Court of Appeal File No.: C65807

COURT OF APPEAL FOR ONTARIO

IN THE MATTER OF A REFERENCE to the Court of Appeal pursuant to section 8 of the *Courts of Justice Act*, RSO 1990, c. C.34, by Order-in-Council 1014/2018 respecting the constitutionality of the *Greenhouse Gas Pollution Pricing Act*, Part 5 of the *Budget Implementation Act, 2018, No. 1,* SC 2018, c. 12

RECORD OF THE INTERVENOR CANADA'S ECOFISCAL COMMISSION

Stewart Elgie, LSM
Barrister & Solicitor
LSO No. 38777P
Faculty of Law, University of Ottawa
57 Louis Pasteur St.
Ottawa, ON K1N 6N5
T. 613-562-5800 1290, ext 1270
Stewart.elgie@uottawa.ca

Counsel for Canada's Ecofiscal Commission

TO: **Attorney General of Ontario**
Constitutional Law Branch
720 Bay Street, 4th Floor
Toronto, ON M7A 2S9

Joshua Hunter / Andrea Bolieiro / Padraic Ryan
Tel: 416-326-3840 / 416-326-0131 /416-326-6287
Fax: 416-326-3840
Email: joshua.hunter@ontario.ca
andrea.bolieiro@ontario.ca
padraic.ryan@ontario.ca
Counsel for the Attorney General of Ontario

AND TO: **Attorney General of Canada**
Department of Justice Canada
Prairie Region Office
301 – 310 Broadway
Winnipeg, MB R3C 0S6

Sharlene Telles-Langdon
Tel: 204-983-0862
Fax: 204-984-8495
Email: sharlene.telles-langdon@justice.gc.ca
Counsel for the Attorney General of Canada

AND TO:

ATTORNEY GENERAL OF SASKATCHEWAN
Ministry of Justice (Saskatchewan)
Constitutional Law Branch
820-1874 Scarth St,
Regina, SK, S4P 4B3
Per: **P. Mitch McAdam, QC, and Alan Jacobson**
Phone: 306-787-7846
Fax: 306-787-9111
Email: mitch.mcadam@gov.sk.ca
Counsel for the Attorney General of Saskatchewan

AND TO:

ATTORNEY GENERAL OF NEW BRUNSWICK
Office of the Attorney General
Legal Services
PO Box 6000, 675 King Street, Suite 2078
Fredericton, NB E3B 5H1
Per: **William E. Gould, Isabel Lavoie Daigle, and Rachelle Standing**
Phone: 506-453-2222
Fax: 506-453-3275
Email: William.Gould@gnb.ca
Isabel.LavoieDaigle@gnb.ca
Rachelle.Standing@gnb.ca
Counsel for the Attorney General of New Brunswick

AND TO:

ATTORNEY GENERAL OF BRITISH COLUMBIA
British Columbia Ministry of Attorney General
Legal Services Branch
6th Floor - 1001 Douglas Street
Victoria, BC V8W 2C5
Per: **J. Gareth Morley**
Phone: 250-952-7644
Fax: 250-356-9154
Email: Gareth.Morley@gov.bc.ca
Counsel for the Attorney General of British Columbia

Goddard Nasseri LLP
55 University Avenue, Suite 1100
Toronto, ON M5J 2H7
Per: **Justin H. Nasseri**
LSO No.: 64173W
Phone: 647-351-7944
Fax: 647-846-7733
Email: justin@gnllp.ca
Toronto Agent for the Attorney General of British Columbia

AND TO:

ASSEMBLY OF FIRST NATIONS
55 Metcalfe Street, Suite 1600
Ottawa, ON K1P 6L5
Per: **Stuart Wuttke and Adam Williamson**
Phone: 613-241-6789
Fax: 613-241-5808
Email: swuttke@afn.ca
awilliamson@afn.ca
Counsel for Assembly of First Nations

AND TO:

ATHABASCA CHIPEWYAN FIRST NATION
Ecojustice Environmental Law Clinic
at the University of Ottawa
216 – 1 Stewart Street
Ottawa, ON K1N 6N5
Per: **Amir Attaran**
Phone: 613-562-5800 ext. 3382
Fax: 613-562-5319
Email: aattaran@ecojustice.ca

Woodward & Company Lawyers LLP
200 – 1022 Government Street
Victoria, BC V8W 1X7
Per: **Matt Hulse**
Phone: 250-383-2356
Fax: 250-380-6560
Email:
mhulse@woodwardandcompany.com
Counsel for the Athabasca Chipewyan First Nation

AND TO:

CANADIAN ENVIRONMENTAL LAW ASSOCIATION, ENVIRONMENTAL DEFENCE CANADA INC. and the SISTERS OF PROVIDENCE OF ST. VINCENT DE PAUL
Canadian Environmental Law Association
1500 – 55 University Avenue
Toronto, ON M5J 2H7
Per: **Joseph Castrilli and Richard Lindgren**
Phone: 416-960-2284 ex 7218
Fax: 416-960-9392
Email: castrillij@sympatico.ca
rlindgren@sympatico.ca
Counsel for Canadian Environmental Law Association, Environmental Defence Canada Inc., and the Sisters of Providence of St. Vincent de Paul

AND TO:

CANADIAN PUBLIC HEALTH ASSOCIATION
Gowling WLG (Canada) LLP
1 First Canadian Place
100 King Street West, Suite 1600
Toronto, ON M5X 1G5
Per: **Jennifer King, Michael Finley, and Liane Langstaff**
Phone: 416-862-7525
Fax: 416-862-7661
Email: jennifer.king@gowlingwlg.com
michael.finley@gowlingwlg.com
liane.langstaff@gowlingwlg.com
Counsel for Canadian Public Health Association

AND TO:

CANADIAN TAXPAYERS FEDERATION
Crease Harman LLP
Barristers and Solicitors
800 – 1070 Douglas Street
Victoria, BC V8W 2C4
Per: **R. Bruce E. Hallsor, Q.C.**
Phone: 250-388-5421
Fax: 250-388-4294
Email: bhallsor@crease.com
Counsel for Canadian Taxpayers Federation

AND TO:

DAVID SUZUKI FOUNDATION
Ecojustice Environmental Law Clinic
at the University of Ottawa
216 – 1 Stewart Street
Ottawa, ON K1N 6N5
Per: **Joshua Ginsberg and Randy Christensen**
Phone: 613-562-5800 ext. 3399
Fax: 613-562-5319
Email: jginsberg@ecojustice.ca
rchristensen@ecojustice.ca
Counsel for David Suzuki Foundation

AND TO:

ÉQUITERRE / CENTRE QUÉBÉCOIS DU DROIT DE L'ENVIRONNEMENT
Michel Bélanger Avocats inc.
454, avenue Laurier Est
Montréal (Québec) H2J 1E7
Per: **Marc Bishai and David Robitaille**
Phone: 514-844-4646
Facsimile: 514-844-7009
Email: marc.bishai@gmail.com
david.robitaille@uottawa.ca
Counsel for Équiterre / Centre québécois du droit de l'environnement (CQDE)

AND TO:

INTERGENERATIONAL CLIMATE COALITION
Ratcliff & Company LLP
500 – 221 West Esplanade
North Vancouver, BC V7M 3J3
Per: **Nathan Hume and Emma K. Hume**
Phone: 604-988-5201
Fax: 604-988-1352
Email: nhume@ratcliff.com
ehume@ratcliff.com
Counsel for the Intergenerational Climate Coalition

AND TO:

INTERNATIONAL EMISSIONS TRADING ASSOCIATION
DeMarco Allan LLP
333 Bay Street, Suite 625
Toronto, ON M5H 2R2
Per: **Lisa DeMarco and Jonathan McGillivray**
Phone: 647-991-1190
Fax: 1-888-734-9459
Email: lisa@demarcoallan.com
jonathan@demarcoallan.com
Counsel for the International Emissions Trading Association

AND TO:

UNITED CHIEFS AND COUNCILS OF MNIDOO MNISING
Faculty of Law, University of Ottawa
57 Louis Pasteur St.
Ottawa, ON K1N 6N5
Per: **Nathalie Chalifour**
LSO No. 37766O
Phone: 613-562-5800, ext 3331
Fax: 613-564-5124
Email: nathalie.chalifour@uottawa.ca

Westaway Law Group
55 Murray Street, Suite 230
Ottawa, ON K1N 5M3
Per: **Cynthia Westaway**
LSO No. 37698V
Phone: 613-722-9091
Fax: 613-722-9097
Email: cynthia@westawaylaw.ca
Counsel for United Chiefs and Councils of Mnidoo Mnising

AND TO:

UNITED CONSERVATIVE ASSOCIATION
McLennan Ross LLP
600 McLennan Ross Building
12220 Stony Plain Road
Edmonton, AB T5N 3Y4
Per: **Steven Dollansky and Ryan Martin**
Phone: 780-492-9135
Fax: 780-733-9707
Email: sdollansky@mross.com
rmartin@mross.com
Counsel for United Conservative Association

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COURT OF APPEAL FOR ONTARIO

IN THE MATTER OF A REFERENCE to the Court of Appeal pursuant to section 8 of the *Courts of Justice Act*, RSO 1990, c. C.34, by Order-in-Council 1014/2018 respecting the constitutionality of the *Greenhouse Gas Pollution Pricing Act*, Part 5 of the *Budget Implementation Act, 2018, No. 1,* SC 2018, c. 12

AFFIDAVIT OF CHRISTOPHER RAGAN
On behalf of Canada's Ecofiscal Commission

I, CHRISTOPHER RAGAN, residing in the City of Beaconsfield in the Province of Quebec, DO SOLEMNLY AFFIRM that:

1. I am the Chair of Canada's Ecofiscal Commission, and am authorized to swear this Affidavit in support of the Ecofiscal Commission's motion for leave to intervene in this proceeding.

2. I am employed as an Associate Professor in the Department of Economics, and Director of the Max Bell School of Public Policy at McGill University. I received a Ph.D. in Economics from the Massachusetts Institute of Technology in 1990. I have published on a range of economics subjects, particularly macroeconomics and fiscal policy. I have held a variety of positions with economics associations. In addition, I was Special Advisor to the Governor of the Bank of Canada from 2004-2005, the Clifford Clark Visiting Economist with Finance Canada from 2009-2010, and a member of the Federal Advisory Council on Economic Growth from 2016-2018. I am also the author of *Economics*, the most widely-used textbook for teaching introductory economics in Canada, now in its 15th edition.

3. I have personal knowledge of the matters to which I depose in this Affidavit, except where otherwise indicated, in which case I verily believe such information to be true.

4. Canada's Ecofiscal Commission seeks to intervene in this appeal for two main reasons: first, because its research and reports have played a substantial role in informing the discussion and development of carbon pricing laws across Canada, and it wishes to contribute its expertise to these proceedings; and second, because it believes it is important that Canada have climate

change laws that are environmentally effective and economically efficient, and important that both the federal and provincial governments have authority to enact such laws, and work in a coordinated manner, to achieve the most cost-effective outcome for Canadians. The Commission was granted leave to intervene in the parallel reference case currently before the Saskatchewan Court of Appeal.

5. Canada's Ecofiscal Commission ("CEC" or "Ecofiscal Commission") is based at McGill University. The CEC was established in 2014, with the support of a number of Canadian foundations and donors. It is an independent, non-partisan research organization, whose mission is

> To identify and promote practical fiscal solutions for Canada that spark the innovation required for increased economic and environmental prosperity.

The Ecofiscal Commission achieves this mission by conducting research, producing reports, and engaging in public education and outreach activities. More information may be found at: www.ecofiscal.ca

6. The origins and purpose of the CEC are described on its website as follows:

> Canada's Ecofiscal Commission was formed by a group of experienced, policy-minded economists from across the country, seeking to broaden the discussion of ecofiscal policy reform beyond the academic sphere and into the realm of practical policy application. The Ecofiscal Commission and its Commissioners are fully independent and aim to inform the public and policy-makers across the political spectrum, at all levels of government.

7. The Ecofiscal Commission includes 13 commissioners and 16 advisory board members. Their names and biographies are attached as Exhibit 1 to this affidavit.

8. The CEC's commissioners include some of Canada's most respected economics experts, including:

- Professor Richard Lipsey, O.C., one of Canada's most distinguished economists, and winner of the Gold Medal for achievement in research from the Social Sciences and Humanities Research Council of Canada in 2005, Canada's highest research honour.
- Don Drummond, formerly Chief Economist at TD Bank, and now a senior fellow at Queens University
- Elizabeth Beale, formerly President of the Atlantic Provinces Economic Council, now retired

- Professor Bev Dalby, Director of the Tax and Economic Growth program, in the School of Public Policy, University of Calgary, who has been a member of federal and provincial commissions on tax and competitiveness.
- Glen Hodgson, formerly Chief Economist at the Conference Board of Canada, and now a senior fellow with the Conference Board and the C.D. Howe Institute.

9. The CEC's advisory board consists of prominent Canadians from across the political spectrum, along with industry and environmental leaders.

10. The CEC's work is supported by a secretariat, made up mainly of economic researchers, along with communications and support staff.

11. The CEC's research and education activities focus on 'ecofiscal' policies. These are more commonly known as 'market-based' policy instruments – such as emission trading or pollution pricing – used to achieve environmental objectives at lowest economic cost.

12. The Commission has produced 14 reports to date, analyzing the potential application of market-based instruments to address different environmental problems. All are supported by economic analysis, and often modeling, and include implications for policy-makers. Each of the CEC's major reports is authored by the Commissioners and undergoes peer review by independent, outside experts.

13. The CEC's first report, attached as Exhibit 2 to this affidavit, synthesizes a substantial body of research and experience showing that market-based policy instruments have several important advantages compared to traditional, 'prescriptive' regulations. First and foremost, they are generally the lowest cost way to achieve an environmental objective. Second, they allow each businesses and household to decide for itself what the most cost effective way is to reduce their environmental impacts. Third, they encourage innovation, by providing an economic reward for reducing environmental impacts. In short, market-based environmental policies are cost-effective, maximize flexibility, and encourage innovation, compared to traditional, 'prescriptive' regulations.

14. The CEC's second report, *The Way Forward*, examined price-based approaches to address climate change. It is attached as Exhibit 3 to this affidavit, and is part of the Attorney-General of Canada's Record in the parallel reference case currently before the Saskatchewan Court of Appeal. The report was awarded the 2016 Doug Purvis memorial prize by the Canadian Economics Association. This award is "widely recognized in the economics profession as the premier academic award for Canadian economic policy contributions," in the words of the Association.

15. This report first reviews the evidence about the very significant *economic costs* that are predicted if we do not effectively mitigate climate change, in the range of 4% of global GDP by 2100. This includes a range of projected economic impacts to Canada, including: increases in extreme weather; changes in water levels, affecting shipping, hydroelectricity and coastal communities; impacts to many industries, including forestry, agriculture, fishing and mining; and particularly severe impacts to Canada's North, where climate change is greatest.

16. The report then reviews the three main *types of policy approaches* governments can use to reduce greenhouse gas (GHG) emissions: conventional 'prescriptive' regulations, subsidies, and ecofiscal policies. It reviews the evidence about the effectiveness of each approach, and explains the advantages of carbon pricing, at pages 9-10:

> The growing prominence of [carbon pricing] policies reflects a practicality that is well known in the economics literature. Economists have long recognized that market-based policies can be used successfully to reduce pollution—including the emission of GHGs—at the lowest possible cost. [emphasis added]

It continues:

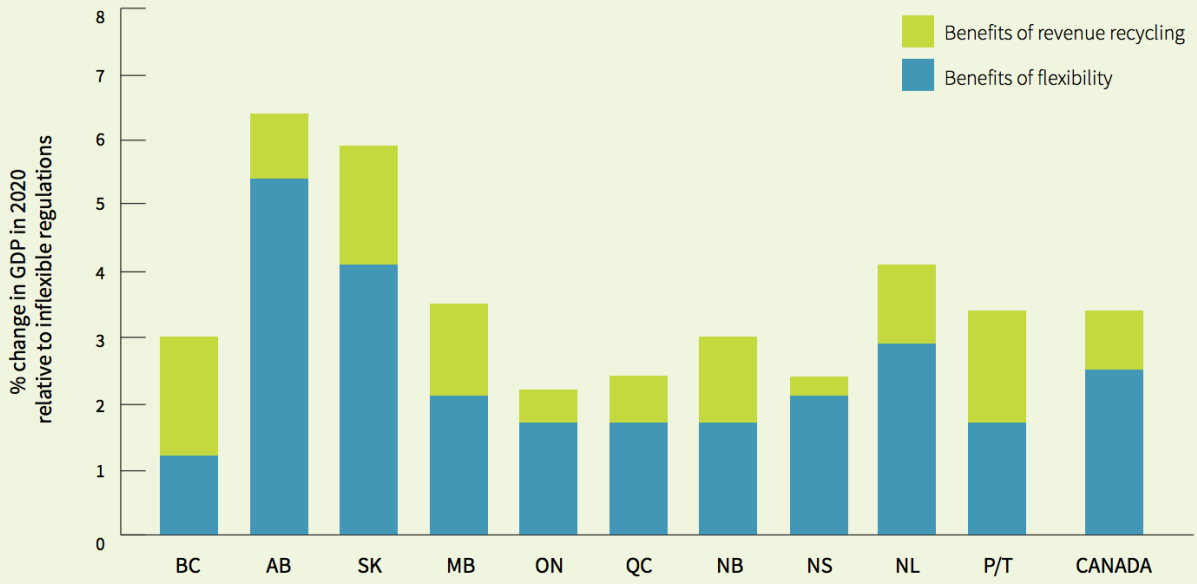
> Three main factors underpin this advantage. Because carbon pricing relies on the market, emitters have flexibility in how they reduce emissions, based on their unique costs of abatement. Carbon-pricing policies also generate revenue that can be used to achieve other economic and environmental objectives [such as reducing taxes on labour or capital, or supporting the development of environmental technology]. Finally, carbon-pricing policies create stronger incentives for innovation than do regulatory approaches; when carbon has a price, there is always value to be gained through innovations that reduce emissions. [emphasis added]

It concludes: "Real-world policy experience also suggests that carbon pricing is quite effective at reducing GHG emissions without negatively affecting the economy." [emphasis added]

17. The report includes an in-depth *economic modeling analysis* comparing the use of price-based approaches with conventional regulations to reduce GHGs – specifically, to achieve the 2020 GHG reduction targets set by each province and territory. The analysis shows that use of price-based policies would achieve Canada-wide GHG reduction targets at 2.5% less cost to GDP than using conventional, inflexible regulations. Further, when the revenues from carbon-pricing are re-invested to reduce taxes, the benefit increases: price-based policies achieve Canada-wide GHG reduction targets at 3.4% less cost to GDP than using conventional, inflexible regulations. In dollar terms, 3.4% of GDP (using Canada's 2017 GDP level) is equal to cost savings of about $70 billion. This is a *permanent* impact on the Canadian economy; by comparison, the global financial crisis of 2008-09 led to a recession in Canada of roughly 2.8% of GDP which lasted for less than two years.

18. These modeling results from this Ecofiscal report, at page 28, are illustrated in the figure below. In the figure, the term "policy flexibility" refers to the use of carbon pricing, as opposed to inflexible regulations.

FIGURE 8: Benefits of Policy Flexibility and Revenue Recycling



The figure shows the economic benefits of policy flexibility (blue) and of revenue recycling (green) relative to inflexible regulations. Revenue recycling can generate benefits for all provinces; for Canada as a whole, it can improve an already-flexible policy by 0.9% of GDP.

Source: Ecofiscal Commission modelling.

19. The report discusses the roles of federal and provincial governments in pricing carbon. At the time, in 2015, three provinces were already pricing carbon: British Columbia, Alberta, and Quebec. The report identified several practical advantages of provinces taking a lead role in pricing carbon: first, it avoids the difficult question of relative burden-sharing among provinces; second, it ensures that revenues generated in each province stay in that province (a federal pricing system also could be designed to achieve that), and can be used to minimize any impacts that may arise from the carbon price, or address provincial priorities; third, it enables the pricing system to be customized to a province's particular circumstances, such as the structure and size of its economy; and fourth, it allows for different types of pricing approaches – such as direct pricing or cap & trade -- which will enable the policy innovation and learning that comes from experimentation.

20. The report also identifies important roles for the federal government, such as ensuring compliance with international treaties, and playing a role in ensuring coordinated, effective,

Canada-wide pricing policies – including setting minimum standards for carbon pricing across Canada as needed. It is important that carbon pricing be broadly applied across all sectors and regions, otherwise some sectors or regions will have to carry a disproportionate share of the burden in meeting Canada's targets, and the overall cost to Canada will be greater.

21. In short, the Commission's research led it to conclude that the optimal outcome for Canada, from an economic and policy perspective, would be a coordinated, Canada-wide system that allowed provinces flexibility about how to price carbon and use the revenues, but with an effective, minimum carbon price across Canada -- to ensure Canada meets its GHG targets as cost-effectively as possible and also promotes the innovation that is central to our long-run economic prospects. The *Greenhouse Gas Pollution Pricing Act* achieves this outcome, which is why the Commission supports it.

22. Following *The Way Forward* report, the Commission released a shorter report entitled *The Way Forward for Ontario: Design Principles for Ontario's New Cap-and-Trade System*. This is the only province-specific report the CEC has released. The report is attached as Exhibit 4 to this affidavit. It examines Ontario's specific economic and emissions situation, and makes a series of recommendations for designing its cap and trade system to promote cost-effectiveness and address competitiveness and equity concerns. Many of our recommendations were incorporated into the system's ultimate design.

23. After these two initial carbon reports, the Commission has released six more research reports on different aspects of carbon pricing, including:

- Provincial Carbon Pricing and Competitiveness Pressures
- Provincial Carbon Pricing and Household Fairness
- Choose Wisely: Options and trade-offs in recycling carbon pricing revenues
- Comparing Stringency of Carbon Pricing Policies
- Supporting Carbon Pricing: How to identify policies that genuinely complement an economy-wide carbon price
- Clearing the Air: How carbon pricing helps Canada fight climate change

24. The Commission's most recent report on carbon pricing, *Clearing the Air*, is meant as a plain language summary of the evidence on key questions about carbon pricing. It includes a summary of the effects of three major carbon pricing systems around the world, at pages 6-10. For example, B.C.'s carbon tax was introduced in 2008, and economic analysis shows that (a) BC's annual GHG emissions are between 5% and 15% lower than they would be without the tax, and (b) the carbon tax has had only a very small impact, if any, on the BC economy – which has outperformed the rest of Canada's since 2008 in GDP growth. The report documents similar experiences from California's system (cap & trade) and the UK's system (hybrid tax and cap &

trade) – significant GHG emissions reductions and no evidence of harm to economic growth. This report is attached as Exhibit 5 to this affidavit, and is part of the Attorney-General of Canada's Record in the parallel reference case before the Saskatchewan Court of Appeal.

25. The Commission has also put out research reports on the use of ecofiscal policies to address a number of other issues: road congestion, biofuels, water conservation and infrastructure, waste management, and the risk of environmental disasters.

26. In addition to producing research reports, the other part of the Ecofiscal Commission's mandate is *education and outreach*. The CEC seeks to promote broader understanding and discussion of ecofiscal policies beyond the academic sphere, to raise awareness and inform policy-making.

27. The CEC carries out its education function using a variety of tools, including: invited briefings and presentations with governments or other stakeholders, public presentations, Ecofiscal events (such as panel discussions with high level audiences), and teaching specialized courses (usually to public officials). The table below shows the CEC's different types of education and outreach activities since November 2014, to the best of my knowledge.

			Total (Nov 2014-2018)
Briefings and Presentations			***138***
	Government		**92**
		Federal	**36**
		Provincial	**56**
		BC	**10**
		AB	**6**
		SK	**8**
		MB	**3**
		ON	**13**
		QC	**6**
		NB	**0**
		NS	**5**
		PEI	**0**
		NL	**2**
		YK	**1**
		NWT	**2**
		NU	**0**
	Business		**46**
Public Presentations			***186***
Ecofiscal Public Events			***41***
Teaching – Eco-fiscal Courses			***7***

28. As indicated above, the Commission is frequently invited to give briefings or presentations to governments (over 60% to *provincial* governments) that are interested in carbon pricing or market-based environmental policies. The province in which we have held the greatest number of such events (13) is Ontario**.** These sessions include everything from appearing before legislative committees, to expert briefings and consultations with senior officials or ministers and other stakeholders. For example, we convened workshops in both Alberta and Manitoba, at the request of their governments, to facilitate informed discussion on the design and development of their provincial carbon pricing systems.

29. In addition to these events, the Ecofiscal Commission seeks to achieve its educational objective using social and traditional media, to reach broader audiences. For example, since November 2014, there have been 128,875 users and 656,759 pageviews of Ecofiscal's web site and reports, to the best of my knowledge. In that time, Ecofiscal Commissioners and staff have published 372 op eds and blogs, and have appeared in 5,912 media stories, mainly on issues relating to our reports, to the best of my knowledge.

30. The work of the Ecofiscal Commission – its research reports, education and outreach activities – is motivated by a strong desire to help improve the well-being of Canadians, which lies at the core of economics. In particular, it is driven by a desire to promote broader understanding of something that economists have long known, but often communicated poorly: that market-based policies, such as pollution pricing, can achieve environmental objectives at much lower cost to the economy than the conventional regulatory tools that governments normally use.

31. The Ecofiscal Commission prides itself in being a source of independent, non-partisan, economic expertise, to inform federal, provincial and municipal governments across Canada. After significant discussion among its Commissioners and Advisory Council, we decided to seek leave to intervene in this case on the belief that the substantial body of economic research and policy analysis we have produced on carbon pricing may help to inform these important judicial proceedings. While the issue in this case is federal authority to price carbon – which we strongly support – the Commission would be equally vigilant in seeking to intervene in support of provincial authority to price carbon, were it challenged.

SWORN/AFFIRMED BEFORE ME at the)
City of Montreal in the Province of Quebec,)
this 18 day of Decemberr, 2018)

Christopher Ragan

AH of nay # 1940775

A COMMISSIONER FOR OATHS IN
AND FOR THE PROVINCE OF QUEBEC

TAB A

This is Exhibit 1 referred to in the affidavit of Christopher Ragan, sworn before me this 18 day of December, 2018, in the City of Montreal in the Province of Quebec

, A Harvey # 1940775

A COMMISSIONER FOR OATHS IN
AND FOR THE PROVINCE OF QUEBEC

The People Behind The Ecofiscal Commission

THE COMMISSIONERS

Canada's Ecofiscal Commission was formed by a group of experienced, policy-minded economists from across the country. With hundreds of years of combined experience, they have helped design, implement, and analyze policies for governments across Canada.

CHRIS RAGAN

Chair, Canada's Ecofiscal Commission
Director, Max Bell School of Public Policy
McGill University, Department of Economics

Formerly
Clifford Clark Visiting Economist, Finance Canada
Special Advisor to the Governor, Bank of Canada

Christopher Ragan is the inaugural Director of McGill University's Max Bell School of Public Policy and is an Associate Professor in McGill's Department of Economics. He is the Chair of Canada's Ecofiscal Commission, which launched in November 2014 with a 5-year horizon to identify policy options to improve environmental and economic performance in Canada. He is also a member of the federal finance minister's Advisory Council on Economic Growth, which began in early 2016.

Chris Ragan is a Research Fellow at the C.D. Howe Institute, from 2010-13 he held the Institute's David Dodge Chair in Monetary Policy, and for many years was a member of its Monetary Policy Council. In 2009-10, he was the Clifford Clark Visiting Economist at Finance Canada; in 2004-05 he served as Special Advisor to the Governor of the Bank of Canada. In 2010-12 he was the President of the Ottawa Economics Association.

