



The Canada We Want in 2020

Towards a strategic policy roadmap
for the federal government

NOVEMBER 2011

**SQUARING
THE CARBON CIRCLE**

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ABOUT CANADA 2020

Canada 2020 is a non-partisan, progressive centre working to create an environment of social and economic prosperity for Canada and all Canadians.

Join the conversation at www.canada2020.ca



PREFACE

MAKING STRATEGIC CHOICES

GOVERNING IS ABOUT making choices. Sometimes the choices governments make are strategic, the product of hard thinking to address major hurdles which coalesce at a particular point in time. It is our belief that Canada is at such a point in time today and it is for this reason that we have produced this collection of papers to kick-start a discussion about the role of the federal government in Canada.

A serious public policy strategy for the country means doing less of some things, while focusing decisively and aggressively on a few important things. This requires in-depth analysis of the really big challenges and opportunities facing the country. It requires governments to be straight with Canadians about the risks and rewards that lie ahead, so that citizens will buy into a clear direction set by government.

The orientation of this volume – indeed the basic orientation of *Canada 2020: Canada's Progressive Centre* – is that the federal government has a vitally important role to play in developing and implementing strategic policies, focusing governments and other institutions in society on the big

challenges the country faces, and mobilizing consensus for action. In other words, we believe that the federal government can be a force for significant and positive change.

This does not mean big government. It means intelligent, innovative, analytical and strategic government. It could conceivably result in smaller government, focused on a few big and important areas of policy that really matter to the country's future.

FIVE CHALLENGES FOR 2020

Today, Canada faces challenges and opportunities that are quite unprecedented in our recent history, although they may seem rather opaque to most Canadians. Our ability to overcome these challenges – and seize the opportunities – will determine the future trajectory of Canada's economy and society over the next generation. Our standard of living and quality of life could well hang in the balance. This is why we need federal leadership.

Canada 2020 contends that there are five fundamental, inter-related challenges confronting the country which require strategic political leadership and policy action from the federal government.

1 Increasing innovation and productivity

Productivity growth and innovation are the sine qua non for economic prosperity. Canada's lack of productivity growth has been a worrying feature of the economy for decades. Since 1984, relative productivity in Canada's business sector has fallen from more than 90% of the U.S. level to 76% in 2007. There are no signs of things improving: quite the opposite in fact.

Since the 1990s, the federal government has been taking steps to try to reverse this trend, primarily by investing in university-based research and development and by cutting personal income and corporate taxes, the standard policy remedies for dealing with flagging productivity performance. Yet Canada's productivity growth has actually become worse over the past decade.

It is therefore time for a much more aggressive, focused and creative federal policy response to Canada's productivity growth and innovation challenge. Without this, we risk falling further behind and losing the revenues that enable us to sustain our standard of living.

2 Rising to meet the Asia challenge

The global centre of economic power is inexorably shifting from the West to the East. This trend has been underway for twenty years, but it is now reaching a crescendo, partly as a result of the fiscal and economic problems plaguing Europe and the United States. There is no better evidence of this shift in economic and financial power than the recent efforts by the European Union to persuade China to help prop up the teetering European financial system.

Canada has been on a slow boat to China – indeed to Asia, more generally – for many years, notwithstanding the fact that we have some significant advantages over other countries in this region of the world. Over the past fifteen years,

successive federal governments have made incremental attempts to broaden and deepen Canada's trade, investment and economic relationships with Asian economies. Despite such efforts, Canada is not really on the map in China and India today, in stark contrast to many of our major competitors.

It is time for the federal government to take a much bolder, more creative and aggressive approach to help deepen Canadian ties with Asia and enable Canadian businesses to take advantage of unprecedented market opportunities in the region. We must leverage our unique strengths and advantages and become an indispensable part of the new Asian century.

3 Squaring the carbon circle

Canada has among the highest *per capita* levels of greenhouse gas (GHG) emissions in the world (although our total contribution to global GHG emissions is low as a result of the relatively small size of the Canadian economy). High Canadian emissions are due in part to our unique geography and harsh climate, but also to a weak culture of conservation and inadequate policy and regulatory regimes.

Modest measures to reduce emissions have been implemented over the past decade. But these initiatives have been neither significant nor strategic; as a result they have had little to no effect on Canada's overall GHG emissions.

Canada is also fast becoming one of the world's leading fossil fuel producers and exporters. It has even been suggested that Canada is "an energy superpower", or at least can realistically aspire to that goal. With that title are likely to come increased emissions, at least in the absence of meaningful measures to combat these.

As a G8 country, an original signatory to the Kyoto Protocol on climate change, and one of the world's largest per capita

carbon emitters, Canada has a moral responsibility to make progress on limiting GHG emissions (if for no other reason than to set an example for the big emitting countries). We are also at serious risk of missing opportunities in the low-carbon economy of the future and of becoming increasingly marginalized economically if we fail to act. It is therefore time for a serious, strategic effort, led by the federal government, to square Canada's carbon circle and put in place policies that will significantly decrease our GHG emissions.

4 Reducing income disparities and polarization

Income inequality has been a creeping problem in Canada and other advanced economies for many years now. The bottom two quintiles of the income scale have seen their market incomes decline, in real terms, since the early 1980s (though transfers have resulted in some degree of after tax and transfer growth). At the same time, the top 1% of economic families have accumulated an ever-increasing share of Canada's wealth.

Income inequality, a feature of all market economies, is now giving way to income polarization. While this phenomenon is still more acute in the US than in Canada, some recent studies suggest the gap between rich and poor – and between the superrich and the middle class – is now growing faster in Canada than in the US.

Income polarization can have seriously perverse effects on the economy and on society. At an extreme, it can undermine social cohesion, unravelling the fabric of a country. The Occupy Wall Street protests, and their analogue in other countries, including Canada, are one early sign of the social discontent that can arise from income polarization and a growing perception that the economy is not working for most people.

Income polarization has not, up until now, been a big issue on the federal agenda. Various reforms to federal income security programs and the tax-transfer system have been put in place over the past twenty years, but these have not been aimed at dealing with income polarization. It is time for the federal government to analyze and consider the longer term effects of income polarization, and to consider strategic policy reforms to head off a looming problem.

5 Securing our health system for the future

Universal, high-quality healthcare has been a defining feature of Canada and Canadian citizenship for 40 years. It is the public service Canadians value most. Yet the general consensus among experts is that if we stick with the current funding/administrative models and tax structure, Medicare as we know it is not financially sustainable.

Healthcare costs have been rising significantly as a fraction of our national income and as a share of government budgets (especially provincial budgets) for a generation now. The basic causes of healthcare inflation are well-known: expensive new technologies, procedures and drugs that permit us to live longer, coupled with an aging society.

While healthcare delivery is a provincial responsibility, healthcare financing – paying for the system – has been a dual responsibility, shared by federal and provincial governments, since the beginning of Medicare. In 2004, in response to rising costs and pressures on provincial treasuries, the federal government announced a major increase in federal fiscal transfers to the provinces for healthcare. With some \$41 billion in transfers for health over ten years, the 2004 Health Accord was billed “a fix for a generation”. Unfortunately, it has proven to be little more than a stop-gap for a decade.

As we approach the end of the Health Accord in three years' time, innovative, strategic policy approaches on health-care financing are urgently required. We also need the federal government to provide leadership on the organizational and accountability issues that underpin our health system in Canada.

The scope of federal government activity clearly extends well beyond these five issues. But our belief is that informed, strategic decision-making in these areas will go a long way towards securing the Canada We Want in 2020.

Our choice to address all the issues together has two implications. First, we will, as we move on, have an opportunity to examine the links between areas (for example, the effect carbon policy will have on our trading relations or the links between income inequality and productivity). Second, the broad scope of issues will give us a chance to reflect more critically on the role of the state, and the effectiveness of policy in general in addressing the key issues of our time.

KICK-STARTING THE CONVERSATION

This volume contains 15 papers, three in each of the five areas identified above. We have brought together a group of authors, all experts in their respective areas, and asked them to approach the issues from a strategic policy standpoint.

For this is what has been missing. The areas have all received attention in the past, but often not in a truly strategic way. Perhaps this lack of policy strategy and priority attention is due to the fact the tipping point has not yet been reached in any given area (although it is looming large in some, notably healthcare financing). Perhaps it is because

governments and politicians lack the ideas to address these issues. Perhaps it is because of scepticism that the federal government can really make a difference. Perhaps we have reached the limits of innovative public policy and governance. Or perhaps we are just avoiding the issues – in a collective state of denial – in the hopes that they will resolve themselves in an acceptable way through incremental policy action.

Whatever the cause, it is time for Canada to break out of this mindset. Many elements of Canadian society – the business community, NGOs, governments at all levels, educational institutions, and Canadian citizens generally – must work to address the challenges. No single entity has the solution. A collective effort is required.

Our goal is to kick-start a strategic policy conversation throughout the country about The Canada We Want in (or by) 2020. Such a conversation has not been evident to date in Parliament, in general elections, in political party platforms, or in the media – indeed in any of the places you would usually expect to see it. The time for that conversation is now. Perhaps it will lead to a consensus among political, business, academic and other leaders in Canadian society that the federal government needs to chart a strategic direction for the country to secure Canada's prosperity and the quality of life Canadians have come to expect. We present this volume as a starting point. ■

INTRODUCTION TO OUR PROJECT

THIS VOLUME MARKS the culmination of **Phase 1** of our project: *The Canada We Want in 2020*.

The overall aim of the project is to launch a debate about the role of the federal government in Canada. This publication is intended to act as a focus for discussion and a core around which we can bring in ideas from a wider range of people. It is, in this sense, a starting point.

Canada 2020 has called on fifteen authors to share their wide-ranging views in the five areas. Sometimes they agree on policy prescriptions, sometimes they disagree. But what all authors have in common is a belief in the value of discussing the options and thinking strategically about the issues that Canada faces.

In **Phase 2** of the project we will stimulate further conversations in each of our five chosen areas. We will host a series of panel discussions and web-based exchanges that draw on the papers in this volume. These discussions will tease out areas of agreement and disagreement and begin to focus on implementation challenges. We expect to conclude this phase by mid 2012.

Phase 3 will see us narrowing back down and reaching conclusions. Drawing on the materials from the previous phases, Canada 2020 will produce a final, consolidated publication towards the end of 2012. This document will summarize our conclusions in each of the five areas. It will take into account recent changes and lay out proposed future strategies. ■

WHAT YOU CAN DO

Our aim is to draw as many viewpoints as possible into this project.

There are several ways you can get involved:

- // Attend our series of panel discussions in 2012**
- // Check our website: download documents, watch interviews and webcasts and make comments**
- // Contact us directly to arrange joint presentations or discussions**

Details are on our project site at: www.canada2020.ca

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SQUARING THE CARBON CIRCLE

BOTH ADVANCED AND emerging markets are moving inexorably towards a low-carbon future. Yet Canada has no coherent strategy to reduce carbon consumption.

