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#7 IN A SERIES

FROM A MANDATE FOR CHANGE TO A PLAN TO GOVERN

A Reasoned Approach to the Climate and the Economy

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INTRODUCTION

Charting a clear path on climate change policy is one of the new government's top priorities. It arrived in office critical of the previous government's climate change policies. The UN Climate Change Conference in Paris following the election provided the opportunity to reinforce its intention to move in a different direction at least in rhetorical and symbolic terms. As the prime minister famously said at the conference: "Canada is back" (Fitz-Morris 2015).

The challenge now is to translate this sentiment into a new federal climate change policy. Federal and provincial environment ministers met last week to begin discussions on a "pan-Canadian framework for combatting climate change" (Liberal Party of Canada 2016). The next opportunity will be an upcoming first ministers meeting between the prime minister and the premiers (tentatively scheduled for 90 days after the Paris conference).

This meeting will test the new government's vision of a national climate change policy rooted in Canadian federalism whereby provinces and territories are expected to enact their own policies that contribute to a national emissions reduction target. It will also eventually challenge the prime minister's characterization that the environment and the economy "go together like paddles and canoes" (Do 2015).

It is not only the prime minister who has made this assertion about the mutuality of the environment and the economy. It is a common refrain from his government that a robust climate change policy can be enacted without damaging economic growth.

There is a risk, however, that this rhetorical device diminishes a serious policy debate about trade-offs. The reality is that environmental policy – enacted via regulation, taxation, or artificial scarcity – has economic costs along with the expected benefits. There will be a trade-off, certainly in the short run, between those policies designed to reduce the rate of increase of carbon emissions and economic goals.[1] That is a given. What is not clear is (1) the nature of the trade-off and (2) the magnitude of the benefits and costs.

That is not to say that the government should not enact an ambitious climate change policy. Global warming presents a long-term risk and the new government is right to focus on the issue. But it does mean that such a policy should be based on an honest assessment of the environment/economy trade-offs.

The Macdonald-Laurier Institute's mission is to help to inform sound public policy at the federal level. Our goal in this essay series is to help the new government best achieve its top policy objectives.

This seventh essay in the series will help Canadians better understand the interrelationship between the environment and the economy in the short and long term. The goal is to inform policy thinking as the new government prepares to develop a climate change policy in conjunction with the provinces and territories.

We will then offer what we think the Canadian and international evidence establishes as the best policy options for an effective climate change plan. The ultimate goal, as the prime minister rightly puts it, is "to leave a sustainable planet for our children and grandchildren" (Trudeau 2015b).

COST ESTIMATES OF GLOBAL WARMING

There are no mainstream voices that contest the science of climate change or present government inaction as a credible policy response. Climate change poses a real cost to the economy in both the short and long run. A response that recognizes this simple fact must pay attention to policies that will mitigate the expected and immediate costs of global warming and simultaneously take action to reduce the rate of increase in carbon emissions and mitigate its damages.

Analysis from the United Nations Intergovernmental Panel on Climate Change (IPCC) has shown that without a significant curb on greenhouse gas emissions global temperatures may rise on the order of 2 degrees Celsius by the end of the century and closer to 4 degrees according to the most aggressive emission scenarios (IPCC 2014). The panel's research finds that a long-term trend of global temperatures increasing by more than 2 degrees Celsius relative to pre-industrial levels could have significant environmental and social effects. These include ocean acidification, a rise in sea levels and a degradation of marine ecosystems, a general increase in species extinctions, a threat to food security, worsening human health, and even the potential for violent conflicts (IPCC 2014). These heightened risks are the reason that the new government has advocated for an international climate change accord to limit the global average temperature rise to well below 2 degrees Celsius.