Ragan's published research focuses mostly on the conduct of macroeconomic policy. His 2004 book, co-edited with William Watson, is called *Is the Debt War Over?* In 2007 he published *A Canadian Priorities Agenda*, co-edited with Jeremy Leonard and France St-Hilaire from the Institute for Research on Public Policy. The Ecofiscal Commission's *The Way Forward* (2015) was awarded the prestigious Doug Purvis Memorial Prize for the best work in Canadian economic policy.

Chris Ragan is an enthusiastic teacher and public communicator. In 2007 Ragan was awarded the Noel Fieldhouse teaching prize at McGill. He is the author of *Economics* (formerly co-authored with Richard Lipsey), which after fifteen editions is still the most widely used introductory economics textbook in Canada. Ragan also writes frequent columns for newspapers, most often in *The Globe and Mail*. He teaches in several MBA and Executive MBA programs, including at McGill, EDHEC in France, and in special courses offered by McKinsey & Company. He gives dozens of public speeches every year.

Ragan received his B.A. (Honours) in economics in 1984 from the University of Victoria and his M.A. in economics from Queen's University in 1985. He then moved to Cambridge, Massachusetts where he completed his Ph.D. in economics at M.I.T. in 1989. See his personal McGill website for downloads of his published research as well as his newspaper columns: https://mcgill.ca/economics/christopher-t-s-ragan

ELIZABETH BEALE

Economist

Formerly
President and CEO, Atlantic Provinces Economic Council

Elizabeth Beale is an economist. She recently retired as President and CEO of the Atlantic Provinces Economic Council (APEC), a position she held from 1996 to 2015. She currently serves as a director of Wawanesa Insurance, Invest Nova Scotia, DHX Media, and Compute Canada. She remains active in Canadian public policy as a commissioner of Canada's Ecofiscal Commission, advisory board member for Smart Prosperity, member of the National Statistics Council and member of the Board of Economic Advisors for the government of Prince Edward Island. In 2015, she was appointed as a lifetime member of the Atlantic Canada Economics Association and Fellow of the World Academy of Productivity Science.

Ms. Beale has served as an advisor to government and industry on economic strategies for Atlantic Canada throughout her career, authoring numerous studies on regional development, labour market, and trade topics. She has combined her commitment to progressive policy research with civil society engagement, serving as governor of Dalhousie University from 2000 to 2010, director of the University of Prince Edward Island's research commercialization initiative (Three Oaks Innovation) from 2006 to 2010 and advisory board member of the Leslie Harris Centre of Regional Policy and Development at Memorial University from 2005 to 2014.

Ms. Beale is a graduate of the universities of Toronto (B.A.) and Dalhousie (M.A. Economics). She resides in Halifax, Nova Scotia.

PAUL BOOTHE

Fellow of the Institute for Competitiveness and Prosperity

Formerly
Western University, Richard Ivey School of Business
Deputy Minister, Environment Canada
Deputy Minister, Finance, Saskatchewan

Paul Boothe is the Managing Director for the Trillium Network for Advanced Manufacturing. He recently retired as Professor and Director of the Lawrence National Centre for Policy and Management at the Ivey Business School, Western University. His career has included university research and teaching, acting as an independent consultant to Canadian and international organizations, and serving at the deputy minister level in provincial and federal governments.

Dr. Boothe's public sector career includes serving as the Deputy Minister of Finance and Secretary to Treasury Board for Saskatchewan (1999-2001), Associate Deputy Minister of Finance and G7 Deputy for Canada (2004-2005), Senior Associate Deputy Minister of Industry (2007-2010) and Deputy Minister of the Environment (2010-2012).

He was appointed to the faculty of the University of Alberta from 1984 to 2007. He has authored more than 70 publications in the areas of macroeconomics, international finance, debt management and public finance. An internationally recognized scholar, he was promoted to full professor in 1991. He founded the Institute for Public Economics in 1997. As an independent consultant, he has worked with Canadian and international clients in the areas of monetary and fiscal policy, and public sector management.

Dr. Boothe was trained in economics at Western (Hons BA) and UBC (PhD).

MEL CAPPE

University of Toronto, School of Public Policy and Governance

Formerly

President IRPP; former Clerk of the Privy Council

Mel Cappe is Professor in the School of Public Policy and Governance, University of Toronto. From 2006- 2011 he was President of the Institute for Research on Public Policy. Prior to that for four years he was High Commissioner (Ambassador) for Canada to the United Kingdom. Before that he served as Clerk of the Privy Council, Secretary to the Cabinet and Head of the Public Service.

Earlier in his career he held senior economic and policy positions in the Departments of Finance and Industry. He was Deputy Secretary to the Treasury Board, Deputy Minister of the Environment, Deputy Minister of Human Resources Development, Deputy Minister of Labour and Chairman of the Employment Insurance Commission.

He has graduate degrees in Economics from the Universities of Western Ontario and Toronto and honourary doctorates from both. He is an Officer of the Order of Canada and a recipient of the Queen's Golden and Diamond Jubilee Medals.

BEV DAHLBY

School of Public Policy, University of Calgary

Formerly

Member of the Technical Committee on Business Taxation

Bev Dahlby is a Distinguished Fellow and Research Director in the School of Public Policy at the University of Calgary. He has published extensively on tax policy and fiscal federalism. In May 2010, Bev was awarded the Doug Purvis Memorial Prize by the Canadian Economics Association for a work of excellence relating to Canadian economic policy.

Bev has served as a policy advisor to the federal and provincial governments in Canada on the reform of business taxation, the fiscal equalization program, tax credits for television and film industry, taxation of inbound foreign direct investment, saving non-renewable resource revenues, and programs in support of research and development and innovation.

His international experience includes advisory work on tax reform in Malawi for the IMF, in Thailand for the Thailand Development Research Institute in Bangkok, and in Brazil and Mexico for the World Bank.

Bev served on Statistics Canada's advisory council from 2005 to 2012. In 2010-11, he was a member of the Expert Panel on Federal Support to Research and Development (Jenkins Panel).

In July 2016, he was appointed Chair of the British Columbia Commission on Tax Competitiveness by the BC Minister of Finance. The Commission's report, Improving British Columbia's Business Tax Competitiveness, was released on November 23, 2016

Bev has a PhD in economics from the London School of Economics.

DON DRUMMOND

Queens University, School of Policy Studies

Formerly
Senior Vice President & Chief Economist, TD Bank
Associate Deputy Minister, Finance Canada

Don Drummond was Senior Vice President and Chief Economist for the TD Bank from 2000 to 2010 and from 2001 until his retirement, he headed government relations for the bank. Drummond served extensively in the federal Department of Finance Canada, and as a scholar at Queen's University.

In 2011-12, he was appointed to head the Commission on the Reform of Ontario's Public Services to look at which areas of service delivery are core to the Ontario government's mandate, which areas could be delivered more efficiently by another entity and how to get better value for taxpayers' money in delivering public services.

Mr. Drummond held senior positions in the areas of economic analysis and forecasting, fiscal policy and tax including Assistant Deputy Minister of Fiscal Policy and Economic Analysis, Assistant Deputy Minister of Tax Policy & Legislation and most recently, Associate Deputy Minister responsible for economic analysis, fiscal policy, tax policy, social policy and federal-provincial relations and the planning of the annual federal budgets.

Drummond is a graduate of the University of Victoria and holds an M.A. (Economics) from Queen's University. He was awarded a Doctor of Laws honoris causa from Queen's in 2010.

STEWART ELGIE

University of Ottawa, Institute for the Environment
Executive Chair, Smart Prosperity

Stewart Elgie is a professor of law and economics at the University of Ottawa, and director of the University's interdisciplinary Environment Institute. He received his Masters of Law from Harvard, and his doctorate (J.S.D.) from Yale. He is also the founder and chair of Smart Prosperity Institute (formerly Sustainable Prosperity), Canada's major green economy think tank and policy-research network. His research involves environmental and economic sustainability, with a particular focus in recent years on market-based approaches.

Elgie started his career as an environmental lawyer in Alaska, litigating over the Valdez oil spill. He returned to Canada and founded Ecojustice, now Canada's largest non-profit environmental law organization; he was counsel on many precedent setting cases, including four wins in Supreme Court of Canada on constitution and environment issues. He was later hired by Pew Trusts as founding executive director of the multi-stakeholder Canadian Boreal Initiative. Prior to his faculty position at University of Ottawa (2004), Elgie held appointments at several Canadian universities (U.B.C., Alberta, York). He has served on or chaired many advisory bodies in the environment/sustainability area.

In 2001, Elgie was awarded the Law Society of Upper Canada medal for exceptional lifetime contributions to law – the youngest man ever to receive the profession's highest honour.

GLEN HODGSON

Senior Fellow, Conference Board of Canada

Formerly
Senior Vice President & Chief Economist, Conference Board of Canada

Senior Vice-President and Chief Economist of The Conference Board of Canada, Glen Hodgson is the Board's chief spokesperson on economic issues.

He has published two books and over 225 articles and briefings. He has written extensively on Canadian tax reform and has co-authored a series on the economics of pro sports in Canada. Glen is leading a new Conference Board research initiative, the Canadian Alliance for Sustainable Health Care (CASHC), just as he led the creation of the Board's Global Commerce Centre.

Previously, Mr. Hodgson spent 10 years at Export Development Canada (EDC) and a decade with the federal Department of Finance. From 1984 to 1988, Mr. Hodgson served at the International Monetary Fund (IMF) in Washington D.C., as Advisor/Assistant to the Executive Director for Canada, Ireland and the Caribbean.

Mr. Hodgson has a B.A. (Honours) in Economics from the University of Manitoba, a M.A. in Economics from McGill University, and pursued Ph.D. studies at McGill. He is the current president of the Ottawa Economics Association.

JUSTIN LEROUX

Associate Professor at the Department of Applied Economics of HEC Montréal

Justin Leroux is an Associate Professor at the Department of Applied Economics of HEC Montréal. He is also a member of the Center for Interuniversity Research and Analysis of Organizations (CIRANO) and the Centre de Recherche en Éthique (CRÉ).

Prof. Leroux holds an M.A. and a Ph.D. in Economics from Rice University, as well as an M.A. in Mathematics applied to Economics from the Sorbonne University in Paris. He is also laureate of the Nationwide French competition for tenured professorship in Economics. Prof. Leroux also holds an engineering degree from the National Superior School for Advanced Technologies (ENSTA), Paris, France.

His research interests focus on fair division and cost sharing, specifically of public services and in environmental issues. Prof. Leroux is also involved in consulting for private firms and governments for which he made contributions regarding the optimal pricing of call center services, road networks and water services.

Prof. Leroux is also the recipient of several research grants from different organizations including Social Science and Humanities Research Council of Canada (SSHRC), the Quebec Research Fund for Society and Culture (FQRSC) and the French National Research Agency (ANR).

RICHARD LIPSEY

Professor Emeritus, Simon Fraser University, Department of Economics

Richard G. Lipsey, FRSC, OC, Fellow of the Econometric Society, and Professor Emeritus at Simon Fraser University, has held professorial posts at the London School of Economics and Essex University in England, and Queen's University in Kingston, Ontario, as well as visiting professorships at Yale, the University of California at Berkeley, Manchester, and the University of British Columbia. He was Senior Economic Advisor, C.D. Howe Institute (1983-89) and Fellow of the Canadian Institute for Advanced Research (1989-2002).

His several textbooks have been translated into more than 15 foreign languages and he has written more than 180 articles and book chapters on theoretical and applied economics and policy. His book ***Economic Transformations: General Purpose Technologies and Long Term Economic Growth*** (Richard Lipsey, Kenneth Carlaw and Clifford Bekar) won the 2006 Schumpeter prize for distinguished writing on evolutionary economics. He was awarded the SSHRC gold medal for distinguished lifetime achievement in 2005 and in 2011 he received one of three inaugural fellowships awarded by the Canadian Economics Society.

He co-founded Simon Fraser's ACT (Adaptation to Climate Change Team), the only university-based think tank initiative in North America dedicated to climate change adaptation.

He has a Ph.D. from the London School of Economics.

NANCY OLEWILER

Simon Fraser University, School of Public Policy

Formerly
Member of the Technical Committee on Business Taxation

Nancy Olewiler is an economist and Professor of Public Policy in the School of Public Policy, Simon Fraser University. Prior to coming to the Economics department at SFU in 1990, she was a professor in the Economics department at Queen's University.

Her PhD is in economics from the University of British Columbia. Nancy's areas of research include natural resource and environmental economics and policy. She has published in academic journals, edited books, has written two widely used textbooks – The Economics of Natural Resource Use and Environmental Economics, and produced numerous reports for the Canadian federal and provincial governments on a wide range of environmental and natural resource issues, including studies on energy and climate policy, natural capital and ecosystem services, and federal tax policy. From 1990 to 1995 she was Managing Editor of Canadian Public Policy.

She is a research advisor and mentor for the Environment and Economy Program for Southeast Asia and the Latin America and Caribbean Environmental Economics Program where she helps supervise research undertaken by researchers in those regions on environmental economics and natural resource issues. She has served on the Board of Directors for BC Hydro and TransLink.

FRANCE ST-HILAIRE

Vice President of Research, Institute for Research on Public Policy

France St-Hilaire is vice-president of research, having joined the Institute for Research on Public Policy (IRPP) as a research director in 1992. She currently oversees the Institute's research agenda and coordinates ongoing projects in economic and social policy.

France is the author of a number of monographs and articles on public finance, social policy and fiscal federalism, as well as co-editor of several volumes published by the IRPP, including the most recent Art of the State volume Northern Exposure: Peoples, Powers and Prospects in Canada's North (2009), A Canadian Priorities Agenda: Policy Choices to Improve Economic and Social Well-Being (2007) and Money, Politics and Health Care: Reconstructing the Federal-Provincial Partnership (2004).

She holds a graduate degree in economics from the Université de Montréal, and has worked as a researcher at the Institute for Policy Analysis at the University of Toronto and in the Department of Economics at the University of Western Ontario.

LINDSAY TEDDS
School of Public Administration, University of Victoria
Visiting Professor, School of Public Policy, University of Calgary

Dr. Lindsay Tedds is an Associate Professor of Economics in the School of Public Administration at the University of Victoria and is Visiting Professor in the School of Public Policy at the University of Calgary. She will join the School of Public Policy full time on May 1 2018 in the role as Scientific Director of Fiscal and Economic Policy. Lindsay holds a BA in Political Science from Carleton University, a BA and MA in Economics from the University of Victoria, and a PhD in Economics from McMaster University. Before becoming an academic she held several posts with the Government of Canada in Ottawa as well as in municipal government in the areas of public economics and policy implementation.

Lindsay's primary research and teaching area is applied economic research and policy analysis, with a particular focus on the design and implementation of tax policy. She has written a number of peer-reviewed journals articles, book chapters, and technical reports, as well as two books in this field.

Her objective as an academic is to make both an academic contribution and to have an impact on Canadian policy-making and policy-implementation with the hope of changing public policy for the better. She regularly stimulates and engages in broader conversations about public policy beyond the academic community through a variety of channels.

ADVISORY BOARD

Composed of some of Canda's most respected leaders in industry, the environment, and across the political spectrum, the Commission's Advisory Board provides critical insight, guidance, and a wealth of perspectives on designing practical and effective ecofiscal policies for Canada's unique context.

ELYSE ALLAN

President and CEO, GE Canada
Vice President, GE

In her role as President and Chief Executive Officer of GE Canada and Vice President GE, Elyse is a passionate champion for Canada's competitiveness, advancing the country's science and technology base and competitive fiscal policy. Her career spans many businesses within GE as well as executive roles external to GE in healthcare and energy.

She actively engages in developing and shaping public policy through industry groups, research and advocacy organizations. Elyse serves on the Board of Directors for the C.D. Howe Institute and the Conference Board of Canada. As well, she recently completed her Board term at the Business Council of Canada (Canadian Council of Chief Executives) and the Canadian Chamber of Commerce, where she also served as Chair. Elyse has participated on a number of federal and provincial government advisory boards and currently serves on the Federal Finance Minister's Growth Council. Through her role on the MaRS Discovery District Board of Directors and the leadership council for Scale Up Ventures, she also works to advance innovation and entrepreneurism. Within GE, Elyse co-chairs the global Women in Commercial Markets initiative. Elyse is member of the Brookfield Asset Management Board of Directors.

Elyse was recognized as: Energy Person of the Year in 2016 by the Energy Council of Canada; a Top 100 Women of Influence and Hall of Fame inductee by the Women's Executive Network; the YWCA 2012 Woman of Distinction (Business); and by Maclean's and Canadian Business Magazines as one of Canada's most influential business leaders. In 2014, Elyse was appointed Member of the Order of Canada for her community engagement and achievements as an innovative business leader.

She received a Bachelor of Arts degree from Dartmouth College in New Hampshire where she studied Biology and Environmental Studies and an MBA from the Amos Tuck School of Business at Dartmouth. An active alumnus, she currently serves on the Tuck School Board of Overseers. Elyse holds honorary doctorate degrees from Ryerson University, Saint Mary's University and Royal Roads University.

DOMINIC BARTON

Global Managing Director, McKinsey & Company

Dominic Barton is the Global Managing Director of McKinsey & Company. In his 30 years with the firm, Dominic has advised clients in a range of industries including banking, consumer goods, high tech and industrials. Prior to his current role, Dominic was based in Shanghai as McKinsey's Asia Chairman from 2004 to 2009 and led the Korea office from 2000 to 2004.

He is the Chair of the Canadian Minister of Finance's Advisory Council on Economic Growth and the Chair of the Seoul International Business Advisory Council. He is also a Trustee of the Brookings Institution, a member of the Singapore Economic Development Board's International Advisory Council, and a member of the boards of Memorial Sloan Kettering in New York City and the Asia Pacific Foundation of Canada.

Dominic is the Co-Chair of the 'Focusing Capital on the Long Term' initiative along with Larry Fink (BlackRock), Andrew Liveris (Dow), Cyrus Mistry (Tata) and Mark Wiseman (BlackRock). The initiative seeks to develop practical structures, metrics and approaches for longer-term behaviours in the investment and business worlds.

Dominic has authored more than 80 articles on the role of business in society, leadership, financial services, Asia, history and the issues and opportunities facing markets worldwide. Dominic is a co-author, with Roberto Newell and Greg Wilson, of *Dangerous Markets: Managing in Financial Crises* (Wiley & Sons, 2002) and *China Vignettes: An Inside Look at China* (Talisman, 2007).

Dominic has received multiple awards for his business leadership and contributions to the communities in which he has lived and worked. In February 2013 Dominic received the Order of Civil Merit (Peony Medal) from former President Lee of South Korea and in August 2014 he was awarded the Singaporean Public Service Star (Distinguished Friends of Singapore). He is a Rhodes Trustee and an Honorary Fellow at Brasenose College, Oxford. Dominic is also an Adjunct Professor at Tsinghua University, Beijing.

GORDON CAMPBELL

Formerly
Canada's High Commissioner to The United Kingdom and Northern Ireland

Gordon Campbell was Canada's High Commissioner to The United Kingdom and Northern Ireland (2011-2016) where he sat on the Board of Governors of the Commonwealth and led the revitalization of Canada House on Trafalgar Square. The project has been hailed for excellence in design and for its reflection of Canada today and led to substantial operational savings and returned over C$ 300 million to Canadian taxpayers.

He was also Canada's special envoy the Ismaili Imamat.

Campbell served as British Columbia's 34th Premier (2001-2011).

As Premier, he led the re-establishment of a strong, internationally-competitive economic foundation in British Columbia based on low taxes, and regulatory reform. Under his leadership B.C.'s AAA credit rating was restored and the province had the best provincial job creation record Canada.

Campbell's P3 infrastructure development was recognized in 2008 with the Canadian Council of Public Private Partnerships' Champion Award.

The Campbell government's climate policy has been described as "the best climate policy in the world" in the New York Times.

The Fraser Institute ranked Gordon Campbell as the best of the Premiers for fiscal performance in "Measuring the Fiscal Performance of Canada's Premiers".

Campbell was the 40th Mayor of Vancouver(1986-1993), served as the Chair of the Greater Vancouver Regional District (1990-1993) and was President of the U.B.C.M.1992-3.

Campbell founded his own development company in 1981 and was General Manager of Development, Marathon Realty (1976-1981).

JEAN CHAREST

Partner, McCarthy Tetrault

Formerly
Premier of Quebec

Jean Charest is a Partner in the Montréal office of McCarthy Tétrault. With a public service career spanning almost 30 years, Jean Charest is one of Canada's best known political figures. Mr. Charest was first elected to the House of Commons in 1984 and, at age 28, became Canada's youngest cabinet minister as Minister of State for Youth.

In 1992, as Minister of the Environment he led Canada's delegation to the Rio Earth Summit on the economy and the environment. Mr. Charest has also served as Minister of Industry and Deputy Prime Minister of Canada. In 1994, Jean Charest became Leader of the federal Progressive Conservative Party, becoming the party's first French Canadian leader. In 1998 he became the Leader of the Québec Liberal Party. He then broke a 50-year provincial record, winning three consecutive election campaigns in 2003, 2007 and 2008.

Under his leadership, Québec experienced stronger economic growth than the US, Europe and Canada, during the global financial crisis. Charest's government was a world leader on climate change, bringing forward the first carbon levy in North America.

Mr. Charest has received the many distinguished awards and honours, including being member of the Queen's Privy Council for Canada, June 1986 (Canada); Commandeur of the Légion d'honneur, February 2009 (France); The Woodrow Wilson Award for Public Service, October 2011 (United-States).

Mr. Charest has been a lecturer in political science at Concordia University. He obtained his law degree from the University of Sherbrooke in 1980 and was admitted to the Québec bar in 1981.

KAREN CLARKE-WHISTLER

Chief Environment Officer, TD Bank Group

Karen Clarke-Whistler is an environmental scientist who is widely recognized as a thought leader in environmental business matters. Prior to joining TD she spent more than 15 years consulting to a diverse base of clients in North and South America, Europe and Africa.

Karen is responsible for developing a program that embeds an environmental perspective into TD's core business strategy. As a result TD is recognized as a North American environmental leader and as a global climate leader.

Through Karen's leadership TD has been able to demonstrate a strong positive link between the environment and the economy. TD's numerous innovations include being the first North American-based bank to be carbon neutral, development of net zero energy branches, creation of low carbon product offerings, and being the first Canadian commercial financial institution to issue a green bond. Collaboration with TD Economics has resulted in a series of papers on the green economy.

Karen's was recognized as one of the 2014 Clean16 for her outstanding contribution to clean capitalism within the financial services sector. She supports a number of groups focused on environmental innovation and collaborative problem solving, including the Boreal Leadership Council, Business Network for Sustainability, Private Sector Advisory Board to the Network Centres of Excellence (NCE), and advisor to Canada's Commissioner of Environment and Sustainable Development.

Karen holds a master's degree in land resource science from Canada's University of Guelph and a bachelor's degree in ecology from the University of Toronto.

JIM DINNING

Chair of Western Financial Group

Formerly
Treasurer of Alberta

Jim Dinning is the Chair of the boards of Western Financial Group (financial services) and Liquor Stores NA Ltd (liquor retail) and past chair of Export Development Canada (trade finance). He is director of a number of other public and private companies and not for profit organizations.

Mr. Dinning held key positions during his 11 years as a member of the Alberta legislative assembly, including provincial treasurer from 1992 to 1997. After his elected career, he served as Executive Vice President of TransAlta Corporation.

Jim is a graduate of Queen's University with a Bachelor of Commerce and a Masters in Public Administration. He received an honorary Doctor of Laws degree from the University of Calgary in 2002 and, having completed a four-year term as Chancellor of the University of Calgary in mid 2014, was named Chancellor Emeritus. He is Chair Emeritus of Canada West Foundation and Director Emeritus of the Institute for Research on Public Policy.

PETER GILGAN

Founder and CEO, Mattamy Homes

Peter Gilgan is Founder and CEO of Mattamy Homes, the largest privately owned homebuilder in North America, with more than 60,000 homes built in hundreds of communities across Canada and the United States.

One of Canada's most successful entrepreneurs, Mr. Gilgan was awarded one of the country's highest civilian honours in 2013 when he was appointed to the Order of Canada, in recognition of his innovative leadership in Canada's construction industry, and for his philanthropic support of initiatives in health care, education and athletics. Mr. Gilgan was also named to the Order of Ontario in 2012, for his business leadership and philanthropic initiatives. In 2013, he was inducted as a Companion into the Canadian Business Hall of Fame and honoured with a Queen's Diamond Jubilee Medal.

Mr. Gilgan's multi-million dollar commitment to philanthropy and community building is unparalleled, from health care to physical activity to higher education and community legacies – he truly is a respected and dedicated community leader.

In March 2012, Mr. Gilgan announced the largest gift to a pediatric hospital in Canadian history with his $40 million donation to SickKids Hospital. In November 2011, he announced an historic $15 million gift to Ryerson University for the development of a new student and community athletic centre at the site of the former Maple Leaf Gardens. In 2010, Mr. Gilgan kicked off the capital campaign to build the New Oakville Hospital with a $10 million pacesetting gift.

MICHAEL HARCOURT

Formerly
Premier of B.C.
Mayor of Vancouver

As former premier of British Columbia, Mayor of Vancouver and City Councilor, Mike Harcourt helped British Columbia earn its reputation as one of the most liveable, accessible and inclusive places in the world. His focus on conservation and sustainable development – and his resolve to contribute to the transformation of cities and communities around the world – has played a significant role in promoting quality of life for those in Canada and abroad.

Mr. Harcourt was appointed by the Prime Minister of Canada to the National Round Table on the Environment and the Economy, and chaired the Urban Sustainability Program. He is Honorary Co-Chair at the University of British Columbia's President's Advisory Council on sustainability.

He is the author of A Measure of Defiance, and co-author of Plan B: One Man's Journey from Tragedy to Triumph and City Making in Paradise: Nine Decisions That Saved Greater Vancouver's Livability.

Harcourt's exemplary career as Lawyer, Community Activist, and Politician has been honoured with the Woodrow Wilson Award for Public Service, the Canadian Urban Institute's Jane Jacobs Lifetime Achievement Award, and the Order of Canada.

Mr. Harcourt holds a B.A. and a L.L.B. from the University of British Columbia, and has been awarded Honourary Degrees from UBC, Royal Roads University, Simon Fraser University, University of Northern B.C., Kwantlen Polytechnic University, B.C. Institute of Technology and Okanagan University College.

BRUCE LOURIE

President, Ivey Foundation

Bruce is President of the Ivey Foundation, a private charitable foundation in Canada, a Director of the Ontario Power Authority, a Director of Philanthropic Foundations Canada and a Director of the San Francisco-based Consultative Group on Biological Diversity.

Bruce is co-author of the best-selling books ***Toxin, Toxout: Getting Harmful Chemicals Out of Our Bodies and Our World***, and ***Slow Death by Rubber Duck***. He is an Honorary Director of the Canadian Association of Physicians for the Environment and a founding Director of Canadians for Clean Prosperity. In 2014 Bruce received Earth Day Canada's Lifetime Achievement Award.

Bruce is well known for his work in convening large collaborative efforts among businesses, NGOs and government that achieve significant progress. Examples include the Canadian Boreal Forest Agreement, one of the world's largest conservation initiatives, and his pioneering role in connecting environmental issues to human health, most notably with the shutdown of coal-fired power plants in Ontario, the single largest climate action taken in Canada.

Bruce is a founder of a number of for profit and non-profit organizations including Summerhill Group, the Sustainability Network, and the Canadian Environmental Grantmakers' Network. He has acted on numerous international, federal, provincial and municipal bodies advising on environmental, health and energy policy issues. Bruce holds a B.Sc. in Geology and a Master's in Environmental Studies.