Despite coming from very different perspectives – a global energy company, a green economy think tank and an investor in the development of natural resources – all the contributors in this section agree upon the imperative for change. Canada urgently needs a meaningful national carbon strategy that will reduce our emissions and provide the certainty that businesses and individuals require for effective future planning.

This is not, then, a business versus the environment problem, as it has often been painted. Indeed, all authors are at pains to stress the need for Canada to identify a path that will enable it to continue to prosper economically, including through exploitation of our natural resources. But, for myriad reasons, we must put in place a national carbon strategy or framework which – **Lorraine Mitchelmore** argues – should be closely intertwined with a national energy framework (something that Yuen Pau Woo also calls for in the Asia section of this volume). **Ian Mallory** points out that this is an opportunity for us to do both “the right thing” and the “smart thing” at the same time.

If we fail to do so, we risk marginalization in the global low-carbon economy. **Stewart Elgie and Alex Wood** stress that Canada should view this nascent economy as an

Canada urgently needs a meaningful national carbon strategy

opportunity, rather than a threat. We should strive to position ourselves as the world’s most environmentally-responsible producer of all manner of goods and services (including manufactured goods and natural resources) in a future that will nevertheless be based on carbon, at least for the next few decades.

Clearly there is a long way to go before we can claim this title. But action must start now. The authors are not, though, in agreement as to the steps that should be taken.

Mitchelmore and Elgie & Wood both favour putting a price on carbon. Shell’s preferred starting point is a cap-and-trade system for the power generation/industry/manufacturing sector. This should be part of a comprehensive policy framework that tailors measures for each sector. It should go hand in hand with a variety of “no regrets” measures, such as increases in energy efficiency and technology investment (particularly to push promising technologies through to wide deployment).

In an ideal world (ah, for an ideal world!), Elgie & Wood prefer a broad-based carbon

tax. A portion of the revenues from such a tax should, in their view, be used to offset the need for future personal tax increases. The rest should be reinvested in low-carbon infrastructure and clean technology development. While favouring a tax, the authors certainly recognize the merits of a cap-and-trade system. For them, what is key is trading; they argue strongly against a “command and control” system for carbon regulation, though this appears to be the direction in which the federal government is currently moving.

For Mallory, this is actually positive: he praises the recently-announced federal government regulations to phase out coal-fired power generation (unless carbon sequestration measures are in place), despite the fact that he is generally opposed to increased regulation. He is a strong proponent of natural gas as the

carbon-based fuel that will help move us to a low-carbon future and, like the other authors, he points out the scope for efficiency-based reductions in carbon emissions. Interestingly, he argues that most of these measures can also be justified on a public policy basis, unrelated to carbon.

Together, then, the contributors make a powerful plea for Canada to move forward in the carbon area. Recent events, including protests and proposed legislative bans on our oil, have underscored the fact that the world does care what we do and that failing to act will increase our economic vulnerability immeasurably. For this reason alone, now is the time for federal leadership in the development of a comprehensive strategy to limit our national emissions. ■

We should strive to position ourselves as the world's most environmentally-responsible producer of all manner of goods and services

LOSING THE 2020 BATTLE: WINNING THE 2050 WAR

LORRAINE MITCHELMORE

Lorraine Mitchelmore is President of Shell Canada Ltd. She also holds the roles of Canada Country Chair and VP Onshore Exploration & Appraisal for Upstream Americas. She has over 25 years of experience in the international oil and gas industry, having started her career on the exploration and production side. Lorraine is a board member of the Canadian Association of Petroleum Producers, the Conference Board of Canada and a member of the Catalyst Canada Board of Advisors. She is also a member of the Canadian Council of Chief Executives.

The dual global challenges of mitigating climate change and supplying the expected surge in global energy demand are formidable. The two issues are highly integrated and the policy direction adopted for each will impact the other.

Canada needs effective and innovative federal policies that will enhance our position as a global energy supplier, broaden our market access to meet global energy demand and at the same time reduce our greenhouse gas (GHG) emissions. We must succeed on both fronts at the same time: as federal and provincial energy ministers tackle the development of a national energy framework, they must collaborate in the development of cohesive and effective national policies that will enable Canada to become a low carbon economy.

Canada is a major global energy supplier and also one of the world's highest *per capita* GHG emitters. Our emissions increased by 142 million tonnes between 1990 and 2008,¹ making it highly unlikely that we can meet our 2020 Copenhagen target of a 17% reduction from 2005 emissions levels without significant economic impact (**Figure 1**). The diversity of GHG emissions sources, the long-term transi-

tion associated with technology development, strong growth in the energy sector, and the high costs of emission reduction stand in the way of near-term progress. Offsets could help close the gap, but the magnitude of offsets required, and the time needed to implement an offset program with credibility, reduce the value of this solution.

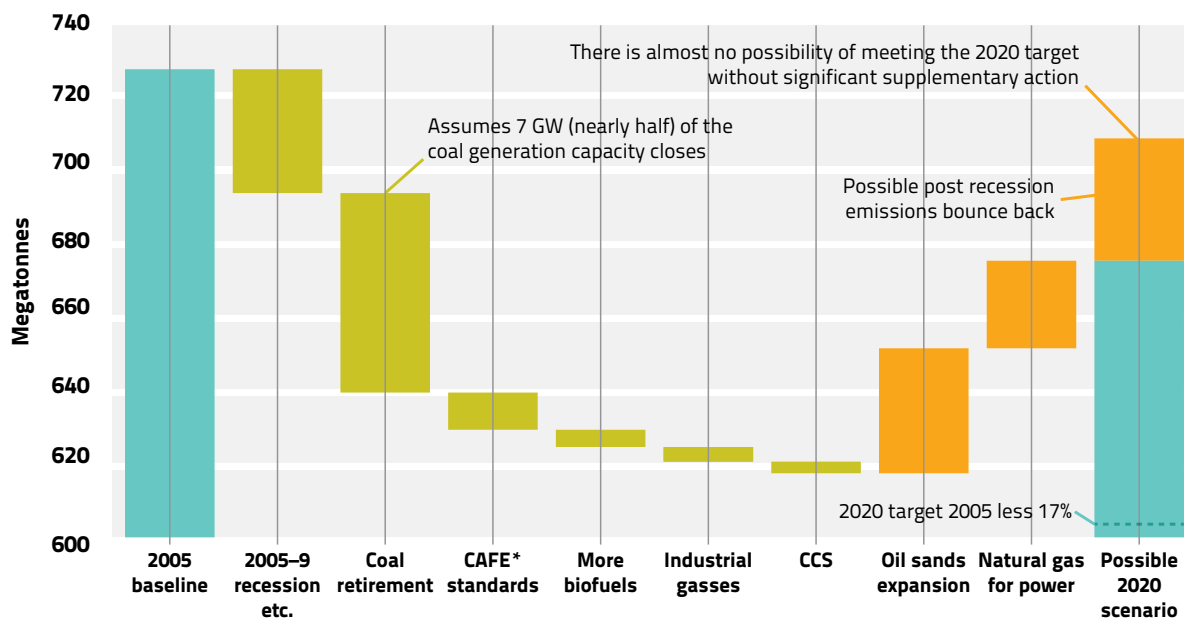
Overall, it is the absence of a comprehensive climate change policy framework, one that takes into account the factors above and starts to put in place the required systems and infrastructure, that is the key impediment to meeting our targets. Developing such a framework – which, in our view, should incorporate a carbon pricing mechanism – must therefore become a federal government priority. This is a long-term project and the effort required should not be underestimated.

THE CONTEXT

To its credit, the federal government has already implemented some important GHG reduction initiatives (e.g. vehicle efficiency regulations, ecoACTION), but more needs to be done, especially on the consumer demand side. Programs need to be longer-term and more cost effective, and we need to set more

¹ The Conference Board of Canada, 2011.

Possible 2020 outlook for Canada



* Corporate Average Fuel Economy – regulations improving vehicle fuel economy

SOURCE: Shell

Figure 1

ambitious objectives. In the near term there are also a number of regulatory, technological and “no regret” initiatives that can help us move forward and position us to make the large-scale reductions that will ultimately be required.

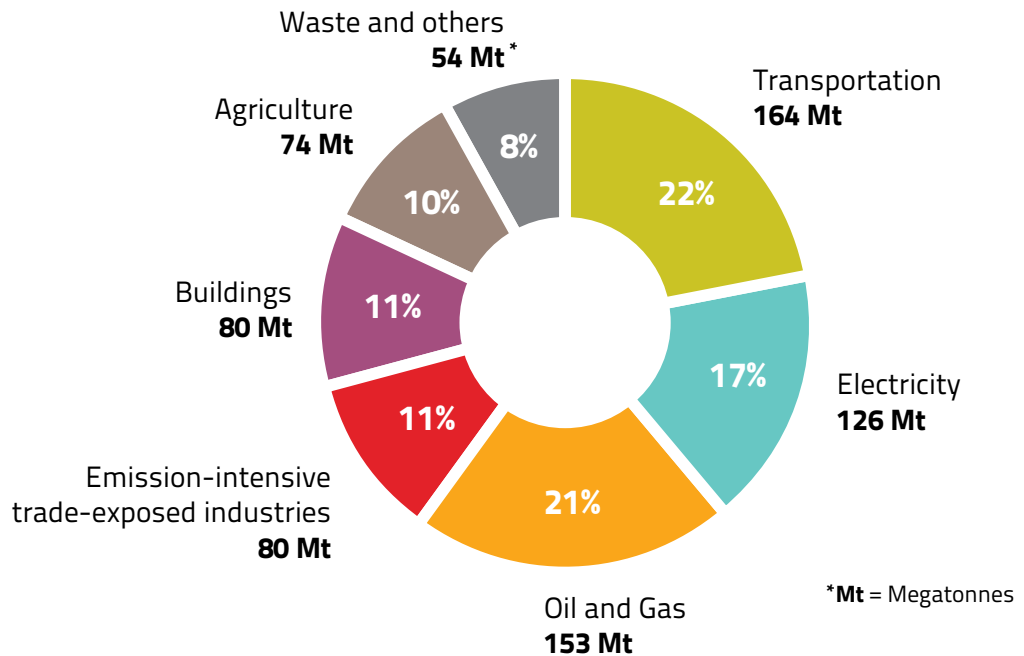
As a starting point, we need to understand our current GHG profile and realistically assess our opportunities for GHG reduction. **Figure 2** shows that our three largest sources of GHG emissions are the oil and gas industry (the emissions from which are rising as this industry expands and more energy-intensive sources come on line), electrical power generation and transportation.

