POWERING UP FOR
THE FUTURE INITIATIVE
.....en

Climate Change?

Reflections on the 20th Anniversary of the 1992 Rio Conference





A Powering Up for the Future Report

The global search for more energy combined with the ongoing anxiety about carbon form the backdrop of the Canada West Foundation's *Powering Up for the Future Initiative*. The initiative facilitates constructive debate on energy policy and promotes the vital importance of western Canadian energy resources to the national, continental and global economy. We are working hard to ensure that western Canadian aspirations and concerns are heard within the national debate and to demonstrate the value of a Canadian energy strategy that is built from the provinces up rather than Ottawa down.



This report was prepared by Canada West Foundation Nexen Executive in Residence Michael Cleland and Canada West Foundation President and CEO Roger Gibbins with the assistance of Canada West Foundation Policy Analyst Robbie Rolfe. The authors wish to thank Canada West Foundation Vice President of Research Robert Roach for his helpful input. The opinions expressed in this report are those of the authors and are not necessarily those of the Canada West Foundation's Board of Directors, advisors or funders. Permission to use or reproduce this report is granted for personal or classroom use without fee and without formal request provided that it is properly cited. Copies may not be made or distributed for profit or commercial advantage. Copies are available for download at no charge from the Canada West Foundation website: www.cwf.ca.

© 2012 Canada West Foundation ISBN 978-1-897-423-96-7

Table of Contents

INTRODUCTION	01
THE WORLD SINCE RIO	02
A STRATEGY GONE WRONG	05
AFTER KYOTO: A NEW STRATEGY	09
CONCLUDING COMMENTS	11
REFERENCES	12

Introduction

This year marks the twentieth anniversary of the UN Conference on Environment and Development (a.k.a. the Earth Summit) held in Rio de Janeiro in June of 1992. Rio was an important watershed in the evolution of global environmental consciousness and governance. Rio made good on the promise of the Brundtland Commission's 1987 report that outlined the idea of sustainable development. In Rio, representatives from 172 governments (including 108 heads of state/government) put the ideas from the Brundtland report into the form of both political declarations and more formal treaties that were expected to drive real change.

Rio covered a broad sweep of issues and, in addition to several declarations, created two global treaties—the United Nations Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNFCCC). The latter and its consequences, particularly for Canada, are the subject of this report.

As the world considers how to move forward on climate change, and as Canada reflects on its place in that conversation, it is an opportune time to examine the successes and failures of the previous 20 years of climate change policy.

Western Canada has a very large stake in this debate for both obvious and less obvious reasons. It is the center of the Canadian fossil fuel industry and, despite a mix of power generation sources including significant hydro capacity in BC and Manitoba, Alberta and Saskatchewan remain highly dependent on coal and natural gas for their electricity. In addition, western Canada is a major resource producer across the board—from mining to forestry to agriculture—and resource production is generally energy and greenhouse gas¹ (GHG) intensive. The region is also expected to experience reasonably strong population growth and the rise in GHG emissions that tends to go along with that growth. And while it is difficult to predict exactly what will happen, a changing climate may result in more extreme weather events in western Canada such as droughts and flooding which could, in turn, affect the availability of water for residential, commercial, agricultural and industrial uses. Western Canadians have, therefore, much to lose and much to gain depending on how Canada and the global community approach the matter of climate change in the coming decades.

CANADA WEST FOUNDATION May 2012

¹ In this report, GHG emissions include all the gases listed in Annex A of the Kyoto Protocol. Carbon dioxide is the most emitted greenhouse gas by far, but it is not the only one.

The World Since Rio

The UNFCCC initiated a process of negotiations that culminated in the Kyoto Protocol in 1997. Kyoto committed its signatories to a variety of emission reduction targets. For its part, Canada agreed to a 6% reduction in its GHG emissions compared to 1990 levels by 2012.

Since Kyoto, many countries have been able to reduce their emissions. The EU15³ countries look like they will come very close to achieving their collective commitment, but it is important to keep in mind that this region had some ongoing processes working in its favour such as the emission-reducing impact of German reunification (as the industrial economy of East Germany essentially disappeared) and the economically-motivated shift from coal to gas in the UK power sector. Giving credit where credit is due, many of these countries deployed relatively aggressive GHG management measures which undoubtedly contributed to their emission reductions.