Both the long and short term economic costs posed by climate change are the subject of considerable debate. Some analysts have projected significant reductions in global economic output due to climate-related factors such as more frequent and more severe floods, hurricanes, wildfires, or other extreme weather events. One of the earliest studies that examined these costs in detail was the Stern report (named after its author, UK economist and 2nd secretary at the UK Treasury Nicholas Stern). His report, published in 2006, estimates that the overall costs of climate change could be the equivalent of shaving off 5 percent of annual global GDP and as much as 20 percent under some scenarios. The report's conclusions are thus alarmist: "Our actions now and over the coming decades could create risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century."

Other studies have found more ambiguous results around the range of net-neutral changes. Some critical analyses of the Stern report, for instance, find flaws in its estimation of the costs of climate change and the benefits of emission reductions (Tol and Yohe 2006; Tol 2009). Another perspective from Danish environmental scholar Bjorn Lomborg (2015) is that inflated conclusions about the environmental and economic effects of climate change are directing attention and resources away from more pressing matters such as global poverty.

Most long-term analysis falls somewhere in the middle. The IPCC estimates global annual economic losses for an additional temperature increase of ~2°C are between 0.2 and 2 percent of income. The median estimate of the six studies cited by the panel's report was that 3–5 degrees of warming would cause a reduction of approximately 3.6 percent in global gross economic product at the end of the century (IPCC 2013).

This is broadly consistent with Canadian research. A 2011 analysis from the National Roundtable for the Environment and Economy estimates that the economic cost for Canada could reach as high as $44 billion per year in the 2050s. It may seem like a lot but we must remember that Canada's total economic output is presently about $1.9 trillion and so this estimate may not represent a significant share of economic activity more than 30 years from now.

There are, of course, limitations to environmental and economic models but this research provides a sense of the magnitude of expected costs that Canada and indeed the world may face. It is

also important to recognize that the costs associated with global warming will not be uniformly distributed – some jurisdictions are more threatened than others. The key takeaway, then, is that climate change presents uncertain but nevertheless real costs to the environment and the economy.

CLIMATE CHANGE POLICY AND ECONOMIC COSTS

Statements about how the environment and economy "go hand in hand" are positive notions but fail to capture the economic costs imposed by climate change abatement policies. The government's positioning on the climate change file has tended to emphasize the long-term effects of climate change over the short run costs of policies designed to curb emissions. Yet carbon dioxide is produced by nearly every aspect of the industrial economy and reducing the flow of emissions is likely to reduce economic growth in the short run. It is vital that any emissions policy weigh the expected near- and long-term costs to economic growth against the expected long-term benefits of those policies.

Government policies to curb greenhouse gas emissions are not costless. As an International Monetary Fund (2008) study puts it: "The macroeconomic consequences of policies to abate climate change can be immediate and wide-ranging, particularly when these policies are not designed carefully." This economic reality is at times neglected in discussion and debate regarding the choice of government policies to reduce greenhouse gas emissions. It should not be. The primary and secondary costs associated with any policy to curb emissions should be near the center of the debate.

That climate change abatement policies have economic consequences hardly seems controversial. The purpose of these policies is to influence personal and industrial decision-making with respect to using carbon. Discouraging the use of high-carbon technologies, products, and production processes is not a tangential outcome of climate change abatement policies: It is the principal goal.

What are the economic costs of combating climate change? And how do they compare to offsetting its expected long-term costs? These are difficult questions. But they ought to be at the heart of any public policy discussion about how to mitigate the negative effects of climate change. There is no consensus on the appropriate "price" of carbon emissions to reflect future expected damage. Sweden posts a carbon tax that is equivalent to approximately $60 per ton of carbon. The UK and Denmark have a price in the $30 range followed by a range of carbon prices in several countries between $5 and $20 (McCarthy 2016). The recent price of a carbon emission permit in the world's largest carbon trading market is in the range of $5 to $15 per ton of carbon.

