

# Climate

## Canadian Policies for Deep Greenhouse Gas Reductions

Mark Jaccard and Nic Rivers

**Comments:**

**“Slowing, Then Reducing, Greenhouse Gas Emissions Is Important but Will Not Be Easy”**

Christopher Green

**“Time to Actually Begin”**

James Meadowcroft


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### EXECUTIVE SUMMARY

Mark Jaccard and Nic Rivers confront a defining issue of public policy for the twenty-first century: reducing emissions of the greenhouse gases (GHGs) that contribute to global climate change. In the authors' assessment, “The only hope for substantially reducing GHG emissions in a market economy is to ensure that the atmosphere can no longer be treated as a free waste receptacle.”

Jaccard and Rivers analyze a scenario in which Canada reduces its domestic GHG emissions by about 60 percent from current levels by 2050. Their policy suite, which consists of a carbon management standard, a vehicle emission standard and reinforced building and appliance standards, is designed to harness the power of market incentives to encourage carbon capture and sequestration, development of new low-emission technologies and switching from high- to low-carbon fuels.

The commentators generally concurred that the policy proposals put forth by Jaccard and Rivers would be effective in accomplishing their goals, but raised some specific concerns about how they would be administered and implemented.



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## SCOPE OF THE CHALLENGE

Global average temperatures are expected to increase by between 2 and 6 degrees Celsius over the coming century. Rising temperatures will continue to increase the rate of evaporation and precipitation, reducing water availability in many areas already facing potable water shortages. Melting glaciers and the thermal expansion of seawater are expected to gradually raise sea levels and potentially damage cities, infrastructure and populations worldwide. Rapid changes in temperature are also expected to significantly affect biological diversity and distribution, with as many as 20 to 50 percent of all species potentially facing extinction.

Canada is not immune to the direct impacts of climate change. Temperature change is likely to be most significant at the earth's poles, which are predicted to warm at about double the average rate. This will have dramatic effects on natural systems and on the human inhabitants of Canada's North. Higher temperatures in urban areas could exacerbate smog, and some pests, like the mountain pine beetle, could become endemic.

Stabilizing climate change is a truly daunting, long-term energy technology challenge. Because such large quantities of GHGs have already been released, the planet will be subjected to significant climate warming over the coming century absent technological advances to extract GHGs from the atmosphere. Jaccard and Rivers state that to stabilize at 550 parts per million — roughly double the earth's pre-industrial concentration, and at the upper end of what most scientists consider acceptable — global GHG emissions would have to peak by 2020 to 2030 and decline quickly thereafter.

Politically, Canada is in a difficult situation in that jurisdiction over environmental problems is ambiguously divided between the provinces and the federal government. As an export-driven economy, Canada also faces pressure from business not to adopt environmental regulations that will place its companies at a competitive disadvantage compared with foreign producers.

Finally, climate change is the ultimate public-good problem. While costs of climate change abatement are borne today by whatever party undertakes an action, most benefits of abatement are far in the future and would be spread throughout the entire world. Despite the challenges of global collective action, the authors assert that industrialized countries such as Canada must take decisive measures now; otherwise, it will be impossible to convince large developing-country emitters like China to do so.

## OPTIONS FOR ADDRESSING THE CHALLENGE

To date, Canada's GHG policy approach has been dominated by voluntarism and subsidies. The authors and commentators agree that these policy tools, while politically attractive and administratively feasible, are largely ineffective at achieving the long-term GHG reductions necessary to combat climate change. Voluntary programs allow individual companies and consumers to determine their own level of environmental effort, and cast government in the role of information provider, facilitator, role model and award giver. Subsidies — such as rebates for the purchase of hybrid cars and grants and tax credits for low-GHG technology development — have more ability to change behaviour than moral suasion. However, the authors conclude that the subsidies needed simply to stabilize GHG emissions are not within the fiscal means of governments. More importantly, because many subsidy recipients would have undertaken the desired action in the absence of the subsidy, such programs can prove to be much more expensive than anticipated.

Command-and-control regulations, common in the 1970s and still in use today, are detailed technology or performance standards imposed on specific emitters. Regulatory instruments are effective at meeting set objectives because of strict enforcement through financial or legal penalties; however, they do not fare as well when it comes to economic efficiency. Emitters must adopt the same technologies and practices, despite having

widely different costs of compliance. Furthermore, technology standards discourage the development of newer, and possibly lower-cost, ways to reduce emissions.

Market-oriented regulations allow individual actors to decide whether to take action to meet the standard or pay others to do so. The familiar “cap and trade” emission standard places a global cap on emissions and distributes permits to firms, giving them the “right” to produce a certain amount of emissions. Companies whose emissions risk exceeding their allocation of permits can choose either to reduce their own emissions or to buy additional permits from another company that has a surplus. This built-in market mechanism encourages emission reductions by those firms that can do it at the lowest cost. The authors conclude that such market-oriented regulations are generally superior to command-and-control regulations in terms of effectiveness and efficiency.

