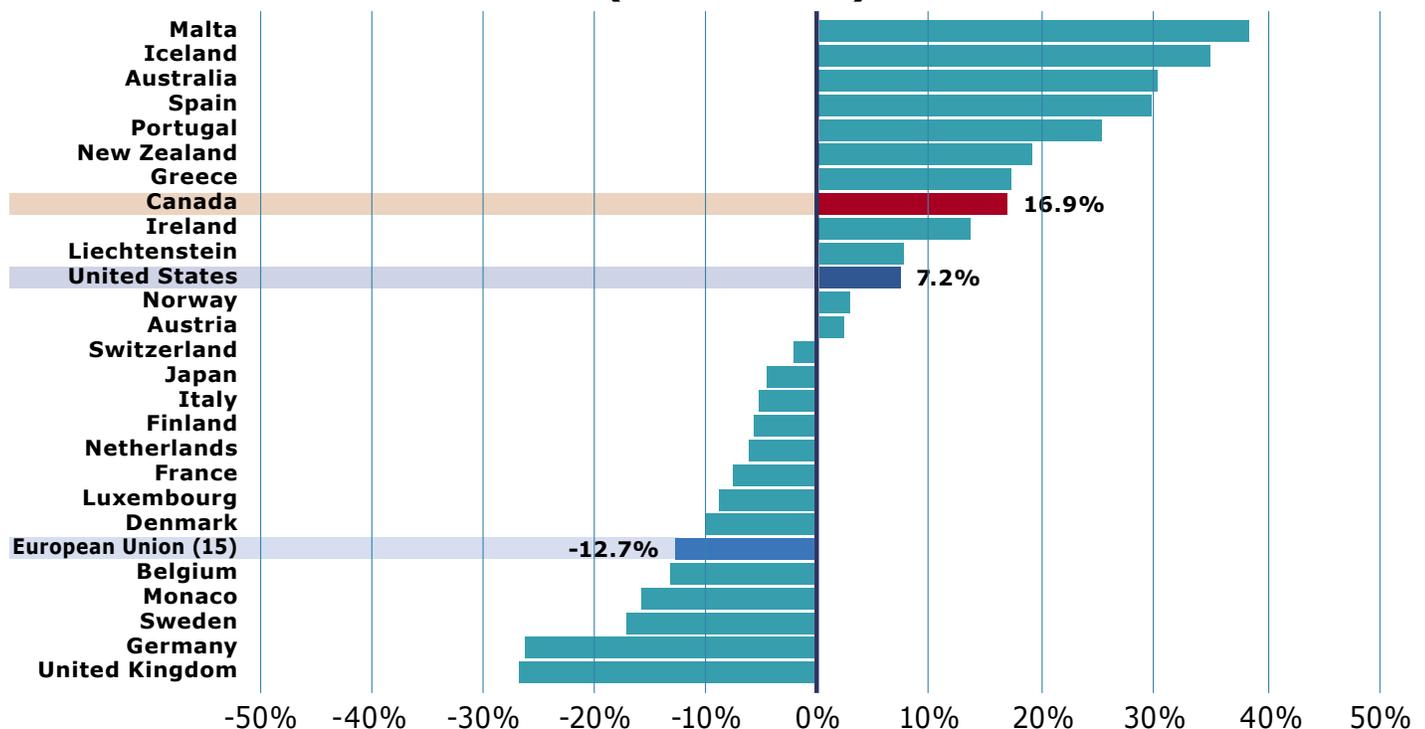
Since 1990, total GHG emissions in the United States and Canada have increased, while total emissions in many other affluent countries have decreased. Chart 1 shows the percentage change in total GHG emissions for each of the economically developed Annex I countries under the Kyoto Protocol. These statistics, and all statistics in this report, are based on data given to the United Nations for total GHG emissions in terms of tons of carbon dioxide equivalent. The data present the changes in actual emissions from economic activity and do not include LULUCF (land use, land-use change and forestry). The decision to exclude LULUCF was taken because of imperfections in the data, which undermine the usefulness of statistics that include reported LULUCF impact on national emissions.⁴

Chart 1 shows that since 1990, 13 of the 26 economically developed Annex I countries have experienced increases in their total emissions levels, and 13 have experienced decreases. Canada and the United States are two of the countries that have experienced overall emissions growth. Only seven countries have seen more total emissions growth in percentage terms than Canada has. The United States has seen an absolute increase in total emissions of 7.2 per cent since 1990.

The story of poor performance for Canada and the United States in terms of reducing GHG emissions from industrial sources is based primarily on the data presented in Chart 1. Since the Kyoto baseline year, Canada and the United States are among the countries that have seen increases in

CHART 1

Percentage Change in GHG Emissions (1990-2009)



Source: United Nations Framework Convention on Climate Change (UNFCCC) Website

total emissions, whereas many affluent European countries have achieved significant reductions. Taken together, the EU15 have experienced a total emissions reduction of 12.7 per cent compared with increases of 7.2 per cent in the United States and 16.9 per cent in Canada.

These numbers have led many to conclude that other affluent countries, and particularly affluent European countries, have markedly better environmental records than the developed North American countries do.

Although overall national emissions totals are frequently cited, they are very crude measures of environmental progress that do not account for the effect of economic growth or even differential rates of population increase. Of course, all else being equal, an increase in a country's population will lead to an increase in fossil fuel consumption and therefore to an increase in GHG emissions. To conduct a meaningful compar-

ative evaluation of emissions reductions performance in the Kyoto era, it is therefore necessary to control for differential rates of population growth, since it is much harder for a rapidly growing country to achieve emissions reductions than it is for a country that is experiencing little or no growth. When a straightforward adjustment is made to control for different rates of population growth, the seemingly uncomplicated narrative of a "green" Europe and a "dirty" North America becomes more complicated.

Canada and the United States have seen higher levels of population growth than most comparably affluent countries over the past 20 years. As Chart 2 shows, Canada's population increased by 22 per cent during this period compared with 23 per cent in the United States and just 9 per cent in the EU15.

Since the economic activity of human beings creates GHG emissions, population growth

CHART 2

Population Growth (1990-2009)