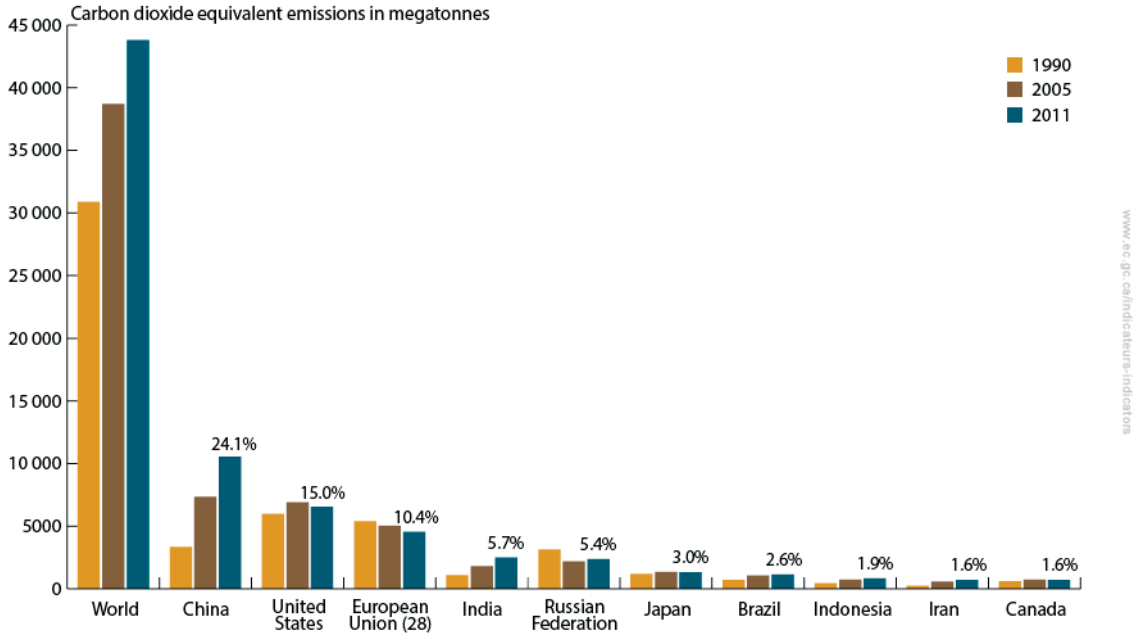
Notwithstanding the certainty about long-term environmental and economic models expressed by spokespeople on the Internet and television, the truth is that no one knows. Any projections about long-term climate change necessarily involve assumptions about human activity, technological change, and other variables. This does not mean that the solution is inaction. As one economist says: "Negative surprises are more likely than positive surprises" (Tol 2012). But it does mean that climate change ought to be treated the way we do other risks that involve trade-offs. Climate change is a risk management issue.

The short-run economic costs of climate change abatement have received considerable academic attention. Economists have studied policies ranging from emissions caps set out in regulation to carbon pricing in the form of a carbon tax or the cap-and-trade model. The concern for policy-makers is the relative *efficiency cost* – referring to the difference between a policy's cost compared to its overall benefit – when determining the best policy option. Separate research produced by the EcoFiscal Commission (2015) and an independent, expert panel appointed by Alberta's government (Leach et al. 2015) has assessed different policies and concluded that carbon pricing is the most efficient option. The evidence shows that the costs imposed by a regulatory response can be the highest due to its inflexibility, limited incentive for technological innovation, and static nature.

The recent Paris conference was heavy on long-term emissions targets and short on estimates about their economic costs. But consider, for one example, that an analysis of President Obama's promise to cut US greenhouse gas emissions by 26 percent to 28 percent relative to 2005 levels by 2025 found that it could reduce the country's economic output as much as $172 billion annually by the target date (Lomborg 2015).

It is important to remember that for a small country like Canada the short-run economic costs of stringent climate change policies are unlikely to be matched by a major change in global emissions. Canada's share of global greenhouse gas emissions is below 2 percent and is expected to decline as emerging economies come to represent a greater percentage (see chart 1) (Environment and Climate Change Canada 2015). Therefore while the government has rightly said that we need to make a contribution to a global effort, we need to be cognizant of the overall effect of Canadian climate policy.