Canada is fortunate to have abundant low-GHG power generation capacity (hydro and nuclear). This means that switching from coal-fired power, while important, will not offer the very significant GHG reduction that can be achieved through the same switch in the US. Nevertheless, the ongoing development of renewable and low carbon fuels for power generation remains vitally important. At the

same time, energy efficiency technologies applied to energy production will help offset the projected increase in GHG emissions, but until breakthrough technologies such as carbon capture and storage (CCS) are widely deployed, increased GHG emissions from the Canadian energy sector are forecast.

Widespread non-fossil fuel motive power (i.e. electricity, hydrogen) for the transportation network will ultimately be required, but this solution lies well beyond 2020. The costs of near term transportation technology solutions will be high and, given the rate of fleet turnover, will happen only gradually. The federal government has recently implemented a biofuels regulation that could provide a more immediate reduction of transportation emissions, but this regulation is focused on biofuel volume targets. We have missed the opportunity to enhance the impact of biofuels by failing to specify a reduction of biofuel carbon intensity and thus failing to incent greater investment in low-carbon biofuel technologies.

Sources of Canada's GHG emissions (2005)



SOURCE: Environment Canada (2011) *Canada's Emissions Trends*.

Figure 2

Demand-side management holds considerable promise for GHG reductions in both transportation and power generation, but resistance will be strong from a society that highly values mobility and a quality of life enhanced by modern technological conveniences.

Looking beyond these three highest emitting areas to other energy intensive industries, we see continued efforts to implement efficiency measures to help offset growth-linked increases in GHG emissions. This process could be made more effective through trading and the purchase of domestic offsets from non-regulated sectors (such as agriculture, forestry and waste). However, this cannot happen until a robust and credible trading infrastructure is in place.

The one untested opportunity of note for Canada might be the GHG offset associated with Reducing Emissions from Deforestation and Forest Degradation (REDD). Deforestation currently accounts for about 18% of global GHGs. Reducing deforestation and thus emis-

sions from tropical and other forests offers an immediate option for GHG reduction at relatively low cost.

Current federal policy in Canada is to align with US GHG policy so as to avoid competitiveness impacts and triggering border tariffs and import taxes. For example, Canada has not only adopted the identical Copenhagen 2020 reduction target, but also plans to adopt "equivalent" regulations to the highly prescriptive equipment regulations the US Environmental Protection Agency will place on US industry. Given the economic and trade ties between the two countries, this alignment of policy may seem to make sense politically and economically. However, there are significant GHG-related differences between the US and Canada that make US policies less well-suited for Canada. For example:

- // Coal power fuel-switching may reduce US GHG emissions close to the target: this is not the case in Canada.

- // Fuel switching is a relatively low-cost GHG reduction solution: Canada therefore faces higher GHG reduction costs than the US
- // Growth in energy-intensive industries is expected to be much higher in Canada than in the US: oil sands and unconventional gas lead this growth.

The challenge for Canada is, then, to develop a coherent and harmonized long-term policy framework that is broad-based and addresses all sectors of the economy. A hybrid of different policy approaches must be adopted to gain maximum value in emissions reductions, while also ensuring we enhance our position as a global energy supplier. This challenge should be addressed through the development of a co-ordinated national climate change policy framework, rather than through the piecemeal adoption of various individual measures.

A CLIMATE CHANGE POLICY FRAMEWORK FOR CANADA

In the quest for such a framework, a variety of policy initiatives have been proposed. These include:

- // implementing a market-based carbon price with trading and offsets for large industrial stationary sources;
- // accelerating strategic advanced technologies (such as CCS, advanced biofuels, power storage, etc);
- // regulating GHG emissions in the transportation and buildings sectors;
- // acting to reduce energy consumption in the power and transportation sectors;
- // acting now on “no regret’ GHG reduction measures that avoid competitive disadvantage and kick-start emissions reductions; and
- // developing a comprehensive Canadian Energy Framework that works in tandem with a long-term Canadian Climate Change Framework.

Given the scope and complexity of the climate change challenge, federal authorities will have to draw on the full suite of policy options. Some will work better, or be more appropriate for particular sectors, than others. Some are better applied in the near term while others will take longer to develop and be contingent on the progress of broader global action. But all must be part of the mix.

At the same time as working on climate change policies, we must also develop a Canadian energy strategy (which will intertwine with our climate strategy). If we do not, we will miss out on opportunities to expand our natural resources development

At the same time as working on climate change policies, we must also develop a Canadian energy strategy

and enhance our access to growing global energy (and other) markets. Under “business as usual” we remain trapped in a regulatory quagmire. First Nations relationships and regulatory assessment and approvals around resource extraction remain unpredictable and we do not have the enabling environment and certainty that we require for future growth in the energy sector, based on a skilled labour force and enhanced innovation.

If we fail to develop an effective energy strategy, GHG emissions may initially go down as we flounder in our efforts to become a major global energy supplier. But this is no solution: if Canada’s prosperity is damaged, this will actually impair our ability to tackle GHG emissions as we will not have the economic capacity to fund further emissions-reduction measures.

In developing our climate change policy framework, a single, economy-wide carbon price is, theoretically, the most efficient

Typical technology pathway model: Discover & Develop, Demonstrate, and Deploy

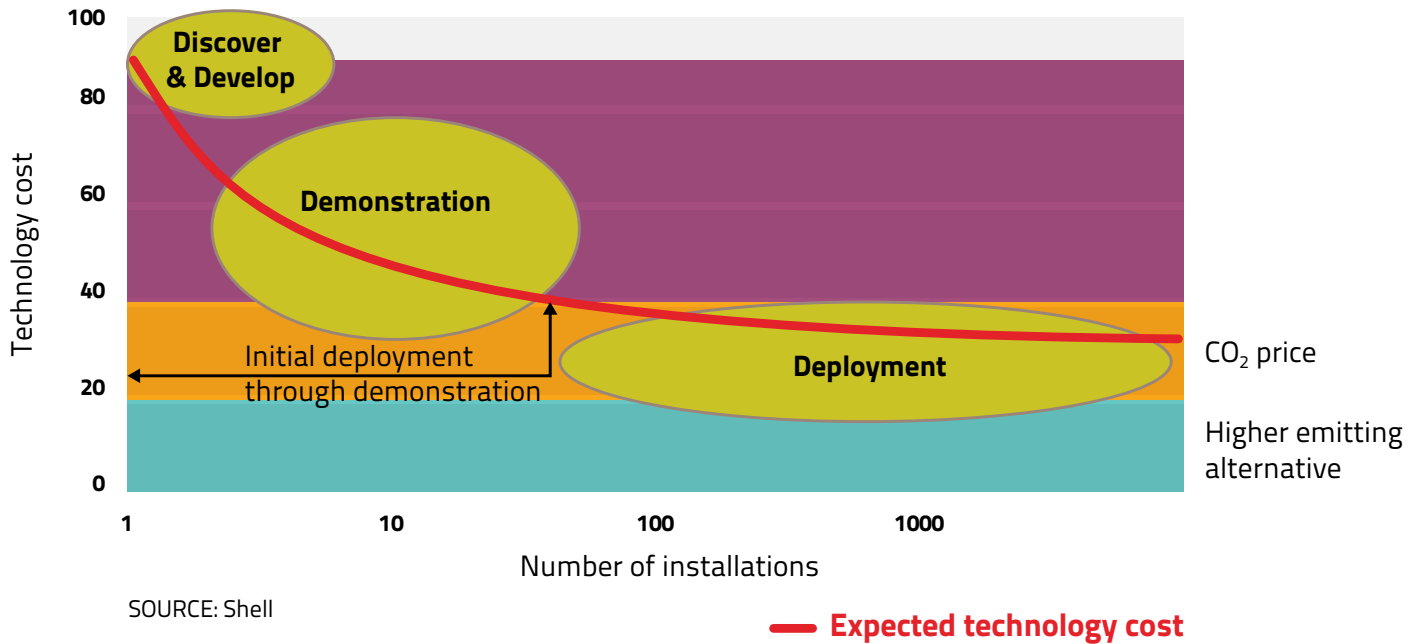


Figure 3

approach. However, this solution may not catalyze the early technological change and initial deployment of technology required in each and every sector. This is because the price response varies from sector to sector due to differences in behavior, infrastructure turnover rates, and the utility value of existing assets. In some sectors a relatively low carbon price would stimulate immediate changes as equipment is replaced. In others, the costs would remain too high meaning that changes might not occur and advanced technology would not be developed within an acceptable timeframe. For this reason, each major sector will require its own targeted policy approach.

TECHNOLOGY AS A SOLUTION

Technology remains a key consideration. There is a need both to increase the speed with which existing technologies are deployed and to develop and bring to market new technologies. Shell favours a

technology pathway model which recognizes three clear phases: (i) Discover and Develop (ii) Demonstrate and (iii) Deploy (Figure 3).

The three stages allow technology to progress down the cost curve. When a new technology is still in the upper part of the cost curve (in the Discover and Develop phase or the early part of the Demonstrate phase) deployment incentives, such as carbon pricing, are not on their own sufficient to enable change. As costs become lower, and with the adoption of a carbon price, this equation should change (as shown by the intersection between the green ovals and the orange bar in the figure above). The Demonstrate phase is key in terms of encouraging learning-by-doing and delivering essential cost reductions for the Deployment phase. It is the Demonstrate phase that demands the greatest funding because it requires multiple facilities to learn the key efficiencies to reduce costs.

The pathway to deployment of CCS, one of the few technologies that is entirely climate-driven and therefore dependent upon policy intervention, can be better understood by reference to this technology pathway model.

- 1 Although a set of CCS technologies exists (has been discovered and developed), there is still vast room for improvement. Advances are essential to improve the efficiency of this important mitigation option prior to commercialization.
- 2 CCS is presently stuck at the Demonstration phase. This phase is critical to the longer-term deployment of CCS in that it both proves the commercial application of the technology in a given location and establishes early infrastructure to support deployment growth. Canada has made positive progress in this area with federal and provincial governments committing a total of over \$2 billion in funding for CCS.² However, more must be done to push CCS through to the Deployment phase.
- 3 An important step is to put in place an emissions trading system that includes a price-signal which will support long-term CCS deployment.

The need to develop novel renewable technology and advanced biofuel technologies from waste feedstocks also underscores the importance of having in place an enabling structure to help push the technologies down the cost curve. Public funding is likely to be critical in the early Demonstrate phase to enable later deployment of large-scale renewable projects.

DEVELOPING A POLICY FRAMEWORK

Building on this understanding of the development and deployment of technology, a

policy framework, such as that presented in **Figure 4**, can be established. The figure shows a potential policy framework structure and provides some generic examples of policy approaches within each sector. Our federal government will have to develop its own policy framework, tailored to the needs of the country. Regulation will play a key role, as will market-based mechanisms.