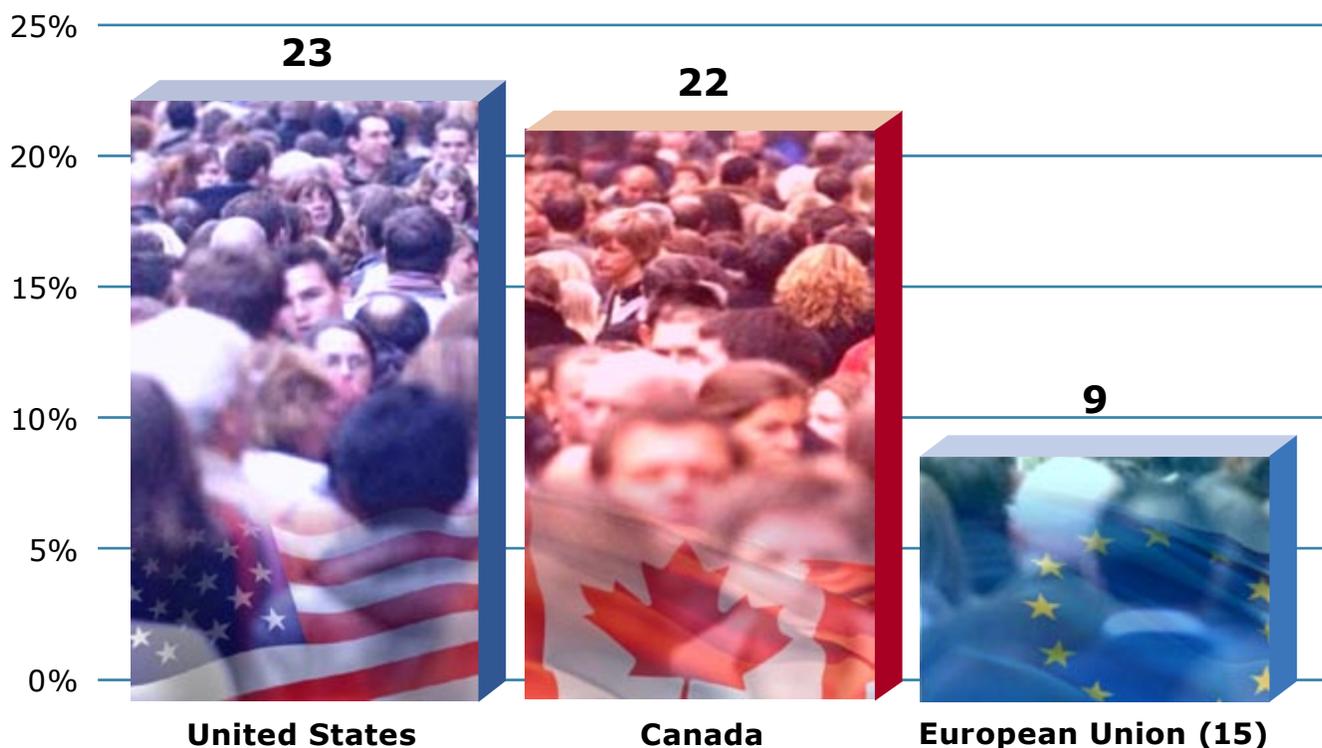
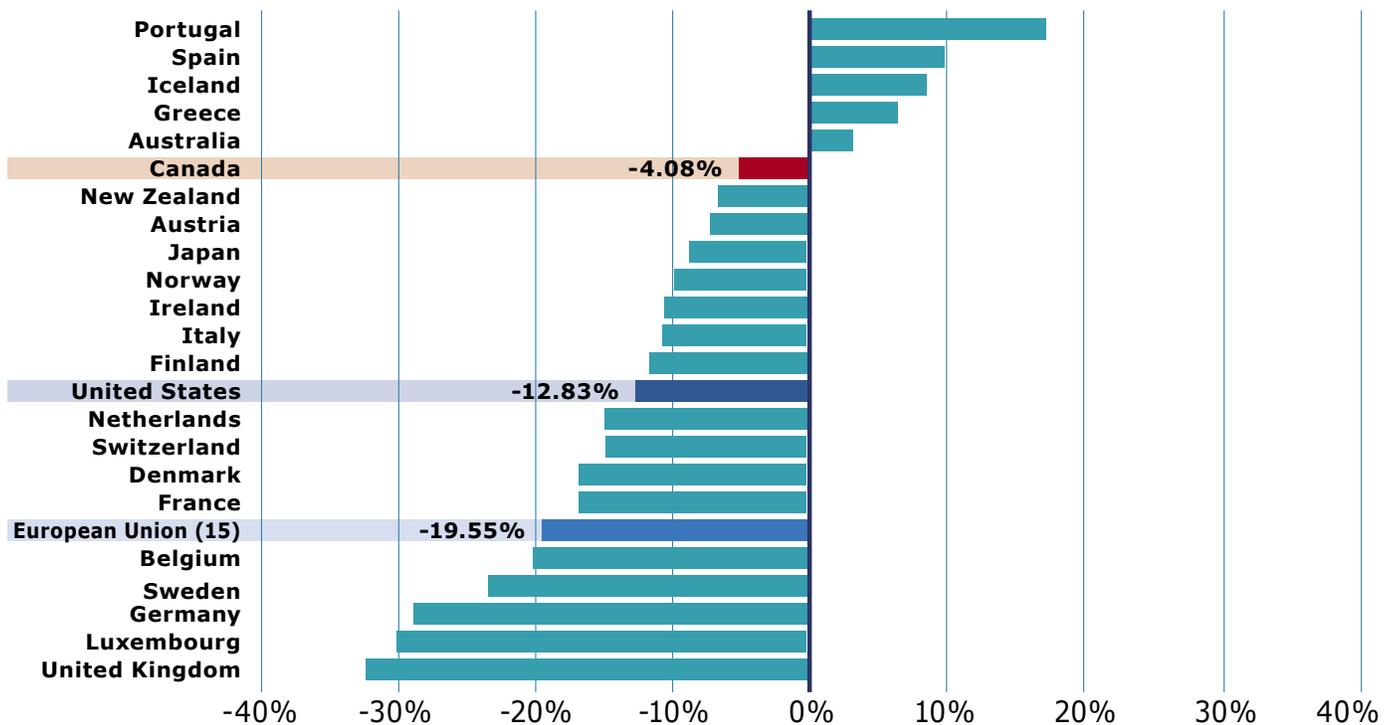


CHART 3

Percentage Change in GHG Emissions Per Capita (1990-2009)



Sources: UNFCCC, IMF

is an important driver of GHG emissions growth. By examining the changes in GHG growth *per capita* rather than observing the change in gross national emissions, we can consider this important variable.

As Chart 3 shows, per capita GHG emissions have shrunk in Canada and the United States since the Kyoto Protocol's baseline year of 1990. Therefore, the overall increase shown in Chart 1 was driven entirely by population growth in both countries. In the United States, per capita emissions had decreased significantly (12.8 per cent) during that time. The United States' per capita GHG reduction record since the baseline year is stronger than most of the developed Annex I countries.

The United States ranks 10th out of the 23 developed Annex I countries for which the IMF provides annual population data (the excluded developed Annex I countries are Monaco, Malta and Lichtenstein, very small

countries that have a combined population of fewer than one million people).

When per capita emissions are considered, the United States outperforms Finland, Norway, Japan and several other countries that enjoy a strong reputation for environmental accomplishments.

Canada ranks 18th out of 23 countries in this indicator. However, Canada has shown an overall decrease in per capita emissions since 1990, and it has a performance record similar to several affluent countries that have strong environmental records including Austria, Japan and Norway.

The preceding tables made use of the Kyoto Protocol's baseline year of 1990 to compare national emissions reductions performance. However, this baseline is somewhat problematic. The 1990 baseline is a politically arbitrary starting point.

The Kyoto Protocol was not actually signed until 1997, but several powerful parties including Great Britain, Germany and Russia had experienced significant emissions reductions during the early 1990s for reasons having nothing to do with conscious efforts to reduce their contributions to the greenhouse effect. Russia and the former East Germany endured industrial collapses at the start of the decade, which led to steep reductions in GHG emissions from fossil fuel use. A detailed blog entry at Breakthrough Europe, a blog hosted by the Breakthrough Institute, notes that it was much easier for Germany to meet its Kyoto targets “because it successfully negotiated 1990 as the baseline year instead of 1997, allowing it to factor in the collapse of East Germany’s industrial sector following reunification.”⁵ These countries lobbied to move the treaty’s baseline year to 1990 rather than use the actual year of its signing, as they wanted to be allowed to count