Finally, a GHG tax, which requires emitters to pay a fixed fee per unit of GHG emitted, has the advantage of allowing emissions to rise if abatement costs are higher than expected. By the same token, a given level of GHG tax cannot guarantee a specific emission target, and so it would likely be necessary to adjust the rate in order to meet a set target. GHG taxes also raise government revenue, which can be used to reduce other taxes or fund other environmental initiatives.

Jaccard and Rivers conclude that the most effective and efficient policies are those that prohibit or financially penalize technologies and activities that emit GHGs. They note that there is virtual unanimity among environmental economists that a GHG tax is the lowest-cost and most effective way to reduce emissions, and emphasize that, while this is their preferred policy, if political will is lacking, then other things must be done.

### THREE PREFERRED POLICIES

#### *A carbon management standard for fossil fuel producers and importers — obligation and certificate trading*

The centrepiece of the authors’ proposal is a market-oriented regulation that would require fossil fuel producers and importers to certify that a growing fraction of the carbon in the fuel they sell does not reach the atmosphere. Firms that

### THREE POLICY PROPOSALS TO ADDRESS THE CLIMATE CHANGE CHALLENGE

- ▼ **Carbon management standard.** Fossil fuel producers and importers must certify that a growing proportion of the carbon they extract from the earth’s crust does not reach the atmosphere. This proportion would rise from 6 percent in 2011-15 to 56 percent in 2046-50.
- ▼ **Zero-emission vehicle standard.** Vehicle manufacturers must sell a minimum number of zero-emission vehicles as a percent of total vehicle sales. This market share would rise from 1 percent in 2015 to 80 percent in 2050.
- ▼ **Strengthened building codes and appliance standards.** While some building codes and standards are relatively strong, there is much room for improvement, and Jaccard and Rivers propose focusing on GHG emissions of new buildings as well as reinforced standards for appliances such as washing machines, dishwashers and commercial lighting.

are unable to meet the standard must either buy certificates from other firms that exceed the standard or face stiff financial penalties. This proposal differs from conventional cap-and-trade systems, which issue permits to emit a given amount of greenhouse gases, and then let firms trade the permits among themselves according to their individual emission patterns. Jaccard and Rivers point out that the carbon management standard avoids the politically thorny problem of how to allocate the permits initially. But the commentators had some reservations about the proposal. Christopher Green expressed some concern about the ability of government authorities to hold upstream producers of fossil fuels responsible for their final use by downstream users. James Meadowcroft was concerned that the proposal has never been tried before and would be difficult to coordinate with cap-and-trade systems prevalent in other countries.

#### *A zero-emission vehicle standard for vehicle manufacturers*

Jaccard and Rivers’ second proposal would require vehicle manufacturers and importers to sell a minimum number of zero-emission vehicles (ZEVs) by a target date as a percentage

of total vehicle sales. The minimum market share of ZEVs would rise over time and a per-vehicle penalty would be charged to manufacturers that do not sell the required number of zero-emission vehicles; however, manufacturers could trade among themselves to meet the overall target. Both commentators expressed some reservation about the proposal, noting that “zero-emission vehicles” could be a misnomer if one considers the life-cycle analysis: electric cars, for example, require recharging, which would increase emissions if the power were generated by fossil fuels. Green further suggests that strengthening existing fuel efficiency standards could achieve at a lower cost much of what Jaccard and Rivers hope to accomplish with their ZEV proposal.

### *Reinforcement of building codes and equipment and appliance standards*

The third proposal calls for stricter environmental performance standards for new buildings, equipment and appliances, and both commentators were essentially unqualified in their support of these measures. The authors note that the most cost-effective way to lower greenhouse gas emissions in the building stock is by means of design and construction, which strongly influence energy use over the life of the building. Standards would both eliminate the least energy-efficient new buildings and encourage retrofitting across the existing stock.



**While politically attractive and administratively feasible, moral suasion and green subsidies are ineffective for reducing greenhouse gas emissions.**

## CONCLUSION

If their policy package were implemented, Jaccard and Rivers estimate that GHG emissions would drop to 357 million tonnes of CO<sub>2</sub> equivalent in 2050 — 50 percent below today’s levels and 70 percent below the do-nothing scenario. The large bulk of this reduction would be due to carbon capture and storage (driven primarily by the carbon management standard) and switching to alternative fuels with lower carbon content (driven primarily by the vehicle emission standard). Reductions due to improved efficiency are small in relative terms, but still amount to an estimated 50-million-tonne reduction by 2050. In his comments, Green made the case that these estimates are based on overly optimistic assumptions about the development of low-carbon technologies. While not disagreeing with the policy directions, he felt that the actual emission reductions would be significantly less.

## THE CANADIAN PRIORITIES AGENDA

The IRPP’s Canadian Priorities Agenda project is designed to initiate a broad-based and informed public debate on policy choices and priorities for Canada over the medium term. Research papers by some of Canada’s foremost scholars examine the most effective ways to address the following eight broad policy challenges:

- Human capital
- Climate change
- Natural capital
- Population aging
- Economic security
- Health outcomes
- Productivity
- Trade and globalization

Based on the results of this research, six judges, among Canada’s top policy thinkers, each crafted from the eight papers a policy package of the specific recommendations that in his or her view will best enhance the economic and social well-being of Canadians.