JANICE MACKINNON

Professor, University of Saskatchewan

Formerly
Minister of Finance, Saskatchewan

Janice MacKinnon is a professor of fiscal policy at the University of Saskatchewan, a Fellow of the Royal Society of Canada and a former Saskatchewan Finance Minister. She has an Honours B.A. from the University of Western Ontario and an M.A. and a PhD from Queen's. She is the author of three books, *The Liberty We Seek* published by Harvard University Press, *While the Women Only Wept* and *Minding the Public Purse*.

Between 1991 and 2001 she was a Cabinet Minister in Saskatchewan and held various portfolios including Minister of Finance, Minister of Social Services, Minister of Economic Development, and Government House leader. During her tenure as Finance Minister, Saskatchewan became the first government in Canada to balance its budget in the 1990s.

She is Chair of the Board of Directors of the OmubudService for Life and Health Insurance, and she is on the Board of Directors of the Canada West Foundation. In 2009 she was appointed to the National Task Force on Financial Literacy and in 2010 Federal Finance Minister Jim Flaherty appointed her as Chair of Canada's Economic Advisory Council. She is also a public commentator on fiscal and political issues in Canada.

In 2012 she was appointed to the Order of Canada. In 2013 she was selected as one of Canada's 25 Women of Influence and in 2014 Federal Finance Minister Joe Oliver re-appointed her as Chair of Canada's Economic Advisory Council.

PRESTON MANNING

President and CEO, Manning Centre

Formerly
Leader of the Official Opposition, Canada

Preston Manning, PC CC AOE, is Founder and President of the Manning Centre for Building Democracy, which he founded in 2005. He is also a Senior Fellow of both the Fraser Institute and the Marketplace Institute at Regent College, UBC.

Mr. Manning served as a Member of Parliament from 1993 to 2001. He founded two new political parties – the Reform Party of Canada and the Canadian Reform Conservative Alliance – both of which became the official Opposition in the Canadian Parliament, and laid the foundation for the new Conservative Party of Canada. Mr. Manning served as Leader of the Opposition from 1997 to 2000 and was also his party's science and technology critic. In 2007 Preston Manning was made a Companion of the Order of Canada and in 2013 was appointed to the Privy Council.

Mr. Manning is an advocate of "green conservatism" – stressing the importance of "living within our means" ecologically as well as fiscally and the benefits of harnessing market mechanisms to environmental conservation.

Mr. Manning graduated from the University of Alberta with a BA in Economics and worked as a consultant to the energy industry for twenty years before entering the political arena. He has received honorary degrees from the University of Calgary, University of Alberta, Southern Alberta Institute of Technology, Tyndale University College, York University, and the University of Toronto.

PAUL MARTIN

Formerly
Prime Minister of Canada

During his tenure as Minister of Finance, Paul Martin erased Canada's deficit, subsequently recording five consecutive budget surpluses while paying down the national debt and setting Canada's debt-to-GDP ratio on a steady downward track. He was the inaugural Chair of the Finance Ministers' G-20 in 1999.

During his tenure as Prime Minister, Mr. Martin set in place a ten year, forty-one billion dollar plan to improve health care and reduce wait times; signed agreements with the provinces and territories to establish the first national early learning and child care program and created a new financial deal for Canada's municipalities. Under his leadership an historic deal was reached with Aboriginal people of Canada to eliminate the funding gaps in health, education and housing known as the Kelowna Accord.

After leaving politics, Mr. Martin founded the Martin Aboriginal Education Initiative focusing on elementary and secondary education for Aboriginal students and the Capital for Aboriginal Prosperity and Entrepreneurship (CAPE) Fund, whose aim is to aid in developing business expertise and mentoring for Aboriginal business..

Internationally, he chairs the Congo Basin Forest Fund, sits on the Advisory Council of the Coalition for Dialogue on Africa, and is a Commissioner for the Global Ocean Commission.

Before entering politics, Mr. Martin was Chairman and CEO of The CSL Group Inc., the largest self-unloading shipping company in the world.

Mr. Martin studied philosophy and history at St. Michael's College at the University of Toronto and is a graduate of the University of Toronto Faculty of Law. He was called to the Ontario Bar in 1966.

PETER ROBINSON

CEO, David Suzuki Foundation

Peter Robinson began his career working as a park ranger in wilderness areas throughout British Columbia, where he was decorated for bravery by the Governor General of Canada. After his park career, he worked at BC Housing, a provincial crown corporation, eventually becoming its CEO. Prior to his appointment as CEO of the David Suzuki Foundation, he was the CEO of Mountain Equipment Co-op.

Peter has a long history of humanitarian work, including monitoring prison conditions with the International Red Cross in Rwanda in 1998, and leading a team for seven years that monitored detained asylum seekers in British Columbia. He has served as the Chair of the Board of Governors and the Chancellor of Royal Roads University in Victoria, and with the Board of Governors of the Canadian Red Cross Society. More recently, he was appointed to the Board of Directors of Imagine Canada, an organization that supports charities across the country.

Peter holds a Doctor of Social Sciences, a Master of Arts in Conflict Analysis and Management, a Bachelor of Arts in Geography, as well as diplomas in Community Economic Development and Fish & Wildlife Management.

LORNE TROTTIER

Co-founder, Matrox Electronic Systems Ltd.

Engineer, entrepreneur and philanthropist, Lorne Trottier has poured his passion for science into research, technological development and education in Quebec.

In 1976, he co-founded Matrox Electronic Systems Ltd., a company known for its innovative computer graphics products. Through his technical innovation and market sense, he has helped Matrox become a leading multinational company in the field of computer graphics, video and imaging.

He is a Board Member of the Trottier Energy Futures Project (TEFP), a project to chart a course for Canada in the reduction of its energy-related greenhouse gas (GHG) emissions by 80% below 1990 levels by 2050, which is overseen by a board comprising the President of the Trottier Family Foundation, the President of the Canadian Academy of Engineering, and the Chief Executive Officer of the David Suzuki Foundation.

He was named a member of the Order of Canada in 2007. He holds three Honorary Doctorate of Science degrees, one from McGill University (1996), one from École Polytechnique de Montréal (2011), and the other from the University of Ontario Institute of Technology (UOIT) in
(2013).

He is unfailing in support of his alma mater, McGill University, in addition to supporting École Polytechnique Montreal and the Montreal Science Centre.

ANNETTE VERSCHUREN

Chair and CEO of NRStor Inc.

Annette Verschuren is Chair and CEO of NRStor Inc., an energy storage technologies venture. Formerly she was president of The Home Depot Canada and Asia, overseeing its growth from 19 to 180 stores (1996-2011) and entry into China, and president and co-owner of Michaels of Canada, the country's largest chain of arts and crafts stores. Ms. Verschuren began her career with the Cape Breton Development Corporation, a coal mining operation in Nova Scotia.

Ms. Verschuren holds board positions with Liberty Mutual Insurance Group, Air Canada, Saputo, Canadian Natural Resources Limited, Centre for Addiction and Mental Health Foundation (CAMH) and the Conference Board of Canada. She serves as a member of the North American Competitiveness Council, appointed by Prime Minister Stephen Harper, was a member of Finance Minister Flaherty's Economic Advisory Council. She chairs the Ontario Clean Energy Task Force and the Federal Government's Expert Panel for the Venture Capital Action Plan. She's also Chancellor of Cape Breton University, and chairs fundraising efforts for the University's new Verschuren Centre for Sustainability in Energy & the Environment (VCSEE).

Ms. Verschuren was appointed as an Officer of The Order of Canada (2011) for her contribution to the retail industry and Corporate Social Responsibility. She's been honoured by Canada's Marketing Hall of Legends (2010) and the Nova Scotia Business Hall of Fame (2010). Recently the Public Policy Forum honoured Ms. Verschuren for her many contributions to public policy.

Ms. Verschuren holds four honorary doctorate degrees and has a Bachelor of Business Administration degree from St. Francis Xavier University.

STEVE WILLIAMS

President & CEO, Suncor Energy

Steve Williams is President and Chief Executive Officer of Suncor Energy. Steve's career with Suncor began in May 2002 when he was appointed Executive Vice President, Corporate Development and Chief Financial Officer. He has also served as Executive Vice President, Oil Sands and Chief Operating Officer. Steve has more than 35 years of international energy industry experience. Early in his career, he worked for Esso/Exxon for 18 years.

Steve is a Fellow of the Institution of Chemical Engineers and is a member of the Institute of Directors. He is one of 12 founding CEOs in Canada's Oil Sands Innovation Alliance (COSIA); a member of the Canadian Council of Chief Executives; and part of the Alberta School of Business Advisory Council at the University of Alberta.

Steve holds a Bachelor of Science degree in chemical engineering from Exeter University and is a graduate of the advanced management program at Harvard Business School as well as the business economics program at Oxford University.

TAB B

This is Exhibit 2 referred to in the affidavit
of Christopher Ragan, sworn before me this
18 day of December, 2018, in the City of
Montreal in the Province of Quebec

Attorney, #1940775

A COMMISSIONER FOR OATHS IN
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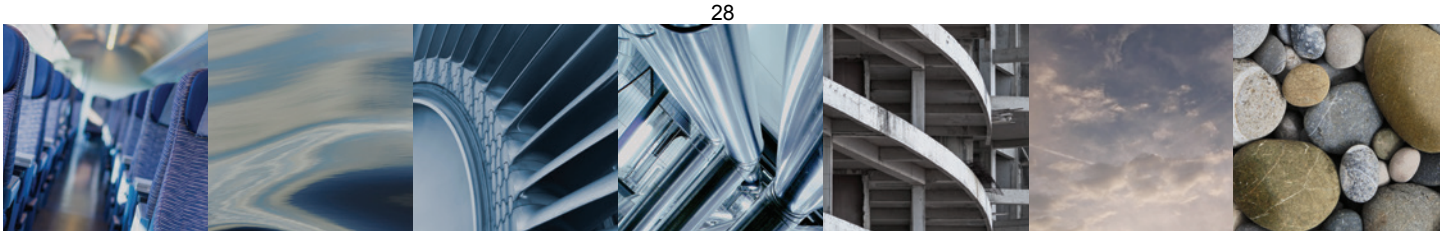
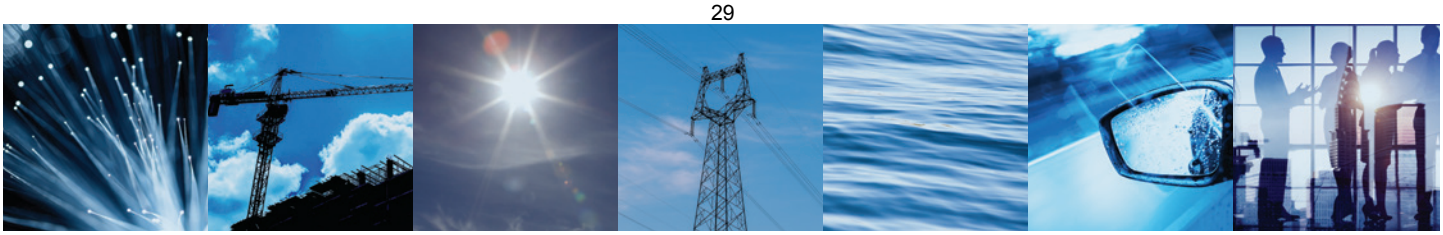


CANADA'S **ECOFISCAL** COMMISSION
Practical solutions for growing prosperity

SMART PRACTICAL POSSIBLE

Canadian Options for Greater Economic and Environmental Prosperity

November 2014



CANADA'S ECOFISCAL COMMISSION

WHO WE ARE

A group of independent, policy-minded Canadian economists working together to align Canada's economic and environmental aspirations. We believe this is both possible and critical for our country's continuing prosperity. Our Advisory Board comprises prominent Canadian leaders from across the political spectrum.

We represent different regions, philosophies, and perspectives from across the country. But on this we agree: ecofiscal solutions are essential to Canada's future.

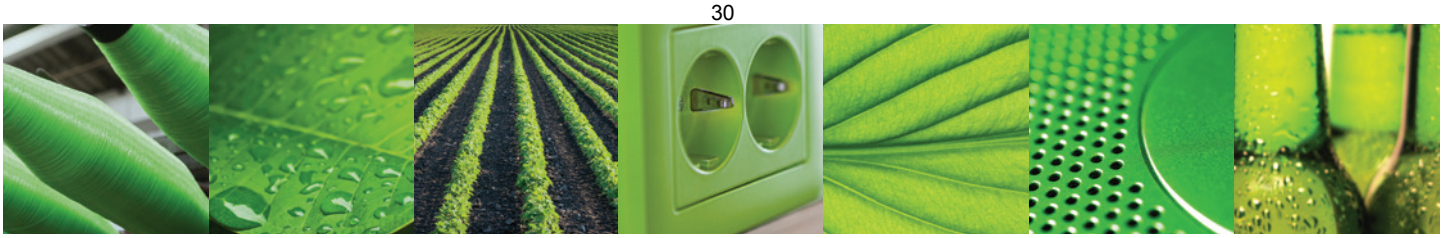
OUR VISION

A thriving economy underpinned by clean air, land, and water for the benefit of all Canadians, now and in the future.

OUR MISSION

To identify and promote practical fiscal solutions for Canada that spark the innovation required for increased economic and environmental prosperity.

For more information about the Commission, visit **Ecofiscal.ca**



A REPORT AUTHORED BY CANADA'S ECOFISCAL COMMISSION

Chris Ragan, Chair
McGill University

Elizabeth Beale
Atlantic Provinces Economic Council

Paul Boothe
Western University

Mel Cappe
University of Toronto

Bev Dahlby
University of Calgary

Don Drummond
Queen's University

Stewart Elgie
University of Ottawa

Glen Hodgson
Conference Board of Canada

Paul Lanoie
HEC Montréal

Richard Lipsey
Simon Fraser University

Nancy Olewiler
Simon Fraser University

France St-Hilaire
Institute for Research on Public Policy

This report is a consensus document representing the views of the Ecofiscal Commissioners. It does not necessarily reflect the views of the organizations with which they are affiliated.

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Peter Robinson
Bob Rae
Lorne Trottier
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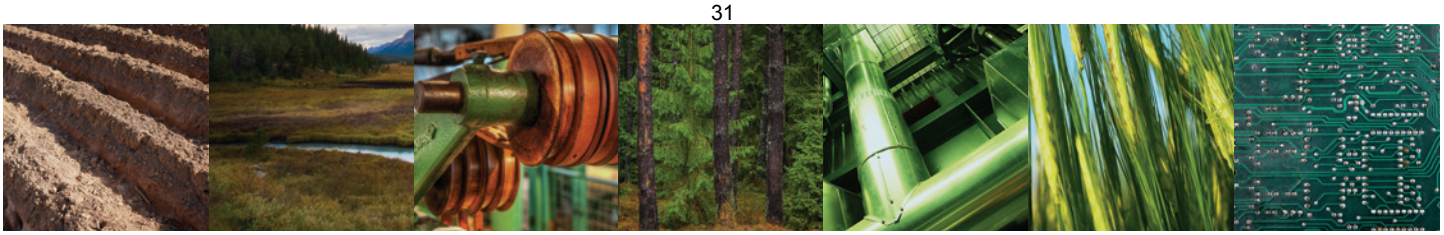

Executive Summary

Canada's Ecofiscal Commission will examine practical fiscal solutions for Canada that spark the innovation required for increased economic and environmental prosperity. We believe that aligning Canada's economic and environmental aspirations is both critical and possible for our country's continuing prosperity.

SMART ENVIRONMENTAL POLICY *IS* SMART ECONOMIC POLICY.

Canada's current and future economic prosperity depend on protecting our clean air, water, and land, and also reducing our greenhouse gas emissions. They depend on ramping up Canadian innovation to respond not only to today's demands, but also to the emerging environmental realities that will shape the markets of tomorrow. We can no longer afford to silo our economic and environmental agendas. The sustained well-being of Canadians requires new policies that align our aspirations for a thriving economy and a clean environment. Current evidence suggests that we can achieve this by using *ecofiscal* policies.

Ecofiscal policies correct market price signals to encourage the economic activities we want (job creation, investment, and innovation) while discouraging those we don't (greenhouse gas emissions and pollution of our land, air, and water). The revenue generated from pollution fees can create further benefits; for example, by reducing taxes on families and businesses or investing in new technologies or critical public infrastructure.

ECOFISCAL REFORM IS A CRITICAL OPPORTUNITY FOR THE COUNTRY.

Canada is fortunate, both in terms of its economic prosperity and its unparalleled natural assets. It has maintained this prosperity not by accident, but through deliberate policy choices. Just as Canada successfully tackled high government budget deficits and embraced freer international trade, implementing ecofiscal policies is our next ambitious, and critical, policy opportunity.

Total Canadian government revenues now represent more than one-third of our gross domestic product (GDP), yet our ecofiscal revenues are only 1% of GDP, a significantly lower share than in other major OECD (Organization of Economic Co-operation and Development) countries. The International Monetary Fund recently suggested that by using ecofiscal policies reflecting damages caused by fossil fuel consumption and traffic congestion, Canada could generate revenues of roughly $26 billion. This would provide an opportunity to achieve further benefits by recycling these revenues back into the economy. Ecofiscal reform thus presents a tremendous untapped opportunity for Canada.

The aim of this report is to start the conversation required to examine these opportunities. The evidence presented here highlights the success of ecofiscal policies already implemented in Canada and the rest of the world—evidence that makes a strong and reasoned argument for greater use of these tools across Canada.

Here are the five pillars of that argument:

1. Canada's natural wealth is fundamental to our economy; damaging it is costly. Sectors such as tourism, forestry, and agriculture rely directly on the health of our ecosystems; most others rely indirectly on the same. The costs of repairing environmental damage use funds that could be invested fruitfully elsewhere in the economy. Increased health problems caused by pollution, the remediation of contaminated sites, and the impacts of climate change will cost taxpayers dearly. Estimates suggest, for example, that air pollutants in Canada will impose health costs of roughly $230 billion between 2008 and 2031. Ongoing climate change is also expected to have major economic implications for Canada, with estimated costs rising from around $5 billion annually in 2020 to between $21 billion and $43 billion annually by 2050. The Insurance Bureau of Canada noted that the "terrible effects of new weather extremes" cost insurers a record-breaking $3.2 billion in 2013.

2. Canadians deserve a better fiscal system. Canada's current fiscal system—the entire collection of taxes, subsidies, and spending policies used by government—is working against our well-being by holding back innovation and productivity while inadvertently promoting greenhouse gas emissions and pollution of our land, air, and water. Taxes are crucial for financing essential government services, but all taxes are not created equal. Income taxes, which

Canada uses extensively, reduce incentives for investment and job creation and tend to reduce economic growth. In contrast, taxes on pollution, which we use sparingly, create incentives for activities that improve the health of our environment.

Ecofiscal policies use market forces to rebalance this equation. They align economic and environmental priorities, creating incentives for conservation, but allowing flexibility in how firms and individuals reduce their pollution. They enable reductions in other taxes, such as corporate and personal income taxes. For example, ecofiscal reforms in Denmark that target air, carbon, and water pollution were used to lower personal income tax rates and reduce employer contributions to social security and pensions while supporting investment in energy efficiency.

3. Ecofiscal policies can be designed to ensure fairness in multiple ways. Fairness is intrinsic to the use of ecofiscal policies, since they require polluters to pay for the environmental damage they cause. Fairness also means ensuring that our grandchildren inherit Canada's natural wealth, not its ecological debt. Failure to invest in clean energy now will cost Canadians many times over down the line. According to estimates by the OECD, for example, every dollar invested now in a low-carbon electricity sector results in more than four dollars saved by future generations (who would otherwise be required to reduce emissions at much higher costs).

Acting fairly also means making decisions that respect and accommodate the diversity of Canada's regions, sectors, and families. Well-designed ecofiscal policies can recognize the differences between regions and need not involve wealth transfers between them. They can also ensure that additional burdens are not placed on the most vulnerable. For example, research suggests that only 10% of the revenue generated by a Canadian carbon tax would be required to offset the impact of the tax for low-income Canadians. Similarly, several policy options exist to address the potential impact of ecofiscal policies on firms' competitiveness.

4. Improving innovation is critical for Canada's future. Ecofiscal policies drive innovation by creating incentives for the development of new technologies that reduce pollution and environmental damage. In Sweden, for example, a price on emissions of nitrogen oxides coincided with a seven-fold increase in patents on pollution-reducing technology from 1988 to 1993. Over the longer term, this innovation will put Canada in a more secure and advantageous position, particularly as our trading partners implement more of their own ecofiscal policies.

5. Canadians can seize an opportunity for long-term, clean prosperity. Right now, however, we are behind the curve. We lag behind most OECD countries in innovation and productivity growth; we also lag behind them in environmental performance. Perhaps not surprisingly, we are close to the bottom of the list in the use of ecofiscal policies. However, important progress—particularly at the provincial level—shows that these policies can and do work in Canada.

This report is the starting point for **Canada's Ecofiscal Commission**. Future research by the Commission will focus on practical policy solutions that can drive the innovative economy we need to succeed in the 21st century. The Commission's future reports will explore these opportunities for pragmatic Canadian policy. Policy issues will likely include:

- **Road congestion pricing.** Road access is free yet it leads to congestion, air pollution, greenhouse gas emissions, and lost productivity through wasted time. Congestion is becoming a significant issue in Canada's major cities. Congestion pricing could be a promising policy solution to promote efficient transportation systems.

- **Municipal user fees.** Cities have limited revenue tools; they tend to rely on property taxes to fund municipal infrastructure. At the same time, users of infrastructure often have no incentive to limit their usage. User fees can create incentives for conservation while also ensuring that cities do not have to overbuild infrastructure.

- **Carbon pricing.** Global climate change will have major economic costs for Canada. Pricing carbon emissions can help achieve reductions at the lowest cost, can contribute to global emissions reductions, and can help position Canadian firms to compete in a cleaner global economy.

- **Subsidy reform.** Many existing Canadian subsidies are environmentally harmful, fiscally wasteful, or both. Biofuel subsidies for ethanol, for example, may actually increase greenhouse gas emissions while also representing large public expenditures. Phasing out such subsidies can therefore generate both economic and environmental benefits.

Executive Summary *continued*

- **Air pollution pricing.** Despite existing regulations, firms have insufficient incentives to reduce emissions of local air pollutants, which have major impacts on ecosystems and human health. Air pollution pricing would create incentives for reducing emissions as well as for the development of new technologies to do so.

- **Water pollution pricing.** Toxic effluents released into waterways—whether from agricultural runoff, tailing ponds from mines, or other municipal and industrial wastewater—can have major implications for ecosystems, but also for human health and for economic activity. Appropriately pricing water pollution can encourage less pollution of Canada's lakes, rivers, and streams.

- **Water use pricing.** Free or inexpensive water leads to over-consumption, putting pressure on supply. Pricing water use appropriately can create incentives for water conservation, though care must be taken to ensure the policy is applied fairly.

- **Catastrophic risk pricing.** Existing liability, insurance, and securities frameworks may not be sufficient to address environmental damages from low-probability catastrophes—such as major rail catastrophes (e.g., Lac Mégantic, Quebec) or tailings pond dam breaches (e.g., Mount Polley, BC)—and thus may provide firms with insufficient incentive for risk management. Risk pricing could fill this gap and reduce the likelihood of catastrophic damage.

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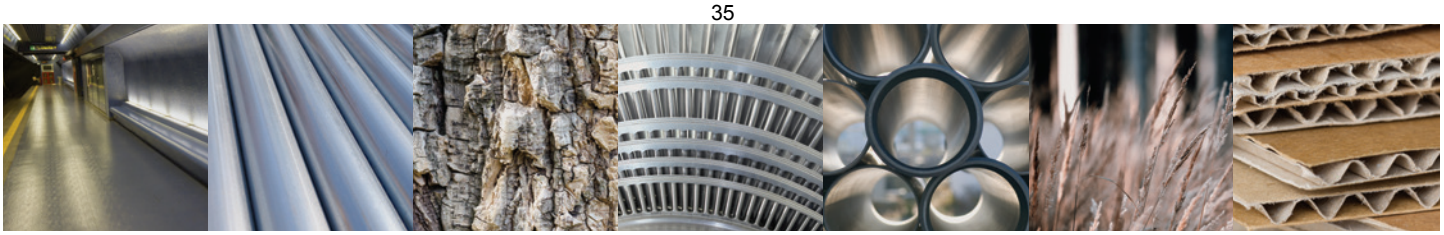


1. Aligning Economic and Environmental Priorities

Smart environmental policy is smart economic policy. Canada's economic prosperity—now and in the future—depends on protecting our air, water, and land. To ensure the sustained well-being of Canadians, new policies are needed to align our environmental and economic objectives.

1.1 CANADIANS WANT CLEAN PROSPERITY

Economic concerns are always important for Canadians. Polling commissioned by Environment Canada from Harris/Decima suggests that the economy was the top priority in 2013. Yet the majority of Canadians also strongly value the environment, ranking it the third highest priority in 2013 (Hill, 2014). In short, Canadians appear to want both a strong economy *and* a clean environment.

Identifying policies that can help achieve both objectives is the purpose of Canada's Ecofiscal Commission. We believe that aligning Canada's economic and environmental aspirations is both critical and possible for our country's continuing prosperity. This is not a question of left versus right or industry versus conservation. All Canadians—and our governments of all political stripes—can support policies that help ensure greater prosperity both today and tomorrow. But such policies need to be smart.

1.2 CANADA NEEDS SMART POLICY

Ecofiscal policies correct market price signals to encourage the economic activities we do want (job creation, investment, and innovation) while reducing those we don't want (greenhouse gas emissions and the pollution of our land, air, and water). They provide real incentives for investment in innovative technologies so that we can continue benefiting economically from our natural wealth while also providing better protection to the environment.

Ecofiscal policies also generate revenue that can be recycled back to the economy to create further economic benefits; for example, by reducing income and payroll taxes or investing in new technologies or critical public infrastructure.

The key idea underpinning ecofiscal reform is that taxes on pollution are better than taxes on income, jobs, or profits. Corporate and personal income taxes reduce incentives for investment and hiring, and tend to reduce economic growth. In contrast, taxes on pollution create incentives for innovating products and processes that avoid causing environmental damage.

Canada's environmental assets are critical for our long-term prosperity. Designing policies that harness market incentives to recognize the true economic value of these assets is the best way to protect them. Harnessing market forces also creates powerful

Ecofiscal policies increase our wealth.

High living standards and natural wealth are inseparable. We cannot achieve one in the long run by running down the other. By protecting and valuing Canada's environmental assets, we will promote enduring growth. In fact, our future wealth depends on doing just that.

"I joined the Ecofiscal Commission because our future prosperity depends on our ability to grow in the context of a healthy environment. We need smarter fiscal policies to get there."

Preston Manning
President & CEO, Manning Centre;
former leader of the official Opposition, Canada

incentives for the development of lower-cost environmental technologies. A well-designed package of policies could therefore produce both a more prosperous economy and a cleaner environment.

Well-designed ecofiscal policies can also be fair. Ensuring polluters pay for the environmental damage they cause is intrinsic to ecofiscal policies. We have a responsibility to the current generation of young Canadians, as well as to those not yet born. They deserve to have access to the same natural wealth that has benefited us so greatly. Their future prosperity will depend on how well we protect what will soon be *their* environmental assets. In addition, careful design can ensure that ecofiscal policies do not disproportionately affect vulnerable Canadians or Canadian regions.