The so-called "economies in transition" (essentially the former Soviet Union and eastern Europe) have seen their emissions drop but, as with East Germany, these countries achieved their reductions largely by means of economic and industrial collapse. The Americas and the Asia/Pacific nations paint a mixed emissions picture with some countries likely to come close to their Kyoto targets while others will miss them by a large amount. Canada is among the latter group. Meanwhile in countries such as China and India, emissions have grown rapidly and total global emissions are well above 1990 levels.

Figure 1: GHG and Energy Combustion Emissions, Targets and Actual

Country or Country Group	Target Emissions (MT of CO ₂ equivalent with target level as a percentage of 1990 GHG emissions)	2009 GHG Emissions (MT of CO ₂ Equivalent)	2009 Energy Combustion Emissions, MT	1990-2009 Total GHG Emissions Growth (Per Year)
Australia	592 (108%)	546	400	-0.02%
Canada	558 (94%)	692	543	0.87%
China	N/A	7,225 (yr 2005)	6,877	4.68%
European Union (15)	3,924 (92%)	3,724	3,063	-0.67%
Economies in Transiti	on* 5,654 (98%)	3,414	2,521	-2.15%
India	N/A	1,876 (yr 2005)	1,586	3.60%
Japan	1,186 (94%)	1,209	1,145	-1.89%
United States	4,923 (93%)	5,546	5,501	0.25%

Sources: United Nations Framework Convention on Climate Change, World Resources Institute and International Energy Agency
*Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia, Slovenia

A few general observations can be drawn from this. While some reductions can be attributed to measures aimed at reducing emissions, many or even most of the drops are the result of economic contraction—something countries do not seek out. The general industrial collapse in Eastern Europe was a key factor. Similarly, the statistics that will eventually be available for the 2008–2012 period will reflect the global recession's dampening effect on emissions.

² Canada withdrew from the Kyoto Protocol in 2011.

³ Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

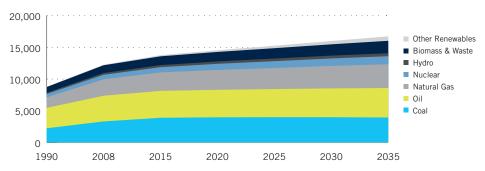
In Canada, the Kyoto commitment reflected a rather limited understanding of the Canadian economy. We overcommitted due to inadequate attention to the inherent underlying energy and carbon intensity of our economy. Population growth and a resource-based economy made it implausible that we could achieve reductions on par with the countries of the European Union.

It is also arguable that Kyoto simply missed the point. While the *moral* motivation behind loading all commitments on to the most developed countries (they caused the problem after all) may have been laudable, there are few better illustrations of the adage about the road to hell being paved with good intentions. Simply put, if the health of the planet was at issue, as opposed to some sort of retrospective justice, then the focus on relatively slow growing developed country emitters was misplaced.

Overall, the world's efforts to reduce GHG emissions can be characterized as something between a weak start and an abject failure. If we really are close to, at or even past the "tipping point" where it becomes too late to prevent catastrophic climate change, then abject failure is the only apt descriptor. Even if one's view is a more sanguine belief that there is still time both to mitigate the causes and adapt to the effects, it is hard to confer a mark better than "weak start." Emissions growth in the developed world has slowed and some countries have even seen actual reductions, but a great deal of this is due to economic and demographic forces rather than to conscious policy action. Emissions in the economies in transition are unlikely to experience continued declines and may grow as their economies recover. And, perhaps most importantly, emerging economies such as China are experiencing very high emissions growth—growth that will no doubt slow, but not enough to drive global emissions downward anytime soon.

Despite efforts to promote low or no GHG alternatives such as renewable or nuclear energy, the world remains firmly tied to fossil fuels (see Figure 2). Many promised solutions such as nuclear energy, bio fuels and wind energy have stumbled on problems of cost, environmental impact or social resistance. End of pipe technologies such as carbon capture and sequestration remain expensively elusive. Energy efficiency is improving and energy intensity is slowly declining, but not fast enough to produce actual declines in emissions.