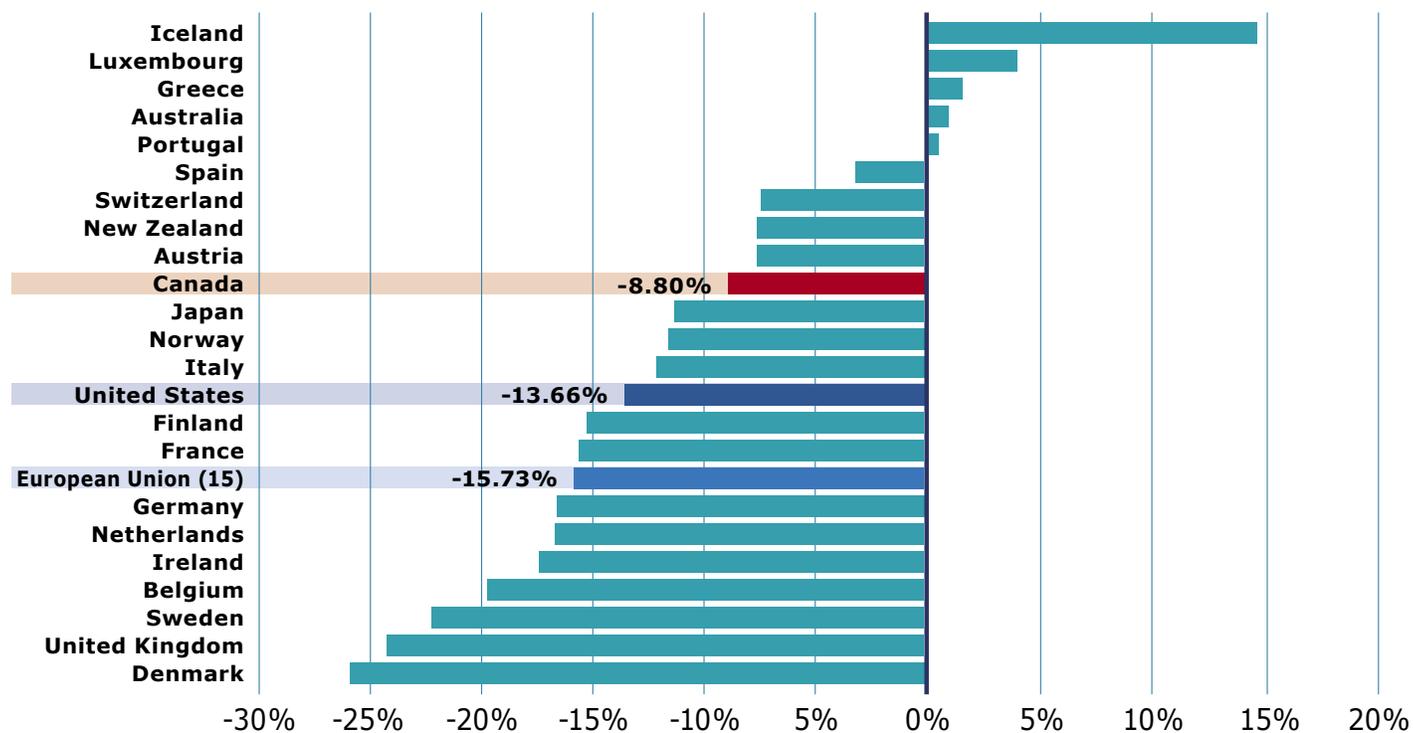
those early reductions, thereby making it much easier to reach their targets.

If, rather than relying on the politically arbitrary baseline year of 1990 that benefits several European countries in comparison with North America, we examine per capita GHG reductions since Kyoto was signed in 1997, the performance gap between Europe and North America decreases substantially—and in the case of the United States, it disappears almost entirely.

As Chart 4 shows, the United States ranks 11th out of 23 countries in this indicator. However, what is particularly striking about this graph is that it demonstrates that since Kyoto was signed there has been almost no difference between the per capita emissions reductions performance of the EU15 and the United States. While the EU15 has cut per capita emissions by 15.73 per cent, the United States has cut them by 13.66 per cent. This does not fit with the narrative

CHART 4

Percentage Change in GHG Emissions Per Capita (1997-2009)



Sources: UNFCCC, IMF

that suggests that European countries and other affluent countries have taken emissions reductions more seriously than the United States has and that they have made substantially greater progress in this area since the signing of Kyoto.

This graph also suggests that Canada's emissions reductions performance in recent years has not been embarrassingly poor in comparison with other affluent countries. Rather, Canada's performance is better described as average. Since Kyoto was signed, Canada ranks 15th out of 23 countries in terms of per capita GHG emissions reduction. Canada's per capita emissions have decreased 8.8 per cent since 1997, which is more than Switzerland's, Spain's and Iceland's have. Three more countries, Japan, Norway and Italy, are within four percentage points of Canada in terms of per person emissions reduction. Although Canada has certainly not been a leader in terms of per capita emissions reduction, the data suggest that Canada's performance since Kyoto has not been as embarrassingly poor as its critics often claim.

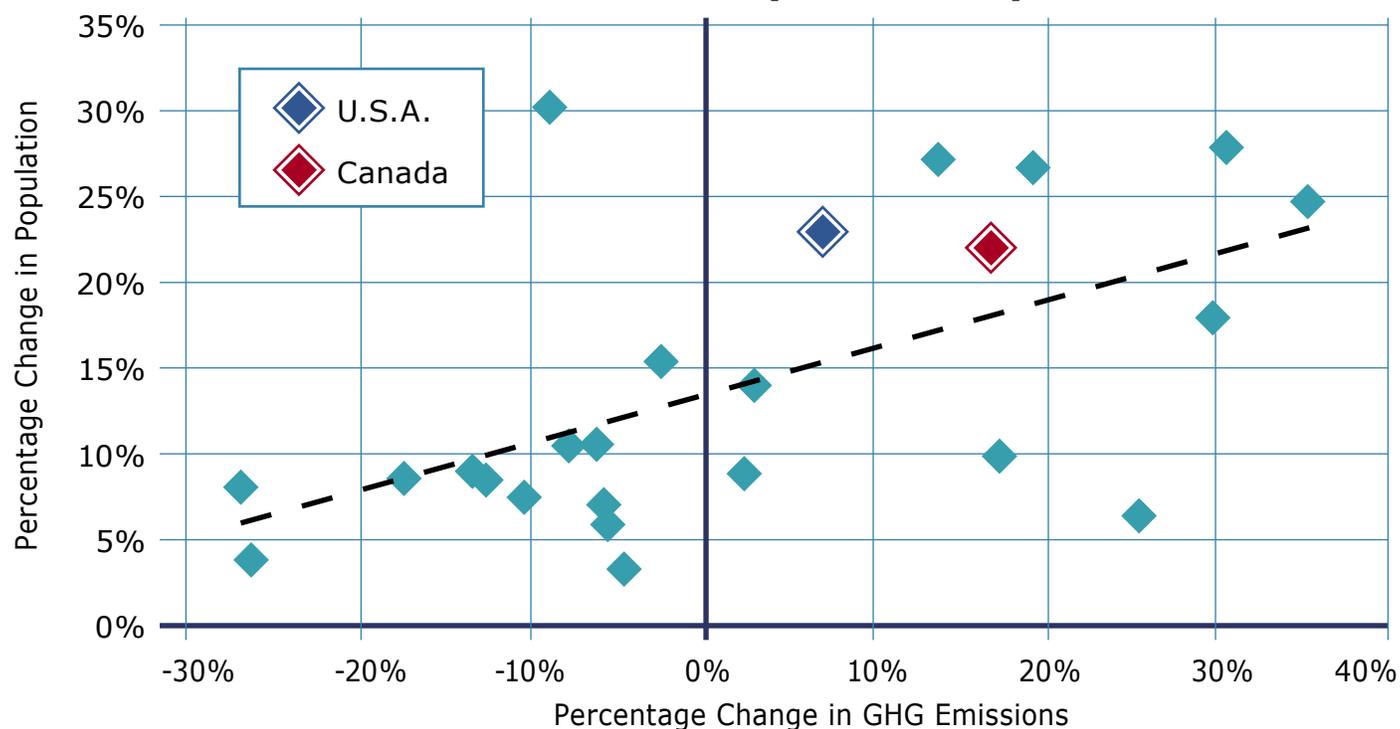
Using either baseline, the data clearly show that the performance gap between affluent European countries and North America in terms of emissions reduction is considerably smaller when per capita metrics are examined than when only total national emissions are considered. This is not surprising. Canada and the United States have had high rates of population growth compared with most other affluent countries, and this has made it more difficult to achieve reductions in total GHG emissions.

This substantial difference in population growth is one of the most important reasons for the EU's larger reduction in GHG emissions compared with North America's over the past 20 years. Commentators and activists who promote an overly simplistic narrative that attributes slower emissions reduction in North America to an absence of environmental virtue or insufficiently "green" public policy often overlook this fact.

...the performance gap between affluent European countries and North America in terms of emissions reduction is considerably smaller when per capita metrics are examined than when only total national emissions are considered...