Canada is fortunate, both in terms of its economic prosperity and its unparalleled natural assets. It has maintained this prosperity not by accident, but through deliberate policy choices. Sometimes these choices require challenging the status quo. In the 1990s, our provincial and federal governments successfully tackled their high budget deficits, we embraced free trade with the United States and Mexico, and the Bank of Canada was an early pioneer in adopting an inflation-targeting framework. Each of these policy decisions was complex and contentious, but few today deny their importance to Canada's long-term prosperity.

Ecofiscal policies are another ambitious and important policy opportunity. Like all policies, however, they must be designed and implemented well in order to realize their benefits. We may not have all the answers today, but we must begin the hard work and the public conversations required to develop practical policy solutions for aligning our economic and environmental objectives.

1.3 ABOUT THIS REPORT

This report presents the case for implementing ecofiscal policies in Canada—including municipal, provincial, and federal governments. It summarizes the evidence available on the economic and environmental benefits of ecofiscal policies, drawing from the experiences of policies implemented inside and outside Canada's borders.

This report is a starting point for Canada's Ecofiscal Commission. Future research and reports will explore specific policy opportunities that can help Canada move toward a more sustainable and prosperous future. This report therefore serves as a foundation for future work. The remainder of the report is structured as follows:

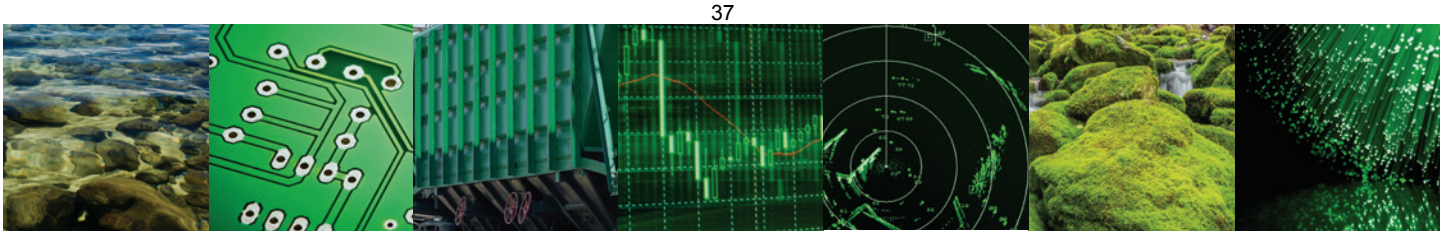
Section 2 defines the set of fiscal policy tools that Canadian decision-makers have at their disposal. It explains what we mean by ecofiscal policies and identifies concrete examples from Canada and elsewhere.

Section 3 makes the economic case for using ecofiscal policies. It shows how smart economic policy must consider the environment while also being responsible and practical. It illustrates how other environmental policies, especially direct regulations, are often more expensive than market-based ecofiscal policies. Yet it also acknowledges that in special circumstances, such policies can play an important role.

Section 4 roots the case for ecofiscal policies in the Canadian context. It benchmarks Canada's economic and environmental performance against other countries, showing that Canada has room to improve along both dimensions, as well as in its use of ecofiscal policies.

Section 5 argues that the time for ecofiscal reform is now. As the rest of the world continues moving toward a more sustainable future, Canada cannot ignore the changes in international markets and the increased market access that improvements in our own environmental stewardship would provide.

Section 6 concludes with a brief discussion of the Commission's future reports.



2. Smart Policy Makes Markets Work Better

Smart policy harnesses the power of markets to achieve objectives. Markets play a remarkable role in coordinating economic activity and allocating resources. They provide incentives for the innovation that drives long-run improvements in living standards. Yet smart policy also recognizes the limitations of markets.

Too often in a market economy, essential environmental resources are unpriced and, not surprisingly, overused. The pollution of our land, water, and air is free to polluters, even though it imposes costs on society. It falls to governments to implement appropriate policies to ensure that market forces align private actions with society's environmental objectives.

Markets work best when assets are properly valued. Putting a price on environmental damage helps to value Canada's natural assets.

This section introduces ecofiscal policy tools as central elements of smart policy. By shifting away from taxing things we desire (such as jobs, investment, and innovation) toward taxing things we dislike (such as pollution and greenhouse gas emissions), governments at all levels can propel their jurisdictions on the path toward greater and more enduring prosperity (Ekins, 2009; Speck, 2007). An ecofiscal policy package thus contains two main elements: increasing the price of pollution and environmental damage, and recycling revenue back to the economy through mechanisms such as reducing existing distortionary taxes.

2.1 PRICING POLLUTION ALIGNS ECONOMIC AND ENVIRONMENTAL GOALS

The ecofiscal tool-kit includes several types of policy instruments that can be used to alter market incentives in pursuit of better economic and environmental outcomes.

Pricing pollution improves market signals

Polluters are not usually required to pay a price for their polluting activities, even though the associated environmental damage imposes real costs on society. Since individuals and companies respond to incentives, more pollution gets produced in the absence of any price "penalty." When firms or households add excessive greenhouse gas emissions and pollution to our water, air, and land, society as a whole is worse off.

When each of us pollutes our environment, society as a whole is worse off.

Ecofiscal tools make markets work better by establishing a price for actions that result in environmental damage. They incorporate the costs of environmental damage into market prices, thus improving market signals. Firms and households respond to these signals by finding innovative and cost-effective ways to reduce pollution.

Governments can use different pricing instruments to improve these market signals. Two of the most important are *cap-and-trade systems* and *environmental taxes*. The former provides certainty as to the quantity of pollution reduced, while the latter provides certainty regarding the price on pollution. Each is discussed below.

Cap-and-trade systems establish a market for pollution reduction by setting a limit on the total allowable level of pollution, issuing permits equal to this level, and then allowing firms to trade the permits among themselves in an active market. Under this approach, companies that can reduce pollution cheaply can take more action and sell their excess permits to those that can only reduce pollution at higher costs. If permits are auctioned to

2. Smart Policy Makes Markets Work Better *continued*

polluters, cap-and-trade systems generate revenue that can then be "recycled" back to the economy (discussed in detail below). The Quebec cap-and-trade system for greenhouse gases, for example, auctions a share of its permits and invests the revenue in green technology. Otherwise, initial allocations of permits are provided to polluters for free, similar to the SO_2 trading system implemented in the United States in the 1990s to combat acid rain.

Alternatively, environmental taxes can be used to align environmental and economic objectives by taxing activities that lead to environmental damage. European nations such as Denmark, Norway, Sweden, and Ireland have introduced taxes on air pollutants, greenhouse gas emissions, and even plastic bags. British Columbia implemented a carbon tax in 2008, starting at $10 per tonne of CO_2 emissions and currently at $30 per tonne.

Cap-and-trade and tax systems are similar in that both put a price on pollution and both can generate revenue that enables reductions in other taxes. The two instruments can even be combined to compromise between providing certainty on the price of pollution and the quantity of pollution reduction. The United Kingdom, for example, implemented a kind of hybrid system in the pricing of solid waste (see Box 1).

Box 1: Waste Pricing in the United Kingdom

Putting a price on solid waste helped the UK to reduce commercial and industrial landfill waste by more than 40%.

Disposal of waste in landfills has various environmental impacts, including methane emissions, an important greenhouse gas, emissions of common air pollutants, which can result in damages to human health and ecosystems, and leachate, which can contaminate water and soil.

To create incentives for reducing the volume of solid waste, the UK has used two different pricing policies. In 1996, it introduced landfill taxes of £7 per tonne of active (i.e., organic) waste and £2 per tonne of inactive (i.e., non-biodegradable) waste. These taxes applied to all sources of waste delivered to landfill sites, whether commercial, industrial, or residential.

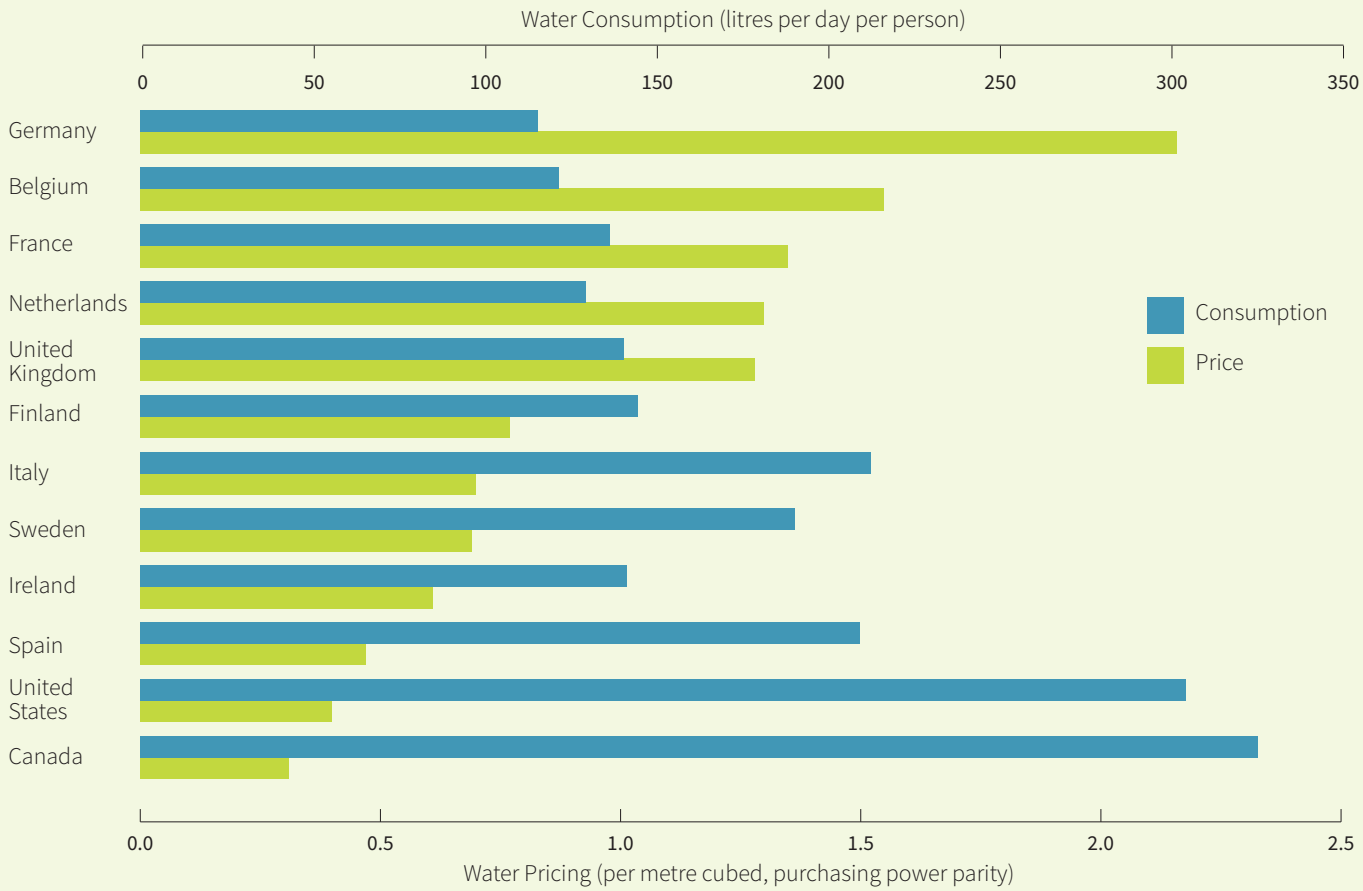
To further reduce the amount of active waste landfilled, in 1999 the UK increased its active waste rate to £10 per tonne. Further yearly raises were implemented; the present rate is £80 per tonne of active waste landfilled.

To complement the landfill tax, the UK also implemented a cap-and-trade system from 2005 to 2013. The system applied to municipal waste (but not to most businesses and industry), and it freely allocated disposal rights to local authorities based on waste targets for each period. The cap-and-trade system provided certainty as to total levels of waste reductions to be achieved, helping the UK to meet its commitments under the European Landfill Directive. Yet the landfill tax continued to play an important role in ensuring a minimum price on waste. It also had broader coverage than the cap-and-trade scheme, because it applied to commercial and industrial waste producers, most of which were not covered by a municipal authority.

Between 2005 and 2010, the combination of the cap-and-trade scheme and the landfill tax led to a reduction in the amount of landfill waste of over 30% (Department for Environment, Food & Rural A!airs [DEFRA], 2012). Over the same period, the volume of commercial and industrial landfill waste, which was covered only by the tax, dropped by more than 40% (DEFRA, 2012).

2. Smart Policy Makes Markets Work Better *continued*

FIGURE 1: International Municipal Water Prices and Consumption



Higher water prices correspond with less water use; Canada has relatively low prices and relatively high per capita water consumption.

Source: Based on data from the Council of Canadian Academies (2009).

User fees create incentives for conservation

User fees provide incentives for environmental conservation by charging the true user cost of public infrastructure such as roads, water and sewer systems, and waste collection and disposal. Users naturally tend to overuse these systems if they are not required to pay the full cost of their use, and this leads to an increased environmental impact as well as a need for additional infrastructure.

We overuse when we don't have to pay. Charging the full user costs for roads, water, and waste disposal creates incentives for environmental conservation.

Figure 1 shows a striking correlation across countries between daily per capita water consumption and the average price paid by users. While the figure does not make any suggestion as to the optimal price of water, it does illustrate that countries with higher consumption tend to have lower prices. Consistent with the underlying logic of ecofiscal policies, Canadians pay very low prices for their water and are very heavy water users (Brandes et al., 2010; Council of Canadian Academies, 2009).

Similarly, roads tend to be financed from general government revenues; individual drivers rarely pay fees based on their usage of roads. As a result, they face incentives to drive more, thus increasing demand for road infrastructure. At the same time, more driving leads to more traffic as well as greater air pollution and greenhouse gas emissions. In the United Kingdom, London uses congestion pricing to effectively address these challenges (see Box 2).

Box 2: Congestion Pricing in London, UK

In London, congestion pricing helped reduce traffic in a high-congestion area by as much as 36% while raising critical revenue for transit improvements.

Introduced in 2003, the London congestion charge is designed to reduce traffic congestion inside a special "congestion zone" located in central London. Non-exempted vehicles entering the zone on weekdays from 7:00 to 18:00 must pay a fixed £10 daily charge. Penalties of £65 to £195 are charged to owners of vehicles that enter the zone without paying the fee. Payment is verified using automatic licence plate recognition. Vehicles with very low emissions and public buses are exempt, while those who reside inside the zone receive a 90% discount.

Revenue from the program is significant, with £222 million raised in the 2012-13 fiscal year, roughly 5% of Transport for London's gross income (Transport for London [TfL], 2013a). The revenues raised from the congestion charge are invested in local transit improvements.

The congestion charge has been highly effective in reducing the volume of vehicle traffic entering, leaving, and travelling in the congestion zone. Traffic in the zone fell almost immediately after the program was introduced, and by between 22% and 36% over the first 10 years of the program. Traffic in the whole of London decreased by 11% between 2000 and 2012 (TfL, 2008, 2013b).

Canadian municipalities are increasingly moving toward full-cost-recovery models, with users paying for infrastructure. In a 2012 survey of Ontario municipalities, for example, half the local governments surveyed were phasing in full-cost-recovery funding models for waste and wastewater infrastructure.

Even so, rate structures need to be designed carefully to create appropriate incentives for conservation. With flat fees, users have no incentive to reduce their usage. With declining block rates, users actually pay less, the more water they use, potentially exacerbating problems of overuse (Watson & Associates, 2012). Some Canadian municipalities have successfully moved toward better incentive structures. The City of Halifax, for example, charges service fees for water, wastewater, and stormwater based on volume used. Similarly, the City of Guelph seeks to reduce its water use by 20% by 2025. To achieve this goal, it increased water and wastewater rates by 19% in 2008, with charges based on volume (Brandes et al., 2010).

User fees can also be used to value environmental resources that are otherwise unpriced. Fresh water, for example, is obviously essential for human well-being, for a productive economy, and for healthy ecosystems. Yet in some situations in Canada, users of fresh water face very low prices even though our water is under increasing pressures, with diminishing supplies underpinning threatened ecosystems (Brandes et al., 2010; Baltutis & Shah, 2012; Council of Canadian Academies, 2009). Even if users pay for the infrastructure required to deliver water, the value of the resource itself is not being reflected in its price (Sawyer et al., 2005). Appropriate fees applied to the use of water can help prevent the waste of this invaluable Canadian resource.

Phasing out subsidies helps get prices right

Finally, reforming some existing policies can create both environmental and economic benefits. Subsidies provide preferential treatment for specific sectors, organizations, or individuals—usually through financial transfers or tax credits. While some subsidies make economic sense, poorly designed ones can be environmentally harmful, economically costly, or both.

Subsidies for pollution-intensive activities distort the economy and lead to higher levels of pollution, with associated costs for society. For example, the Ontario Clean Energy Benefit program provides a 10% rebate on the first 300 kWh of all electricity consumed by owners of residential buildings, small businesses, and farmers, thereby creating disincentives for energy conservation (Commission on the Reform of Ontario's Public Services, 2012). At the federal level, Canada has already taken steps to reduce subsidies for fossil fuel producers (see Box 3).

Box 3: Fossil Fuel Subsidy Reform in Canada

Since 2009, the Canadian government has honoured its G20 commitments by reducing financial support for fossil fuel production by an estimated $400 million per year.

At the Pittsburgh G20 summit in 2009, Prime Minister Harper and other G20 leaders agreed to "phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest [individuals]" (Office of the Auditor General of Canada [OAG], 2013). Since then, Canada has continued to make progress toward these objectives (Olewiler, 2012).

Recent reforms align tax treatment of the oil sands with that for conventional oil and gas production. Given that oil sands technologies have matured considerably, preferential support for oil sands development is no longer required:

- The 2007 federal budget eliminated eligibility for the accelerated rate for capital cost allowance for the tangible capital costs of oil sands projects, moving from 100% to 25% over several years.
- The 2011 federal budget removed eligibility of intangible capital costs of oil sands exploration, reducing support for development expenses and resource property expenses.

It is too soon to know how these budgetary changes will influence the development of resources or the level of greenhouse gas emissions in Canada. But they clearly reduce incentives for economically inefficient, emissions-intensive activity. A recent report estimates the reduction in government financial support to fossil fuel producers of approximately $400 million per year based on changes contained in Canada's 2007, 2011, and 2012 budgets (Green Budget Coalition, 2013).

2.2 "RECYCLING" REVENUE CREATES ADDITIONAL ECONOMIC BENEFITS

Pollution taxes and user fees clarify market signals and improve environmental outcomes. But they also generate revenues for governments. By "recycling" these revenues, further economic benefits are achievable.

Reducing existing taxes creates economic gains

Reducing other taxes as part of an overall "tax shift" can generate large economic gains. Boadway and Tremblay (2014) suggested that Canada's current corporate tax system is discouraging investment and hindering innovation and productivity growth. Chen and Mintz (2013) argued that maintaining low corporate rates is essential for attracting business investment in Canada, and highlighted recent provincial policy actions in the opposite direction. Similarly, payroll and personal income taxes reduce the incentives for work and acquiring education and skills. Shifting taxes away from employment, income, and profit can lead to greater investment, higher wages, and ultimately more economic growth.

Subsidies are often both ineffective and costly, and thus represent a poor use of scarce public funds. Many kinds of subsidies suffer from what are called "free-ridership" challenges—when the subsidized activities would have occurred even without the subsidy (Olewiler, 2012). In these situations, the public funds are spent, but little of the stated objective is achieved.

Ecofiscal policies can generate revenue that creates space for governments to reduce costly taxes on employment, income, and profits.

In the 1990s, for example, Denmark implemented a series of tax shifts that imposed new taxes on air pollutants, water, and greenhouse gases, while simultaneously reducing income taxes and employers' contributions to social security and pension funds (see Box 4). Similarly, the British Columbia carbon tax embedded revenue recycling in the legislation, with the government legally

required to ensure that overall tax revenues did not increase as a result of the carbon tax. In fact, from 2008 to 2013, revenue reductions from personal income and business tax cuts exceeded the revenue raised by the carbon tax by $760 million (Government of British Columbia, 2010, 2011, 2012, 2013, 2014a). These income tax reductions were a key element of B.C.'s carbon tax. The economic benefits of revenue recycling are revisited in Section 3.

Other options for revenue recycling can also create economic benefits

While reducing corporate and personal income taxes may be the most growth-friendly method of recycling revenues, other options exist. The benefits of using revenue in alternative ways must be weighed against the potential gains from reducing existing distortionary taxes. Whether economic benefits emerge from these alternative approaches are to a much greater extent contingent on the details of implementation. Three other options are:

- **Reducing government deficits.** Recent studies in both the United States and Europe have explicitly considered how carbon taxes could be used to address fiscal challenges (e.g., Ramseur et al., 2012; Marron & Toder, 2013; Vivid Economics, 2012). Indeed, for governments faced with a need for greater revenues, increasing pollution taxes is arguably a far better choice than increasing corporate or personal income taxes.

- **Supporting infrastructure and technology.** Revenues from user fees and pollution taxes canalso be earmarked for public investment. If done wisely, such investments could also lead to economic benefits. Investing in critical infrastructure can improve productivity; investing in research and development can boost innovation. Both can potentially enhance long-run growth.

  Governments can also choose to invest in environmental technologies—either in the use of existing technologies to reduce environmental damage or expenditures on research and development aimed at creating new technologies. Existing programs such as the Regional Greenhouse Gas Initiative (a cap-and-trade system in the northeastern United States) and the Quebec cap-and-trade system use revenue from auctioned permits to support the development of new environmental technologies.

  It is worth noting, however, that targeted public investments come with risks. The wrong investments, or even sensible projects pursued poorly, will waste scarce public funds. In Canada and elsewhere, governments have often been poor at identifying and carrying out worthwhile investment projects, especially when short-term political considerations dominate the pursuit of long-term priorities.

- **Protecting vulnerable segments of the population.** Revenues can also be used to insulate low-income households from the burden of pollution pricing. In British Columbia, for example, the design of the carbon tax allows for the provision of low-income tax credits. The Australian carbon pricing system (now repealed) similarly included a mechanism to provide cash supplements to low-income households. Costa Rica uses 3.5% of the revenue from its carbon tax to provide incentives for forest conservation to landowners and indigenous communities, indirectly offsetting costs of the policy to rural populations (International Council of Mining and Metals, 2013).

Pricing pollution is better than taxing income

Whatever a government's overall fiscal situation, whether it is seeking to increase or decrease its overall level of taxation, the logic of ecofiscal policies offers a genuine opportunity. User fees

We need a better fiscal system, not higher taxes.

An effective and efficient Canadian fiscal system for the 21st century will promote innovation and growth while reducing pollution and environmental damage. This requires redesigning our current fiscal system, but it need not increase Canadians' overall tax burden or the size of government.

"Smart policy means using revenue from pollution fees to reduce taxes in a way that enables job creation and gives money back to families. Our job at Canada's Ecofiscal Commission is to show Canadians across the country the economic and environmental benefits of this approach."

Jean Charest

Partner, McCarthy Tetrault; former premier of Quebec

Box 4: Ecofiscal Policies Have Reduced Pollution in Denmark

Ecofiscal policies in Denmark helped reduce personal income taxes as well as employers' contributions to pensions and social security, while supporting investments in energy efficiency.

Denmark introduced a tax on CO_2 emissions in the early 1990s. The tax was levied on the consumption of fuel by both firms and households, based on carbon content. It was designed to offset an existing energy tax on oil products, coal, and electricity consumption; energy taxes were reduced as the carbon tax was introduced. Over subsequent years, Denmark phased in a broader program for ecofiscal reform.

In the first phase of reform (1994-1998), Denmark introduced a range of other environmental taxes, including taxes on tap water, wastewater, and paper and plastic bags. Reducing income tax rates was also a key aspect of the policy. In 1998, the income tax reductions were equivalent to about 2.3% of GDP.

In the second phase (1996-2000), energy taxes were increased and SO_2 and natural gas taxes were introduced. The focus of the second phase was recycling revenue to industry. Revenue was used to reduce employers' pension and social security contributions, and to subsidize commercial investments in energy efficiency.

The third phase of the Danish reforms (1999-2002) was designed to increase revenue through increased environmental taxes over the short term, but to be revenue neutral in the long run (emissions would be reduced over time, reducing the revenue from the tax). Revenue was used to reduce personal income taxes as well as taxes on pension savings.

These reforms have been effective. Recent analysis comparing the actual Danish outcomes with a hypothetical baseline (without policy changes) suggests that the carbon taxes led to declines in greenhouse gas emissions (of 3.4%) but increases in both national income and employment (of 0.4% and 0.5%, respectively) (Barker et al., 2009). Water pricing contributed to reductions in water use of about 13% over the first five years of the policy. Similarly, the discharge of water pollutants from sewage treatment plants declined by about 20% (ECOTEC, 2001).

and pollution taxes can always be used as a substitute for more distortionary and growth-retarding taxes. Shifting away from income taxes and toward pollution taxes can generate significant economic and environmental benefits.

2.3 SMART POLICY MATTERS FOR ALL LEVELS OF GOVERNMENT

Ecofiscal policies present an opportunity for all levels of government in Canada. But depending on the issue, different levels of government may have different options.

User fees are an essential fiscal tool for municipalities

User fees present an especially important option for municipal governments. Municipalities have limited means of generating revenue to fund infrastructure investments. As a result, cash-strapped local governments rely on property taxes or transfers from provincial governments. User fees (e.g., fees for solid waste disposal, water use, or wastewater treatment) can generate revenue that allows municipalities to avoid increasing property taxes. At the same time, it establishes incentives for conservation, reducing the need for infrastructure spending.

Ecofiscal tools are particularly well suited to provinces.

For three reasons, Canada's provincial governments should seriously consider a greater use of ecofiscal policies. First, we must not forget that provinces have long been policy innovators in the Canadian context, and this is equally true in the case of ecofiscal policies. British Columbia's carbon tax is now internationally regarded as a model of smart environmental policy. Alberta has priced carbon emissions, and uses the revenues to finance green technological development. Quebec has implemented a cap-and-trade system. Following these leads, there is a clearer path ahead for ecofiscal reform in other Canadian provinces.

Second, the provinces have a strong constitutional basis for taking the lead in the use of ecofiscal policies. Responsibility for the environment is shared between provincial and federal governments,

but the provinces have sole jurisdiction over natural resources. How Canadians develop and use natural resources such as water, fossil fuels, minerals, forests, and land have major implications for environmental sustainability.

Third, each province has a unique economic and environmental profile. As a result, there is a strong case for designing ecofiscal policies customized to each provincial context. In terms of climate and energy, for example, electricity generation in British Columbia, Manitoba, Quebec, and Newfoundland and Labrador relies strongly on low-emissions hydroelectric capacity; in contrast, electricity grids in Alberta, Saskatchewan, and Nova Scotia are largely supplied by emissions-intensive coal-fired electricity plants. At the same time, capital-intensive resource sectors play a critical role in Alberta, Saskatchewan, and Newfoundland and Labrador, with relatively labour-intensive manufacturing and service sectors being more important in central Canada and other Atlantic provinces. These differences underline the importance of effective ecofiscal policies being designed with close regard to provincial and sectoral context.

Coordination can avoid a patchwork of policies

For environmental challenges that are national (or even global) in scope, there is a strong case in principle for policy to be designed and implemented at the national (or multinational) level. In Canada's case, this principle must confront the practical constraint that the various provincial contexts be incorporated into the policy design. Over the years, these provincial and regional differences have presented serious challenges for federal governments aiming to produce uniform national policy, especially in areas that encroach on provincial jurisdictions.