Figure 2: Actual (1990, 2008) and Projected (2015-2035) World Primary Energy Demand (Million tonnes of oil equivalent – Mtoe)



Source: International Energy Agency

Carbon pricing is the most important single policy instrument for addressing climate change, but it has not found widespread acceptance except in parts of Europe and in rare North American cases such as British Columbia. Energy is still relatively inexpensive notwithstanding the recent run up in oil prices, and fossil fuels are still the cheapest and most readily available options. In the face of economic uncertainty, widespread resistance to price and tax increases and greatly diminished public attention to climate change, many policymakers have, temporarily at least, concluded that it is a losing proposition to push hard against the upward pressure on emissions.

This is not saying that the news is all bad. While recent downticks in emissions in Canada and the United States may or may not prove meaningful, the longer trend of GHG intensity (emissions per unit of GDP) since 1990 is encouraging (see Figure 3). Emissions intensity in Canada has been declining and that decline has continued through the post-2008 economic downturn. US GHG intensity has declined even more over the same period. The bulk of this change is attributable to changes in energy intensity (i.e., simply using less energy) rather than to changes in the GHG intensity of the energy system (i.e., a lower carbon energy system). At the same time, a great deal of anecdotal evidence suggests that there is a ferment of innovation activity with respect to energy production, delivery and use—virtually all of which is directed at reducing GHG emissions and other environmental impacts. In other words, a case can be made that we are on our way to a long-term transformation of the energy system, just not as radical of a transformation as envisaged at Rio or Kyoto and far less than what much of the scientific community believed to be necessary at the time.

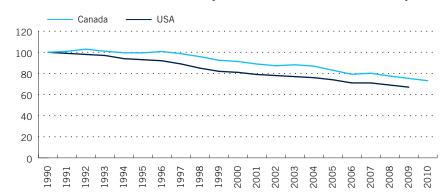


Figure 3: Canada and US GHG Emissions Intensity 1990-2010 (Indexed GHG Intensity)

Note: Base year for index is 1990 (1990=100). Index is calculated as the ratio of megatonnes of carbon dioxide equivalent emissions to GDP as a percentage of the 1990 emissions to GDP ratio. Sources: Environment Canada, Energy Information Administration and Canada West Foundation

A Strategy Gone Wrong

An optimist faced with the circumstances described above might conclude that it cannot get worse and that we should start to see a turn for the better. Whether this will be proved correct will rest, at least in part, on the world learning and heeding the lessons of the past 20 years. Where did the world, and more particularly Canada, get it wrong and what can be done to correct these mistakes?

Putting it a little uncharitably, the largest error was that governments, their officials and much of the surrounding policy community made numerous bad judgements based on flawed reasoning. This may seem like a harsh judgement, but we need to consider the evidence. Many important realities were treated as inconveniences rather than real issues, and were accordingly given short shrift.

The first example of flawed reasoning was the intense focus on the imperatives surrounding one complex natural system (the climate) without giving anywhere near the necessary consideration to the imperatives of an equally complex human system—the political economy of the world. The climate science said there was a looming crisis. Radical action was needed because the science said so, and therefore the political economy would adapt because it had to. This syllogism found expression in the outcome from one of the precursors to Rio, the World Conference on the Changing Atmosphere in Toronto in June 1988, where politicians and scientists concluded that "[h]umanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war" (World Conference on the Changing Atmosphere 1988, 292). The conference recommended a 20% reduction in carbon dioxide emissions from 1988 levels by 2005 (World Conference on the Changing Atmosphere 1988, 296-297). This declaration got the world's attention and set in motion the UN machinery that eventually led to Rio. All good, but the target itself was as surely plucked from the atmosphere as the CO₂ that participants wanted to remove. Even if the reduction goal was scientifically grounded, it had no grounding whatsoever in socioeconomic or political realities.