Regulation is required to initiate technology development in areas where mitigation measures are very costly and therefore unresponsive to a carbon price. Regulation can provide incentives for technology development that might otherwise remain stagnant for many years. Examples are regulation on improved vehicle efficiency and the development of advanced low-carbon intensive biofuel technologies to reduce transportation emissions, as well as more efficient building standards.

In designing a “fit-for-purpose” policy framework, the government must be sensitive to policy overlap which can have unintended, adverse consequences. As an example, refinery GHG emissions are regulated under controls on facility-based GHG emissions, but some jurisdictions also include these emissions in the lifecycle regulations of blended biofuels. Double regulation can send mixed signals about appropriate reduction strategies and, in the worst cases, lead to failure to recognize reductions.

OPTIONS FOR THE DEPLOYMENT PHASE: CARBON PRICING

In this section we expand upon one “box” (highlighted) in **Figure 4**: proposed carbon pricing for the Deployment phase for power generation and industry/manufacturing.

The implementation of an effective carbon price at the federal level should be a critical part of Canada’s GHG reduction policy framework. Market-based mechanisms and the application of a carbon price to sectors that are highly responsive to price signals (generally large stationary sources

² This funding is provided through a number of federal and provincial programs, such as the Government of Canada’s recently created Clean Energy Fund. Canada’s ecoENERGY Technology Initiative also provides \$151 million for seven CCS projects and the Government of Alberta is providing \$2 billion to fund large-scale CCS projects.

Example of a generic policy framework

	Power generation / Industry & Manufacturing	Transport	Commercial & domestic (buildings)	Land use / Agriculture
Discover / Develop	Broad energy production, energy use and agriculture R&D policy framework			
Demonstrate	Large-scale first-generation CCS demonstration projects	Large-scale advanced biofuel technology production	Encourage step-out design of efficient building construction	Encourage early adoption of new techniques
Deploy	Carbon price legal framework	Vehicle efficiency/ low-carbon fuel incentives	More advanced efficiency standards	Best practice sharing

Figure 4

such as power generation and large industrial facilities) are an effective means of reducing emissions. Our recommendation would be to introduce a carbon price, initially, only to large, stationary point sources. This will provide a sound basis on which to add sectors over time.

Figure 5 gives a brief overview of the various options for implementing a carbon price

A quick review of the current state of carbon pricing in Canada clearly demonstrates the lack of a harmonized Canadian approach. British Columbia and Quebec have implemented carbon taxes that put a price on GHG emissions through a tax on fuels or utility services. Alberta, by contrast, has a baseline-and-credit system in place to reduce the carbon intensity of large industrial facilities. Companies can supplement their own reductions in facility GHG emissions by purchasing offsets within the province, or

paying a penalty into a technology fund. In addition, several Canadian provinces have cap-and-trade regulations ready, but not yet implemented.

The goal of a carbon price is to trigger a change in the economy so that the market begins to differentiate between goods and services on the basis of their carbon footprint. The carbon price, initially felt by the emitter (for example, by paying a tax or by purchasing allowances from the government), is ultimately passed through to the consumer. The result is that the cost of most goods and services will increase, but a new cost ranking will emerge that will alter the purchasing patterns of consumers. High carbon products will become less competitive; they will either be removed from the market or reengineered to reduce their carbon footprint. The additional costs borne by the consumer (paid to the govern-

Options for implementing a carbon price

Implementation Option	Description
Cap-and-Trade System	By design, a cap-and-trade system delivers a specific environmental outcome (through the overall cap) and does so at the lowest overall cost to the economy by driving participants progressively to implement projects from left to right across the abatement curve. Once mature, allowances are auctioned by the government into the market with the funds being recycled back to the consumers purchasing the goods and services from the sectors covered by the system. Early on, as the economy begins adjusting to the carbon pricing mechanism, the government may allocate some or all of the allowances for free. This approach is operating in the power and industrial sectors in the EU.
Carbon Tax	A carbon tax operates in much the same way as a cap-and-trade approach, although is arguably less efficient in delivering a clear environmental outcome. There is no cap, but it does establish the new capital flow through the economy and does force price differentiation on the basis of relative carbon footprints and market response
Baseline-and-Credit Approach	In a baseline-and-credit approach the government establishes a baseline emission for each sector, typically on a CO ₂ /unit of production basis. The participants can earn credits by exceeding the baseline. If they fall short they have to surrender credits. Credits are tradable and can be banked as in the cap-and-trade approach. There are several challenges with this approach including: the uncertainty of the environmental outcome; the complexity of managing the system due to the need for accurate benchmarking; the lack of market liquidity resulting in poor price discovery; and the fact that system does not set up the same flow through the economy as does a cap-and-trade or carbon tax approach.
Project Mechanism	A project mechanism approach effectively reverses the capital flow. The government buys from the emitters, which means it must raise taxes to extract this money from the consumer. The consumer might get some of this back through a lower cost of goods and services as projects increase efficiency. However, it means that the market does not determine the way forward – rather the government does through its selection of projects to fund (a matter of some complexity). Finally, this approach results in a somewhat random attack on the abatement curve, rather than the comprehensive and ordered attack that a carbon price, ideally via cap-and-trade, would deliver. Project mechanisms are currently in place in many developing countries due to the carbon price opportunity delivered through the Clean Development Mechanism of the Kyoto protocol.

Figure 5

ment in the form of a carbon tax or the purchase of allowances) must then be offset, either through personal tax reductions or a decrease in sales tax.

Additionally, emissions-intensive domestic industries that are exposed to foreign imports or export markets without a similar carbon cost should be shielded to mitigate

competitiveness effects and the risk of carbon leakage (i.e. moving facilities across borders to jurisdictions with no carbon price).

In an ideal world, policy measures should be as consistent as possible across as wide a range as possible. They should start between states and provinces and extend over time across free trade zones, leading ultimately to global consistency.

Draft Canadian climate change policy framework

	Power generation / Industry & Manufacturing	Transport	Commercial & domestic (buildings)	Land use / Agriculture
Discover / Develop	Clean Energy Fund and ecoENERGY Initiatives			
Demonstrate	CCS demonstration (e.g. Alberta)	Biofuels from waste feedstock	Innovative step change in building design	REDD credits
Deploy	Energy Efficiency Act Regulation on coal-fired electricity regulation (in development) Alberta SGER Western Climate Initiative	Renewable fuel content (Biofuel Bill) Passenger automobile and light truck GHG emission regulations BC Carbon Tax	Improved building standards	Low till agriculture

SGER – Specified Gas Emitters Regulation

Figure 6

The carbon price can reasonably be set by only one mechanism in a given jurisdiction. Shell believes that cap-and-trade is the preferred carbon pricing approach as it offers certainty in emissions reductions, the greatest compliance flexibility, and the lowest cost of compliance through market mechanisms such as trading and offsets. However, we also recognize that greater flexibility and efficiency comes at the cost of greater complexity. While a global cap-and-trade system may be the ultimate long-term goal, simpler carbon pricing approaches – such as a carbon tax

or baseline-and-credit approach – may be important forerunners.

AN IMPLEMENTATION ROADMAP

The first step for Canada is to assess what the current federal regulatory and policy landscape looks like, including the parameters set by any emergent Canadian energy strategy.

Figure 6 takes the previous generic policy framework and applies it to Canada. While not exhaustive, it illustrates the many gaps that need to be filled in order to develop an integrated and coordinated national policy framework.

The second step is to develop policy approaches that fit within this framework, cover all sectors of the economy and are based on long-term (i.e. 20+ years) environmental objectives. By 2020, the federal government should have a fully developed policy framework in place (bear in mind that the EU took ten years to establish a similar framework and it is still a work in progress).

Shell believes that cap-and-trade is the preferred carbon pricing approach as it offers certainty in emissions reductions

The following are some of the measures that will likely be required:

- // Regulations aimed at phasing out coal power generation and moving to lower-carbon sources, such as natural gas, will significantly reduce GHG emissions. However, to live up to the Government of Canada's commitment that 90% of electricity should be generated from non-emitting sources by 2020, there must be clarity on the role of renewables. A carbon price would be the most effective stimulant to renewable power.
- // Industry, in general, is at present largely unregulated, though the federal government has announced plans to change this. The problem is that a prescriptive, regulatory approach without a carbon price and market mechanisms is likely to be extremely costly and inefficient. Furthermore, it will not stimulate trading across sectors (such as between agriculture and forestry and industry). If the government is determined to implement prescriptive, performance-based regulation to align with the US, we urge the incorporation of market mechanisms (such as trading and domestic offsets) as well as funding for technology, so these regimes can readily transform into more efficient carbon pricing approaches in years to come.
- // Biofuels regulation must evolve from a volume-based, agriculturally-driven policy to one which focuses on reduced carbon intensity and better technologies.
- // Opportunities abound to reduce demand for transportation (e.g. better urban planning and lower GHG transportation options for both public and commercial uses). A carbon tax on transportation fuels is, on the other hand, likely to be relatively ineffective as it will not be high enough to stimulate either changes in behaviour or the very expensive technological measures that are required.
- // Proposed measures in the area of commercial building are relatively short term and limited in their reach. Establishing longer-term policy frameworks with ambitious but achievable goals that are tailored to Canada's needs, must be a priority. A facilitating framework to enhance and encourage more public and private R&D and innovation will be an essential component.

There are clearly great challenges that must be overcome in the years ahead. While long-term actions are being designed we should not lose the ability or will to act. There are a multitude of short-term "no regret" steps in areas such as energy efficiency, transportation demand management, renewables and innovation that can be taken today that will move Canada forward without impairing the competitiveness of Canadian businesses. These should not be ignored. The Government of Canada must not allow its inability to meet the 2020 target to delay action that will help put our house in order by 2050. ■

CANADA'S CARBON CHALLENGE: REDUCING EMISSIONS WHILE MAINTAINING OUR QUALITY OF LIFE

IAN MALLORY

Ian Mallory is President of Pickworth Investments LP, a Calgary-based venture development firm focused on natural resources in the Americas. He has been an executive at three major Canadian power and gas utilities. Prior to that he was Counsel to the Treasury of the World Bank. Ian is a graduate of Harvard, the University of Toronto, and Cambridge, and was called to the bar of Ontario in 1986. He has been an adjunct professor at the law school of Georgetown University and an instructor at the business school at the University of Calgary.

This paper is dedicated to the memory of Ken McCready, one of Canada's pioneers in thinking about sustainable development as it pertains to carbon emissions.