For early steps in policy development, provinces can take the lead; there is much to be done and no need to rely on actions from the federal government. Over the longer term, however, some coordination of provincial policies is necessary to avoid a costly patchwork of policies that leads to overall inefficiency. Differences in policies across provincial borders can increase complexity and costs for firms that operate in many regions. And aggressive policy in one province can lead to expensive reductions in pollution, while the absence of policy in other provinces may leave low-cost improvements unrealized.

Eventual coordination of various provincial systems is therefore crucial, especially for those environmental challenges that are broadest in scope. This coordination could be facilitated by federal involvement or by active efforts by the various provinces, possibly through the Council of the Federation.

There are many precedents for this kind of provincial coordination. At the 2014 meeting of the Council of the Federation, for example, premiers discussed a coordinated national energy strategy, and agreed on the importance of "transitioning to a lower-carbon economy through appropriate initiatives such as carbon pricing, carbon capture and storage, and other technological innovations"(Council of the Federation, 2014).

Similarly, in 2009, the Canadian Council of Ministers of the Environment (CCME) sought to harmonize wastewater treatment across Canada by establishing national effluent quality standards. While most Canadian provinces agreed to these standards, the CCME has no authority over their enforcement. To demonstrate commitment to the strategy, in 2012, the Canadian government implemented the Wastewater Systems Effluent Regulations (WSER) under the Fisheries Act, thereby making the limits binding (CCME, 2014).

In summary, Canadian policies need not be federal to be national. Ecofiscal policies can be designed and implemented by individual provinces and municipalities, mindful of their own specific contexts and priorities. But in those cases where coordination or alignment across jurisdictions is in the national interest, coordination and harmonization can lead in the long-run to a coherent and effective national system of ecofiscal policies.

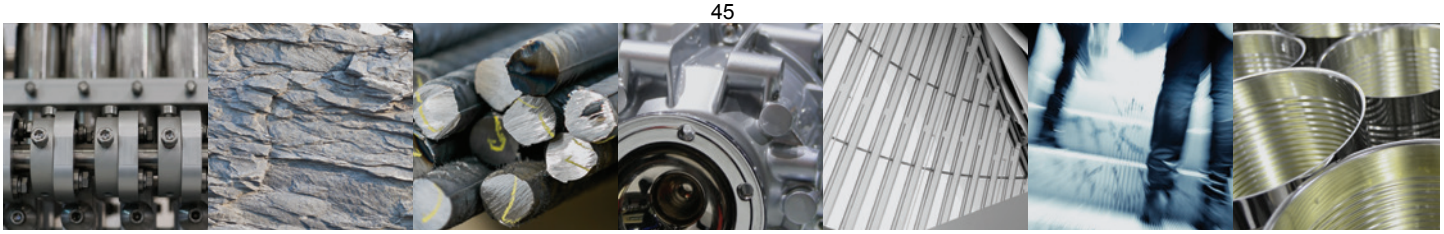
Ecofiscal policies are good for Canada's regions.

Well-designed ecofiscal policies will enable provinces to recycle revenue back into their own economies, in ways that have the biggest impact and make the most sense on the ground. Ecofiscal policies need not transfer wealth between provinces or regions.

"This isn't about robbing Peter to pay Paul; it must not be. It's about showing governments that sensible policy tools can reduce pollution and greenhouse gas emissions while helping the economy—and also be consistent with their provincial priorities."

Jim Dinning

Chair of Western Financial Group; former treasurer of Alberta



3. Smart Environmental Policy *Is* Smart Economic Policy

This section lays out the many economic benefits and the relative advantages of ecofiscal policies as compared with other policy approaches. Recognizing that smart policy must also be fair for all Canadians, it shows how ecofiscal policies can be designed to address the diversity of regions, sectors, and households.

3.1 ECOFISCAL POLICIES HAVE MANY ECONOMIC BENEFITS

Ecofiscal policies create economic benefits in three ways: protecting natural assets, recycling revenues by reducing other taxes, and driving innovation. Each is discussed below.

Ecofiscal policies can protect Canada's natural assets

A prosperous Canadian economy *relies* on well-functioning Canadian ecosystems. Olewiler (2012) noted, "Our lands, atmosphere, and water are essential to economic activity and our quality of life." Preventing environmental damage can have many economic benefits, though quantifying them is admittedly challenging. While most are not captured by conventional measures of GDP, others directly affect economic activity. The benefits of protecting the environment come in two general forms: avoiding the costs that directly result from environmental damage and avoiding the costs of having to clean up environmental damage.

- **Damage to ecosystems reduces Canadians' income and health.** The Canadian Medical Association (2008) estimated that human health impacts from air pollution reduce worker productivity, with associated losses of around $18 billion (in 2006 dollars) between 2008 and 2031. Air pollutants such as ozone can also negatively affect the market value of food crops (Sawyer, Steibert, & Welburn, 2007). Warmer winters as a result of climate change have led to a pine beetle infestation in British Columbia, reducing the supply of marketable timber (Natural Resources Canada, 2014). Climate change will similarly have major implications for natural resource sectors, food production, biodiversity, and human health. Remote and Northern communities are likely to experience particularly large changes (Warren & Lemmen, 2014). Toxic effluents released into our waterways reduce the economic potential of fisheries and tourism.

$18 billion = lost worker productivity from illnesses related to air pollution

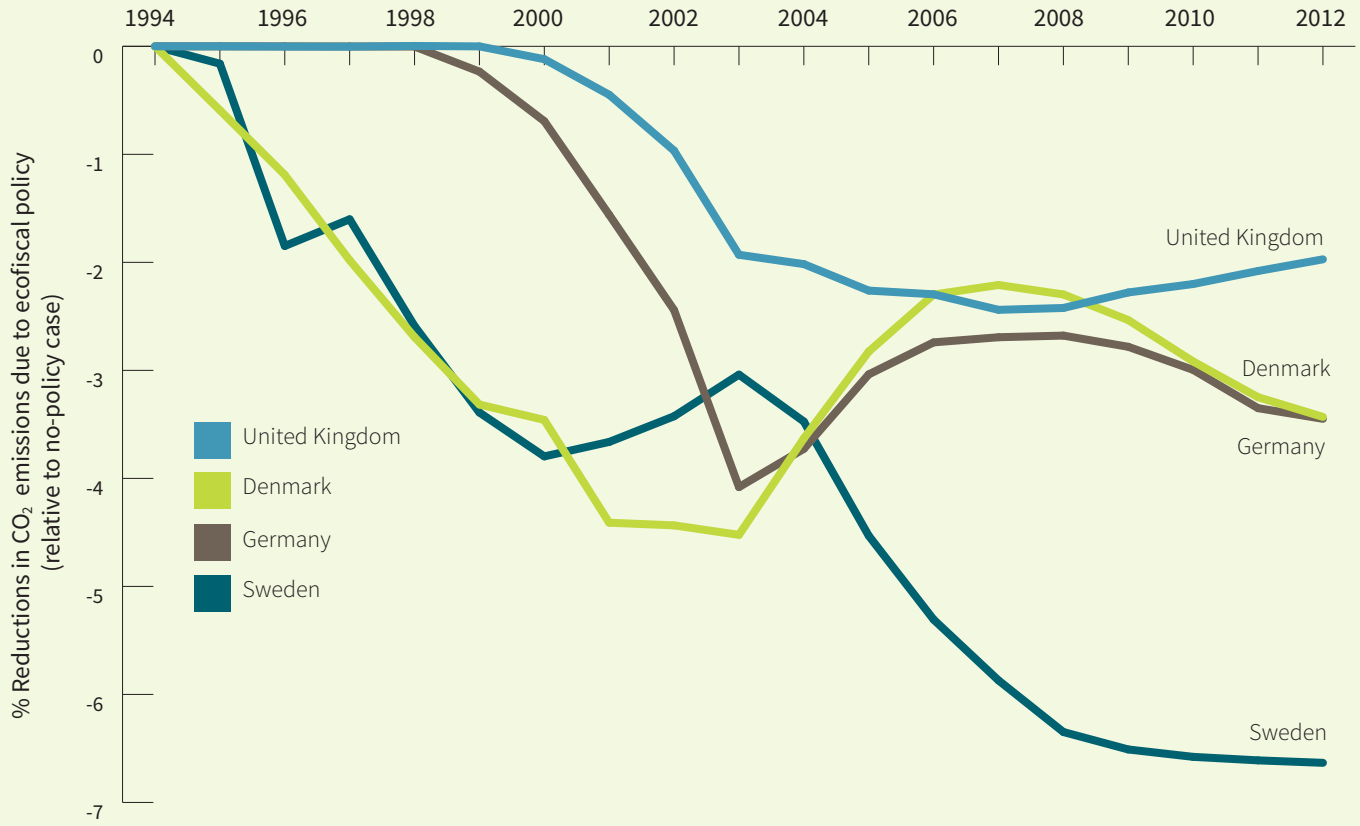
$228 billion = health costs from illness and premature deaths caused by air pollution

Since clean air and water are obviously important for our well-being, reducing pollutants can improve health and reduce mortality (e.g., Matus et al., 2008). The OECD (2014a) recently estimated that among its member countries in 2010, air pollution from road transportation alone imposed costs of close to US$1 trillion from health impacts (including death and illness). In Canada, the Canadian Medical Association (2008) estimated that between 2008 and 2031, air pollutants will impose costs of around $228 billion in terms of premature deaths and reduced health. Environment Canada (2010) estimated that a 10% reduction in air pollutants (such as ozone and fine particulate matter) would generate benefits valued at $4 billion.

- **Cleaning up environmental damage is costly.** Remediating impacts of pollution and climate change has opportunity costs: funds spent on remediation could be invested in other productive activities (Olewiler, 2012). For example, the federal

3. Smart Environmental Policy *Is* Smart Economic Policy *continued*

FIGURE 2: The Effect of Ecofiscal Policies on GHG Emissions in Europe



Ecofiscal policies in Denmark, Germany, Sweden, and the United Kingdom reduced greenhouse gas emissions relative to what would have occurred in the absence of those policies.

Source: Based on data from Barker et al. (2009).

government budgeted $1 billion between 2012 and 2014 to remediate contaminated sites (Canada, 2012). In some cases, damage to ecosystems may be irreversible. Once critical biological thresholds are crossed, remediation is more than costly; it may be impossible.

With respect to climate change, Natural Resources Canada notes the growing scientific consensus that the rising atmospheric concentration of greenhouse gases is increasing the frequency and intensity of some extreme weather events (Warren & Lemmon, 2014). The Insurance Bureau of Canada (IBC). estimates that the "terrible effects of new weather extremes" cost insurers a record-breaking $3.2 billion in 2013 (IBC, 2014).

- **Ecofiscal policies are effective.** Evidence from other jurisdictions shows that ecofiscal policies can protect vital environmental assets. The UK Green Fiscal Commission concluded that evaluations of European experience "overwhelmingly suggest that environmental taxes are environmentally effective" (Green Fiscal Commission, 2009, p. 24). The COMETR (Competitiveness effects of Environmental Tax Reforms) project is one of the most comprehensive economic analyses of the impacts of ecofiscal policies. It applied a detailed economic model to assess the impacts of pollution-pricing policies implemented in various European countries. This analysis found that in each country emissions fell relative to what would have occurred in the absence of the policies (Barker et al., 2009). Figure 2 illustrates these results for four countries, showing in each case the estimated reductions in greenhouse gas emissions during the period when ecofiscal policies were in place. The figure plots emissions reductions relative to the (counterfactual) case in

Box 5: Environmental Impacts of the British Columbia Carbon Tax

Per capita fuel use in B.C. has dropped by 16% since the province's carbon tax was instituted in 2008, while it has increased by 3% in the rest of Canada.

In 2008, British Columbia implemented a revenue-neutral carbon tax. The tax initially applied to the use of carbon-based fuels at a rate of $10 per tonne CO_2e, and subsequently increased to its current level of $30 per tonne. The tax covers 77% of B.C.'s greenhouse gas emissions, applying to residential, commercial, and industrial sources. The revenue generated by the tax is substantial; it raised $1.2 billion in 2013-14, roughly 18% of the province's personal income tax revenue, or over half its corporate income tax revenue (Government of British Columbia, 2014b). The tax is legally required to be revenue neutral, with all revenue from the tax used to reduce other taxes, including reductions in corporate and personal income taxes and targeted reductions for vulnerable households and communities. The shift has turned out to be revenue *negative*, with total tax cuts being larger than the revenue raised by the carbon tax (Harrison, 2013).

Though the tax is still young, trends in B.C. relative to the rest of Canada provide early evidence as to its effectiveness. Fuel use per capita declined by 16% in B.C. in the first six years, but increased by 3% over the same period in the rest of Canada. These provincial differences cannot be explained by differences in economic growth: sales of refined petroleum products per unit of GDP decreased by 15% from 2008 to 2011 in B.C., but grew by 2% in the rest of the country. Neither are they explained by provincial population trends: per capita sales of gasoline in B.C. decreased by 4% from 2008 to 2011, but grew by 3% in the rest of Canada (Elgie and McClay, 2013).

Other province-specific trends could also be factors in the province's shift toward less fuel consumption. This period also saw, for example, investments in public transportation in the Lower Mainland. Yet additional analysis further supports the idea that the carbon tax played a central role in driving emissions reductions. For example, Rivers and Schaufele (2012) assessed the impact of the carbon tax and estimate that the tax led to a reduction of more than 3 Mt of gasoline-related greenhouse gas emissions. They also rejected alternative factors such as cross-border shopping and other vehicle efficiency policies as unlikely to explain the emissions reductions.

Analysis so far has focused on the short-term impacts of the B.C. carbon tax. In the longer term, the carbon tax is likely to drive even deeper emissions reductions as firms and households respond more fully to the new market signals by investing in new equipment, electricity-generating projects, and vehicles. Long-term policy certainty, however, is important. Clear, predictable policy can create a sufficiently strong price signal to enable these investments.

which ecofiscal policies were not implemented. It suggests that policy in Sweden, for example, reduced 2007 emissions by 6%.

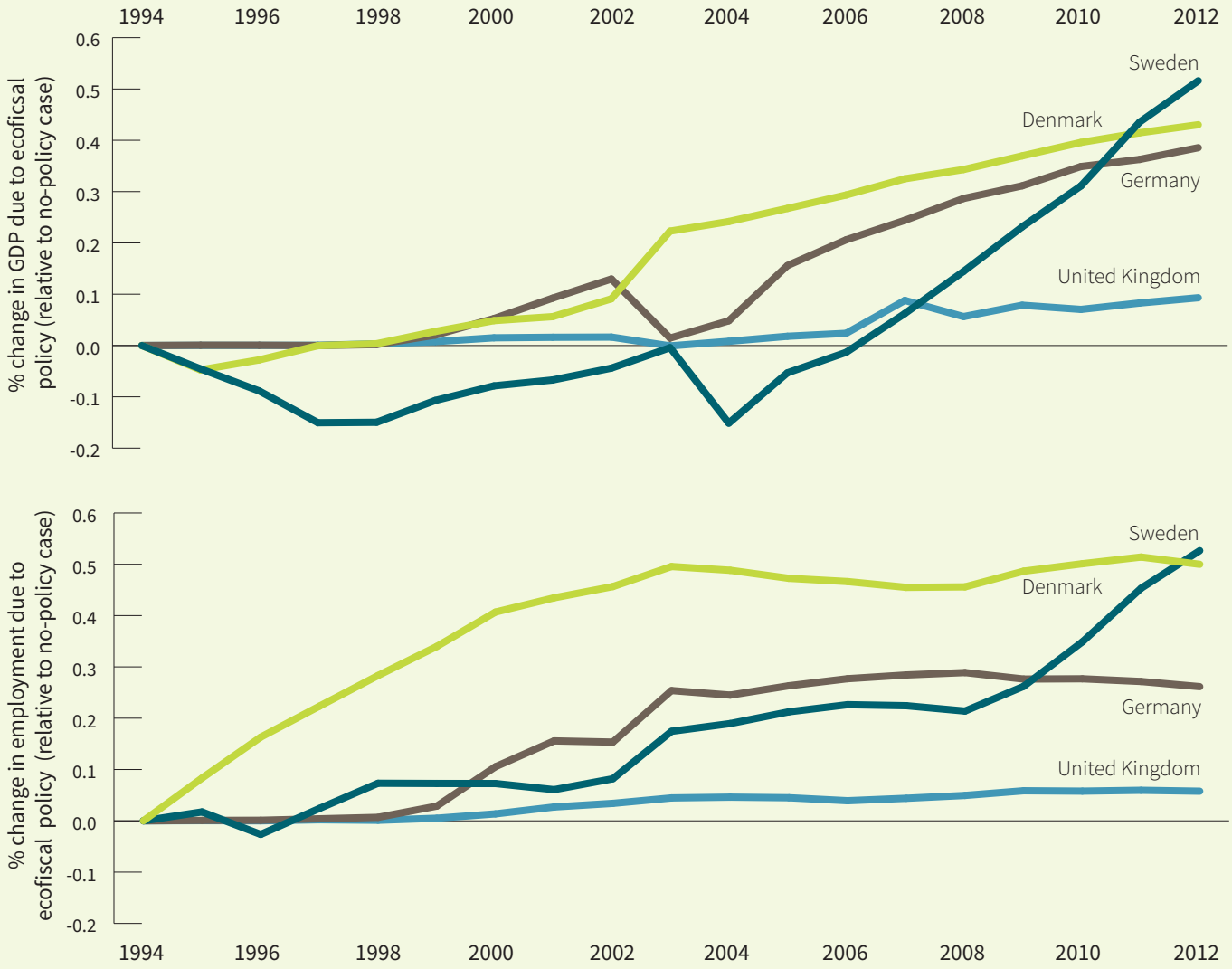
Experience closer to home similarly suggests that market-based policies can achieve environmental objectives. Early analysis suggests that the British Columbia carbon tax is reducing both fuel use and greenhouse gas emissions (see Box 5). Federally, Canada successfully implemented cap-and-trade systems for ozone-depleting substances in the 1990s in accord with the Montreal Protocol. The various systems covered ozone-depleting substances, including chlorofluorocarbons (commonly referred to as "CFCs"), as well as methyl chloroform, hydrochlorofluorocarbons, and methyl bromide. For the last, total permissible use was capped, and tradable quotas were distributed to the many firms that used methyl bromide. The system was designed to eliminate the substance for all but non-critical uses (*Canada Gazette*, 2011).

Reducing taxes on employment and income can drive better economic performance

Pricing environmental damage using ecofiscal tools allows government to simultaneously reduce other tax rates (among other possible options for revenue recycling). And reducing the taxes that are most damaging to the economy can lead to the largest benefits. Reducing personal, corporate, and payroll taxes, for example, can create stronger incentives for investment, profit, and hiring. Revenue recycling is central to the case for ecofiscal reform.

3. Smart Environmental Policy *Is* Smart Economic Policy *continued*

Figure 3: GDP (top) and Employment (bottom) Impacts of Ecofiscal Policies



Ecofiscal policies in Denmark, Germany, Sweden, and the United Kingdom bolstered economic growth, leading to more jobs and higher GDP.

Source: Based on data from Barker et al. (2009).

The potential benefit of reducing taxes is a key issue for Canada. As we discuss in Section 4, Canada has shown persistently low productivity growth—a key driver of long-term economic growth—over the last 20 years, particularly relative to the United States and other OECD countries (Rao, 2011; OECD, 2014b). Canadian business investment, another driver of productivity and growth, is similarly lagging, with historic lows in Ontario and Quebec in particular (Dachis et al., 2014). Lower taxes are one important factor that could lead to investment and productivity gains (Parsons, 2008), although admittedly, the empirical importance of this link remains debated.

The aforementioned analysis of ecofiscal policies in six European countries suggests that emissions reductions could be achieved with generally positive economic impacts both in terms of employment and GDP. Revenue was recycled in different ways in each country, with some combination of mechanisms including (1) reductions in income tax; (2) reductions in employer contributions to social security; and (3) public investment in energy-saving technologies. The results indicate that the European ecofiscal policies led to employment gains and positive GDP impacts in all six countries (Barker et al., 2009).

Figure 3 shows the estimated economic impacts of the ecofiscal policies used in Denmark, Germany, Sweden, and the United Kingdom. The two charts illustrate gains in GDP and employment resulting from ecofiscal policies, in each case showing the effect on the measure relative to the (counterfactual) case in which no policy change occurred. The analysis reveals that ecofiscal policies modestly improved economic outcomes over the medium term, though in some cases short-run adjustment costs are apparent.

Ecofiscal policies drive innovation

Innovation includes both the invention of new technologies and processes and the improvement of existing ones, and it is essential for improving economic and environmental performance. Innovations in processes allow the economy to produce more with less, thus improving productivity and driving economic growth.

Pricing pollution provides an important incentive for such innovation, as it leads firms to strive to avoid polluting activities (Fischer, 2009). At the same time, reductions in existing taxes (particularly corporate taxes) also drive innovation. Both "halves" of ecofiscal policies can increase the expected returns on research and development, and can stimulate innovation that reduces the costs of achieving environmental improvements (Newell et al., 1998; OECD, 2010).

Ecofiscal policies provide an enduring, consistent incentive to develop new ways to reduce costs: if pollution has a price, innovations to reduce pollution are valuable. In contrast, prescriptive regulatory approaches that mandate specific technologies or levels of performance typically provide incentives to reduce pollution only up to a required performance standard. Ecofiscal policies therefore provide an impetus for ongoing gains in productivity.

If pollution has a price, innovations to reduce pollution are valuable.

A growing body of evidence supports the link between ecofiscal policies and innovation. A comprehensive review from the European Environment Agency (2011) found that market-based environmental policies increase innovation and the diffusion of environmental technologies. OECD (2009) analysis suggested that a carbon price designed to stabilize global GHG emissions would lead to more than a four-fold increase in energy-related research and development expenditures. Analysis of patent data from 1978-2008 for 11 OECD countries suggests that increases in fossil fuel prices (a proxy for a price on carbon) lead to increased inventive activity around renewable technologies relative to fossil fuel technologies (Lanzi et al., 2012). Similarly, analysis of around 4,200 firms in seven OECD countries suggests that flexible performance standards have an impact on research and development expenditures, while rigid, prescriptive technology standards do not (Lanoie et al., 2011).

A global price on carbon that stabilizes GHG emissions would quadruple global investment in energy-related research and development.

In terms of evidence from specific policy examples, reductions of SO_2 emissions in the electricity sector in the United States came at a significantly lower cost than expected under the cap-and-trade system implemented in the 1990s. Innovations in fuel blending and in industrial organization emerged that led to lower costs for emissions reductions (OECD, 2010). The program provided incentives that accelerated technological change, even if some of the innovation was already happening (Burtraw, 2000).

Similarly, Sweden's policy to price emissions of nitrogen oxides in the 1990s appeared to drive increased innovation. The timing of the policy correlated with a sharp increase in patents for technologies to reduce NO_x emissions. Moreover, both the costs of reducing pollution and the emissions intensity of regulated Swedish facilities continued to decline after the policy was implemented, suggesting the policy continued to create incentives for emissions-reducing innovations (OECD, 2010).

The countries that signed the Montreal Protocol implemented a variety of effective and flexible policies to achieve reduction goals (such as Canada and the United States using cap-and-trade systems), which led to the commercialization of various inventions for reducing ozone-depleting substance pollution (Stavins, 2007).

A survey of multiple studies finds clear evidence of a link between environmental policy and innovation, but the strength of this link admittedly varies (Ambec et al., 2011). Lanoie et al. (2011) found evidence both that environmental policy stimulates innovation and has a positive effect on business performance, offsetting some of the costs of complying with environmental policy.

3.2 ALTERNATIVE POLICY APPROACHES CAN BE EXPENSIVE

Environmental policies in Canada have largely relied on approaches that are less cost-effective than ecofiscal policies. While regulatory approaches and subsidies can be useful in some circumstances, ecofiscal tools generally offer a more cost-effective way to achieve environmental objectives. We focus on two types

of costs: those to the economy in terms of reduced income and productivity, and those to governments in terms of fiscal impacts. Each is discussed below.

Ecofiscal policies are more cost-effective than regulatory approaches

Ecofiscal policies are said to be *cost-effective* when environmental objectives can be achieved at lower costs to the economy than when using alternative policies. For three reasons, ecofiscal policies tend to be cost-effective.

First, ecofiscal policies are flexible and rely on market forces. Unlike *command-and-control* regulatory approaches, market-based approaches can ensure all polluters covered by the policy are led to reduce pollution overall at the least possible cost (e.g., Goulder and Parry, 2008). Establishing a price on pollution gives households and firms the incentive and flexibility to reduce pollution in a way that best suits their own situation. In contrast, regulations require specific actions or the use of specific technologies, even though the costs of taking these actions may vary between different firms or different households. Such prescriptive regulations usually result in higher total costs for any given amount of pollution reduction.

Ecofiscal policies give people and businesses the flexibility to find the least expensive solution that works for them.

Second, unlike direct regulations, ecofiscal tools generate revenues that can be used to reduce existing taxes. Corporate and personal income taxes impose a drag on the economy. Reducing these taxes encourages more economic activity and so further reduces the costs of environmental policy.

Third, direct regulations generally provide less incentive for innovation. Under a regulatory standard, polluters have incentives only to achieve the required level of performance. With ecofiscal policies, on the other hand, the price on pollution provides continuous incentives for deeper reductions and for creating new technologies that drive greater environmental improvements.

Policy experience supports these arguments. For example, the cap-and-trade system for SO_2 in the United States did not include revenue recycling (permits were provided to emitters for free). Even so, the flexibility provided by permit trading resulted in massive cost savings (estimated at around $800 million per year) when compared with costs under regulatory alternatives for achieving the same reductions in acid rain (Stavins, 2007; Carlson et al., 2000).

Despite the higher total costs associated with direct regulations, they are politically attractive because the costs are often hidden from public view—regulations usually have no direct impact on a government's budget, but nonetheless impose real costs on businesses and consumers. This helps to explain their ongoing popularity with governments. The irony, of course, is that ecofiscal policies such as pollution taxes, which impose explicit costs on polluters, end up leading to lower overall costs to society for any given amount of pollution reduction.

Direct regulations to reduce pollution cost businesses and consumers more than policies that put an explicit price on pollution.

Environmental subsidies are often unnecessarily expensive

Canada has often relied on *subsidies* to create incentives for actions that reduce environmental impacts. For example, until 2012, the federal government provided tax credits to homeowners who increased the energy efficiency of their homes by improving insulation or upgrading furnaces. It continues to provide a tax credit to users of public transit.

For two reasons, subsidies of this type are often unnecessarily costly to government, using funds that could be better spent elsewhere. First, subsidies identify and target specific prescriptive actions to reduce pollution. Yet governments have shown limited success in identifying the best opportunities for reducing pollution. For example, in the case of ethanol subsidies, Canadian governments have provided levels of support equivalent to 20% to 70% of the market value of the product. But the average costs of the associated GHG emissions reductions have been very high—on the order of $200 to $430 per tonne (Auld, 2008; Laan et al., 2011). In contrast, ecofiscal tools generally provide broad incentives to reduce pollution and rely on market signals to best identify the least-cost options available for reducing pollution.

Second, subsidies can be problematic because they may reward companies or individuals for taking actions they would have taken even in the absence of the subsidy. While some commuters might choose to take public transit only because of the incentive provided by the tax credit, many others would have done so—those without cars, for example—even without the tax credit. In these cases, there is a fiscal cost of providing the subsidy but no associated environmental benefit.

Subsidies can therefore be much more expensive in achieving pollution reductions than ecofiscal policies. For example, four provinces in Canada provide rebates for purchases of hybrid electric vehicles (British Columbia, Ontario, Prince Edward Island, and Quebec) as a technology that can reduce greenhouse gas emissions. Analysis suggests that the associated emissions reductions have an average cost of $195 per tonne (Chandra et al., 2010). These are very expensive reductions; British Columbia's carbon tax is successfully driving emissions reductions at a current cost of only $30 per tonne.