By the time countries arrived in Rio, the adopted target was a considerably watered down 0% growth from 1990 by 2000, otherwise known as "stabilization." Although it was the subject of rather more political consideration than was given to the so-called "Toronto target," the Rio target still had very little socioeconomic basis. Canada, for example, adopted it on the fly in the middle of a preparatory meeting in 1990 in Bergen, Norway at virtually the same moment that Canadian energy ministers were in the midst of disagreeing fiercely about its feasibility. The energy ministers concluded that the proposed limits on greenhouse gases were "premature, given the extensive consultations now under way in most jurisdictions" and unanimously abandoned the target proposed at the World Conference on the Changing Atmosphere (Jaremko 1990a, F1; Jaremko 1990b, C1). Stabilization was a weak compromise in many eyes, given a starting point of minus 20%, and anything less was politically inescapable at the time. Stabilization thus became an untouchable benchmark for a subsequent public and media discourse that made the Kyoto targets—give or take a percentage point here and there—a political given except in a few outlier (and perhaps more prudent) countries like Australia.

Compounding the inattention to economic realities was a second flaw: countries treated GHG reduction as a pollution control problem. The decision-makers behind the UNFCCC were strongly influenced by the experience of the Montreal Protocol to limit ozone depleting chemicals. By almost any standard, the Montreal Protocol was a huge success in international environmental governance, and just like generals fighting the last war, negotiators brought the success of Montreal to the climate table. The problem was that the lessons of ozone had almost no relevance to climate change or GHG management. Ozone depletion was due to a very specific group of chemicals with limited applications produced by a small number of countries and for which there were ready substitutes. GHG emissions were about as different as it was possible to be—pervasive in the world economy, generated by virtually every human activity and attributable to substances for which ready substitutes did not exist. GHG management was and is a societal transformation problem for which the tools of pollution control—regulations, technology prescription, penalties for non-compliance—are of limited value and might even be perverse in their effects.

THE MONTREAL PROTOCOL

In 1974, Frank Rowland and Mario Molina published leading edge work in the journal **Nature** that tied ozone depletion to the presence of chlorine in the stratosphere from chlorofluorocarbons (CFCs). The ozone layer is important because it shields the Earth from some ultraviolet radiation. Weakening the ozone layer would lead to increased negative health and environmental effects (e.g., cataracts and skin cancer). Further research showed that other chemicals (halons, hydrochlorofluorocarbons, etc.) also contribute to weakening the ozone layer.

The international community first acted in 1985, by agreeing to the Vienna Convention for the Protection of the Ozone Layer. Much like the UNFCCC, the Vienna Convention did not specify legally binding targets. The Montreal Protocol, which was negotiated in 1987, established legally binding targets, much like the Kyoto Protocol. The Montreal Protocol focussed primarily on phasing out CFC use in developed countries by 1996 (developing countries were given a 10 to 15 year grace period to phase out the use of ozone depleting chemicals).

On almost any measure, the Montreal Protocol has been a success. It is the first treaty to have achieved universal ratification and it has been successfully added to at subsequent conventions. Most importantly, the release of harmful ozone depleting chemicals has dramatically declined.



The third flaw in reasoning, which followed from the first two, was to act as if the impediments in the underlying structure of the economy, as well as in the world of physical artefacts on which our lives and economies are founded, could be largely assumed away. Canadian GHG emissions grew about 2% per year over the 1990-1997 period (UN Data 2011). The necessary implication of zero GHG growth from 1990 levels by 2000 was -4% annual growth between 1997 and 2000. To reach the Kyoto protocol target of -6% by 2008-2012, a decline of 1.5% per year would have been needed. GHG emissions increase due to underlying forces in the economy and society—most importantly, population growth and growth of income per capita. Governments have little control over these forces, and even if they did have control, they would prefer to see population and income grow rather than decline.

For Canada this oversight was particularly egregious. If the benchmark was western Europe, whose commitment roughly mirrored Canada's, there are at least four profound differences between the respective economies, all of which create more upward pressure on Canadian emissions: higher population growth, a resource based economy, a large and growing oil and gas industry and an urban structure which is inherently energy intensive. Even had there been the will to try to change these facts, the physical economy stood squarely in the way. The underlying cause of GHG emissions is not only, or even mainly, behaviour, but also the nature of the physical infrastructure that has been built over decades and even centuries. This infrastructure includes not only power plants and oil refineries, but just as importantly, the cities in which we live. The idea that this physical world could be transformed so radically and so quickly was, to say the least, improbable, but widespread perceptions of the urgency of the issue and the expected catastrophic implications of failing to deal with it, all projected through the politics of the climate negotiations, simply trumped common sense.