Chart 1: Global greenhouse gas emissions, 1990, 2005, and 2011



Source: Environment and Climate Change Canada 2015.

As for the potential for carbon pricing, there are important questions about its applications across jurisdictions – particularly those with high-emission sectors – and its interaction with other forms of taxation. These considerations must be accounted for in the design and implementation of a new federal climate change policy that adopts carbon pricing.

Research conducted by the EcoFiscal Commission – a pro-carbon pricing policy organization – finds that carbon taxes would disproportionately impose "competiveness pressures" on certain provinces and sectors (Beale et al. 2015). The so-called "carbon disadvantage" could be the result of a carbon price differential between provinces or relative to other countries or may stem from the application of a uniform price across provinces and territories with different levels of carbon intensity. This may justify transitional support or a differential phased-in rate among provinces to mitigate short-run economic costs for high emitters such as Alberta and Saskatchewan.

Policy analysis published by the Macdonald-Laurier Institute has challenged some of the assumptions with respect to the so-called "double dividend" of carbon taxes – that is, the notion that they can contribute to a reduction of emissions and form the basis of pro-growth tax reform. The study finds that the imposition of a carbon tax on top of the current taxation of capital and labour would actually exacerbate existing distortions because it would implicitly act as a tax hike on investors and workers by raising the final prices of goods and services (Murphy 2014). This finding should not necessarily dissuade the government from adopting a carbon tax but it should contribute to decision-making with regards to its rate and how to redirect new revenues in a "tax swap".

The upshot is that any climate change policy must account for both the long-term environmental and economic effects of climate change and the short-term costs of curbing emissions. This is certainly not an excuse for inaction. It is meant to encourage an honest assessment of these trade-offs and a plan that creates as little hardship as possible for low-income earners and disproportionately-affected industries.

A ROLE FOR TECHNOLOGICAL INNOVATION

The question, then, is not whether the government ought to take steps to mitigate climate change in the immediate- and long-term but rather which policies are likely to limit global warming's negative effects at the lowest cost in terms of economic growth. This analysis must also consider the distributional costs of different policy options.

The government has talked about the importance of technological innovation as a long-term solution to lowering greenhouse gas emissions. It has, for instance, set out a role for the state to "make strategic investments in clean technology" as part of a plan to support the development of new, low-carbon technologies (Trudeau 2015a). The government should be lauded for focusing on the role for technological innovation in combating the effects of climate change. Private sector innovation and adaption will need to be a key part of an effective climate change policy. As one

economist puts it: "the answer [to climate change] is Schumpeter" in reference to the Austrian economist responsible for path-breaking research on the process of bottom-up, technological innovation (Pethokoukis 2014).

The Liberal Party platform commits the government to large-scale public investment in green technologies to encourage "early adopters" and the creation of "clean jobs." The evidence from similar public programs should cause the government to rethink this part of its plan. A 2014 paper published by the Macdonald-Laurier Institute, co-authored by Douglas Auld and Ross McKitrick, examined the cost and benefits of the previous government's biofuels spending. The findings were far from positive. The study estimates that federal initiative cost Canadians between $3.00 and $3.50 for every dollar of social and environmental benefits achieved even after using "very optimistic assumptions about the efficacy of reducing GHG from ethanol blending." The reality is that the program may have *actually* caused an increase in emissions because many ethanol production processes are so energy-intensive relative to conventional gasoline. The evidence of gross inefficiency on a global scale with respect to government mandates for biofuels production is well documented (Auld 2013).

This experience with state-sponsored environmental innovation is hardly unique. Consider, for instance, the problems that have plagued the Ontario government's *Green Energy Act*. The centerpiece of the 2009 plan is a program of subsidized electricity contracts called Feed-in-Tariffs that provide long-term guarantees of above-market rates for power generated by new technologies such as wind turbine farms, solar panel installations, bio-energy plants, and small hydroelectric generators. Research has shown that this policy has had a negligible effect on the environment and imposed high economic costs (McKitrick 2013). These policies have contributed to Ontario's dubious ranking as the jurisdiction with the highest electricity prices in North America and drawn the ire of the provincial Auditor General for their tedious micromanagement and high consumer cost. Her recent report concludes that Ontarians have paid $37 billion above market price for power over the past eight years (CBC News 2015).