Ecofiscal policies are not the best tool for *all* policy problems

While ecofiscal policies are generally the most cost-effective, other instruments can play a useful role in certain circumstances.

A regulatory approach may be more appropriate when critical thresholds or extreme damage from pollution exist (e.g., health risks). In these cases, command-and-control policies may be required to ensure no local area exceeds the threshold (e.g., some toxics). Similarly, when environmental improvements are required very quickly, regulations might be more appropriate. In some situations, immediate reductions are required, such as with new risks identified from toxic substances. In contrast, ecofiscal instruments create incentives by changing relative prices, and so their impacts occur gradually over time as individuals and companies respond to the policy by changing their behaviour.

Further, subsidies or command-and-control regulations can sometimes usefully complement ecofiscal tools. Multiple policy instruments may sometimes be required. For example, while ecofiscal policies can drive innovation, broad subsidies to research and development can complement pollution-pricing policies. Regulations might also be useful when consumer behaviour is particularly insensitive to price changes, especially in the short run. Vehicle efficiency standards, for example, shift manufacturers toward supplying fuel-efficient vehicles more quickly than price instruments affect drivers' demand. Finally, firms often have insufficient incentives to innovate, and public support for research can be justified in these cases. In conjunction with ecofiscal policies, these subsidies can accelerate the development of new technologies to reduce pollution and environmental damage, providing more options for individuals and companies looking for ways to respond to the prices on pollution.

3.3 WELL-DESIGNED ECOFISCAL POLICIES ARE FAIR

Polluters impose costs, ranging from the health effects from dirty air and water to lost worker productivity and output, on the rest of society. Of course, all of us cause some amount of pollution every day, but some cause far more pollution than others. It's only fair that polluters be required to pay for these costs, and ecofiscal policies automatically generate this outcome.

Ecofiscal policies can also be designed to ensure an acceptable level of fairness in other dimensions—fairness to future generations, to regions, to low-income households, and to vulnerable sectors.

We are accountable to future generations

Future generations should not be left worse off as a result of actions taken now, yet environmental damage occurring today represents a genuine threat to their living standards. Impacts from climate change, for example, are expected to have major economic implications for Canada. The National Round Table on the Environment and the Economy (NRTEE) (2011) found that the costs of climate change in Canada could rise from around $5 billion annually in 2020 to between $21 billion and $43 billion annually by 2050 (in 2006 dollars). As discussed earlier, environmental resources cannot be depleted indefinitely without threatening Canadian prosperity.

Ecofiscal policies need not lead to interprovincial wealth transfers

As already discussed, some ecofiscal policies are probably best implemented at a provincial or municipal level. Decentralized policies can better reflect the unique circumstances of each region, and can also ensure that wealth is not transferred between provinces. Even if a Canada-wide policy is preferred because of the desire for policy uniformity across the country, it can be designed to ensure that all new revenues are recycled within the province in which they are generated (Peters et al., 2010).

Well-designed ecofiscal policies need not create financial transfers across provinces or regions.

Ecofiscal policies can be designed to protect low-income households

Ecofiscal policies can be designed to avoid excessive burdens being placed on lower-income households. Since lower-income households tend to spend a larger share of their income than higher-income ones on transportation and fuels for heating and cooking, it is not surprising that studies often show environmental taxes (especially those on energy) to be regressive (Blobel et al., 2011; OECD, 2006; World Bank, 2005).

Careful policy design can address these distributional impacts. Using a portion of revenue generated by ecofiscal policies to directly compensate low-income households—for example, through

Box 6: Water Pricing in Singapore

Equitable pricing helped Singapore achieve a 9% reduction in water consumption without hurting low- and middle-income families.

As an island with high population density, Singapore faces various resource challenges. Its supply of fresh water is so limited that Singapore purchases a large share of its water from Malaysia via pipeline. With current demand (approximately 1.5 billion litres per day) projected to double by 2060, Singapore seeks to become increasingly self-sufficient (Singapore Government, 2013).

A water-pricing system designed to recover costs associated with both water provision and wastewater handling, as well as to create incentives for conservation, is central to this strategy. Prior to 1997, households in Singapore paid a significantly lower price than businesses for water use. Singapore implemented a revamped water tariff system in 1997, with water prices between households and industry more closely aligned, and designed to better reflect the full economic and ecological cost of the water provision and treatment. A water bill in Singapore includes explicit line items for water and infrastructure use, highlighting costs per unit of water used by households and businesses alike. A system of block pricing means that greater consumption costs more, creating incentives for water conservation.

These fees, however, take up a disproportionate share of budgets for lower-income households. To address such regressive impacts, the Singaporean government provides a subsidy for low- and middle-income households. It provides a quarterly sales-tax rebate that reflects water and electricity expenditures based on the number of rooms in a household (Singapore Government, 2014). The design of this rebate ensures that vulnerable households have an incentive to reduce water consumption while still mitigating the negative impact on their purchasing power.

Singapore's water-pricing reforms are highly effective. Per capita water consumption decreased from 176 to 160 litres per day between 1994 and 2005, with a target of 140 litres per day by 2030.

Canada's HST transfers—the overall equity of the policy can be improved. Mathur and Morris (2012) found that redirecting 11% of the revenue from a $15 per tonne carbon tax to the poorest 20% of U.S. households would leave them no worse off as a result of the tax. Rivers (2012) found in the Canadian context that less than 10% of revenue from a $30 per tonne carbon tax would be required to avoid regressive impacts for low-income households. Analysis of ecofiscal policies used in the Netherlands and Sweden suggests that similar transfers almost totally neutralized the regressive impacts (Blobel et al., 2011). See Box 6 for details on how water-pricing policies in Singapore have been designed to avoid undesirable impacts on low-income households.

Ecofiscal policies need not harm firms' competitiveness

If Canadian firms are subjected to increased costs from unilateral domestic policies while foreign firms do not face similar policies in their countries, concerns are rightly raised about the threat to Canadian firms' competitiveness. Investment and production might shift to countries with less stringent policies, in which case there may be no net improvement in global environmental performance. In such situations, Canada would merely be "exporting" its pollution abroad, and suffering economic costs in the process. At a national scale, this risk is particularly pertinent with respect to the United States, given the close integration of many North American markets. Similar risks could also exist at the provincial level if policy in some provinces advanced much further ahead than others.

Concerns regarding competitiveness are most justified for sectors that are both pollution intensive and active in international commodity markets (Reinaud, 2008; Aldy & Pizer, 2007). For example, in the case of ecofiscal policies to reduce greenhouse gas emissions, firms producing aluminum, cement, pulp and paper, and steel have relatively high costs of mitigation and little or no influence on their pricing, because they compete in global commodity markets. The result is potential vulnerability to ecofiscal policies.

In contrast, sectors that are less pollution intensive and have well-established brands and pricing power—such as high-end clothing, furniture, prepared foods, and professional and financial services—are far less vulnerable to the effects of ecofiscal policies.

3. Smart Environmental Policy *Is* Smart Economic Policy *continued*

Perhaps surprisingly, current evidence suggests that, though the impact on specific sectors may be significant, ecofiscal policies tend to have only small implications for the economy as a whole (e.g., Reinaud, 2008; Barker et al., 2009; Quirion & Hourcade, 2004; NRTEE, 2011). One study, for example, estimates that a small carbon price ($15 per tonne) in the United States would shift less than 1% of manufacturing production overseas and have no discernable impact on manufacturing employment (Aldy & Pizer, 2007). These short-term costs are analogous to the transitional adjustments under trade liberalization. In both cases, the economy adjusts to new prices over time; capital gets reinvested appropriately, and jobs shift to alternative industries.

Similarly, recent research in the United Kingdom finds no evidence that the competitiveness of firms has been negatively affected by that country's climate-change policies, and also suggests that well-designed policies can *create* business opportunities for UK firms by improving productivity relative to that in other countries (Bassi & Zenghelis, 2014). Positive competitiveness impacts are increasingly relevant as other jurisdictions implement their own ecofiscal policies. For example, while some Ontario sectors (e.g., cement and petroleum product manufacturing) might face risks under carbon-pricing policies, other Ontario sectors (e.g., electricity, pulp and paper, and food manufacturing) could have a carbon *advantage* relative to North American competitors in a carbon-constrained market (Sawyer, 2013).

Despite this evidence, the potential threats to competitiveness cannot be dismissed. Two issues deserve mention. First, the adoption of poorly designed environmental policies can harm firms' competitiveness. Parts of German industry are concerned, for example, that high energy prices (caused by subsidies for renewable electricity and the closure of nuclear plants) will undermine their competitiveness (Karnitschnig, 2014). Second, given the limited stringency of ecofiscal policies implemented in most jurisdictions, there remains considerable uncertainty regarding the magnitude of competitiveness impacts. It is possible that more aggressive policy changes could lead to disproportionate impacts on firms' competitiveness.

Whatever impacts might be created from a stand-alone pollution-pricing policy, however, the advantage of using a well-designed package of ecofiscal policies is that there is scope to adjust other taxes in an effort to mitigate these effects. For example, higher taxes on pollution can be offset with rebates, transfers, or reductions in corporate tax rates. Providing free allocation of permits in a cap-and-trade system can also counteract incentives for moving production abroad (Fischer & Fox, 2009, 2004). Border adjustments can level the playing field with firms based in unregulated jurisdictions. And the gradual introduction of policy can give firms time to adjust. All of these approaches have advantages and disadvantages in addressing competitiveness issues, but all of them, if designed properly, can be used to address the legitimate concerns regarding the competitiveness of Canadian firms.

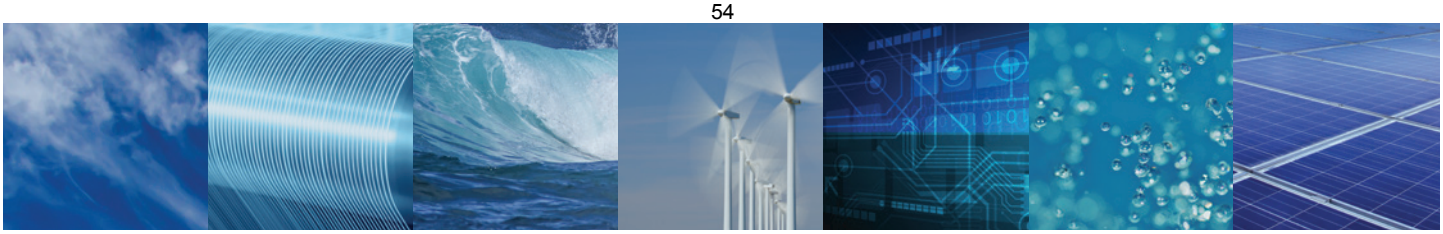
Ecofiscal policies align with a competitive economy

Innovation and efficient use of our natural resources are critical to improving Canada's productivity, and ultimately our competitive position in the 21st-century economy. While ecofiscal policies will impact different sectors in different ways, evidence shows that they have little impact on the overall economy. Countries that have already adopted ecofiscal policies show no tendency for their firms to relocate elsewhere. As other nations continue in this direction, Canadian industries have an opportunity to benefit from increased global demand for cleaner technologies.

"We need to be thinking about how to stay competitive not just in five or 10 years, but also in 20 and 50 years. The Ecofiscal Commission is focusing on solutions that would better position Canadian industries to achieve a competitive advantage in a rapidly evolving global economy."

Steve Williams

President & CEO, Suncor Energy



4. Canada Can Do Better

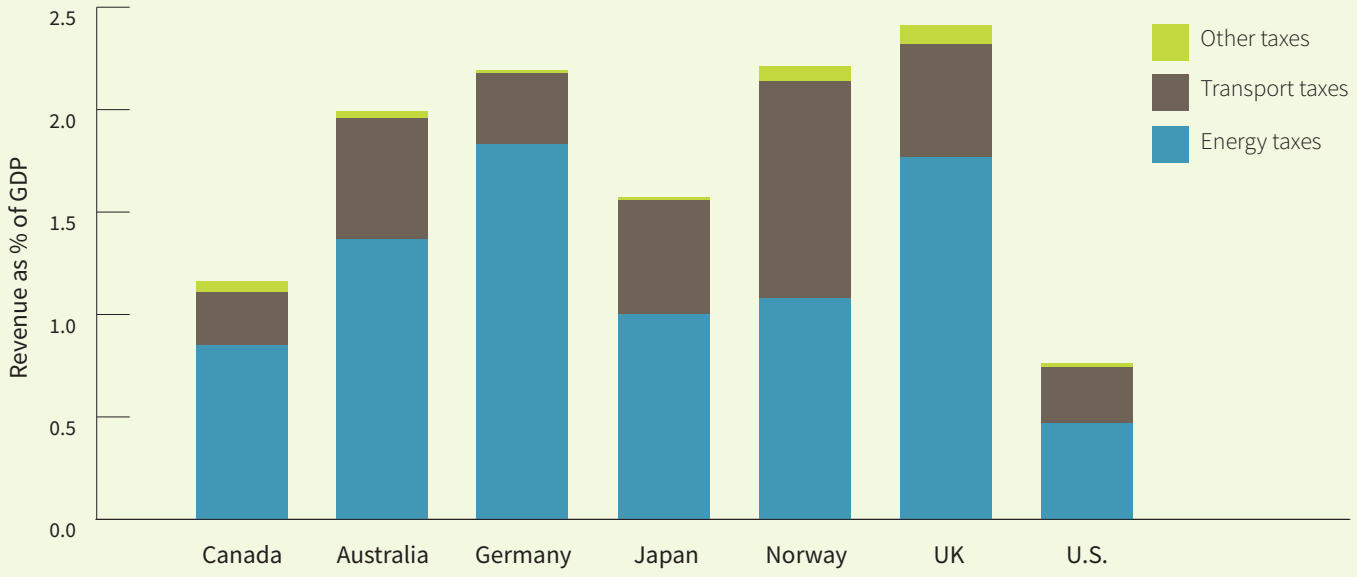
Canadians have come to enjoy a standard of living envied around the world. Yet we can do even better. Putting ecofiscal policies in place is a key step for Canada to improve its management of natural assets and ensure a sustained prosperity.

Measurement is crucial for policymakers: it helps identify gaps, as well as the best policies to address them. This section benchmarks Canada's performance against a group of comparable jurisdictions, including select countries from the G7 (Germany, Japan, the United Kingdom, the United States), plus two other small, resource-rich advanced economies (Australia and Norway). First, we assess the extent to which Canadian governments have implemented ecofiscal policies. Second, we benchmark Canada's economic performance. Finally, we benchmark Canada's environmental performance.

4.1 CANADA MAKES LIMITED USE OF ECOFISCAL POLICIES

To what extent does Canada use ecofiscal policies relative to other jurisdictions? Figure 4 shows OECD estimates illustrating the revenues generated by "environmentally related taxes" as a share of GDP. (Note that the OECD's definition includes taxes on any

FIGURE 4: Environmentally Related Tax Revenue, 2012



Canada uses environmentally related taxes less than most comparable countries.

Source: Based on data from OECD (2014c). Note that most resource royalties are excluded from these data, though some provincial data appear to be inconsistent; for example, some mineral royalties in British Columbia and Quebec are included.

activity directly related to pollution.) Canada is second lowest in the group, suggesting that it is behind the curve in shifting to policies that can more closely align its economic and environmental objectives.

Figure 4 includes three categories of environmentally related taxes: energy taxes, transport taxes, and other taxes. Energy taxes include those that apply to energy products and CO_2 emissions associated with the consumption of fossil fuels. Transport taxes refer to those relating to the ownership and use of motor vehicles. Other taxes include pollution and resource taxes, such as waste charges. In all countries shown, most environmental tax revenue is generated from energy and transport taxes. While the OECD's definition does not align perfectly with ecofiscal policies, it provides a useful metric to assess Canada's relative use of policies that price pollution and environmental damage.

For Canada, the greatest revenues come from the federal and provincial fuel taxes as well as provincial motor vehicle licence fees. None is designed to achieve environmental objectives, but indirectly they all create incentives for reduced energy use and thus generate environmental benefits. The Canadian data also include policies designed with explicit environmental objectives; British Columbia's carbon tax is the most significant in terms of revenue. Remaining pollution and resources taxes are marginal in scale or in national coverage.

Total Canadian government revenues now represent over one-third of our GDP, yet our ecofiscal revenues are just above 1% of GDP. Ecofiscal reform thus presents a tremendous untapped opportunity. Canada could raise an additional 1% to 1.5% of GDP through ecofiscal policies if it adopted rates comparable to those in the United Kingdom, Norway, and Germany. Similarly, the International Monetary Fund recently suggested that Canada could raise additional revenue equal to 1.4% of GDP, or about $26.5 billion, with energy taxes that reflect the marginal damage caused by fossil fuel consumption and traffic congestion (Parry et al., 2014). Indeed, taxes on various kinds of pollution could be increased, or created anew where they do not yet exist; at the same time, various other, more distortionary and growth-retarding taxes could be reduced. No change in overall government revenues would be necessary to create such an ecofiscal reform.

4.2 CANADA CAN IMPROVE ITS ECONOMIC PERFORMANCE

Comparing economic performance between countries is challenging; each country has unique characteristics and its own strengths and weaknesses. A few key indicators are nonetheless suggestive.

Figure 5 benchmarks Canada in terms of three complementary economic indicators:

- GDP per capita is a comprehensive measure of average income within an economy and is the most widely accepted measure of its residents' material living standards.

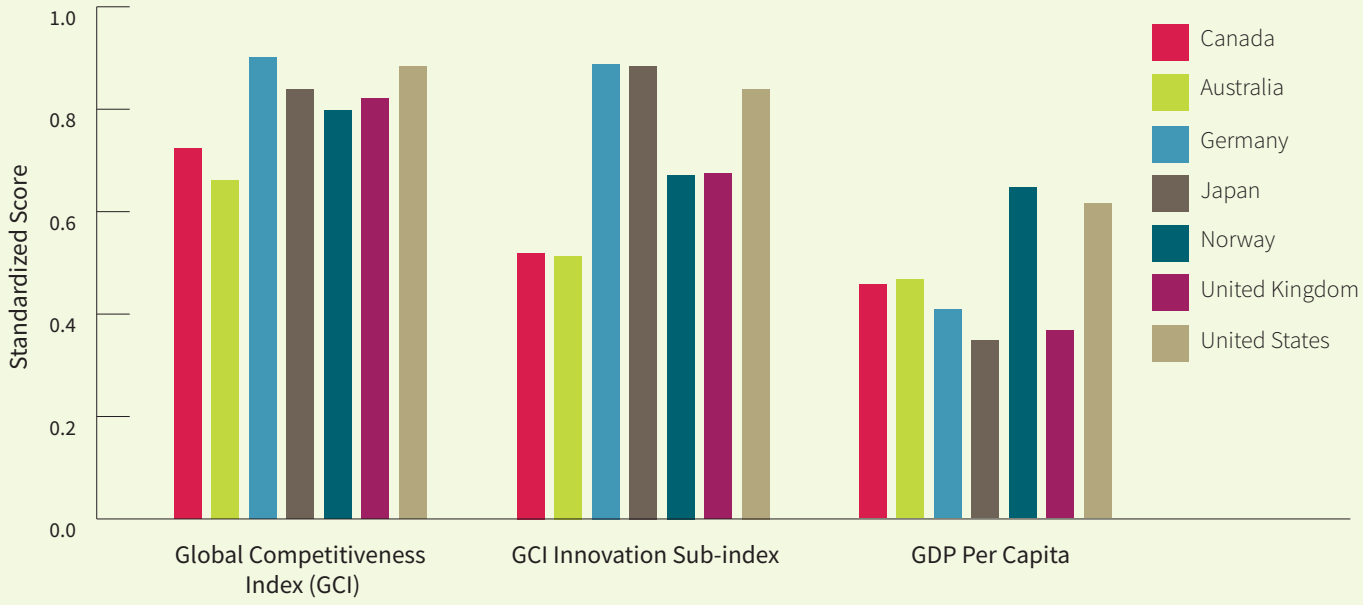
- The World Economic Forum's Global Competitiveness Index (GCI) considers important drivers of productivity such as the quality of institutions, infrastructure, education, and other market factors.

- The Innovation Index is a sub-index within the broader GCI that focuses specifically on innovation, including private investment in research and development, patent applications, and university-industry collaboration.

Figure 5 illustrates Canada's well-documented limitations in terms of innovation, which have contributed to anemic productivity growth in recent decades (Drummond & Bentley, 2010; Council of Canadian Academies, 2013). The World Economic Forum notes that "Canada's competitiveness would be further enhanced by improvements in its innovation ecosystem," such as increased spending by businesses in research and development and by government in technological products (WEF, 2013b). Countries ranking higher in terms of overall competitiveness systematically rank higher in the innovation component. Top-ranking countries for competitiveness such as Germany and the United States rank significantly higher than Canada in innovation.

Canada's relatively poor innovation performance is consistent with its low growth in labour productivity. Stronger labour productivity means producing more goods and services with fewer hours of work—so innovation is naturally a key long-run driver of productivity growth. Canadian labour productivity since 2000 has grown at roughly half the annual rate from the preceding three decades. In addition, Canada's performance pales in comparison with that of our most important trading partner: productivity growth in the overall U.S. economy has been about three times the Canadian rate since 2000 (Drummond, 2011; Drummond et al., 2013). If we consider only the business sector, Canadian labour productivity growth has been consistently lower than in the United States since 2008 and has even declined in some years (Statistics Canada, 2013).

FIGURE 5: Three Indicators of Economic Performance



Canada's economic performance is in the middle of the pack; it particularly lags the comparator countries in terms of innovation.

Sources: Based on data from OECD (2014c); WEF (2013a). Figures 5 and 6 use normalized indices for the various indicators. For each indicator, the country with the highest score is rescaled to 1, and the one with the lowest score is rescaled to 0. This scale maintains both the rankings relative to other OECD countries and the relative magnitude of scores.

This productivity gap and poor innovation record could jeopardize Canada's relatively strong current performance in terms of GDP per capita. It is often heard that the prominence of Canada's resource sector accounts for the country's long-standing weakness in innovation, and that our continued emphasis on resource development inevitably confines us to this path. Yet the data in Figure 5 suggest this is not the case. Norway is also a resource-intensive economy and scores 29% higher than Canada on the GCI's Innovation Index. Resource development and innovation are not incompatible.

Improved productivity is ultimately the path to higher long-run living standards, and better management of natural resources is part of the story. Properly valuing our natural resources through smart policies will allow Canadians to reap the maximum benefits of our resource-based economy. Innovation and efficient resource use will improve Canada's productivity and competitive position.

4.3 CANADA CAN BETTER MANAGE ITS NATURAL ASSETS

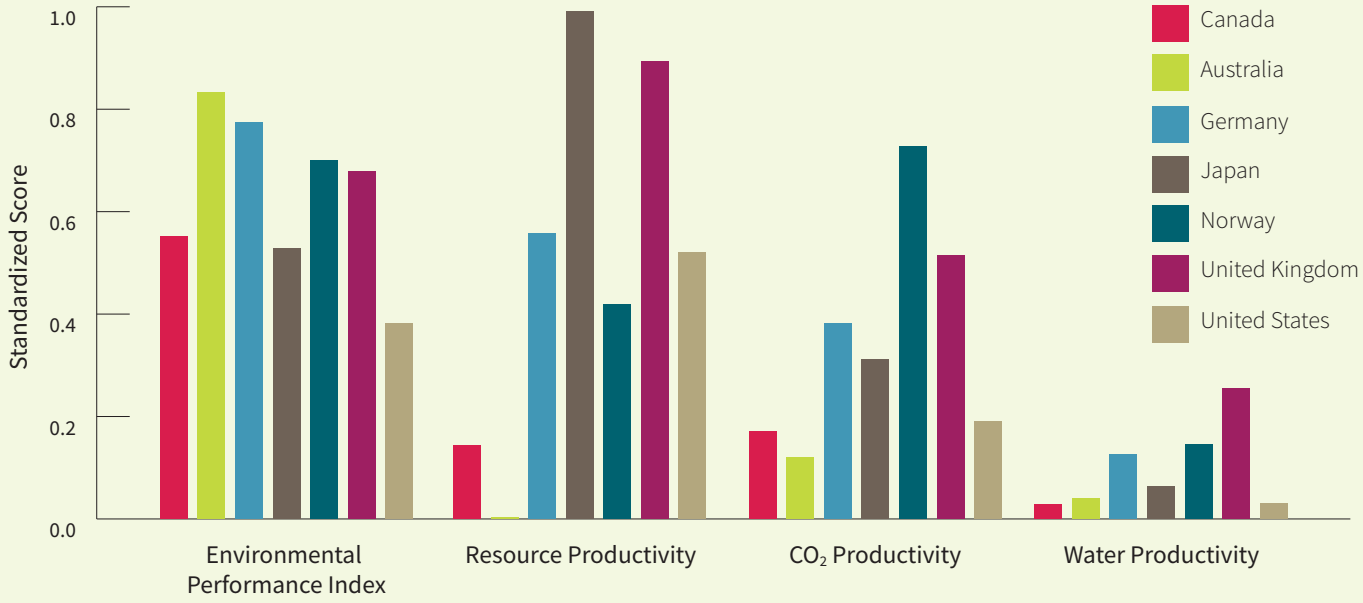
To what extent can Canada improve its management of natural assets? As with measures of economic performance, unique circumstances of each country make comparing environmental performance challenging. Yet benchmarking Canada against other countries can help identify gaps in Canadian performance.

Figure 6 compares Canada with the same set of countries, using four different aspects of environmental performance:

- The Environmental Performance Index (EPI) is a biennial index covering a wide range of national-level environmental data developed by Yale and Columbia universities in collaboration with the WEF. The 2014 framework combines 20 indicators focused on the protection of human health from environmental damage, ecosystem protection, and resource management. Performance is based on the extent to which various policy targets are being achieved.

4. Canada Can Do Better *continued*

FIGURE 6: Benchmarking Canada's Environmental Performance



Canada's environmental performance lags behind the comparator countries, particularly with respect to resource use, greenhouse gas emissions, and water use.

Sources: Based on data from EPI (2014), World Bank (2014a) and OECD (2014c). See the note to Figure 5 for an explanation of the construction of these indicators.

- Resource productivity is an index of GDP per unit of non-energy materials used. This indicator is Europe's headline indicator for its Resource Efficiency Roadmap (European Commission, 2011).

- CO_2 productivity is an index of GDP per unit of CO_2 emitted. It reflects the extent to which a country generates economic growth without producing carbon dioxide emissions.

- Water productivity is an index of GDP per cubic metre of fresh water used. It shows how efficiently water is used within a country's economy.

While these metrics do not represent a comprehensive analysis of all dimensions of environmental sustainability, they provide a useful window into Canada's performance as well as its ability to generate income while minimizing resource depletion. Among its peers, Canada ranks third worst on the Environmental Performance Index. While Canada scores vary highly in terms of achieving its targets for protecting human health from environmental damage, it has low scores in terms of ecosystem protection and resource management. Based on EPI's indicators, the most pressing issues for Canada are its loss of forest cover, its failures to achieve policy targets for fish stocks and habitat conservation, and its failure to de-intensify economic growth from carbon emissions.

Canada depletes more natural assets and produces more waste per unit of GDP than comparator countries.