This last point underscores the fourth flaw in the reasoning. In part, because of the pollution control mindset referred to earlier, the fundamental architecture of Kyoto rested heavily on the idea of command and control—legally binding quantitative commitments backed by sanctions. Such international agreements can be found—trade agreements being the most important or the already mentioned Montreal Protocol. But trade agreements imply near-term gain to balance the pain, and agreements like the Montreal Protocol touch a limited number of players. A legally binding GHG agreement entails large and painful adjustment costs with no offsetting benefit except possibly in a far distant future. As important, such an agreement necessarily reaches deep into the whole fabric of the domestic economies of its signatories and entails a large sacrifice of sovereignty for the collective good. The idea—in 1997—that the US would ever ratify such an agreement was impossible to reconcile with experience. The idea that China and India might permit such deep intrusions into domestic policy in the future seems at least as improbable.

In any event, there are good reasons why governments should not make such commitments. Legal commitments can distort the analytical framework and lead to perverse behaviour when governments act to reduce emissions within their borders but then end up increasing global emissions. For example, to evade binding limits in a country, a company may move production to another country where there is no such policy. Instead of reducing emissions, the emissions have just shifted locales. Overall emissions do not decline, but the country with the command and control policy has reduced its emissions. This is known as "carbon leakage."

More importantly, and as noted, the underlying drivers of GHG emissions are population and economic growth. Governments have little control over these, or if they do, the desire for growth tends to drive them in directions opposite to the desired reduction in GHG emissions. Short of an extraordinary political commitment to massively rebuild a country's entire social and economic infrastructure, governments undertaking commitments of this sort are doing so without the means to meet them.

The problem was that a number of well-publicized economic modelling initiatives provided a means to essentially ignore this problem, indicating that GHG reduction targets could be achieved at little to no cost over the long-term. For example, a UK study found that the economic costs of stabilizing greenhouse gas emissions to a sustainable level would be around 1% of global GDP by 2050 (United Kingdom 2006). A study reviewing Canada's more recent goal to reduce emissions to 20% below 2006 levels by 2020 found that meeting those targets would only shave 0.2% off of annual GDP growth (Bramley, Sadik and Marshall 2009).

These studies, however, essentially wave away the costs of the immediate physical and economic adjustment process. Even the most sophisticated economic models are not very good at dealing with social, economic and political friction—things like real world capital investment decisions, the social implications of changes in industrial structure or public resistance to new energy projects. Factors such as these made it unlikely that the physical economy could adjust as fast or cheaply as needed and, even if it could, the political costs of forcing it to would be extremely high. But the models said that it would be virtually free over the long-term, and that became the story.

Despite this, it was clear to many that meeting Kyoto entirely through domestic physical adjustment was impossible. There was need for another way out of the problem and that was when the idea of emissions trading arrived to save the day.

If the changes to the physical economy required to meet Kyoto were unrealistic, then "offsets" from other countries or other activities (such as forestry and agriculture) would make up the gap and emissions trading would make it economically efficient. Trading and offsets are potentially useful mechanisms, but they work only under a hard cap on GHG emissions and someone still has to pay for the offsets. Unfortunately, trading served as an emollient that seemed to make the pain go away. The creation of a carbon market became more than merely a facilitator of change; it became a central objective, as if reducing GHG emissions was not just free but an economic opportunity that countries should not miss out on.

The difficulty, aside from the sheer complexity of setting up offset and trading systems and ensuring that they are not being gamed or subject to fraudulent behaviour (not a trivial matter), was the political poison pill implicit in them. The idea that any given jurisdiction would smile benignly on a system which entailed transfers to other jurisdictions for the right to power and fuel its economy seems politically naive. The political storm in Ontario in the late 1990s when Ontario Hydro was found to be investing modest sums in Costa Rican rain forests should have told everyone all that needed to be said. But the momentum behind trading continued to gather force, at least until the 2009 recession, despite the clear implication that for every company or jurisdiction that was going to gain billions of dollars in emissions credits, there was another that would pay billions of dollars to purchase them. There was no free lunch after all.