These outcomes should not be unexpected. Government possesses no informational or technological advantage over private markets. It is also prone to political impulses – not market ones – dictating financing decisions.[2] The result is the selection of "winners" and "losers" by politicians and bureaucrats with limited investment experience or expertise, and partly through a non-economic lens.

A 2008 study published by the National Bureau of Economic Research examined the performance of virtually all Canadian enterprises financed by both government and private capital between 1996 and 2004 and found that overall companies financed by government-sponsored venture capital performed poorly (Brander, Egan, and Hellmann 2008). These firms were less likely to grow operations and tended to generate significantly lower commercial value than their privately financed counterparts. Companies financed by government were also more likely to go out of business, less likely to attract investment from the United States, and less likely to engage in innovative activity.

What is required is a bottom-up, market-driven technological response to the risks of climate change. This requires a general pro-innovation agenda including competitive taxation, a robust intellectual property regime, a sensible regulatory framework, public investments in human capital, and high-quality infrastructure that includes traditional assets such as roads and bridges and new digital infrastructures such as high-speed research networks. There is no question that government policy must play an important role in creating the conditions for private ingenuity to flourish. But its role should be limited to an enabling function rather than as an active participant in directing resources. That may include providing accelerated depreciation for investments in new, low-carbon technology.

This is not a case of abstraction. There are plenty of real life examples. Consider what has occurred in the technology-driven energy revolution in the United States over the past several years. Market-driven technological innovation such as hydraulic fracturing (often called "fracking") has helped to shift US energy sources toward natural gas and away from more carbon-intensive sources like coal. This has contributed to the fastest rate of reduction in carbon emissions of any major country and to permanent reductions in absolute emissions. The Department of Energy expects that energy-related carbon emissions in the US will remain below 2005 levels for decades in spite of population growth. Notwithstanding the subsidies provided for all fossil fuel exploration and extraction in the US, at least one analysis has concluded their was little direction from government on how to achieve these technological breakthroughs. As the authors write, it happened with "little inducement or guidance from Washington" (Manzi and Wehner 2015).

Yet the climate models fail to account for this type of game-changing innovation. They ignore human agency and the large structural shifts that result from new technologies. The role for government policy therefore is to create the conditions for businesses and individuals to "be much more imaginative than the economic models expect" (Manzi and Wehner 2015).

THE NEW GOVERNMENT'S PLAN

The government inherited a climate change policy from its predecessor that was cautious about economic trade-offs stemming from climate change abatement policies. Its primary response was a limited implementation of a "command and control" or regulatory approach in spite of its high economic cost. It is fair to say that the new approach to curbing greenhouse gas emissions offered by the Liberal Party during the recent federal election represented a significant policy difference.

The new prime minister stated that his government "is making climate change a top priority" (Trudeau 2015a). It loomed large in the Liberal Party's election platform and the new government's first Speech from the Throne. Symbolic steps such as the establishment of the Cabinet Committee on Environment, Climate Change and Energy and the renaming of the Department of the Environment to the Department of the Environment and Climate Change have pointed to the government's heightened emphasis on the file.

Specific details of its climate change plan are still undeveloped but it has provided some broad brushstrokes of its key parameters. The prime minister's speech in Paris, for instance, set out what he described as its five principles.

The first principle is that Canada's climate change policy will reflect the best scientific evidence and advice. The participation of environmental scientists at the prime minister's meeting with the premiers in November was an example of this principle in practice. Incorporating estimates of the long-term economic costs of unchecked climate change into current policy is another.

The second is the government will support carbon pricing as a policy means to curbing greenhouse gas emissions. As discussed, carbon pricing can come in the form of a cap-and-trade model or a more conventional carbon tax and the government has refrained from expressing a preference for a specific policy but it has been unequivocal that in general terms carbon pricing is the best option. This is a clear rejection of the "command and control" and emissions intensity strategy of the previous government.