As the world struggles to implement an effective regime to restrict carbon emissions into the atmosphere, Canada's situation sticks out prominently – and often awkwardly. Although many other countries emit much greater volumes of carbon than we do, Canada enjoys two special distinctions: (i) we are the second largest *per capita* emitter of carbon in the world (after Australia); and (ii) as we expand our production from the oil sands and increase exports to the United States and other countries, we appear to be ever more hooked on carbon.

Our efforts to manage carbon emissions will therefore remain firmly in the international spotlight. Institutions in most of our key markets in the US, Europe and Japan will be looking to see Canada manage our carbon emissions in a way that is responsible and commensurate with our level of social development and international standing. If we do not assume a leadership position on this issue, our economy will attract negative attention, including, possibly, foreign taxes and sanctions on our products and services, as well as lost opportunities within the future “carbon-lite” economy.

Anybody who does not think this is a real risk should consider the protests in the US during the summer of 2011 over the Keystone XL Pipeline. The project has become a lightning rod in certain quarters of the US for allegedly abetting a huge increase in greenhouse gases. Approval could well be denied by the US authorities. If the project does not proceed, it would have a significant impact on the oil sands, an industry that, if well managed, can help maintain our national level of prosperity for the next 50 years.

This is not to suggest that Canada should make its policy merely to please our partners. There has been lots of independent, innovative and positive policy discussion in Canada on global climate change. The point is rather that whether or not Canada wants to do the “right thing” for the global climate, we should certainly do the “smart thing” and work to manage our carbon in our own self-interest.

We need to recognize that fossil fuels will drive our economy for the next 25 years, whether we like it or not. Renewable energy is a wonderful source – and should be brought on stream as fast as practicable

to replace oil and gas – but we are two or three major technical breakthroughs away from that happening. While we are working on those breakthroughs, the question is: how do we manage our production and consumption of carbon most intelligently?

GOVERNMENTAL HOT AIR

In the past, the Government of Canada's (and some provinces') emission management policies have seemed to be predicated largely on hope and mass ascetic denial. Grand gestures were made, and ambitious targets set, without sufficient thought being given to how they would be attained. Canada agreed to extremely challenging goals for carbon reduction – in the Kyoto Protocol in 1998 to 6% below our 1990 levels by 2012, and in the Copenhagen Accord in 2009 to 17% below our 2005 levels by 2020 – without any clear plan of how to get there. Sure, Rick Mercer implored each of us to save a tonne of air by staying at home (or something). And the coast-to-coast rally of roundtables and sprinkling of relatively modest incentives to carbon-friendly causes was somehow supposed to yield significant reductions in emissions.

With that kind of kick-off “action plan”, it should be no surprise that in 2011 Canada remains far from meeting the targets to which we have committed. We have not made any progress at all on a total basis, although our national carbon-intensiveness (per-unit-of-GDP) has declined somewhat over the past six years. Most of this decline, however, is due to the efforts of those provinces and private sector companies that adopted a proactive approach for their own political or business reasons.

The Hon. Rona Ambrose, a federal government minister, admitted (with refreshing candour) as early as 2006 that we were not going to be close to meeting our targets on the original schedule. We need more of that type of objectivity, if we are to understand exactly where we are and what we need to

Whether or not Canada wants to do the “right thing” for the global climate, we should certainly do the “smart thing”

do. And if we are to meet our Copenhagen target – even at a later date, say by 2030 – we will have to implement an ambitious national program of carbon efficiency that will affect the lives of every Canadian.

WHEREIN LIES CANADA'S CARBON PROBLEM?

Before we consider the solution, it is imperative that we be clear on the dimensions of the problem. The principal sources of carbon emissions in Canada are:

- // thermal power plants that burn fossil fuels (so, ultimately, consumers of electricity);
- // road transportation, particularly automobiles and commercial fleets;
- // heating of buildings; and
- // the production of oil, gas and chemicals.

We need more objectivity if we are to understand exactly where we are and what we need to do

Among fossil fuels, the hierarchy of carbon emissions is very clear: coal is the worst, followed by fuel oil and gasoline. Natural gas is the least carbon-emitting fossil fuel, although unconventional sources (shale gas, coal-bed methane) can be less good than their conventional cousin.

POLICY GOALS AND CONSTRAINTS

Facing this problem, what should be our policy goals? There are four key ones:

- 1 Reduce significantly carbon emissions on a gross and *per capita* basis.
- 2 Maintain economic growth.
- 3 Secure an economic and political leadership role in the new carbon-lite economy.
- 4 Minimize taxes and government regulation.

As is usually the case for big problems, there is tension between the goals: finding the best solutions will be an exercise in creativity and optimization.

There are four key considerations in policy development:

- 1 Carbon is an essential driver of our economy today. Blunt reductions will impose costs that will reduce economic growth and (initially anyway) impair our international competitiveness.
- 2 To the extent that big carbon emitters such as China, India and Russia are not with the global carbon-reduction program, Canada's gross reductions will be ineffectual on a global basis. We therefore run the risk of imposing sacrifices on our economy to no significant benefit for anyone.

3 Regulatory schemes are complicated and expensive to administer.

4 Renewable energy – solar, wind, small hydro, tidal, etc. – can help but, technologically and developmentally, they will not come close to filling the carbon space for the next 20 years.

CURRENT SOLUTIONS

In Canada, six specific solutions to the carbon problem have been promulgated and to various – often nominal – degrees implemented.

1 **Carbon tax** A broad-based tax on the consumption of carbon is an economist's dream, for its apparent even-handedness, relative ease of application and alleged effectiveness. In reality, a broad application of a carbon tax – in the short term, anyway – is as likely to hurt as much as help. In order to pack the desired transformational punch, the tax will have to be so high as to impair our economic growth. (The British Columbia carbon tax, slated to rise to 6.67 cents per litre of gasoline in 2012, is way too low to stop SUV-lovers from turning the ignition.) Further, a broad tax also does not adequately promote the desirability of moving people *en masse* to the "second best" solution, fossil fuels with lower carbon counts.

2 **"Cap-and-trade" system of regulation** This is another good economist's concept that could work well for large volume emissions that have regional sources and impact (such as oxides of nitrogen and sulfur). For CO₂ emissions – which are not "pollutants" but an inert by-product that is in global, not local, over-abundance – in a huge, growing, regionalized country such as

**A broad application
of a carbon tax is as likely
to hurt as much as help**

Canada, the challenges of using such a mechanism would be enormous. Cap-and-trade might help keep the lid on CO₂, but in an inclusive system there would likely be significant leakage and constant attempts to recalibrate. (“What if I can buy a carbon offset from offshore Norway, or plant some trees in Niger, or help Alberta cows belch less? Do I have more room to emit? Maybe I can even sell the excess?”) If just a few large emitters were included in the regulation, there would not be enough liquidity to establish a proper market. Accordingly, let’s not go there – yet anyway.

3 Prohibition of carbon emissions in the absence of sequestration This instrument, under which big point sources of carbon would be required to shut down (or not start up) unless they could sequester their carbon emissions in underground storage reservoirs, has been derided as clumsy, anti-economic and a prime example of over-regulation. A number of ambitious carbon capture and sequestration (CCS) projects are currently being piloted, mainly in Alberta. In the long run, some configuration of these is likely to be highly effective in reducing carbon emissions. As CCS is expensive, it raises the cost of the carbon-emitting activity (and therefore tends to reduce its incidence) much more than a broad-based carbon tax would – and in a directed manner, with little collateral economic damage. We should therefore double-up on the development and evaluation of these CCS projects.

4 Investment in energy efficiency This seems to be the “also-ran” of carbon management policy, but it remains one of the most cost-effective options.

If we can squeeze more energy-value per unit of carbon emitted, both our gross and *per capita* emissions will fall. There are dozens of ways that we can increase energy efficiency and, with the help of recent technological improvements, we should be able to do this without sacrificing economic growth. Indeed, there has been more profound progress in energy efficiency technology over the past five years than there has in renewable energy generation. In the electricity sector alone, a combination of LED lighting, “smart grid” distribution systems, and upgrades to modern machinery and appliances can reduce consumption of electricity for urban areas by over 20%.

There has been more progress in energy efficiency technology over the past five years than there has in renewable energy generation

5 Investment in renewables A quick switch from fossil fuels to renewable energy is the pet policy of many climate activists. It is a laudable and essential goal. We will get there eventually: with continued improvements in technology, the price of power from wind, small hydro (including promising new “very-low-head” turbines), solar, tidal, hydrogen and bio-mass generation will become sufficiently competitive to meet base-load demand. But probably not for another 25 years.

To accelerate this transition to renewables, more help from governments will be required. Additional

¹ We have world-class expertise in energy innovation in Canada, though our financing institutions are not always sufficiently risk-assuming – see Vancouver’s Chrysalix Energy venture capital as the capable financial exception in Canada that proves this rule.

support for research and development would be very welcome.¹ However, the real challenges lie in commercialization and finding ways to support new technologies through the “valley of death” between perfecting the technology and securing the first pilot projects and commercial contracts.

Government can help, facilitating initial commercial contracts through: (i) setting up “feed-in tariff” arrangements (as in Ontario); (ii) using their own procurement programs (as with the City of Calgary); or (iii) offering specific project subsidies, such as the federal Wind Power Production Incentive (WPPI) program. Needless to say, such catalytic programs for the private sector need to be carefully designed to ensure that they are open to all comers, have tough performance standards in place and taper off over time.

We must attack the point-sources of carbon with as much vigour and precision as possible

6 Expansion of nuclear power Switching to nuclear power is another “good idea” that is highly problematic in implementation. While nuclear can be safe in well-controlled circumstances, the disasters at Fukushima and Chernobyl have demonstrated that conditions in the real world conspire to make this a risky, and ultimately expensive, fuel source. With so many other energy options available, Canada should “just say no” to new nuclear power, for the best practical reasons.

NOW WHAT? THE SMART, CRASH ANTI-CARBON PROGRAM

If we want to meet our carbon targets in the next 20 years, we need to engineer a massive shift in the profile of our national energy consumption and production. We must attack the point-sources of carbon with as much vigour and precision as possible, trying very hard to avoid collateral damage to other economic activities in the process. Regrettably, this means a greater number of regulations – but more specific and directed ones.

In order to get public buy-in for this massive shift, and to ensure that we do not hobble our economy with constraints that many other larger countries are eschewing, we need to subject each of our main anti-carbon programs to a second test: is there sufficient public policy rationale to adopt this measure for reasons unrelated to carbon? Fortunately, with the exception of targeted CCS projects in the highest-emissions situations, the answer for all the measures recommended below should be “yes”.

The list below provides details. It should be noted that natural gas features prominently as a solution rather than a problem. This might sound counter-intuitive, as natural gas is a fossil fuel that emits carbon. However, as it emits much less carbon per unit of energy generated than other fossil fuels, a quick switch to natural gas will have a huge and early impact on both total and *per capita* carbon emissions in Canada.