After Kyoto: A New Strategy

The climate change file has lost much of its public salience. In the world of economic uncertainty since 2008, the environment in general has dropped well below the economy and health care as a dominant public concern. The climate science has lost much of its lustre following the revelations of so-called "climate-gate." The international process limps along, albeit with more symmetrical engagement of developed and emerging economies. The commitments in the Kyoto protocol itself will essentially become moot after the end of the commitment period spanning 2008 to 2012.

However, this does not mean that the underlying problem of human induced climate change has disappeared. The global dialogue and negotiating process continues. The process of trying to invent a radically lower carbon economy continues. And the public will more than likely again turn its attention to the issue and hold companies and governments to account for their actions or inactions to reduce GHG emissions.

There is a certain irony in the Kyoto commitment period being marked by a roughly coincident and extended period of economic uncertainty and by a consequential dramatic loss of momentum on the file. Much of what was agreed to and undertaken in the name of Kyoto has proved to be a dead end. What better time than now, therefore, to hit the reset button? If the process is to be reset, what possible advice can we extract from the experience of the past 20 years? What would cause observers 20 years from now to characterize the intervening time as one of strategy gone right?

- → Start by recognizing that the complex human systems that cause GHG emissions need to be treated with as much humility as the natural one we seek to protect. Treat GHG emissions reduction as a societal transformation issue, not a matter of pollution control. The transformation will take time and policy cannot ignore this fact.
- → Build on the possible rather than hoping for the improbable. While the technology needed to create an extremely low carbon economy exists, it is still very far from being practical or economic. Forcing this change entails risks and costs that the experience of the last 20 years indicates society is not prepared to bear. Just as important, experience should tell us that many options might be blind alleys because they push society up against other limits—such as impacts on the food system from biofuels, impacts on social tolerance from wind farms or materials limitations in the case of rare earths which will need to underpin the drive for increased electrification of the economy (Fridley 2010). Experimentation and incremental change are not only lower risk and lower cost, they may actually achieve the desired outcome with greater certainty.
- → Recognize Canada's interests in this. We have an interest in transforming our economy to a much lower GHG configuration. However, it is profoundly contrary to our interest to do so by throwing overboard some of our largest sources of prosperity and a great deal of our established and undepreciated infrastructure. Public policy that ignores this fact in favour of some sense of global responsibility will simply fail.

- → Start with the demand for energy, not the supply. Supply arises to meet demand. Although obvious, the implication of this fact is ignored in virtually all energy policy discussions which instead become arguments between one set of energy lobbyists (the fossil producers) and another set (the renewable producers). More heavy lifting needs to be done at the demand end, mainly through efficiency improvements and through a long-term reconfiguration of the energy systems in our communities. Without this, it is a fair bet that the cost—not to mention the environmental and social impacts—of converting the supply system to a low or zero GHG configuration will prove overwhelming.
- → Use price in favour of regulation. Societal transformations are made by entrepreneurs, scientists and engineers, not by lawyers, accountants and policemen. The causes of GHG emissions are everywhere and no instrument can reach into every corner and crevice of the economy as effectively as prices for energy that reflect all costs (including the carbon embedded in it). Regulations and other direct government interventions have many useful roles to play, but in a 21st century economic transformation which will need to be as fundamental as the widespread application of electric power and the internal combustion engine that shaped the 20th century, regulation can work only at the margins.
- → Emphasize the need to change the physical economy rather than delaying this through offsets and trading. If there is pain, it can be spread or mitigated, but no financial mechanism will eliminate it. Financial instruments may delay the day of reckoning, but that day of reckoning will come—and possibly at greater cost unless it is faced squarely for what it is.
- → Be honest with citizens and consumers. Far too much of the policy following Rio, up to Kyoto and afterward was sustained by feeding the public on what they wanted to hear. Dealing with GHGs would be easy and painless if only the fossil fuel lobbyists would step out of the way. Emissions trading would not just make the pain disappear it would actually make us rich. Cap and trade systems were politically saleable because the public would not realize until too late that the effect was the same as a tax. This approach has not worked. It may even have backfired and it is worth trying something else.
- → Recognize that we really do not know what is going to happen and when. We can anticipate the direction of change but not its precise shape or velocity. In such circumstances, the only sorts of commitments and policy instruments consistent with good public policy are directional. Mandatory commitments and command and control regulation distort behaviour and lead to far more effort spent meeting the letter rather than the spirit of the commitment.
- → Bring these realities to the international table. Until such time as a truly radical process of technological change is well underway, the scale of emission reduction commitments that characterized the Rio to Kyoto period and since (such as Canada's current commitment to 17% below 2006 levels by 2020) will prove elusive—physically, technologically, economically, socially and politically. The commitments we make should be ones that we actually believe we can achieve, rather than ones we are trapped into by accident and inattention.