CHART 5

Population Growth vs. Percentage Change in GHG Emissions (1990-2009)



Sources: UNFCCC, IMF

Chart 5 illustrates how population growth largely shapes the extent to which national emissions change. There is a clear correlation between population change and GHG emissions change in affluent countries over the past 20 years. This graph includes the 23 economically developed Annex I countries for which reliable demographic and population data are available from the IMF.⁶

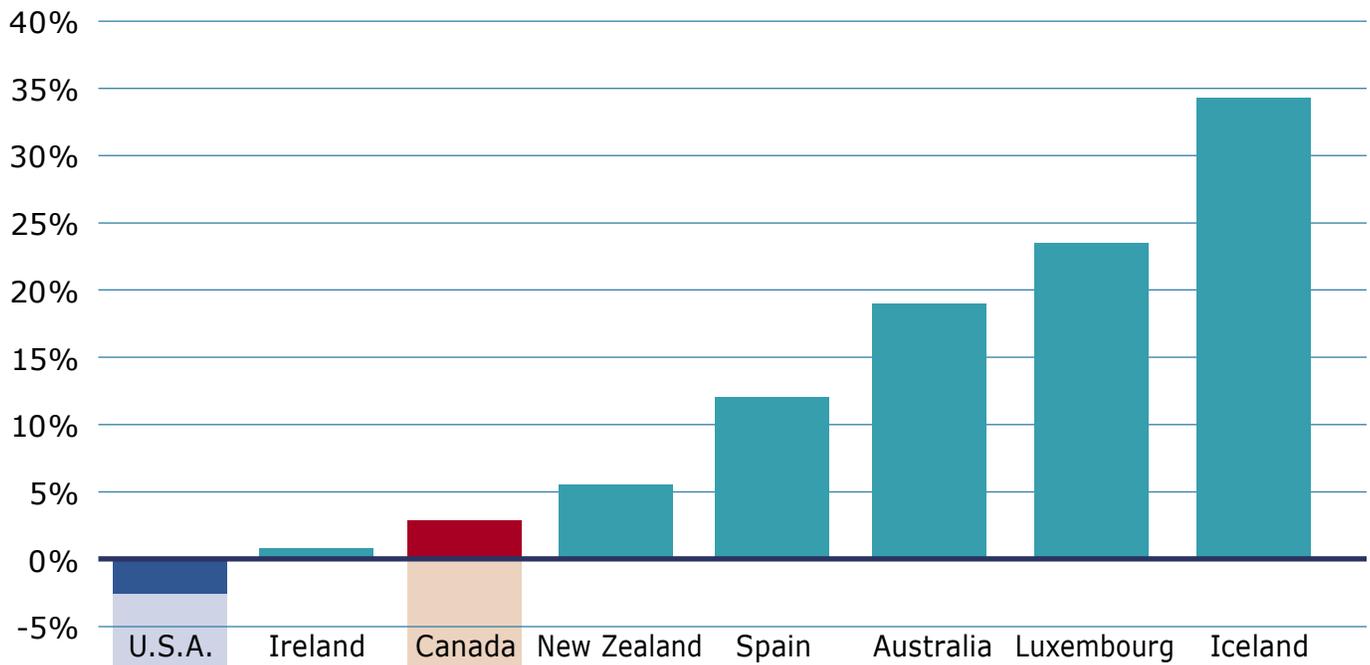
Predictably, countries with slow rates of population growth were, generally speaking, able to achieve significant emissions reductions during the Kyoto era. Meanwhile, countries that experienced rapid population growth generally found it much more difficult to achieve emissions reductions.

There are a few exceptions. Tiny Luxembourg has experienced substantial population growth with meaningful reductions in GHG emissions since 1990 (top left corner of Chart 5). Portugal, on the other hand, has had slow population growth but significant GHG increases (bottom right corner). However, the data generally tell a straightforward story—countries with high levels of population growth have generally seen emissions increases or small reductions whereas countries with low growth rates have usually managed to achieve impressive reductions.

The emissions reduction record of Canada over the past decade is comparable to most other countries with similar levels of economic and population growth, and the record of the United States is better than average when compared with similarly fast-growing countries.

CHART 6

Percentage Change in GHG Emissions in Countries with >10 Per Cent Population Growth (1997-2009)



Sources: UNFCCC, IMF

Chart 6 illustrates this point by comparing GHG emissions increases since 1997 in all countries that have experienced population growth of 10 per cent or greater. The United States is the only one of these eight countries to achieve absolute reductions during this period, and Canada shows only a small increase since 1997 compared with the much larger increases in most of the other fast-growing countries.

While overall emissions reductions in Canada and the United States have been smaller than what has been achieved in some other jurisdictions in recent years, the data show that this is largely due to their rapidly growing populations, and Chart 6 shows that both countries' records of emissions reductions are actually quite good when compared with similarly fast-growing countries.

The United States is the only one of these eight countries to achieve absolute reductions during this period...

The influence of economic growth on GHG emissions in developed countries

We have seen that population growth is highly correlated with higher rates of GHG emissions growth. The same is true for economic growth. Economic activity causes the consumption of fossil fuels. All else being equal, higher levels of economic activity will lead to higher levels of fossil fuel consumption and GHG emissions. As a result, countries with booming economies will generally find it much harder to achieve significant reductions in GHG emissions from fossil fuel consumption compared with countries whose economies are growing slowly. Canada and the United States have both enjoyed strong economic growth over the past 20 years, and this is a major factor in their inability to achieve the major emissions reductions that have occurred in countries whose economies have not grown as quickly.

Charts 7 and 8 show the correlation between economic growth and higher rates of GHG emission growth during the Kyoto era. Whether the baseline is 1990 or 1997, there is a positive correlation between economic growth and a higher rate of GHG emissions. The result is statistically significant at the 5 per cent level when using the 1997 baseline and at the 10 per cent level when using the 1990 baseline. Countries such as Canada and the United States where GDP growth has been robust have found it far more difficult to achieve GHG reductions than have countries such as Denmark and Belgium where economic growth has been weak.

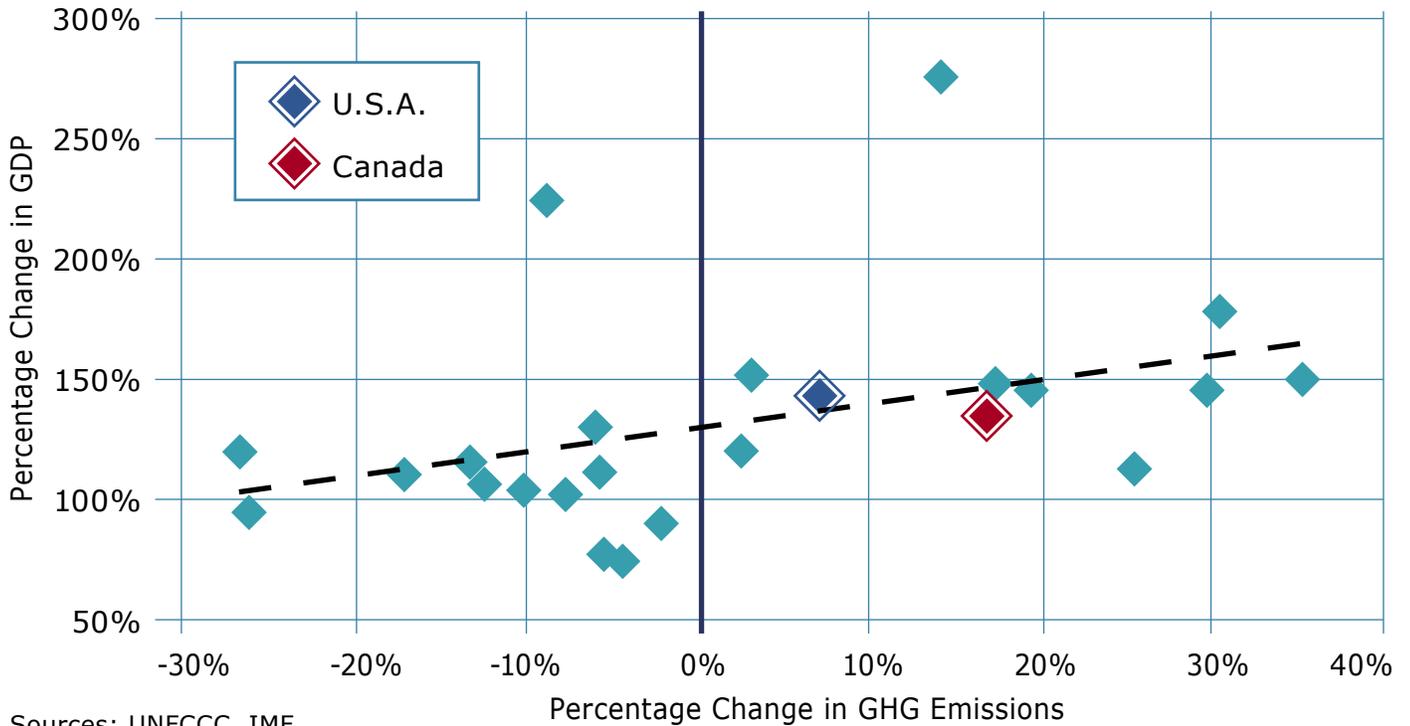
To be sure, some countries have achieved meaningful GHG reductions while enjoying rapid economic growth. The Netherlands, for example, has enjoyed economic growth comparable with North America's since 1997, and it has achieved significantly larger emissions reductions. Portugal, on the other hand, has had larger emissions increases than either North American country despite a lower rate of economic growth.