The third principle is to adopt a federalism approach whereby a national emissions reduction target is set and provinces and territories are responsible for devising their own policies – including carbon pricing – to meet their respective shares of the aggregate target. The federal government would play a coordinating role and provide fiscal transfers to incentivize provincial and territorial action. The purpose of this approach is to allow for decentralized policies that reflect provincial and territorial environmental and economic circumstances and preferences.

The fourth is the government will prioritize climate change as part of its international development agenda. The government has pledged $2.65 billion over five years (more than double relative to the previous government) to help developing countries tackle climate change and the prime minister says that he is prepared to do more as part of his vision for Canada to "take on a new leadership role internationally" (Trudeau 2015a).

The final one is that the government views climate change as a "historic opportunity" (Trudeau 2015a) for change rather than a challenge to be managed. As mentioned above, the prime minister emphasizes the role that innovation will need to play in establishing the basis for "long-term sustainable economic growth" (Trudeau 2015a) and pledged public financing for early adopters of green technologies and firms that are "creating clean jobs" (Liberal Party of Canada 2015).

How these principles translate into a climate change policy is yet to be seen. The government has committed to negotiate the details of a "pan-Canadian framework" at a first ministers meeting, with last week's meeting of environment ministers serving as the opening salvo.

As the federal government prepares to meet the provinces and territories, it should draw on the body of research on the environment/economy trade-offs in the short run and consider what, if any, steps it might take to mitigate the impact of its carbon pricing policy, particularly for low-income Canadians and the sectors disproportionately affected. More fundamentally, though, it needs to think more about its "innovation" agenda and what the proper role is for the government relative to the market and the risks associated with state-directed corporate subsidies.

RECOMMENDATIONS FOR A NEW CLIMATE CHANGE POLICY FOR CANADA

The prime minister has stated that "Canada is back" (Fitz-Morris 2015) and will do its part to fight global climate change. The government has also committed to work with the provinces and territories to establish a pan-Canadian carbon pricing regime and to direct public resources to new clean technologies. In the spirit of contributing to the discussion on this vital public policy issue, we offer five ideas to complement the prime minister's stated principles and help the government inform its policy thinking in advance of meeting with the premiers on this file.

Responding to the expected costs of global warming over the long-term by implementing policies that have an immediate impact on the economy is a classic inter-generational cost-benefit challenge. It requires a thoughtful response independent of decisions made solely within a political time frame. This should not be an excuse for inaction. But it should discourage simplified utterances like "environment and the economy go hand in hand." As MLI managing director, Brian Lee Crowley (2012), writes in the *Hill Times*:

> The key discussion, then, is not about whether climate change is occurring, but how great we think the risk is, and how big the insurance premium is we are willing to pay to mitigate the potential damage. That is a completely different conversation.

Most environmental and economic models suggest that climate change presents a credible risk and the government should consider short-term policy actions to mitigate these risks. This means a clear and transparent assessment of the short-run trade-offs, including an evaluation of the economic costs of different policy options. It is worth noting, for instance, that the academic research finds that the previous government's reliance on regulatory policy may prove to be the most costly option. The government will likely need to establish mechanisms to offset an unacceptable redistribution of wealth and/or income. This is part of the British Columbia carbon tax strategy.

The government sees technological innovation as another of the key principles of its climate change objectives but should re-examine the focus of its policy. The weakness of state-driven innovation has been discussed above. Instead the government should consider policies to enable bottom-up, market-driven technological innovation to mitigate and adapt to the risks posed by climate change. A pro-innovation agenda with respect to climate change is composed of the same basic policies for other sectors. This means a neutral policy framework including competitive taxation, strong intellectual property and a sensible regulatory regime, the enhancement of human capital, and high-quality infrastructure. Our main point here is that government has a key enabling role for the next big idea to address climate change but it will almost certainly be conceived in a university laboratory or a business facility and not a bureaucratic office.