That is not to say that natural gas is without its own complications.² Certainly the development of “unconventional” natural gas (shale gas and coal-based methane) has its own environmental challenges (land-use, water contamination, etc.) that must be carefully managed. David Suzuki and the Pembina Institute also caution against a massive expansion in natural gas infrastructure because they think this could lock the country into fossil fuels for many years and impede the shift to renewables. On that

² See David Suzuki Foundation & the Pembina Institute (2011) *Is natural gas a climate change solution for Canada?* (<http://www.davidsuzuki.org/publications/reports/2011/>)

point, we should remember that natural gas can act as an “enabler” of renewable energy. The biggest problem with wind, small hydro, and solar energy is that their production depends entirely on the vagaries of the elements: natural gas (with turbine and smart grid technology) can provide the background “swing-supply” that will actually allow more renewables to be deployed.

These are the recommended measures:

1 Reduce emissions from electricity

// *Action:* Require the conversion of all coal and fuel-oil fired power plants to natural gas, unless CCS systems are in place.

a. Non-carbon justification: This will have a major positive impact on local levels of various kinds of pollution.

b. Federal role: Set tough emissions standards.

// *Action:* Improve the efficiency of electricity consumption. With the installation of new, efficient technologies, Canadians can readily reduce their consumption of electricity by 15% or more within five years.

a. Non-carbon justification: As many of these technologies have short pay-back periods under current energy prices, there will be an ongoing economic benefit to making the switch.

b. Federal role: Swing both stick and carrot. Ban the least-efficient technologies (bye bye, higher wattage incandescent bulb!), and provide limited-time incentives (tax and grants) for installation of newer technologies. Expand informational programs on energy efficiencies to assist consumers.

// *Action:* Stimulate more renewable energy projects.

a. Non-carbon justification: This will

Natural gas can provide the background “swing-supply” that will allow more renewables to be deployed

reduce all kinds of pollution (other than visual) and help grow new, critical industries in Canada.

b. Federal role: Expand WPPI-type programs that provide temporary grants to newer technologies, including tidal power. Direct federal procurement to include the purchase of new green power, including by making available commercial test sites on suitable federal properties. Tidal power, in particular, could benefit enormously from a range of initial test sites with government as the customer.

2 Get vehicles, especially big and gasoline-burning cars, off the road

// *Action:* Encourage smaller cars.

a. Non-carbon justification: Having less metal *per capita* on the roads and in the garages of our cities brings obvious and numerous benefits to all.

b. Federal role: Raise taxes on bigger cars, eliminate them on the smallest cars.

// *Action:* Promote “congestion charges” in the cores of our biggest cities, as has been done in central London (where a collateral benefit of the charge is said to be a 12% reduction in carbon emissions).

a. Non-carbon justification: Same benefit as in a) above.

b. Federal role: Tie the federal gas tax transfer to the imposition of a congestion charge in cities with a metropolitan population of over two million initially, reducing to one million after 2020.

// *Action:* Expand public transit, especially rail (or light rail), in all urban areas.

a. Non-carbon justification: This is a public good that brings numerous benefits to the community.

b. Federal role: Provide grants for a portion of capital costs to encourage new construction (not operation). Provide generous tax credits for a portion of annual commuter passes.

// *Action:* Promote the use of biodiesel, especially in fleets. Biodiesel is a more environmentally friendly fuel than ethanol and it can be produced in abundance in Canada.

a. Non-carbon justification: This will help develop a major new industry, with significant export potential.

b. Federal role: Reduce taxes on biodiesel.

3 Reduce carbon emissions from buildings

// *Action:* Invest in insulation retrofits. This could reduce emissions in cities by more than 10%.

a. Non-carbon justification: This will also reduce energy bills.

b. Federal role: Provide limited-time enhanced tax credits and grants for retrofit to encourage quick conversion. (This is already being promoted through the “ecoEnergy” program, but should be expanded.)

// *Action:* Switch to natural gas heating from fuel oil or electricity. Natural gas is usually more efficient for heating than electricity (even natural gas fired electricity) and is cheaper than fuel oil.

a. Non-carbon justification: Same benefit as in a) above. Also supports the Canadian natural gas industry which is experiencing a cyclical downturn.

b. Federal role: Give natural gas a ten-year exemption from any increase in federal energy taxes (including any carbon tax).

4 Demand carbon-efficient production from oil and gas and chemical industries

This is the newest frontier in anti-carbon policy, and the one that is prompting industry and government (both provincial and federal) to come together to establish a mutually acceptable framework.

The desired policy actions will include: i) eliminating existing waste that emanates from flaring and inefficient machinery and/or recovering waste heat for usage; ii) deploying technologies that will produce more oil and gas for less energy input, particularly in the oil sands; and iii) establishing CCS projects to neutralize emissions from the most significant point-sources.

Unfortunately, apart from the economic benefits associated with more efficient production, these actions cannot be as well justified for reason of collateral public benefits as the other actions above. (Production of oil and gas is usually located in rural or remote locations and presents less scope for switching and optimization). However, many companies are now displaying a positive attitude towards these challenges, as is illustrated by various CCS projects being launched in Alberta.

With the installation of new efficient technologies, Canadians can readily reduce their consumption of electricity by 15% or more within five years

An excellent example is Shell's Quest Project, which will capture, transport and store more than one million tonnes of CO₂ per year from Shell's Scotford Upgrader starting 2015. This project which will cost \$1.3 billion, has received a grant of \$745 million (over 15 years) from the Government of Alberta, and \$120 million from the Government of Canada's fund for research and development of clean energy.

In addition to providing such catalytic grants, alongside the provinces, for the first CCS projects, the federal government can also play a very important role in reducing carbon emissions in oil and gas by: (i) setting reasonable emissions standards for carbon producing point-sources, including fossil fuel extraction, processing and transportation; and (ii) using tax policy to encourage the adoption of new technologies for efficient production and reduction of waste. Significant additional discussion will be required between government and industry to find the right framework. Needless to say, however, government should take a proactive stance to ensure that such a framework gets implemented within a reasonable time.

It is clear from the list of actions above that Canada still has a long way to go to put in place mechanisms that will reduce our carbon emissions in order that we can meet our international responsibilities and, hopefully, also maintain our economic growth and quality of life. Nonetheless, after years of disappointment, and underperformance compared to many provincial counterparts, there is now cause for optimism.

The federal government is finally assuming a leadership stance. It has eschewed a national carbon tax and a cap-and-trade system – which are the right moves at this time, as explained above. And it has recently demonstrated that it might indeed be seri-

After years of disappointment there is now cause for optimism

ous about implementing the type of solutions proposed in this paper: that is a series of targeted regulations to attack the critical point-sources of carbon emissions and the stimulation of alternatives to carbon-based consumption.

In its proposed *Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity Regulations* published for comment on August 27, 2011, the federal government made two very important declarations: (i) that coal-fired power plants without a CCS system will effectively be phased out; and (ii) that the target emissions standards for power plants (and by implication, eventually other heavy industries) will be set by high-efficiency natural gas. The first declaration is important as it demonstrates the determination to make an immediate and significant impact on point sources of carbon, while limiting collateral damage to the economy as a whole. The second declaration properly highlights the critical role of natural gas as the “good carbon emitter” that will, if properly encouraged, allow us fully to face up to our current carbon challenge.

It is hoped that these regulations will recognize that if CCS systems are shown to be effective in reducing net coal-fired atmospheric emissions to at or below natural gas levels, coal-fired plants deserve a carefully monitored new lease on life.

We will see in the months ahead whether this initiative is followed up with equally bold and well-targeted federal measures.

If CCS systems are shown to be effective in reducing emissions, coal fired plants deserve a carefully monitored new lease on life

A NATIONAL CARBON AGENCY?

The broad scope of possible federal policy measures in this space raises the question of whether they should be brought together in a tightly organized package with unified administrative direction. However compelling this might sound, it is probably not worth the effort. First, any bureaucratic initiative whose moniker contains words that sound anything like “national”, “energy” and “program” will create bad harmonics in corners of the country that are particularly important for the resolution of this chal-

lenge. Second, the diversity and complexity of the proposed targeted point source and alternative-development approach is likely to be more effective in a decentralized administrative environment.

This approach will require detailed regulation and enforcement, well-directed funding and uncommon co-operation between all levels of government and the private sector. This is likely best achieved if senior federal government officials provide only broad policy guidance to their experts in the various sectors, as well as the appropriate funding and legislative support to make them stick. Any high profile, unified administration for national carbon action would perhaps best be deployed as a monitoring agency and external information bureau, to tell the world how – in the words of the song from a durable Canadian rock band – we can get there if we try. ■

BUILDING A LOW-CARBON, HIGH-OCTANE CANADIAN ECONOMY

STEWART ELGIE AND ALEX WOOD

The year 2010 witnessed several historic events, with profound implications for Canada's economic and environmental future.

First, global investment in clean energy capacity surpassed investment in fossil fuel-based capacity for the first time. Overall spending on clean energy has risen by over 500% from 2004 – 2010, to \$211 billion.¹ It is projected to grow a further ten-fold by 2020, to reach a total of US\$ 2.3 trillion.²

Second, 2010 was tied for the warmest year in the Earth's recorded history. This record-high heat has spawned record-low Arctic sea ice levels and other catastrophic effects, such as BC's devastating mountain pine beetle outbreak (which continues to spread eastwards).

Third, global oil production hit record levels in 2010 – despite growing concerns that we are at, or near, peak oil – as did domestic production in Canada (the bulk of it coming from oil sands).³ Demand for timber, minerals and other resource products (which tend to be energy intensive) also continued to grow.

2010 also saw an unprecedented number of countries (141: including the US, EU,

China and Canada) sign on to binding targets for greenhouse gas (GHG) emissions reductions as part of the Copenhagen Accord. At the same time, Canada's oil sands became a prime target of global environmental protest – a trend which has intensified in 2011.

These events underscore two important realities for Canada. One is that the world is shifting to a low carbon economic future. One can debate the pace, but the shift is unmistakable. This low carbon transformation will affect most aspects of our economy and lives: the buildings we inhabit, the transportation we use, the products we make, and the energy that powers us. Many are labelling it “the next industrial revolution”, and most of the world's major economies are shifting their spending and policies to prepare for it.

The second reality is that, despite this low carbon trend, fossil fuels and energy intensive industries are likely to remain a major part of the global economy for decades to come. Absent unforeseen technological breakthroughs or ecological catastrophe, the shift to cleaner technologies and energy, and the replacement of global capital stocks, can only happen so quickly. In the meantime, a growing global population and rising

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¹ UNEP & Frankfurt School (2011) *Global Trends in Renewable Energy Investment*.

standard of living (especially in developing countries) will mean that demand for fossil fuels and other natural resources will remain strong. And Canada is a major producer of both.