Both graphs suggest that there is nothing remarkably good or remarkably bad about North America's GHG emissions reductions performance given the two countries' levels of economic growth since 1990 and 1997. Canada and the United States are very close to the regression line, which suggests that GHG emissions change has been near to what should be expected given their comparatively strong GDP growth in the Kyoto era.

Chart 9 (page 16) further demonstrates the point that neither Canada's nor the United States' performance in GHG emissions reductions in recent years is especially bad compared with other countries that have experienced similar or greater levels of economic growth. It compares the percentage change in total emissions since 1990 for all economically developed Annex I countries that have matched or exceeded Canada's level of economic growth. Canada has outperformed most of the 10 countries in this group of fast-growing economies in terms of stabilizing emissions since 1990. Five countries have seen faster emissions growth than Canada had; three have seen slower emissions growth; and one,

CHART 7

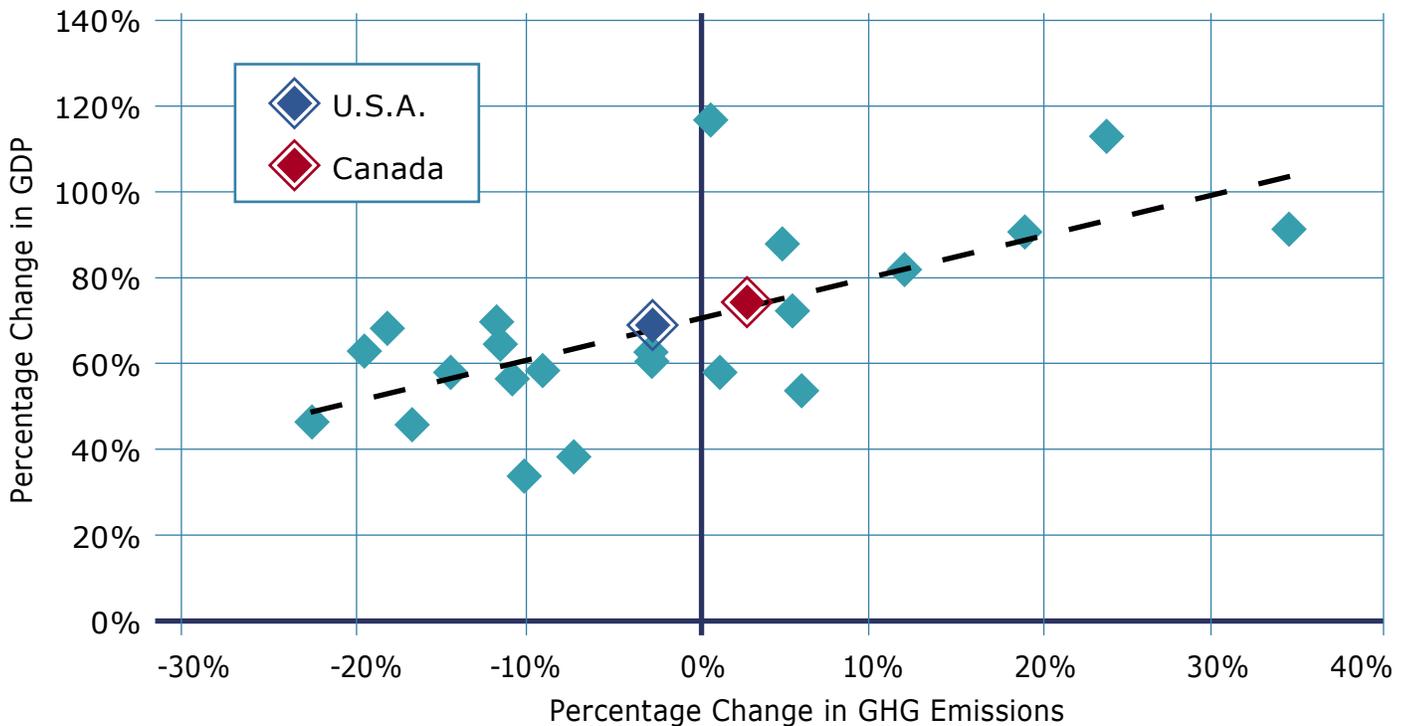
GDP Growth and Percentage Change in GHG Emissions (1990-2009)



Sources: UNFCCC, IMF

CHART 8

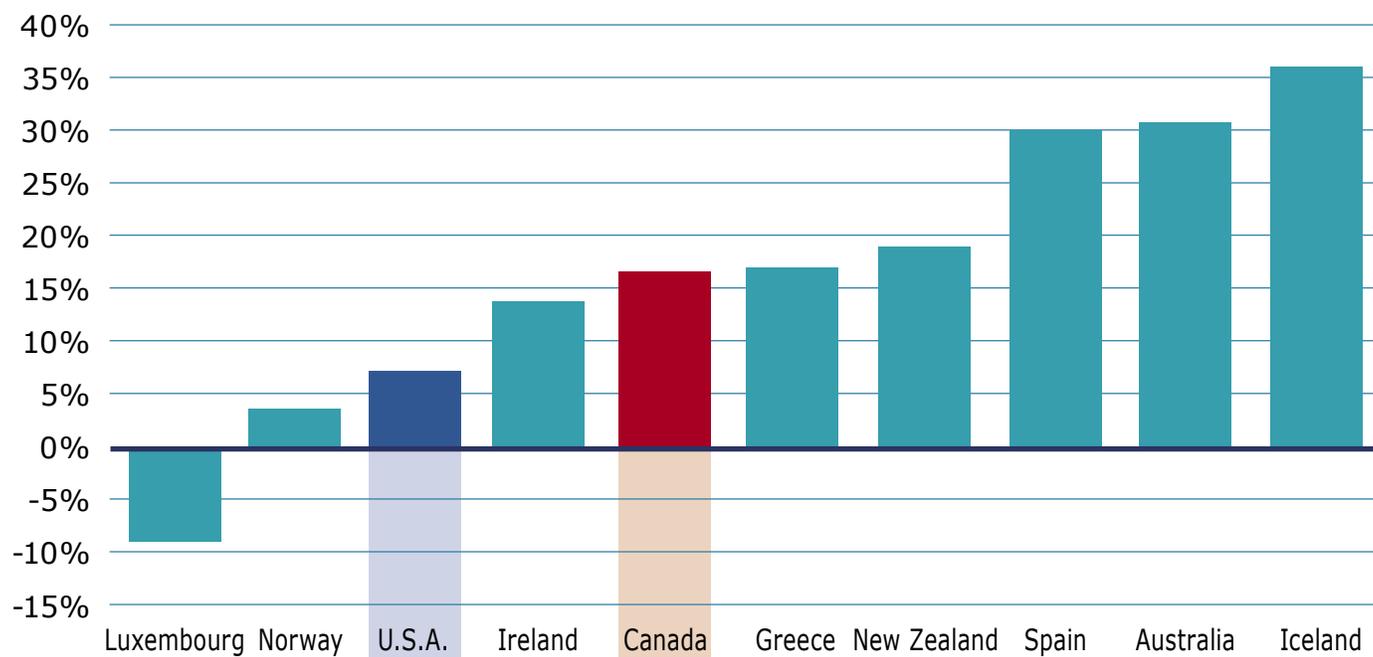
GDP Growth and Percentage Change in GHG Emissions (1997-2009)