The government has committed to a federalism approach to climate change abatement policy whereby provinces and territories will be responsible for setting their own policy agendas with financial support from Ottawa. This model has conceptual appeal since different provinces and sectors will be inversely affected based on their carbon intensity and it allows for provincial

and territorial governments to adopt policies that are responsive to their respective needs and preferences. But there are real practical limitations to a "patchwork" arrangement across the country. Different climate change policies in general and divergent carbon pricing rates in particular could soon become new interprovincial barriers to trade and commerce and the federal government is thus going to need to think about how to mitigate these challenges. The EcoFiscal Commission has begun asking these questions (Ragan 2016). A carbon pricing regime with federal coordination similar to the harmonized sales tax could conceivably form part of the eventual solution.

If the government ultimately goes the route of a federal price on carbon, it is critical to be clear about the disposition of new tax revenues. A default position should be that any new carbon pricing regime is revenue neutral for businesses or individuals. Otherwise it is hard to argue against the claim that is not just a tax grab for a fiscally-strapped government (Cameron and Szacki 2015). Policy analysis published by the MLI has already found that even a revenue-neutral carbon tax could impose costs on businesses and their workers so any carbon pricing regime will need to be carefully designed not to cause regional or income inequities that will be rejected by Canadians. A smart "tax swap", as it is sometimes called, would focus on improving the competitiveness of the federal personal income tax system and reinforcing existing strengths with respect to corporate taxation. It would not direct new revenue into state-directed corporate investments for the reasons set out elsewhere. An argument can be made to allocate a portion of the new tax revenue to fund capital investment incentives for new, low-carbon technology. A portion of the new revenue may also need to be earmarked to address the regional or income inequality issue.

The final point is that any climate change policy should rely upon trial and error and a general humbleness rather than sweeping and costly reform. If there were ever an issue that is not well-suited for simplistic solutions, it is this one. Government policy should neither be dismissive of climate change nor reckless in its response to the risk that it poses. It should accept the risk of man-made climate change but reject utopian and unworkable schemes to stop it. Instead we should concentrate scarce resources where they would maximize human well-being, including technologies and infrastructure that will allow Canada to adapt to uncertain climate conditions in the future.

CONCLUSION

The long-term impacts of climate change on ocean levels, forestry, food production, rainfall, and freshwater resources, for instance, are expressed in likelihoods and ranges, and based on assumptions that are always changing. The farther we gaze into the future, the greater the uncertainty with respect to the global implications of a warmer climate. We can only speculate about future technologies that may mitigate these risks.

The new government is committed to crafting a more ambitious federal policy than its predecessor's with respect to climate change. Its spokespeople have frequently said that a strong climate change policy can have economic upsides and that we should *not* see the environment and the economy as competing policy issues.

The purpose of this essay is not to discourage the government from prioritizing climate change as a top file on its policy agenda. Climate change represents a long-term risk and the government should be lauded for making it a policy priority now. But it is important to understand that climate change is a complex question for which the best answer is neither a "regulatory Rube Goldberg machine" (Manzi and Wehner 2015) nor an ill-conceived carbon pricing regime that punishes certain regions or sectors, or becomes a tax grab for the government. There are no simple solutions; only sensible choices.

The appropriate answer is a level-headed solution that assesses the risks and trade-offs and creates the conditions for the type of technological innovation that prepares us for nature's dynamic evolution. This would represent big thinking and evidence that Canada is indeed back, as the prime minister has promised the world.

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ENDNOTES

1 Any reference to carbon, carbon dioxide, or carbon emissions in this report refers to the five major gases that contribute to global warming expressed in terms of tons of carbon dioxide. Those gases are carbon dioxide, methane, nitrous oxide, CFC-11, and CFC-12.

2 For analysis of incorrect information related to carbon policies, see Auld, Douglas, 2015, "Emissions Intensity and Choice of Policy Instrument with Asymmetric Information and Growth."

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