Canada must view the low carbon economy as an opportunity, not a threat

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To some, these twin realities seem to point in opposite directions – with the implication that we must choose between supporting the “new economy” or the “current economy”. In fact, the two realities can – and must – be reconciled. How to do so is the vital question, with profound implications for Canada's future prosperity. What policies will enable Canada to capitalize on its strengths in the economy of today while also preparing the country for success in the low-carbon economy of tomorrow?

The answer, we argue, is that Canada must view the low carbon economy as an opportunity, not a threat – including for its oil and resource industries. Canada should move aggressively to adopt smart, cost effective policies that will not only encourage clean energy and technology growth, but will also position Canada as the world's most environmentally sustainable producer of oil, gas, natural resources and other manufactured products. Indeed, failure to respond to the demands of an ever-greening global marketplace will pose a growing threat to Canadian exporters – as we see with Europe's proposed low-carbon fuel standard, which could make market access to the EU a real issue for Canadian oil sands producers. The most important (but not the only) policy needed to drive this change is to put a meaningful price on carbon emissions.

Effective carbon policies will also enable Canada to do its part to address the critical

problem of global climate change. While this paper focuses mainly on the economic dimensions of the issue, there are of course very compelling scientific and moral arguments for acting, which have been well canvassed elsewhere.

THE PACE OF OUR TRANSFORMATION

Countries around the world are wrestling with the same issues as Canada. Their approaches generally fall into one of three groups: go fast, go slow, or go smart. There are plausible arguments to support each approach.

// **Go fast** countries are betting that the shift to a low carbon economy will be faster than most expect. If this happens, early mover countries such as Norway – which aims to be carbon neutral by 2030 (despite the fact that it is a major oil exporter) – South Korea, Germany and Denmark stand to benefit. All are moving aggressively to accelerate clean energy and technology development through green taxes, incentives, targeted spending and other policies.

// **Go slow** countries are betting that the low carbon economy will emerge more slowly than expected. These countries are generally reluctant to impose additional costs on domestic industries and consumers in order to address a global problem (climate change) or prepare for a new economic reality that is just starting to unfold. The US is a prime example; it has refused to regulate carbon emissions (nationally) and has abandoned its Kyoto target (although it is ramping up spending on clean energy).

// **Go smart** is a middle path. Countries in this group assume that the low carbon transition will happen, but believe that traditional sectors will remain

² Pew Charitable Trusts (2010) *Global Clean Power: A \$2.3 Trillion Opportunity*.

³ BP Statistical Review of World Energy (2011).

important for many years. They are hedging their bets, putting in place modest, cost-effective policies to foster low carbon options while still supporting the growth of traditional industry and energy sectors. Examples include, Australia (its carbon tax exempts motor fuels and provides major support for carbon-intensive resource sectors), parts of Europe, and China (which is rapidly building coal power plants, while raising fossil fuel taxes and becoming a leader in clean energy production and low carbon transportation).

Canada generally falls into the “go slow” camp, at least nationally.⁴ We are one of the few developed countries still without a national carbon pricing scheme or a plan to introduce one. Moreover Canada’s carbon emissions have risen more than almost any other OECD country since 1992. We have abandoned our Kyoto target, and our green economic spending lags behind that of most competitor nations.

So which of the three approaches is best for Canada? “Go slow” may seem the safest, in the short-run: it avoids imposing costs on our industries and consumers that are not faced by our major competitor, the US. In the medium-term, however, this may leave us dangerously ill-prepared. Pegging ourselves to the US, a country on the trailing edge of global low-carbon change, may well hamper the future competitiveness of many Canadian industry sectors, by failing to spur necessary innovation and efficiencies. By following the US we also run the risk that an American policy – when it does come – will put domestic interests first, to our detriment (think: “buy American”).

Moreover, it is not even clear that this strategy heads off short-term pain. Growing pressure from carbon-conscious consumers, environmental NGOs and investors is increasingly threatening Canadian oil and gas exports

(the high-powered US campaign to block the Keystone pipeline is the latest example), and beginning to tarnish other sectors as well. This may be why powerful industry voices such as the Canadian Council of Chief Executives, and others, have begun publicly to push for national carbon pricing regulations.

A “go slow” (or “go with the US”) carbon strategy is therefore neither safe, nor in Canada’s overall economic – let alone environmental – interest.

The economy of the future is likely to reward companies (and countries) that are energy efficient, low polluting, and use scarce natural resources efficiently. Rather than seeing this shift as a threat, and resisting change, Canada should view it as an opportunity. That means putting in place policies to get ahead of the wave of change – in the same way that we did when we negotiated one of the world’s first continental free trade agreements in the late 1980s, and slashed our fiscal deficit in the early 1990s. These far-sighted government actions both involved some short-term pain, but they positioned Canada to prosper in the shifting global economic reality of the time.

We now face a new (and potentially greater) economic shift, and similarly prescient policies are needed to prepare Canada for it. To be clear, that does not mean simply following the “go fast” climate policy path of countries such as Sweden, Germany or Denmark, whose economies are quite different from ours. Rather, Canada should pursue its own “go smart” path to a low-carbon future, along the lines of Australia – through cost-effective policies that foster eco-innovation but also reflect its inherent economic strengths, including a rich endowment of natural resources and related know-how.⁵

For Canada, being a green economic leader does not mean *just* building more windmills, solar panels, electric cars and other clean technology products (though these are likely to be of growing importance). It also means becoming the world’s most

⁴ Several provinces – such as BC, Ontario and Quebec – are in the “go fast” or “go smart” camps.

⁵ Certain provinces (such as BC, Ontario and Quebec) may be positioned to pursue a more aggressive low-carbon policy path.

environmentally responsible producer of oil, timber, minerals, vehicles, and other energy intensive, manufactured products. “Made in Canada” should become a recognized brand of environmental leadership, across all sectors – through real changes to practices and policies, not just better communications. This will be an undoubted challenge, but with our resource wealth, diverse manufacturing base, and highly educated and skilled workforce, we should rise to meet it.

“Made in Canada” should become a recognized brand of environmental leadership

Our ability to do so is illustrated by the recent history of our forestry sector. Twenty years ago, this sector stood in the cross-hairs of global environmental opposition, as a result of its outdated practices. After a decade of intense conflict, marked by international boycotts and massive civil disobedience, the industry is now embracing sustainability as an economic opportunity, not a threat. It has adopted world-leading standards for forest certification and practices, is working hand-in-hand with environmental groups to protect endangered species and spaces, has dramatically reduced its carbon emissions, and is developing innovative new bio-products. Forestry is a real-life example of how Canadian resource and industry sectors can position themselves to prosper in an ever-greening, low carbon global economy.

Moreover, we may not be quite as far behind as some critics make out. The federal government has already brought in new vehicle fuel efficiency standards (with the US), is investing in carbon capture and storage technology (in partnership with some provinces), and is planning to regulate carbon emissions from coal power.

GETTING FROM HERE TO THERE

What public policies and investments will best accelerate Canada’s economy-wide shift to a low-carbon future?

A full answer to this question is beyond the scope of this paper, since it involves most aspects of our economy and society. However, an overall low-carbon policy package should feature an array of tools, including:

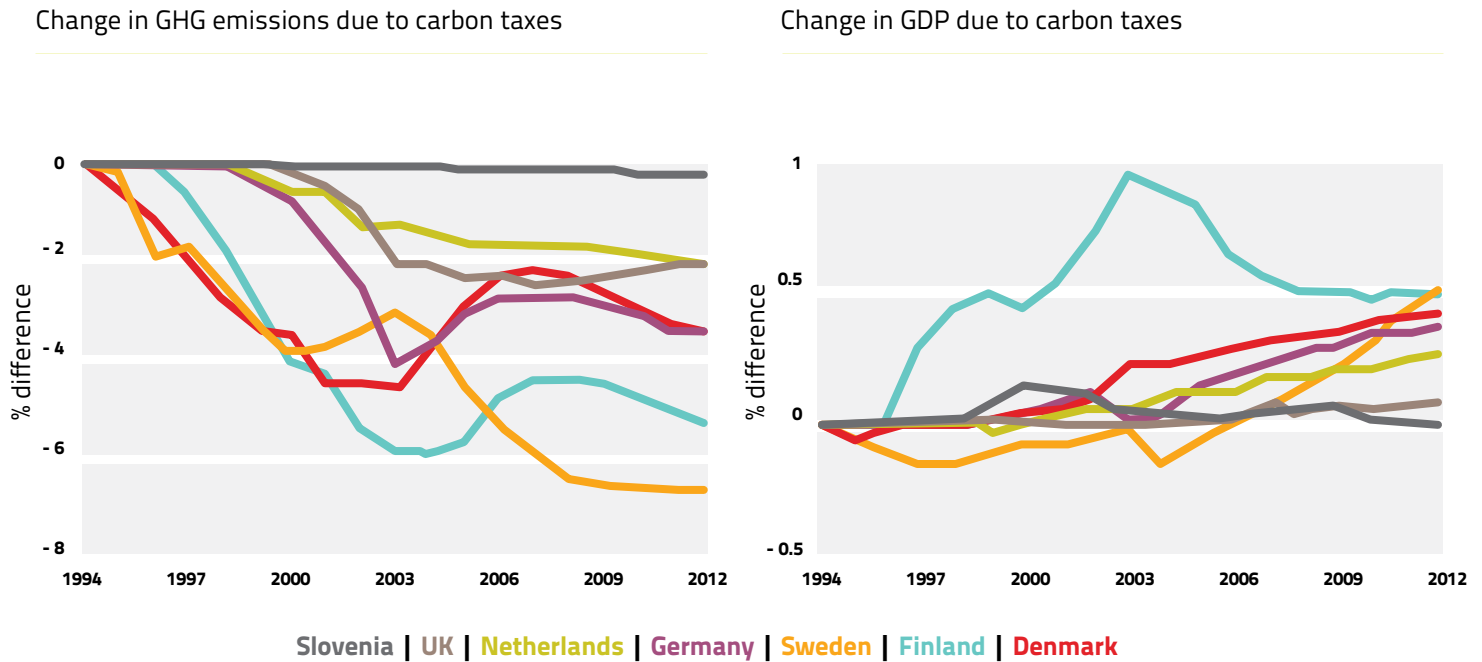
- // public investments in green infrastructure (transit, buildings, electrical grid, etc.);
- // incentives to help strategic clean energy and tech industries get established;
- // carbon pricing, across the economy;
- // regulation, where pricing is less effective (e.g. product standards, building codes); and
- // research support to spur low-carbon innovation (technical, economic and policy).