Sources: UNFCCC, IMF

CHART 9

Percentage Change in GHG Emissions in Developed Countries with Economic Growth Equal to or Greater than Canada (1990-2009)



Sources: UNFCCC, IMF

Luxembourg, has experienced real emissions reductions. As for the United States, so often cast as the climate change villain, we see that it is the third-best performer out of 10 in this group of fast-growing economies in terms of stabilizing GHG emissions.

The evidence presented in the previous two sections suggests that the inability of Canada and the United States to achieve rapid total emissions reductions comparable to those achieved in the EU15 and some

other affluent jurisdictions has been largely attributable to strong economic and population growth in North America during this time. These economic and demographic factors should be recognized as important determinants of GHG change in recent years. North America's emissions reductions performance should be seen largely as a function of these forces rather than simply as evidence of failed environmental policies or a lack of environmental virtue.

...the United States is the third-best performer out of 10 in this group of fast-growing economies in terms of stabilizing GHG emissions.

“Outsourcing” emissions?

The previous two sections show that when population growth and economic dynamism are considered, the gap between Europe and North America in terms of GHG reductions shrinks considerably. When we look at the impact of international trade, or “outsourcing” of emissions, the gap shrinks further still. This section will discuss this phenomenon.

Recent research on the effect of international trade on national GHG emissions shows that the remaining performance gaps are, in part, the result of...

“[t]he current ‘production-based’ carbon accounting system ... allows countries to claim responsibility only for emissions produced within their borders, rather than those contained in the goods they consume, which are often manufactured in polluting factories on the other side of the world.”⁷

The current accounting system focuses on the GHG directly emitted by each country instead of on the amount of emissions that occurred during the production of the goods and services consumed by the residents of a particular jurisdiction. Therefore, countries can appear to make great strides toward emissions reduction when they “outsource” carbon-intensive economic activity to other countries. If an affluent country slows down its manufacturing and increases its imports of carbon-intensive products from the developing world, its territorial emissions will decrease, but any environmental benefits related to global warming are illusory if these emissions have merely been replaced by emissions elsewhere. In other words, the accounting system does not measure the amount of GHG emitted to produce all of the goods and services that citizens of a country actually consume.

The territorial emissions reductions achieved by affluent countries that “outsource” their emission-causing activities to the Third World without reducing their actual consumption of products that produce GHG emissions look good on Kyoto balance sheets, but they do nothing to reduce the concentration of GHGs in the atmosphere.

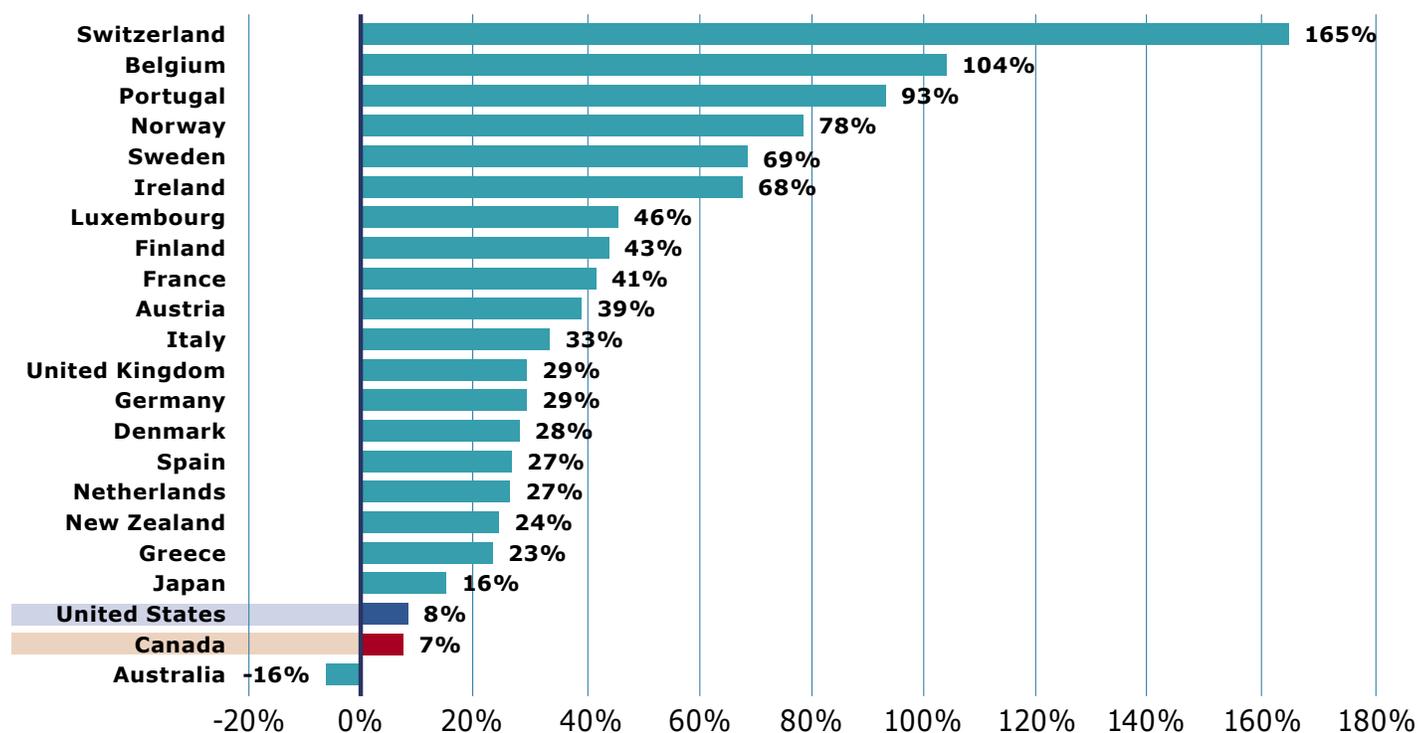
Several recent studies demonstrate that many European countries that are viewed as top performers in terms of GHG reduction “outsource” a far greater share of their GHG consumption to other parts of the world than do Canada and the United States. For many countries with sterling environmental reputations, significant territorial emissions reductions have been achieved partially by transferring a large share of their carbon-intensive economic activity to China and other developing countries.

In recent years, a number of studies have shed new light on the effect of international trade on national GHG inventories and the extent to which various wealthy countries outsource carbon emissions to the developing world. For example, a study by the Proceedings of the National Academy of Sciences (PNAS) developed a global consumption-based emissions inventory for carbon dioxide, the most important greenhouse gas. The study demonstrated that 24 per cent of global carbon dioxide emissions were traded internationally in 2004 and that understanding the role of this trade is crucially important to assessing national GHG reduction performance in the economically developed world.