The three productivity indices in Figure 6 reinforce Canada's ranking under the EPI. Our average per capita income is admittedly enviable, but we lag far behind our peers in terms of *how* we choose to produce that income. Each unit of Canadian GDP depletes more natural assets, uses more material inputs, and generates more harmful greenhouse gas emissions than is the case in our comparator countries. The World Energy Council's 2013 assessment of 129 countries is further evidence of Canada's poor performance in terms of environmental sustainability. While Canada scores well

4. Canada Can Do Better *continued*

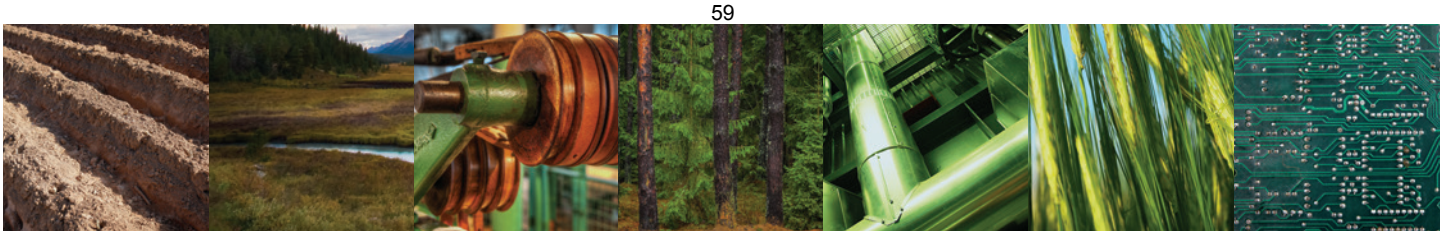
for measures of energy security and energy equity, it ranks 60th for environmental sustainability (World Energy Council, 2013). There is an opportunity here to do much better.

Of course, part of Canada's environmental performance is due to structural factors and national circumstance. Major Canadian sectors such as mining, and oil and gas development are typically more polluting and resource intensive than many others. Similarly, Canada's relatively abundant freshwater resources have led to weaker incentives to improve water productivity.

Yet Canada's long-held comparative advantage in the production of natural resources makes ecofiscal reform more important, not less. While it is likely that Canada will always be more resource intensive than Japan or Germany, for example, ecofiscal policy can help us make better use of our valuable resources. As pressure on our fresh water mounts from greater development and ongoing climate change, and international political pressure grows to constrain greenhouse gas emissions, Canada's environmental performance will have even closer connections to its long-run economic performance. Getting prices and incentives right is critical if we are to continue benefiting economically from our natural wealth while also easing the transition to new and cleaner technologies over time.

Australia—another highly developed, resource-intensive economy—is often compared to Canada in discussions of economics and the environment. Australia scores much higher on the EPI, having achieved more policy goals for issues related to ecosystem vitality. For example, the index suggests that Australia has better managed its forest cover and habitat conservation. However, like Canada, Australia faces challenges with respect to more aggressively reducing its carbon intensity and better protecting its fish stocks. Australia's low scores on environmental productivity indicators highlight room for improvement in creating economic growth that is decoupled from environmental damage.

Norway also ranks higher than Canada on the EPI, though it too faces challenges related to forest cover and poor management of its fisheries. However, Norway's performance on environmental productivity indicators suggests that it is possible for resource-rich countries to generate strong economic growth with lower environmental damage and depletion of natural assets. Is it only coincidence that Norway's strong performance in both environmental and economic terms aligns with its relatively greater reliance on ecofiscal policies?



5. The Time for Action Is Now

As the link between environmental assets and economic prosperity becomes clearer, ecofiscal policies grow in relevance. For several reasons, there are clear advantages to beginning now on the path to reform.

5.1 DELAY IS COSTLY

A global transition to a cleaner economy is already underway. As a small and open trading nation, Canada will eventually make the same transition. But starting now, and moving gradually, is far less costly than delaying action until much later, when sudden and dramatic policy actions will likely be necessary.

Canada must avoid "locking in" to pollution-intensive infrastructure

In the absence of ecofiscal policies, Canadian firms will continue to make investments in technologies that lead to environmental degradation. In many cases, these investments are long-lasting. Coal-fired power plants, for example, have a working life of around 40 years. Once new infrastructure is built, it becomes expensive to retire prematurely. Essentially, we become "locked in" to pollution-intensive and environmentally damaging facilities, even when better alternatives become available. The same logic applies to buildings, manufacturing facilities, and vehicles.

Continued delay in the evolution of policy creates uncertainty that hinders the ability of firms to make investment decisions. An uncertain future policy landscape leads to risks of current assets becoming "stranded" if their value falls significantly in the presence of selected future policies (Lee & Ellis, 2013). Some Canadian firms are already building "shadow" carbon prices into their investment decisions in an effort to manage these risks and anticipate the effects of future ecofiscal policies (Sustainable Prosperity, 2013). In contrast, starting now to gradually implement ecofiscal policies creates long-term and predictable incentives for making choices that are less environmentally damaging. Firms and households will make investments based on their long-term expectations regarding the price of pollution.

A cost-effective transition to a clean economy takes time

Ecofiscal policies influence investment and purchasing decisions by changing relative prices. Industrial burners that produce fewer nitrogen oxide emissions, for example, become economical when a price is placed on air pollutants. Water-efficient appliances are more desirable when water use is priced appropriately. Yet firms and households tend to make these investments only when old equipment is ready to be replaced, unless incentives are strong enough to justify an earlier switch. The changes induced by policy, therefore, take time to have their full effects.

Ecofiscal policies also create incentives for the development of new, innovative technologies that can reduce environmental damage. In the long term, innovation is an essential benefit of ecofiscal policies, but it takes time for innovations to mature and lead to reduced environmental damage.

Evidence on the costs of delay in responding to pollution is particularly strong in the context of climate change. The recent fifth assessment report from the Intergovernmental Panel on Climate Change (2014) showed a range of estimates for the costs of reducing GHG emissions, but they all grow much higher, the longer the delay in policy actions. Similarly, the OECD's estimates suggest that for every $1 of clean energy investment *not made* in the electricity sector before 2020, expenditures of $4.3 would be required between 2021 and 2035 to make up for increased emissions (OECD, 2011). And in the United States, each decade of climate policy delay increases the costs of the eventual policy actions by 40% (Council of Economic Advisers, 2014).

In the Canadian context, a recent report estimates that waiting until 2020 to implement climate policies sufficient to achieve deep emissions reductions (65% below 2005 levels) by 2050 would cost

Canadians $87 billion more than taking equivalent action now. Costs of delay come in the form of refurbishments, retrofits, and the premature retirement of assets (NRTEE, 2012).

$87 billion = Cost to Canadians of delaying until 2020 actions to achieve deep reductions in carbon emissions by 2050.

5.2 ECOFISCAL POLICIES CAN CREATE SOCIAL LICENCE

The concept of social license has occupied headlines in Canada since 2013, particularly in the context of pipelines. Major development projects—new pipelines, forestry projects, power plants, mines, or oil sands projects—are increasingly contingent on local stakeholders' attitudes and approval. Without social license, organized opposition can stymie major projects. Ernst and Young (2013) suggested that a lack of social license is now one of the top business risks for the mining and metals industry.

Social license is particularly important for Canada given the importance of our natural resource sectors. Resistance to the Keystone XL and Northern Gateway pipelines, for example, largely stems from concerns about environmental impacts. As argued in a report written by the former head of the Canadian Gas Association, a more systematic approach to sustainable development can improve public support for major resource projects (Cleland, 2014).

While the need for social license might once have applied on a project-by-project basis, the challenge is now more general (McLaughlin, 2013). Public policy—and ecofiscal policies in particular—can help create the necessary social license. Resource industries struggle with social license partly because current policies in Canada provide insufficient incentives for environmental protection. In the absence of an overall policy framework that protects the environment, stakeholders oppose individual projects. Making polluters responsible for their environmental damage under effective ecofiscal policy could enable new support both domestically and internationally.

Environmental "credibility" is important for gaining access to international markets

Social license from credible environmental policy matters for Canada's access to international markets. The Canadian Chamber of Commerce (2014) noted that clear sustainability policies are crucial, given that perceptions of environmental impacts are becoming increasingly important to the success of Canada's natural resource sectors. For example, sustainable forest management practices are now an advantage for British Columbia's forestry sector in terms of competing in a global market (Working Roundtable on Forestry, 2009). Improved environmental performance—and the social license that comes with it— has allowed Canada's forestry sector to regain international market share.

On the other hand, weaker environmental performance at home can threaten market access abroad. Failing to implement policies adequate to achieve our targets for greenhouse gas emissions, for example, has exposed Canada to international criticism and left it vulnerable to international policy decisions (Cleland, 2014). Some suggest that more effective policies designed to reduce Canada's greenhouse gas emissions could help facilitate American political approval of the Keystone XL Pipeline (e.g., Panetta, 2014).

As other countries continue implementing their own ecofiscal policies, they may choose to impose policies harmful to Canadian exports. For example, low carbon fuel standards—such as those in California and Europe—would penalize Canadian fuel exports, given their higher life-cycle emissions. Countries implementing carbon pricing could similarly implement tariffs based on carbon content in order to prevent their own firms from being disadvantaged by Canadian ones operating within a weaker policy context (NRTEE, 2012).

Canada can act now in good company.

Canada can drive its own policy agenda without waiting for the leadership of other nations. Canada's economic strengths and natural assets are unique, and we require solutions specific to our national context. We cannot ignore the relationship with our closest trading partner, but we can act now and know we are in the good company of the world's most economically competitive nations.

"Canadian competitiveness concerns require making smart ecofiscal decisions, not delaying them."

Paul Martin

Former prime minister of Canada

Credibility also matters for domestic support

Resource development projects face related challenges across this country. First Nations communities and environmental groups are campaigning against the Northern Gateway pipeline in British Columbia, expressing concerns about potential pipeline leaks, and oil tanker traffic and spills on the Pacific coast, as well as upstream pollution from the oil sands. First Nations in New Brunswick are protesting shale gas exploration because of the associated risks to water supply and traditional land rights (McLaughlin, 2013). In Ontario, First Nations have similarly protested chromite mining inside the Ring of Fire, partially based on the possible impacts on water quality (Scoffield, 2012).

It is worth emphasizing that even an aggressive use of ecofiscal policies would not be sufficient to fully address these issues. Building trust between governments, First Nations communities, and stakeholders requires a broader process of engagement and communication. Yet re-establishing confidence in public policy and regulatory systems is central (Cleland, 2014). The introduction of ecofiscal policies designed to value and protect environmental resources could play an invaluable role.

5.3 GLOBAL MARKETS ARE CHANGING, AND CANADA MUST KEEP PACE

Big investments in disruptive technologies are driving change in the global economy, particularly in terms of technologies that reduce environmental damage. Innovative policies and new business models are emerging in various jurisdictions that reflect increasingly serious environmental concerns. A recent estimate, for example, predicts that global clean technology markets will be worth $816 billion per year by 2015 (Copenhagen Cleantech Cluster, 2012). Yet, of the 65 publicly traded companies currently listed on the Cleantech Index, only one is Canadian (Cleantech Group, 2014).

$816 billion = Estimated annual value of the global cleantech market by 2015

1 / 65 = number of publicly traded Canadian companies on the Cleantech Index

The world is moving toward a cleaner economy

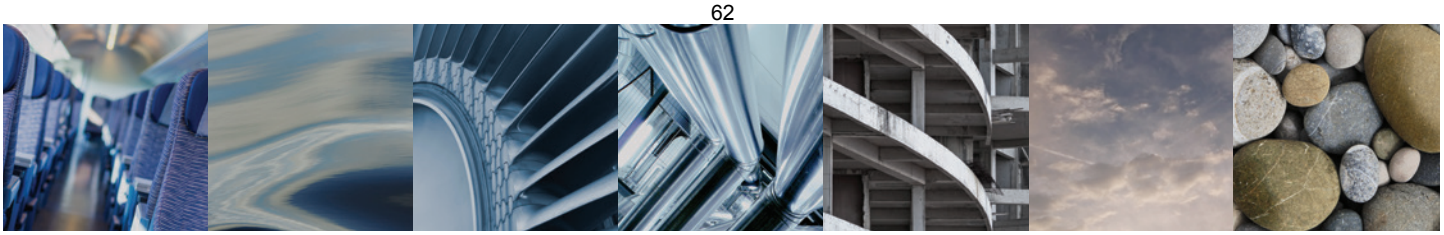
As OECD Secretary-General Angel Gurría noted in 2012, "Businesses are taking promising steps: the 'green race' is already on" (OECD, 2012). Globally, and across various economic sectors, clean goods and technologies are increasingly important parts of the economy. The United States and China are Canada's two most significant trading partners. They also happen to be the world leaders for investment in renewable energy (Frankfurt School, United Nations Environment Programme, & Bloomberg New Energy Finance, 2013). Motivated by concerns over both local and global pollution, China plans to implement a national cap-and-trade system for greenhouse gas emissions in 2016, in addition to a variety of initiatives to promote the development of clean-energy technologies (Chen & Reklev, 2014).

Ecofiscal policies are increasingly part of these global trends. More and more, transitioning a clean economy by pricing pollution is becoming part of mainstream economic policy thinking. In 2014, for example, both the World Bank and the International Monetary Fund released studies emphasizing the economic, environmental, and health benefits of addressing climate change with ecofiscal tools (Parry et al., 2014; World Bank, 2014b).

Canada could benefit from being part of the transition

Canada would be well served by actively participating in the global shift to a cleaner economy. Despite its resource-intensive economy, ecofiscal policies could help Canada become an environmental and economic leader. As other jurisdictions implement environmental policies, global demand will increase for technologies and skills that reduce pollution and environmental damage, creating opportunities for Canadian industry. A study by McKinsey and Company suggests that under the right policy conditions, Canada could have comparative advantages in areas such as sustainable resource development, carbon capture and storage, uranium mining, and hydroelectricity expertise. It suggests that Canada could take the lead in emerging markets such as off-grid solar photovoltaic power, biomass energy, conventional hydro and marine power, and energy-efficient buildings (McKinsey & Company, 2012).

As with all market transitions, a shift to a cleaner economy will take time as product and factor markets adjust. Ecofiscal policies can help prepare Canadian firms for this transition through clear, predictable price signals.



6. Summary: Ecofiscal Policies Are Smart for All Canadian Governments

This report makes the economic case for reducing taxes on labour and income while increasing them on pollution and environmental damage. It draws on the growing body of experience from governments that have taken this step. And the evidence is clear: ecofiscal policies are smart—both for the economy and for the environment.

This alignment is no coincidence. Long-term, sustainable, and equitable prosperity requires managing environmental assets in an economically sensible way.

The argument for greater use of ecofiscal policy in Canada is summarized as follows:

1. **Canada's environmental assets—from fresh water to healthy ecosystems to clean air—are essential to our continued economic prosperity.** The costs to worker health and productivity from environmental damage are significant and represent lost wealth and well-being. The financial costs associated with cleaning up environmental damage could be used on other goods and services, and thus represent a significant opportunity cost for Canadian society.
2. **Ecofiscal policies align economic and environmental objectives.** Ecofiscal policies use market forces to align economic and environmental priorities, creating incentives for conservation. They also enable reductions in other, more distortionary and growth-retarding taxes. For both reasons, ecofiscal policies are more cost-effective than other policy approaches such as direct regulations and subsidies.
3. **Ecofiscal policies can be designed to ensure fairness.** With prices attached to pollution, polluters are required to pay for the costs they impose on others. This is only fair, for current and future generations alike. Ecofiscal policies can also be designed to ensure that vulnerable regions, sectors, and households are treated fairly.
4. **Ecofiscal policies drive innovation.** Pricing pollution creates incentives for the creation of new technologies to reduce pollution and environmental damage. Over the longer term, this innovation will be essential for Canadian prosperity, particularly as our trading partners continue implementing their own ecofiscal policies.
5. **Canadians can seize an opportunity for long-term, clean prosperity.** Despite some progress, Canada currently lags behind many other countries in implementing ecofiscal policies, in innovation and productivity performance, and in the protection of natural assets. Beginning now to move forward with ecofiscal policies will position Canada for long-term prosperity.

As we have illustrated, the range of potential ecofiscal policies is broad. From London's road-congestion charge to Singapore's water user fees to British Columbia's carbon tax, examples of successful policy are diverse. And based on a benchmarking of environmental performance, Canada has room to improve along multiple dimensions.

WHAT ARE THE GREATEST OPPORTUNITIES FOR CANADIAN POLICYMAKERS?

This report is only a starting point for Canada's Ecofiscal Commission. Our future reports will consider a range of issues and examine pragmatic policy solutions appropriate for Canadian governments in all jurisdictions. The policy issues will likely include:

- **Road congestion pricing.** Road access is free, yet leads to congestion, air pollution, greenhouse gas emissions, and lost productivity through wasted time. Congestion is becoming a significant issue in Canada's major cities. Congestion pricing could be a promising policy solution to promote efficient transportation systems.

6. Summary: Ecofiscal Policies Are Smart for All Canadian Governments *continued*

- **Municipal user fees.** Cities have limited revenue tools; they tend to rely on property taxes to fund municipal infrastructure. At the same time, users of infrastructure often have no incentive to limit their usage. User fees can create incentives for conservation while also ensuring that cities do not have to overbuild infrastructure.

- **Carbon pricing.** Global climate change will have major economic costs for Canada. Pricing carbon emissions can help achieve reductions at the lowest cost, can contribute to global emissions reductions, and can help position Canadian firms to compete in a cleaner global economy.

- **Subsidy reform.** Many existing Canadian subsidies are environmentally harmful, fiscally wasteful, or both. Biofuel subsidies for ethanol, for example, may actually increase greenhouse gas emissions, while also representing large public expenditures. Phasing out such subsidies can therefore generate both economic and environmental benefits.

- **Air pollution pricing.** Despite existing regulations, firms have insufficient incentives to reduce emissions of local air pollutants which have major impacts on ecosystems and human health. Air pollution pricing would create incentives for reducing emissions as well as for the development of new technologies to do so.

- **Water pollution pricing.** Toxic effluents released into waterways—whether from agricultural runoff, tailing ponds from mines, or other municipal and industrial wastewater—can have major implications for ecosystems, but also for human health and for economic activity. Appropriately pricing water pollution can encourage less pollution to Canada's lakes, rivers, and streams.

- **Water use pricing.** Free or inexpensive water leads to over-consumption, putting pressure on supply. Pricing water use appropriately can create incentives for water conservation, though care must be taken to ensure the policy is applied fairly.

- **Catastrophic risk pricing.** Existing liability, insurance, and securities frameworks may not be sufficient to address environmental damages from low-probability catastrophes—such as major rail catastrophes (Lac Mégantic, Quebec) or tailing pond dam breaches (Mount Polley, BC)—and thus may provide firms with insufficient incentive for risk management. Risk pricing could fill this gap and reduce the likelihood of catastrophic damage.

As policy-minded economists, we will build on the strongest, and most recent and relevant research in these areas. We will engage with a cross-section of Canadians and experts for practical insights to develop evidence-driven solutions for ecofiscal reform. And we will contribute to the serious discussions that these issues warrant.

We share a vision for an innovative and thriving Canadian economy, now and in the future, underpinned by clean air, land, and water. We are committed to helping Canadians, and our decision-makers, identify and seize the best policy opportunities to achieve this vision.

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Glossary

Air pollutants: Materials emitted into the atmosphere that have detrimental health and/or environmental effects, regionally or globally. Examples of air pollutants include particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), ozone-depleting substances, and volatile organic compounds (VOCs).

Cap-and-trade system: An ecofiscal policy instrument that creates a market for pollution reduction. Such a system sets a limit on total allowable levels for a given pollutant (the "cap") by issuing permits for emissions equal to this level, and then allows emitters to trade the permits among themselves in an active market. Under this approach, a market price for permits emerges: companies that can reduce pollution cheaply can take more action and sell their excess permits to those that can only reduce pollution at higher costs.

Carbon dioxide (CO_2): In this report, carbon refers to the greenhouse gas carbon dioxide emitted largely from the combustion of fossil fuels. Carbon dioxide is the principal greenhouse gas emitted from human activity that is responsible for climate change.

Command-and-control regulations (also referred to as "direct regulations"): Regulations that are prescriptive, explicitly setting out required performance under law; for example, in terms of required technologies to be used or maximum levels of pollution emissions allowed. Command-and-control regulations are usually more rigid (and more costly) than ecofiscal policies, though in some cases remain an appropriate policy tool.

Competitiveness: The extent to which a firm or industry can successfully participate in an international market. It is influenced by many variables, including market power, product differentiation, taxation, input prices, exchange rates, productivity, and regulations.

Cost-effective: The extent to which a given outcome is achieved at lowest cost. Cost-effectiveness is thus a criterion used to compare the relative costs of different policy options.

Direct regulations: See "command-and-control regulations."

Distortionary taxes: Taxes that change relative prices and thereby create incentives for firms or households to change behaviour. For example, taxes on personal income reduce the after-tax return to labour and thus reduce incentives for working and hiring.

Ecofiscal policies: Policies that align economic and environmental objectives by shifting away from taxing things society wants more of (such as jobs, income, or profits) toward taxing things society wants less of (such as pollution and resource waste). Ecofiscal policy tools include subsidy reform, user-fees, and pollution pricing.

Environmental tax: An ecofiscal policy instrument whereby government taxes are imposed on actions that lead to environmental damage.

Fiscal system: The entire collection of taxes, subsidies, and spending policies used by government.

Free-ridership: Within the context of ecofiscal policy, this occurs when firms or households collect a government subsidy for taking a specific action, but would have taken the same action even in the absence of the subsidy.

Full-cost-recovery: When users of a service—such as water or sewage infrastructure—pay for the entire costs of building and using that service. User fees can be used to ensure full-cost-recovery.

Greenhouse gas (GHG): Gases present in or emitted into the atmosphere whose effect is to trap some of the incoming solar radiation. Carbon dioxide from fossil fuel combustion and land-use changes, and methane from agriculture are the two principal greenhouse gases.

Gross domestic product (GDP): The monetary value of all goods and services produced within a country during a specific period of time (usually one year).

Innovation: The process of improving existing technologies and processes, and developing new methods, devices, processes, and concepts. Innovation is critical for raising long-term living standards.

Nitrogen oxide (NO_x): An air pollutant that results largely from combustion activities in transportation, industry, and power generation.

Organisation for Economic Cooperation and Development (OECD): A multinational institution (of developed economies) that focuses on comparison, coordination, and improvement of policy and economic research.

Pollution pricing policy: An ecofiscal policy that creates economic incentives for reducing environmentally harmful activity by putting a price on pollution. Cap-and-trade systems and environmental taxes are examples of pollution pricing policies.

Productivity: The level of output created per unit of input used. For example, the labour productivity of an economy refers to GDP per unit of labour input (typically per hour of work effort).

Regressive: Referring to a policy that imposes a disproportionately high burden on lower-income taxpayers.

Revenue neutral: Describing an ecofiscal policy in which all revenue generated by the policy is returned to firms and/or households through reductions in existing taxes. Implementing a revenue-neutral policy does not lead to a change in the overall level of government revenues.

Revenue recycling: The way in which government revenues generated from an ecofiscal policy are returned back to firms and/or households.

Social license: Broad public approval for an organization or project.

Subsidy: A government policy that provides preferential financial treatment to particular groups (whether specific sectors, firms, or households) based on certain characteristics or actions.

Subsidy reform: Phasing out or redesigning existing subsidy policies (specifically, in the context of this report, existing subsidies that are environmentally or economically harmful, or both). Subsidy reform is one element of the ecofiscal policy tool kit.

Sulphur dioxide (SO_2): An air pollutant that results largely from combustion activities in transportation, industry, and power generation.

User fee: An ecofiscal policy tool requiring payment for the use of public services or infrastructure. For example, municipal households and users might pay user fees for water and sewage infrastructure based on the volume of water they consume or the volume of wastewater they produce.

CANADA'S **ECOFISCAL** COMMISSION
Practical solutions for growing prosperity

Canada's Ecofiscal Commission
c/o Department of Economics
McGill University
855 Sherbrooke Street West
Montreal, QC H3A 2T7

www.ecofiscal.ca

TAB C

This is Exhibit 3 referred to in the affidavit
of Christopher Ragan, sworn before me this
18 day of December, 2018, in the City of
Montreal in the Province of Quebec

Attorney, # 1940775

A COMMISSIONER FOR OATHS IN
AND FOR THE PROVINCE OF QUEBEC

This document – **Canada's Ecofiscal Commission, *The Way Forward: A Practical Approach to Reducing Canada's Greenhouse Gas Emissions*** – may be found in the Affidavit of John Moffet, Exhibit O, Record of the Attorney General of Canada, Volume 2, pp. 518-581

TAB D

This is Exhibit 4 referred to in the affidavit
of Christopher Ragan, sworn before me this
18 day of December, 2018, in the City of
Montreal in the Province of Quebec

Attorney #1940775

A COMMISSIONER FOR OATHS IN
AND FOR THE PROVINCE OF QUEBEC

CANADA'S **ECOFISCAL** COMMISSION
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THE WAY FORWARD FOR ONTARIO

Design Principles for Ontario's New Cap-and-Trade System

June 2015

Dale Beugin
Mel Cappe
Glen Hodgson
Paul Lanoie
Chris Ragan

EXECUTIVE SUMMARY

Over the next year, Ontario will design and implement a cap-and-trade system for reducing greenhouse gas emissions. Much public discussion has focused on the effectiveness of cap-and-trade as an overall approach to pricing carbon. While it is possible to debate the inherent advantages and challenges of cap-and-trade compared with other carbon-pricing approaches, the fact is, these differences are small. Effective cap-and-trade systems can, and do, exist. But various problems also exist. In Ontario, as in any other jurisdiction, the success of the cap-and-trade system will hinge on the design details.

Drawing on the Ecofiscal Commission's April 2015 report, *The Way Forward*, this brief outlines four fundamental principles of good cap-and-trade design. It offers a practical roadmap and specific recommendations to Ontario as the province moves toward developing its policy. The same principles could be used as a guide by any province considering the introduction of a cap-and-trade system.

A common theme runs through these principles and recommendations: transparency. It is not enough to design a policy that is effective, cost-effective, and fair. It must also be clear, predictable, and immune to political interference. The confidence of Ontarians—everyday consumers and big emitters alike—is critical to the success of the province's new policy. While the principles outlined in this brief do not address every detail of policy the government will need to consider, they offer the basis for a well-designed cap-and-trade system for Ontario.

Principles and Recommendations

1. Stringency of policy should rise gradually and predictably over time in order to drive meaningful emissions reductions.

Ontario should

- introduce a "cap" on emissions that results in meaningful reductions. That cap should steadily and predictably decline over time;
- manage price volatility to ensure long-term incentives for innovation and deep reductions;
- enforce strong non-compliance penalties.

2. Coverage of policy should be as broad as practically possible.

Ontario should

- use a combination of upstream and downstream points of regulation;
- avoid exemptions or exclusions to ensure cost-effective, fair, and transparent policy;
- carefully handle the use of offsets, if used, which can further broaden coverage, but only if they are credible and represent real and verifiable emissions reductions.

3. Aim to auction all allowances. The scope for free allocations should be narrow, rules-based, and transitional.

Ontario should

- auction allowances as a rule to enable more cost-effective, simple, and transparent policy;
- allocate free allowances only as an exception to reduce adverse competitiveness impacts, but provide this support based on clear, transparent rules and for a limited period;
- avoid free allowances in sectors in which emitters can pass on costs.

4. Seek out opportunities for linkage.

Ontario should

- link with Quebec and California, as planned, to improve cost-effectiveness reinforcing an existing template for inter-jurisdictional carbon-pricing;
- encourage other provinces and jurisdictions to join the linked system, broadening the scope of the cap-and-trade system
- design its system for harmonization on elements such as price floors/ceilings, reporting, and monitoring, verification, and enforcement.