Here we focus on *carbon pricing*, the single most important measure that Canada can take. A carbon price will ripple through the economy, reaching all producers and consumers, and motivate behavioural and investment changes – much more quickly, widely and efficiently than could be accomplished by regulating all of these activities separately.

There are two main ways to price carbon: through a tax or fee on emissions or a cap-and-trade system. Both pricing approaches can achieve reductions at much lower cost than traditional “command and control” regulation.

The efficacy of a trading approach was demonstrated by the US Acid Rain program – the first large-scale experiment with emissions trading. The program achieved 25% greater reductions in sulphur dioxide (SO₂) at roughly half the cost of a conventional regulatory approach. Its success has inspired the creation of carbon trading regimes in a growing number of jurisdictions, including Europe,

Changes in GHG emissions and GDP due to carbon taxes in various European countries



SOURCE: Ekins, P. (2007). *An assessment of ETR on the competitiveness of selected industrial sectors*. COMETR (Competitiveness Effects of Environmental Tax Reforms).

Figure 1

New Zealand, the Northeast US states, and Alberta. While it is too early to measure cost savings from these programs, US government studies indicate that a national carbon trading scheme would generate cost-savings of over 50% compared to more traditional command and control carbon regulations (of the type that Canada is currently considering).

Carbon taxes have also proven to be a cost-effective way to meet climate goals. Six western-European countries have brought them in since the 1990s, and a major EU-sponsored study found them to have both positive environmental effects (causing emissions reductions of 2–7%) and beneficial economic impacts (a small, positive effect

on GDP, mainly due to tax shifting which, amongst other things, can increase investment in growing economic sectors such as clean energy).⁶

British Columbia passed North America's first true carbon tax in 2008.⁷ Since then, BC's per capita fuel use has fallen nearly 3% compared to the rest of Canada, making BC the country's most fuel-efficient province.⁸ The tax has now risen to \$25/tonne (higher than Europe's current carbon market price), yet it appears to have had no adverse effects on the province's GDP (which is essentially unchanged relative to other provinces) – in large part because all revenues are used to cut other taxes.

⁶ Tax shifting occurs when the revenues from environmental taxes are used to lower other types of taxes, particularly on income or labour. Overall taxes are not raised, just shifted. The result is higher taxes on things we want to discourage (pollution), and lower taxes on things we want to encourage (investment and employment).

In addition to lowering costs, carbon pricing is also more effective than conventional regulation at stimulating innovation. The reason is that an emissions price creates an economic reward for each additional unit of emission reduction – which simply setting an emission standard does not do. If a company can find innovative ways to reduce emissions below the targeted level, it will make (or save) more money. A recent OECD study documents the innovation-inducing effects achieved by various green taxes.⁹ Similar results can normally be obtained from emissions trading.

If it is to be effective, carbon pricing must be well designed. There are examples of poorly designed carbon taxes (Norway's, for example, includes overly broad exemptions) or emissions trading schemes (e.g. the EU system over-allocated allowances in its first phase) and we must learn from these. Sustainable Prosperity, working with a group of economic, business and environmental experts, has identified key principles for effective carbon pricing systems. For example, the systems should be: (i) comprehensive; (ii) simple; (iii) predictable; (iv) adaptable; and (v) have a price sufficient to achieve environmental targets.¹⁰

Of the two carbon pricing approaches – a tax on emissions, and a cap-and-trade system – most economists prefer a tax (as do a growing number of Canadian industries and environmental groups). They point to several main advantages, including simplicity (it builds on the existing tax system), comprehensive coverage (across the whole economy), ease of establishment (BC's tax was developed in just a few months), low transaction costs (no trading fees), and greater price certainty – ideally by starting with a modest price that ramps up steadily over time (as BC's does), to allow firms time to plan and adjust. A well-designed cap-and-trade system, however, can be almost as effective and comprehensive, and brings the added benefit of certainty of emissions reductions.

What is clear is that either type of carbon pricing system is preferable to command and control regulation. Yet there is growing concern that Canada may choose this inferior route. From 2005 – 2010, the federal government issued a series of plans for carbon cap-and-trade systems. But its recently-released regulations for power plant emissions follow a command and control approach. While it is perhaps understandable that trading would be excluded from regulations that deal only with power plants (a very limited trading market), the government has indicated that it may follow this same path when extending carbon controls to other sectors. Given the manifest benefits of a pricing approach, this would be a huge missed opportunity. At the very least we could incorporate some elements of pricing by building trading and offset options into intensity-based emission standards (as Alberta has done).

An important feature of carbon pricing is that, by definition, it generates revenues. With a tax, firms pay for every ton of carbon emitted. With cap-and-trade it is less clear: certainly firms must pay for all emissions over their assigned cap level, and most economists argue they should also be made to pay for every tonne emitted – which is typically done by selling or auctioning allowances to emit. If such allowances are allocated without payment, based on existing emissions, this effectively rewards those who are already emitting the most. Nevertheless, there is typically strong pressure from firms for governments to allocate most allowances for free – an approach which is rife with potential for backroom manipulation. Auctions, by contrast, are transparent and generate funds that can be used to buffer the impacts of climate policy on vulnerable groups or sectors, or for other important economic or environmental goals (discussed below).¹¹

It is estimated that a national Canadian carbon-pricing scheme would initially generate about \$5 – 15bn annually (for a tax, or cap-and-trade with full auctioning, based

⁷ Quebec brought in a climate levy in 2007, but it is too small to have any real effect on emissions.

⁸ Sustainable Prosperity (2011) (unpublished research: report in preparation).

⁹ OECD (2010) *Taxation, Innovation and the Environment*. Paris: OECD.

¹⁰ Sustainable Prosperity (2009) *Eight Principles for Carbon Pricing*. (<http://www.sustainableprosperity.ca/article11>)

¹¹ The EU trading system currently charges for less than 10% of allowances (slated to rise to over 50% by 2013). Australia's new carbon pricing system requires firms to pay a fixed price of \$23/tonne for all of their allowed emissions. Alberta uses an alternative approach, allowing firms to pay into a government "technology fund" at \$15 for each tonne emitted over their limit (a similar fund was in previous federal policy proposals).

on a carbon price of \$15 – \$20/tonne), rising thereafter with the price of carbon. Even a more limited technology fund approach (like the Alberta model) could generate revenues of close to \$1 billion per annum.

The question then becomes: how best to use these carbon revenues? Options include deploying them to:

- i) reduce distortions in the broader tax system – by cutting taxes on income, investment or labour;
- ii) address competitiveness issues arising from the carbon price – e.g. with time-limited tax breaks or refunds for trade-exposed, energy-intensive sectors;
- iii) offset the proportionally greater impact of a carbon price on vulnerable regions or low-income households – with targeted tax refunds (as was done in BC); or
- iv) fund low-carbon public infrastructure or clean technology research and development.

Each option has some merit. Certainly government should use a portion of the revenues to buffer the adverse effects of carbon pricing on vulnerable groups, regions or industry sectors. The most economically efficient option is to channel most or all of the revenues into cutting taxes on labour or income, to spur investment, employment and growth (as was done in BC, and many EU countries). Indeed, it has been estimated that recycling all revenues into tax cuts would reduce the impact of a carbon price on Canada's economy to negligible levels (roughly 0.1% of GDP annually through 2020).¹² However, at a time of record deficits, when it may be hard to justify further tax cuts, the main function of carbon revenues might be to fund critical public investments without the need for tax *increases*.

Thus, in Canada's present economic circumstances, we would argue that a large portion of potential carbon revenues should be used to support low-carbon infrastructure and clean technology development, for the following reasons:

A large portion of potential carbon revenues should be used to support low-carbon infrastructure and clean technology development

- 1 We need major investment in **public infrastructure** to support a low carbon economy. The list of key investments includes: a smart electrical grid (to boost energy efficiency, and enable clean power producers to feed in); public transit; clean energy generating facilities; carbon capture and storage distribution capacity; energy efficient public buildings and housing; as well as research to advance low carbon technology and innovation.
- 2 The transformation to a low-carbon economy will also require major **private investments** in infrastructure and technology (in electric cars, carbon capture, biofuels, clean power, energy-efficient plant and equipment, etc.). Expected short-term carbon prices (in the range of \$15 – \$30/tonne) are far too low to drive the scale of investment and change needed. Therefore, public incentives will be needed to kick-start the necessary private investments.
- 3 Considerations of **intergenerational equity** also support such a reinvestment. The effects of climate change will be felt, most deeply, by future generations. It is only fair that much of the rent from depleting this non-renewable resource (in the form of carbon revenues) be reinvested in building a low carbon economy that will enrich future Canadians.

¹² National Roundtable on the Environment and Economy (2009) *Achieving 2050: A Carbon Pricing Policy for Canada*. Ottawa: NRTEE.

The best approach to revenue recycling is likely to be some combination of tax cuts, buffering vulnerable constituencies, and investing in clean technology and infrastructure. Over time, the focus should shift more towards tax cuts, as deficits start to fall and carbon prices rise, stimulating low carbon investment with less need for public support.

Substituting pollution taxes for income taxes has a further benefit in that it decouples overall tax revenues from labour income. This is particularly important in view of Canada's aging population. As an aging nation, we will be working less (so paying less income taxes) but demanding more services, especially healthcare. By shifting taxes more towards consumption and pollution (which will normally fall more slowly than aggregate income as the population ages) the level of public revenues, and thus the capacity to provide services, can be better maintained.

This approach is the one that British Columbia has utilized to great effect. The carbon tax has given it fiscal space to significantly reduce income taxes. BC now boasts the lowest rates in Canada for both corporate and personal income taxes.

CONCLUSION

The debate around carbon policy in Canada is often clouded by two major misconceptions: first, that policies to reduce GHGs and build a low carbon economy will hamper Canada's competitiveness and, second, that Canada must choose between developing its

fossil fuel and energy-intensive industries or building a low-carbon economy. Both premises are largely false. As regards the first one, the short-term costs associated with a well-designed carbon pricing policy will be minimal – roughly 0.1% of GDP annually. And the benefits are enormous: not only will Canada be well-positioned to prosper in a future low-carbon world, but we will also play our due part in lessening the massive costs of climate change.

The second premise is also flawed, and paints a false dichotomy: moving forward with effective climate policy is as important to the economic success and security of Canada's energy and resource sectors as it is to the clean technology sector. The emerging low-carbon economy will require not only windmills, biofuels and BlackBerries, but also oil, timber and minerals, as well as cars, trains and chemicals. Canada should strive to become the world's most environmentally responsible producer of natural resource and manufactured products – an increasingly important market advantage – while also growing its clean energy and technology sectors.

It is not an either/or choice, and the sooner we get past that misconception the sooner we can get on with developing smart climate policies – starting with federal carbon pricing – that will position Canada to prosper in the economy of tomorrow, while bolstering the economy of today. ■

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