More specifically, the PNAS study found that although some affluent countries achieved reductions in their territorial emissions, these gains were offset by the growth in emissions in developing

CHART 10

Percentage Change to 2008 Territorial Emissions when Trade is Included



Source: PNAS

countries, largely because of the production of goods that are eventually exported to richer countries. The PNAS authors note: "[F]rom 1990 to 2008 CO₂ emissions in developed countries (defined as countries with emission-reduction commitments in the Kyoto Protocol, Annex B) have stabilized but emissions in developing countries (non-Annex B) have doubled."⁸ The authors found that an important reason for the continued global increases in total GHG emissions is that "emission transfers via international trade often exceed the emission reductions in the developed countries..."⁹

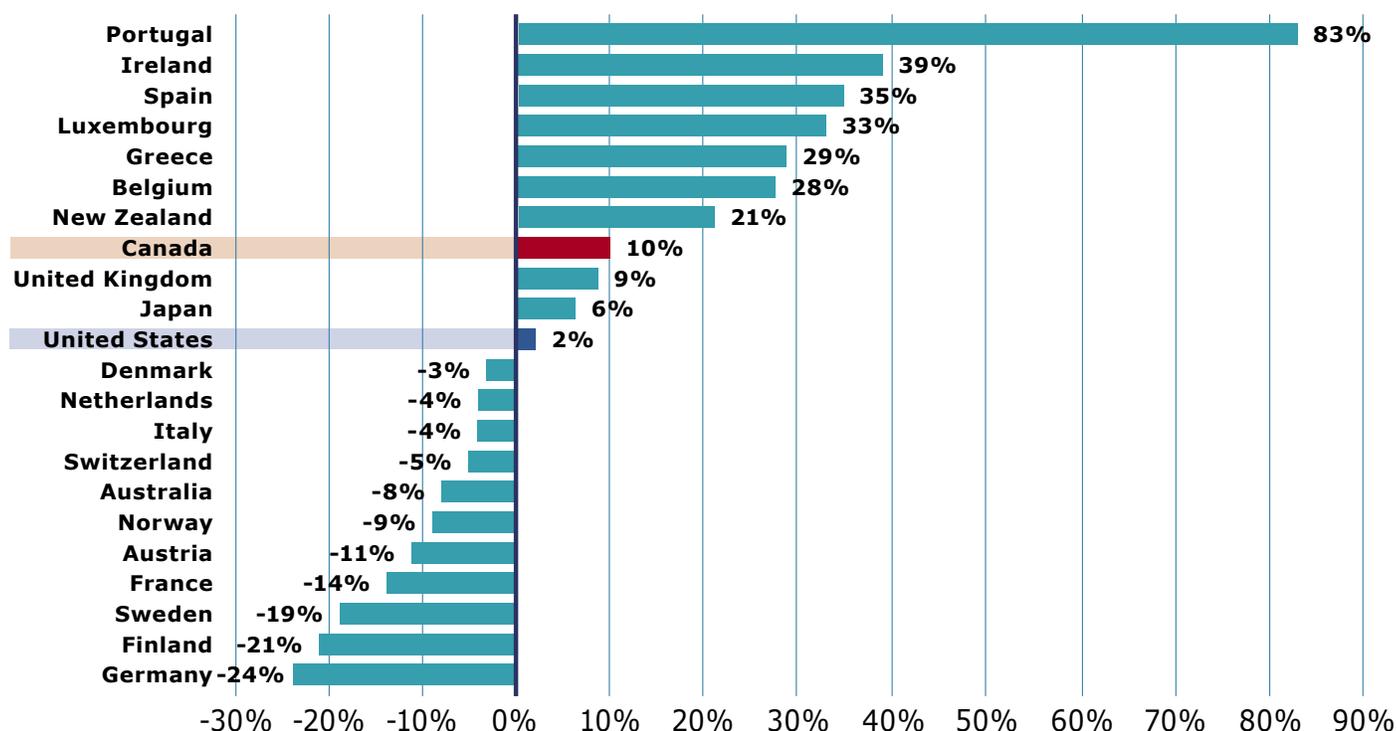
In other words, emissions emanating from the production of exported goods and raw materials in developing countries frequently outweigh any emission reductions by developed ones.

A closer look at the data reveals that this is especially true for several countries in Western Europe that are frequently identified as leaders in emissions reduction.

As Chart 10 illustrates, the inclusion of emissions that occurred elsewhere for the production of goods and services consumed within specific developed countries shows that all but one of the economically developed Annex I countries (Australia) are net exporters of GHG emissions to other countries. However, the data show that the United States and Canada "outsource" a much smaller share of their GHG emissions to the developing world than do most other economically advanced countries. Whereas Germany and the United Kingdom outsource about 30 per cent of their emissions, Canada and the United States each outsourced fewer than 10 per cent of their consumption-based emissions in 2008.

CHART 11

Percentage Change in Consumption-based Carbon Dioxide Emissions Per Capita between 1990-2008



Source: PNAS

When we examine consumption-based estimates, Canada and the United States are still among the countries with the highest levels of per capita GHG emissions in the world. However, as Chart 10 suggests, the gap between North America and affluent European countries shrinks significantly when consumption-based accounting rather than territorial accounting is examined.

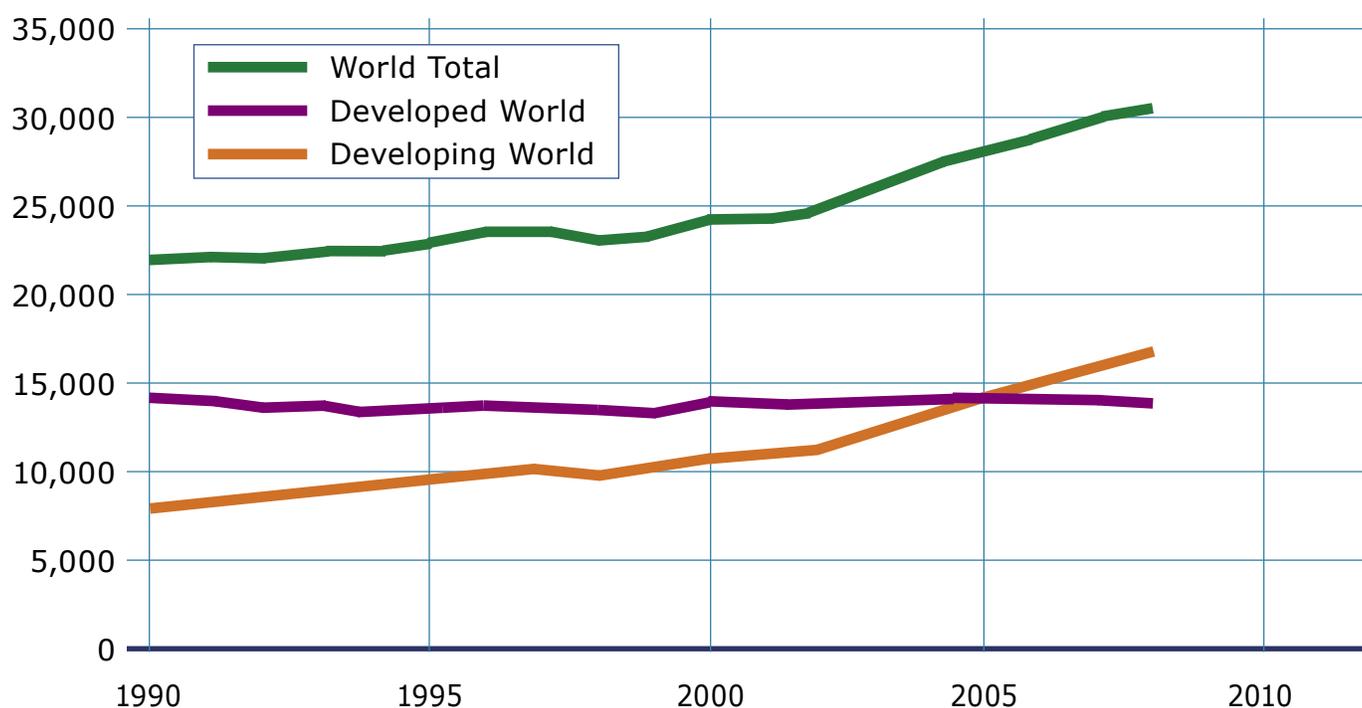
Focusing on carbon consumption rather than territorial emissions also leads to a different assessment of the countries' performances in terms of emissions reductions since 1990. Chart 11 presents the change in consumption-based carbon dioxide emissions between 1990 and 2008 for economically advanced Annex I countries.