Concluding Comments

Given what has happened with global emissions over the past 20 years, there is little to celebrate with respect to the 20th anniversary of Rio. At the same time, the lack of global progress over the last 20 years should not be seen as a cause for despair, but rather as an opportunity to build a more constructive and successful strategy going forward.

Moreover, the efforts of the past two decades have not been without positive consequences. Global consciousness of the challenges of climate change and GHG management has grown. It has become almost impossible for anyone to talk seriously about energy without accounting for the GHG consequences of any action contemplated. Many underlying energy trends driven by both economic and environmental factors are in the right direction. Despite the failures of silver bullets such as many technologies or the financial wizardry of carbon trading, the pace of invention in the past two decades appears to have accelerated dramatically, and there is a multitude of possibilities across the energy spectrum—from production to consumption—that can contribute to reduced emissions.

A very low greenhouse gas future will take time to achieve, and as the world feels its way toward such a future, there will be more false starts and more mistakes. Hopefully the global environment will give us time to learn from them.

References

Bramley, Matthew, Pierre Sadik and Dale Marshall. 2009. *Climate Leadership, Economic Prosperity: Final Report on an Economic Study of Greenhouse Gas Targets and Policies for Canada*. Accessed April 24, 2012. www.pembina.org/pub/1909.

California Council on Science and Technology. 2011. *California's Energy Future—The View to 2050 Summary Report.* California Council on Science and Technology.

Fridley, David. 2010. "Nine Challenges of Alternative Energy." In Richard Heinberg and Daniel Lerch (ed.) *The Post Carbon Reader: Managing the 21st Century's Sustainability Crises.*

Jaremko, Gordon. 1990a. "Energy Ministers Won't Sacrifice Jobs for Clean Air." Calgary Herald, April 3.

Jaremko, Gordon. 1990b. "Coalitions Demand Clean Air Pledge." Calgary Herald, April 6.

Nanos. 2012. *National Issue: Jobs/Economy Dominates as Top Issue of Concern*. Accessed April 23, 2012. www.nanosresearch.com/library/polls/2012-02-IssueE.pdf.

United Kingdom. 2006. Stern Review: The Economics of Climate Change Executive Summary. Accessed April 23, 2012. http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/media/4/3/Executive_Summary.pdf.

UN Data. 2011. *Greenhouse Gas (GHGs) Emissions without Land Use, Land-Use Change and Forestry (LULUCF) in Gigramrs (Gg) CO₂ Equivalent.* Accessed April 24, 2012. http://data.un.org/Data.aspx?q=greenhouse+gas&d=GHG&f=seriesID%3aGHG.

World Conference on the Changing Atmosphere. 1988. *Conference Statement*. Accessed April 20, 2012. www.cmos.ca/ChangingAtmosphere1988e.pdf.

A Western Voice on National Policy Issues

In 1971, the Canada West Foundation was established to give the people of the West—British Columbia, Alberta, Saskatchewan and Manitoba—a voice for their dreams, interests and concerns. In doing so, the goal was to put the West on the national agenda and be at the forefront of the most important issues and debates.

Since then, the Canada West Foundation has successfully met that goal, proving itself to be one of Canada's premier research institutes. The Canada West Foundation is the only think tank dedicated to being the objective, nonpartisan voice for issues of vital concern to western Canadians.

For over 40 years, we have represented western viewpoints. We are proud of our accomplishments and know that our research and commentary have improved government policy and decision-making.

Today the West is in, but we won't stop there. We continue to promote important issues and debates that provide made-in-the-West solutions to national problems and keep the West thriving.

CANADA IS STRONGER WHEN THE WEST IS THRIVING!



Your support makes a difference