The most striking aspect of this graph is that far fewer countries have achieved per capita emissions reductions since 1990 compared with when territorial emissions were examined (see Chart 4 page 10). When territorial emissions were examined, all but five countries had achieved per capita emissions reductions. When we examined consumption-based emissions change, approximately only half of the developed Annex I countries showed per capita emissions reductions since 1990.

Canada and the United States are still among the countries with the highest levels of per capita GHG emissions in the world.

CHART 12

Territorial Emissions in the Developed World, the Developing World, and the World as a Whole (1990-2008)



Source: PNAS

Clearly, the inclusion of “outsourced” emissions makes several countries’ emissions reductions performance much less impressive.

One particularly important example of this phenomenon is the United Kingdom, a country that is frequently identified as an exemplar of strong emissions reduction performance. We see that when “outsourced” emissions are examined, the United Kingdom has had an increase approximately as large as Canada’s in consumption-based emissions per capita since 1990 and not the impressive reduction per capita that we saw in Chart 4 (page 10) when territorial emissions were considered. We also see that per capita consumption-based emissions growth had been milder in the United States than in the United Kingdom during this time.

It is precisely these facts that led Oxford University professor of energy policy Dieter Helm and chief scientific adviser David Mackay to describe the United Kingdom’s apparent success in reducing emissions as an “illusion” created by existing accounting systems that do not account for “outsourcing” or “leakage” of emissions to developing countries.¹⁰

This shortcoming in the territorial accounting system makes the performance of almost all developed countries look better than it is, and it affects some countries more than others. The United Kingdom, Norway, Sweden and France are a few countries that benefit from the omission from territorial accounting systems of the “outsourced” emissions, whereas Australia, Canada and the United States benefit far less because these countries “outsource” a smaller share of their emissions.

Chart 12 helps illustrate the extent to which emissions reductions in the developed world have been, in part, an “illusion” that is based on the transfer of carbon-intensive manufacturing to the developing world. Although emissions in the developed world have dipped slightly since 1990, in the developing world they have shot up, leading to higher worldwide emissions. The trends shown in Chart 12 are partially the result of GHG “outsourcing.”

When consumption-based measures of GHG change since 1990 are examined, Canada and the United States do not appear to be environmental laggards, and they show performances that are closely aligned with a number of countries that enjoy outstanding reputations for environmental performance including the United Kingdom, Japan and Denmark.

This shortcoming in the territorial accounting system makes the performance of almost all developed countries look better than it is...

Conclusion

Canada and the United States are often portrayed as villains in the global narrative surrounding GHG reductions. Whereas affluent Northern and Western European countries are praised for achieving impressive GHG reductions, Canada and the United States are criticized for experiencing overall emissions increases and, in the case of the United States, for failing to ratify the Kyoto protocol.

The evidence presented in this paper suggests the dominant narrative is an oversimplification. We saw that the impressive emissions reductions in many European countries were made much easier by slower population and economic growth than has occurred in the two affluent North American countries. Once straightforward adjustments are made to control for economic and population growth, there appears to be nothing especially bad about Canada's emissions reduction performance in comparison with most similarly affluent European countries. The United States actually outperforms a number of countries that enjoy sterling reputations for environmental leadership. Furthermore, we showed that Canada and the United States "outsource" a smaller share of their GHG emissions to other countries than do most other affluent countries with whom we have historically compared ourselves.

When the Kyoto Protocol was signed, Canada and the United States began the emissions reduction process with a high baseline level of per capita GHG emissions. Not surprisingly, today, Canada and the United States still have per capita GHG emissions that are among the highest in the world.

However, a popular narrative surrounding GHG emissions reduction performance holds that the affluent North American countries have been particularly bad actors. This report has shown that this is an oversimplification. When straightforward adjustments are made to account for population and economic growth, we see that the performance gap between North America and Europe becomes much smaller and that the performances of Canada and the United States in terms of emissions reduction are comparable to what has been achieved in other fast-growing jurisdictions. In fact, the United States compares favourably with most other countries that have experienced similarly high levels of population and economic growth.

We have also shown that some jurisdictions that are lauded for outstanding GHG emission performance have achieved impressive-looking emission reductions partly because of combination of "outsourcing" emissions, slower than average economic and population growth and reliance on the arbitrary 1990 baseline. These facts suggest that national GHG emissions change over the last decade has been driven as much by international trade patterns, demographic change and population growth as by environmental policy or conscious shifts in national energy mixes.

The evidence we presented in this report suggests that the narrative of a "green" Europe rapidly transitioning to a low-carbon economy and a "dirty" North America failing to make progress is an unhelpful oversimplification that fails to account for the complicated set of factors that influence GHG emissions patterns in particular jurisdictions.

Endnotes

1. Christoph Böhringer and Carsten Vogt, "Economic and Environmental Impacts of the Kyoto Protocol," *The Canadian Journal of Economics* (May 2003): 478.
2. The United States signed the Kyoto Protocol but the treaty was never ratified by the legislative branch of government, which means that the United States did *not* accept its assigned target as legally binding.
3. Turkey was subsequently designated a transition economy and is not grouped with the affluent Annex One countries. Since 1990, Turkey has experienced significant GHG growth as well as GDP and population growth. Malta is part of the European Union, and does not have an independent national emissions target, but does participate in the European ETS.
4. A recent paper published by the World Resources Institute highlighted the problems with current LULUCF accounting. The authors write, "[C]urrent accounting systems under LULUCF rules do not yet provide the accuracy and precision needed for credibly including land use emissions in emission trading." The paper further concluded, "[S]ignificant improvements in transparency and consistency are needed in the way countries report on land use change and emissions from forest activity." The environmentalist organization Greenpeace anticipated these problems with LULUCF accounting, writing, "[B]y far the land use and forestry (sink) provisions of the protocol ... [provide] the greatest potential to allow for Parties to inflate their emission budgets." See <http://www.wri.org/publication/forests-in-the-balance-sheet> and <http://archive.greenpeace.org/climate/politics/lyonloop.html>.
5. Jerome Roos, "Cancun Can't: The Twilight of European Climate Leadership, Part One," Breakthrough Institute, November 23, 2010. Accessed October 15, 2011. Available online at: http://breakthrougheuropa.org/blog/2010/11/a_long_road_to_ruin_from_kyoto.shtml.
6. Again, the three excluded countries, Monaco, Malta and Lichtenstein, have a combined population of less than one million people, and their inclusion would not have any meaningful effect on the findings of this paper.
7. Eifion Rees, "UK's Greenhouse Gas Emissions Reductions an 'Illusion,'" *Ecologist*, February 2, 2011. Accessed October 15, 2011. Available online at http://www.theecologist.org/News/news_analysis/753571/uks_greenhouse_gas_emissions_reductions_an_illusion.html.
8. Glen P. Peters, Jan C. Minx, Christopher L. Weber and Ottmar Edenhofer, "Growth in Emission Transfers via International Trade from 1990-2008," ed. William C. Clarke, *Proceedings of the National Academy of Sciences*, March 29, 2011. Accessed October 15, 2011. Available online at <http://www.pnas.org/content/early/2011/04/19/1006388108.full.pdf>.
9. Ibid.
10. Eifion Rees, "UK's Greenhouse Gas Emissions Reductions an 'Illusion.'"

Further Reading

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The Environmental State of Canada: Thirty Years of Progress

Kenneth P. Green and Ben Eisen

<http://www.fcpp.org/publication.php/2826>

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Conversations on the Frontier with Kenneth Green

<http://www.fcpp.org/publication.php/2854>

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