THE WAY FORWARD FOR ONTARIO

Design Principles for Ontario's New Cap-and-Trade System

Dale Beugin, Research Director, Canada's Ecofiscal Commission
Mel Cappe, Professor, University of Toronto, School of Public Policy and Governance
Glen Hodgson, Senior Vice President & Chief Economist, Conference Board of Canada
Paul Lanoie, Professor of Economics, Université de Montréal, HEC Montréal
Chris Ragan, Chair, Canada's Ecofiscal Commission and Associate Professor of Economics, McGill Univeristy

Canada's Ecofiscal Commission

Over the next year, Ontario will design and implement a cap-and-trade system for reducing greenhouse gas emissions. The details of cap-and-trade design are critically important, perhaps even more so than for a carbon tax. A well-designed system can equitably achieve emissions reductions at least cost. A poorly designed system risks being not only ineffective but also unfair and less cost-effective. This brief builds on the Ecofiscal Commission's first report on carbon pricing, *The Way Forward*, to identify principles for a well-designed cap-and-trade system in Ontario.

We consider four main principles of design. Several other details are also important, but this paper focuses on the fundamentals. Overall, the theme of governance emerges, spanning all four design principles as a means of ensuring transparency and predictability. We describe these issues in turn: stringency, coverage, permit allocation, linkage, and governance.

Principle #1: Stringency should rise gradually and predictably over time to drive meaningful emissions reductions

A cap-and-trade system imposes a *quantity constraint* (the "cap"), limiting the total allowable levels of greenhouse gas (GHG) emissions in a given compliance period. The cap reflects the total number of tradable emissions allowances (also known as "permits") created by the policy. To comply with policy, emitters require a permit for each tonne of emissions. Critically, the cap declines over time, with deeper reductions required in subsequent compliance periods.

A lower cap represents a more stringent policy because it requires more action by emitters overall. Yet because the allowances are tradable, different emitters will generally reduce their emissions by different amounts. A carbon price emerges from the market created by these trades and the scarcity created by the cap. Not surprisingly, a lower cap generally leads to a higher carbon price.

The two key metrics to compare the stringency of different cap-and-trade systems—(1) the strictness of the quantity constraint and (2) the carbon price—are really just two sides of the same coin. To these two metrics, one can add a third measure of stringency: penalties for non-compliance. We discuss each in turn.

A "cap" on emissions

The cap on GHG emissions depends on the target the authorities want to reach at the end of the compliance period (as part of the Western Climate Initiative, for example, regulated emitters in California and Quebec must demonstrate their compliance at the end of three-year periods). The more ambitious the target, compared with the baseline, the more important will be the reduction of allowances each year.

For Ontario's cap-and-trade system to be effective, the total quantity of permits allocated must be equal to the provincial cap. This is not always simple, and errors can undermine the confidence in the system. In the European Union's Emissions Trading System (EU ETS), for example, too many permits were allocated during the pilot phase (2005-2007), partly due to limitations in emissions data. Initially, there was no overall limit to the number of allowances; the total supply was simply the result of the 25 separate decisions concerning the number of allowances that each member state chose to distribute within its jurisdiction. The issue of over-allocation came to light when it was discovered, in April 2006, that there were more allowances than actual emissions, which led to a collapse in the price.[1] In the

[1] For more details, see Ellerman and Joskow (2008).

third phase of the system (2013-2020), efforts have been made to overcome these difficulties. In particular, a single EU-wide cap on emissions has replaced the previous uncoordinated system of national caps. The EU also took steps to manage price volatility, as discussed below.

The dynamics of the emissions cap are also important. The sooner governments implement policies, the more time emitters have to make changes gradually, rather than abruptly. An economic environment with a predictable decline in the cap, which would generally lead to a similarly predictable increase in price, is essential to long-range planning, especially for capital-intensive businesses. Steadily increasing the stringency by tightening the cap over time will avoid unnecessary shocks to the economy, but will nonetheless encourage households and businesses to change their behaviour as the price of carbon rises.

Mechanisms to manage price volatility

The *carbon price* reflects each emitter's marginal incentive for reducing GHG emissions. Carbon prices make carbon-intensive activities more costly relative to less intensive activities and can actually make carbon-reducing activities profitable. In a cap-and-trade regime, a carbon price emerges from the trading of allowances whose scarcity value derives from the existence of the cap.

This carbon price is not fixed. Like all market-determined prices, the price of carbon can fluctuate, though, as we discuss below, policy design can moderate these swings. Changes in technologies, and the ebb and flow of the business cycle can be especially important in driving price volatility. In the EU ETS, for example, the global financial crisis of 2008-10 and the very low growth in subsequent years led to lower than expected GHG emissions. As a result, the demand for allowances fell and the market-determined price of carbon plummeted. Yet the market responded exactly as should be expected: the emissions cap was easier to achieve, given the reduced economic activity, and a lower carbon price was the inevitable result.

Price volatility can nonetheless be problematic. A persistently low carbon price provides inadequate incentives for innovation and long-term investments in low-carbon technologies (Knopf et al., 2013; Sijm et al., 2013). In contrast, large and sudden spikes in the price could threaten business competitiveness and be detrimental to the economy.

Design mechanisms can manage this price volatility. Three main approaches are available:

- A *price floor* establishes a minimum carbon price, guaranteeing incentives for innovation and long-term emissions reductions. In California and Quebec under the WCI, for example, no bids for allowances are accepted below the "auction reserve price." This minimum price is currently around $15 per tonne and is scheduled to increase by 5% (plus inflation) each year (California Air Resources Board [CARB], 2015). Both the Regional Greenhouse Gas Initiative (RGGI) and New Zealand's cap-and-trade system also have forms of price floors.

- A *price ceiling* places an upper limit on the market price of allowances, guarding against costly price spikes. It does so by selling additional permits at a fixed price. The now-repealed Australian carbon-pricing policy, for example, planned for two phases. From 2012 to 2014, the policy was more like a carbon tax, with no true cap on emissions, and unlimited numbers of allowances were available for sale at a fixed price. During the second planned phase of the policy (which was never realized), a price ceiling at AUS$20 above expected international prices would have ensured prices would never be too far out of line with those in other jurisdictions (Center for Climate and Energy Solutions [C2ES], 2011).

- Alternatively, a *market stability* reserve manages prices via adjustments to the permit supply. The Quebec-California system, for example, sets aside a small portion of the total allowances and makes them available for sale at a fixed price. This approach ensures that the emissions cap is never exceeded, while still providing the government with a mechanism to reduce price variability. Similarly, the EU ETS chose to delay the auction of 900 million tonnes' worth of emissions allowances in the early part of its third phase to reduce the supply in the short term. In the longer term, it will use a stability reserve that can add or deduct allowances to the reserve set-aside from future compliance periods to manage price fluctuations (Knopf & Edenhofer, 2014).

Penalties for non-compliance

Incentives under a cap-and-trade system only hold if regulated entities have no motivation to cheat. At the end of the compliance period, each affected emissions source is required to hold at least one allowance for each unit of emissions during the compliance period. Cap-and-trade programs must include provisions authorizing the regulating authority to reconcile the emissions of

each source with the number of allowances they hold to determine compliance. The regulating authority must have the power to impose and enforce sufficient penalties on emissions sources that do not comply with the program rules (US EPA, 2003).

The EU ETS, for example, has a non-compliance penalty of €100 per tonne, an amount far higher than the current market price of allowances. As illustrated in the table below, in many regimes, including the California-Quebec system, the fine is expressed as a multiplier of the carbon price, ensuring that the wedge between the penalty and the marginal incentive to reduce emissions remains constant in relative terms.

Table 1 compares the stringencies of cap-and-trade systems in other jurisdictions, highlighting caps, measures to manage price volatility, and penalties for non-compliance.

Summary: Increasingly stringent policy

- Ontario's "cap" on emissions should require meaningful emissions reductions and should steadily and predictably decline over time.
- Ontario should manage price volatility to ensure incentives for long-term innovation and deep emissions reductions.
- Ontario should enforce strong non-compliance penalties to ensure the policy creates incentives for emissions reductions.

Table 1: Comparison of Stringency of Cap-and-Trade Systems

Area and System	Stringency of Cap	Price Volatility Management	Penalty for Non-Compliance
Quebec-California System (Western Climate Initiative)	For Quebec, 3.2% annual reduction (from 2015 level)	Auction floor of $15 (2015), rising 5% annually + inflation; soft price ceiling through a strategic reserve	Entities must surrender four allowances or offsets for each missing allowance
European Union Emissions Trading System	1.74% annual reduction (from 2008-12 average level)	Market stability reserve automatically adjusts the annual supply of allowances based on the surplus in the market (starting in 2019)	Fine of €100/tCO_2
Regional Greenhouse Gas Initiative	2.5% annual reduction until 2020	Floor price of $2.05 in 2015, increasing annually by 2.5%	Fine equal to three times the allowance price for each missing allowance
South Korea Emissions Trading System	1.9% annual reduction (from 2015 level)	The government may intervene directly in the market if there is a need to stabilize prices	Fine shall not exceed three times the average permit price over a given compliance year
New Zealand Emissions Trading System	Unlimited intensity-based allocations means no hard cap on emissions	Fixed price option at NZ$25	Fine of NZ$30-60/$tCO_2$

Source: Carbon Market Watch, 2015

Principle #2:
Make coverage of policy as broad as practically possible while maintaining the integrity of the system

The coverage of Ontario's new cap-and-trade system (i.e., those emissions subject to the cap) will be a key determinant of its success or failure. Coverage defines the emissions subject to the cap and thus to the carbon price. Broad coverage creates incentives for emissions reductions throughout the economy. Coverage also matters for minimizing the costs of any given level of emissions reduction. The more emitters (and emissions) covered by the policy, the more incentives exist to realize all available low-cost reductions. But what does broad coverage mean in practical terms?

Point of regulation

The *point of regulation*—which defines who must comply with the emissions cap—is a key determinant of coverage. This design decision mainly concerns balancing the cost-effectiveness of broad coverage against the higher administrative costs that occur with having more capped emitters. There is a credible argument that a cap-and-trade system should be applied to a smaller number of emitters in order to keep administrative costs to a minimum. RGGI, for example, covers only power producers, thus targeting a major source of GHG emissions while limiting the number of participants and the complexity of the system.

A *downstream* cap—applied at the end of lifecycle for fuels—limits the emissions actually produced by regulated emitters. Yet to manage complexity and administrative costs for both government and emitters, a downstream cap typically only applies to large emitters (those with emissions above a given threshold). Imposing and enforcing a cap on many small emitters is impractical; including more "point sources" in the policy adds administrative costs, but also poses measurement and enforcement problems for non-point sources, such as vehicles. In the Quebec cap-and-trade system, for example, only emitters that exceed 25,000 tonnes of CO_2e per year (including both process and combustion emissions) have their emissions directly capped (International Carbon Action Partnership, 2014).

An alternative approach is to apply a cap-and-trade system *upstream* on fuel distributors, based on the carbon content of the fuel they sell.[2] Fuel distributors pass the carbon costs on to their consumers, including vehicles, buildings, and other small emitters. Emissions from the many such small entities would be challenging to include directly under a downstream cap. An upstream cap has lower administrative costs and less complexity both for the emitters themselves and the enforcement apparatus required by government. On the other hand, it only covers GHG emissions associated with the combustion of fossil fuels.

The Quebec and California systems actually use a combination of upstream and downstream approaches. Fuel use for small emitters is covered via an upstream cap on fuel distributors, while large emitters have their emissions capped directly. The result is an approach with broad coverage—around 85% of provincial emissions in Quebec—but relatively modest administrative fees. One estimate suggests that administrative costs for Quebec's cap-and-trade system in 2014 were only about $2.5 million (Chalifour & Papy, 2015). To put this cost in context, Quebec's system is expected to generate revenues of approximately $425 million in 2015. This model is a useful one for Ontario to emulate.

Emitters may be more aware of the carbon price in a downstream system in which they directly "experience" the policy, and as a consequence of this greater awareness, they may respond with greater behavourial changes. This could be one advantage of a downstream system. However, an upstream system could achieve a similar impact if retailers were required to make the carbon costs embedded in prices explicit to consumers, in the same way that HST is currently explicit on all final sales receipts.

Exemptions and exclusions

There will always be arguments for excluding a firm, industry, or region from a cap-and-trade system. Such exemptions are rarely justified. They reduce cost-effectiveness, undermine the system's credibility, and create divisiveness among emitters.

Excluding emitters from a cap-and-trade system can significantly reduce the cost-effectiveness of the policy. Achieving the same level of emissions reduction under a system with narrower coverage means that costs of compliance will be borne by a smaller number of emitters. Some will face no incentives, while others will face stronger ones. If the exempted entities have low abatement costs, then the overall costs of the policy are necessarily increased, as low-cost emissions reductions opportunities are missed.

Exemptions also undermine the credibility of a system by reducing fairness. Without all emitters facing the same price, political rivalries, jealousies, and competition will undermine political support for the regime. Further, once one exemption is granted, denying others becomes more challenging for government to justify. Drawing the line is very difficult in both

[2] Applying the cap even further upstream (to fossil-fuel producers) is impractical, given the large number of entities involved in production.

economic and political terms. Exemptions invite all participants to engage in rent-seeking behaviour in an effort to receive special status. Such rent-seeking activities, though potentially very rewarding for the specific firm involved, represent a net loss to society. A similar argument applies to allocating emissions permits, as discussed below.

In cases where specific emitters might legitimately need transitional support—for example, those that are especially *emissions-intensive* and *trade-exposed*—policymakers should consider alternative approaches. See the discussion below relating to the allocation of permits.

Pros and cons of offsets

Offsets broaden the coverage of a cap-and-trade system to include emissions reductions that are hard to incorporate directly under the cap, such as changes in agricultural practices, forestry or land use. Broadening coverage can improve the cost-effectiveness of the overall policy, but only if these emissions reductions are a genuine result of the policy. If emissions reductions would have happened anyway, even in the absence of the offset payment, then the effectiveness of the policy is undermined. British Columbia's Auditor General (2013) identifies this problem in B.C.'s offset program, used to help government facilities achieve carbon neutrality. Strong and transparent governance of offsets can help address these concerns. Offsets in Alberta's Specified Gas Emitters Regulation, for example, are verified by independent third parties; offset protocols pass through technical, stakeholder, and public reviews. Members of the Western Climate Initiative can each certify and issue offsets and set limits on compliance using offsets. (Sawyer, et al., 2011).

Summary: Broad coverage, practical design

- Ontario should use a combination of upstream and downstream points of regulation to design a cap-and-trade system with broad coverage.
- Ontario should avoid exemptions or exclusions to ensure more cost-effective, fair, and transparent policy.
- Ontario should be careful with the use of offsets, which can further broaden coverage but only if they are credible and represent real and verifiable emissions reductions.

Principle #3:
Aim to auction all allowances; the scope for free allocations should be narrow, rules-based, and transitional

A cap-and-trade system creates a market for emissions allowances, and thereby creates a price for those same permits. As a result, emissions allowances have economic value. Authorities must decide whether to give that value to firms in regulated industries, through free allocation of permits, or to sell permits through transparent and competitive auctions. It is also possible to combine these two options by auctioning a fraction of the permits and giving the remaining permits for free.

Existing cap-and–trade systems highlight the range of choice for permit allocation. In the U.S. Acid Rain program, SO_2 allowances were freely allocated to regulated entities. All CO_2 allowances were auctioned under RGGI, while approximately 25% of the CO_2 allowances were initially provided for free in the Quebec and California systems, the rest being auctioned (Ecofiscal Commission, 2015).

It is worth noting that the method by which permits are allocated has no impact on the effectiveness of the cap-and-trade system in achieving targeted emissions reductions (Kopp, 2007). Whether allowances are distributed for free or auctioned, the total number of allowances—and thus the cap—is not affected. As a result, the same emissions reductions are achieved in either case, as long the total number of allowances is the same.

The nature of permit allocation does, however, have implications for both the cost-effectiveness and the fairness of the policy. If allowances are auctioned, revenues can be significant. Beugin and Thivierge (2015) provide a rough estimate of carbon revenue for Ontario (assuming that 70% of allowances are auctioned) at $1.5 billion in 2016 and rising to $3 billion in 2020. How these revenues are recycled has important implications for the net cost of the program to individual stakeholders and to the province as a whole.

The rationale for free allowances: Managing the transition

Arguments for free allowances are usually rooted in competitiveness concerns. The cost of purchasing allowances could leave emissions-intensive and trade-exposed firms competitively disadvantaged in international markets. Providing free allowances to these firms can reduce the average cost of policy to emitters while maintaining their marginal incentives to reduce emissions, thus addressing these competitiveness

concerns. Providing free allowances based on output or emissions-intensity ("output-based allocations") can reduce the incentives for emitters to reduce their production or motivate relocation to jurisdictions with weaker policy.

Market structures play an important role. If emitters can pass through costs of carbon in the form of higher prices, then free allowances can lead to windfall profits for those emitters. Electricity generators in the EU ETS, for example, passed on some costs to electricity consumers under the EU ETS, even though they received free allowances (Ellerman & Joskow, 2008). Windfall profits reduce the fairness and the cost-effectiveness of a cap-and-trade system.

The challenges of free allowances and the case for auctioning

A number of concerns are raised with the free allocation of allowances.[3]

As with exemptions, free allocations can be divisive, because they provide economic value to specific emitters. The value of allowances can thus lead to rent-seeking: Decisions about how free permits should be allocated may be subject to intense lobbying, which could undermine confidence in the effectiveness of the cap-and-trade system. Similarly, depending on design, they can provide an advantage to firms existing at the time the system is first implemented; if new entrants are not afforded the same benefits as incumbents, they will suffer undue prejudice.

As a result, transparent allocation of free permits requires clear criteria to determine how many allowances should be given, and to whom. Allowances could be distributed on the basis of historical emissions ("grandfathering") or on the basis of output. Grandfathering requires that good historical emissions data exist for all players in the system. The measurement, reporting, and verification of such metrics may be considered an administrative burden of the free allocation process. Furthermore, giving allowances on the basis of historical emissions is a questionable approach in the long run, depending on how the allocation rule is updated over time, since large emitters receive more valuable allowances. Similarly, providing free allowances based on output effectively subsidizes production and potentially making the cap harder to achieve (National Round Table on the Environment and the Economy, 2009).

Perhaps the biggest problem is that providing allowances for free forgoes the opportunity to achieve important economic benefits by using the auction revenue to reduce existing growth-retarding taxes, provide critical infrastructure, invest in environmental R&D, or several other options. For instance, in *The Way Forward*, the Ecofiscal Commission (2015) uses a simulation exercise to show that, for a given level of emissions reduction, revenue recycling through reduced personal income taxes can improve the cost-effectiveness of a carbon-pricing policy by 0.9 % of GDP relative to an inflexible regulatory approach. Revenue also creates opportunities to provide targeted support to those households and sectors disproportionately affected by the carbon price, thus addressing legitimate concerns of fairness.

Given the concerns related to the free allocation of permits, any such provision should meet three criteria:

- It should be *narrow* in that it should apply only to the most emissions-intensive and trade-exposed sectors. Reducing leakage and competitiveness impacts is a legitimate goal, but only a small share of the economy is likely vulnerable.
- It should be *rules-based* in that data, not discretion, should be used to identify vulnerable sectors, thus increasing transparency.
- It should be *transitional* in that it is phased out over time, thus providing additional incentives for emissions-intensive and trade-exposed firms to develop new technologies to allow them to compete internationally under carbon constraints.

Summary: Auctioning as the rule; free allowances as a transitional exception

- Ontario should auction most allowances to enable more cost-effective but also simpler and more transparent policy.
- Free allowances may have a role to play in addressing competitiveness and leakage concerns. However, Ontario should only narrowly provide this support, based on clear and transparent rules, and for a limited period.
- Ontario should avoid providing free allowances to sectors in which emitters can pass on costs.

[3] As a result, systems are trending toward increased auctioning over time. See the Carbon Market Watch report from May 2015.

Principle #4: Seek out opportunities for linkage

Linkage means that emitters can trade emissions allowances between different cap-and-trade systems, creating a common market with a consistent price. It is a mechanism for harmonizing carbon prices and can increase both the overall effectiveness and cost-effectiveness of the policy.

Ontario's cap-and-trade system should be designed from the outset to facilitate straightforward linkage with other cap-and-trade systems. In fact, it is on track to do exactly this with a stated intent to cooperate with Quebec and California.

The benefits of linkage

Linkage with other cap-and-trade systems offers several benefits.

Most importantly, it increases the overall cost-effectiveness of the policy by broadening the coverage of the cap across multiple jurisdictions, allowing for more low-cost emissions reductions. Economic modelling of the permit trade between California and Quebec, for example, suggests that Quebec will have fewer low-cost emissions reductions available than California, given that the province's electricity system is already decarbonized. Linkage therefore allows Quebec emitters to avoid high-cost emissions reductions, while California emitters achieve more low-cost reductions. The result is savings to Quebec in the form of avoided costly emissions reductions and net revenue flows to California, both on the order of several hundred million dollars. Both jurisdictions gain from linked trade (Purdon et al., 2014; CARB, 2012).

Linkage also increases market liquidity by establishing a larger permit-trading space, allowing larger and more frequent trades to take place within a common system. It also improves the durability of policy by increasing stakeholder acceptance across multiple cap-and-trade jurisdictions, making it harder for arbitrary changes to any one system without consultation with partners. In the long term, linkage with other carbon-pricing policies—such as a carbon tax—are also possible, though the mechanism for doing so is less straightforward.

In the longer term, linkage also begins to establish a common framework for carbon pricing across more jurisdictions and more emissions. As more jurisdictions join the system, more global emissions reductions can be achieved in a cost-effective manner. A larger network of linked carbon markets also reduces competitiveness and leakage concerns, since linkage harmonizes the carbon price.

Challenges of linkage

At the same time, however, linkage can create perceived political problems. On the one hand, jurisdictions that are net buyers of allowances can face challenges over the perceptions associated with using cash payments to avoid emissions reductions at home. On the other hand, net sellers of allowances will see a higher carbon price—and so higher final energy costs—as a result of linkage. Despite these perceptions, the reality is that both jurisdictions gain economically from linkage, and total emissions within the system are reduced in a cost-effective manner. When Ontario joins Quebec and California, it is unknown whether it will be a net seller or net buyer of allowances, since the flow of allowances across jurisdictions depends on the level of the cap and the costs of abatement within the province, relative to those in Quebec and California. As a result, governments need to spend time educating businesses and the public on the advantages of establishing system linkages, while also ensuring that the linked systems are aspiring to high common standards.

Linkage also constrains design choices, requiring alignment of policy on several key dimensions. For example, for allowances to be equivalent between systems, a consistent definition of emissions is required. Similarly, administrative functions such as measurement, reporting, and verification regimes must be harmonized. Price floors and ceilings must also be aligned. And joint auctions—such as those held by Quebec and California—are likely necessary to ensure that permit revenue is shared equitably.

A significant commitment will be essential if Ontario is to ensure that these linkage issues are effectively addressed. That said, experience in California and Quebec shows clearly that cap-and-trade systems can be successfully linked. Since mid-2014, Quebec-based industries have been able to purchase allowances from California to meet provincial targets for emissions reductions, and California's industries can tap into Quebec's carbon market.

Summary: Planning for linkage

- Ontario should link with Quebec and California, improving cost-effectiveness overall by increasing flexibility between jurisdictions and establishing a template for broader, harmonized inter-jurisdictional carbon pricing.
- Ontario should also encourage other provinces and jurisdictions to join the linked system, broadening the scope of the cap-and-trade system.
- Ontario should design its system with linkage in mind, thus harmonizing on design elements such as price floors/ceilings and monitoring, verification, and enforcement.

Conclusion:
Governance for transparency and predictability

This brief lays out four central principles for effective and cost-effective cap-and-trade design. It provides a practical road map for Ontario as the province develops its policy. These principles are quite general and can thus also provide guidance to other provinces considering implementing a cap-and-trade system.

The four principles, and the associated recommendations for Ontario, are as follows:

1. **Stringency should rise gradually and predictably over time to drive meaningful emissions reductions.**

- Ontario's "cap" on emissions should require meaningful emissions reductions and should steadily and predictably decline over time.
- Ontario should manage price volatility to ensure incentives for long-term innovation and deep emissions reductions.
- Ontario should enforce strong non-compliance penalties to ensure the policy creates incentives for emissions reductions.

2. **Make coverage of policy as broad as practically possible while maintaining the integrity of the system.**

- Ontario should use a combination of upstream and downstream points of regulation to design a cap-and-trade system with broad coverage.
- Ontario should avoid exemptions or exclusions to ensure more cost-effective, fair, and transparent policy.
- Ontario should be careful with the use of offsets, which can further broaden coverage, but only if they are credible and represent real and verifiable emissions reductions.

3. **Aim to auction all allowances; the scope for free allocations should be narrow, rules-based, and transitional.**

- Ontario should auction most allowances to enable more cost-effective but also simpler and more transparent policy.
- Free allowances may have a role to play in addressing competitiveness and leakage concerns. However, Ontario should only narrowly provide this support, based on clear and transparent rules, and for a limited period.
- Ontario should avoid free allowances in sectors in which emitters can pass on costs.

4. **Seek out opportunities for linkage.**

- Ontario should link with Quebec and California, improving cost-effectiveness overall by increasing flexibility between jurisdictions and reinforcing an existing template for broader, harmonized inter-jurisdictional carbon pricing.
- Ontario should also encourage other provinces and jurisdictions to join the linked system, broadening the scope of the cap-and-trade system.
- Ontario should design its system with linkage in mind, thus harmonizing on design elements such as price floors/ceilings and monitoring, verification, and enforcement.

A market for emissions allowances generated through a cap-and-trade system can provide clear incentives for emissions reductions. But for Ontario's system to perform well over time, the institutions around it must be credible in the eyes of the general public as well as Ontario's emitters. Given the complexity of cap-and-trade systems and the importance of design details, an approach to governance that includes sufficient transparency and operational predictability would go a long way toward building strong public support.

Transparency, predictability, and good governance underpin all the principles described above. Stringency is fundamentally about a clear, predictable, long-term price signal; emitters must be confident that the cap will decline and the price will increase predictably without political interference. Broad coverage is about treating emitters as equally as possible based on clear rules, rather than succumbing to the pressures of non-transparent lobbying for exemptions. Auctioning allowances is similarly about avoiding subtle transfers of value through the allocation of free permits. And without credibility and transparency, linkage is impossible.

While the case for policy transparency is likely an absolute,

predictability must nonetheless be balanced with adaptability. Predictability does not refer to static policy that never changes, but rather to adjusting policy over time along a clear and planned policy trajectory. Policy design will naturally evolve, based on new information and learning about what works best. Yet given the importance of long-term certainty about the durability of the policy and the carbon price, decisions around the management of the cap-and-trade system should be as predictable as possible. To create a stable business-operating environment, rules-based approaches that provide a high degree of clarity and certainty in advance are significantly better than discretionary ones. Adjustments to policy should be based on the best available evidence. Above all, the system must be perceived as being free of political interference.

Overall, designing cap-and-trade according to these principles can help ensure a policy is effective, cost-effective, and fair. Still, while the principles described here lay out the fundamentals, we acknowledge that other design details also matter. Allowing emitters to bank and borrow allowances between compliance periods, for example, can increase flexibility, though may also introduce complications. Mechanisms may be required to account for new entrants into the market, particularly if some allowances are provided for free. And the question of how revenue should be recycled back to the economy so as to drive the maximum possible economic benefits for Ontario remains an outstanding question. A wide range of credible recycling options is clearly available, and these choices can strongly affect performance of cap-and-trade system, particularly in terms of fairness. Future work from the Commission will explore the question of revenue recycling directly.

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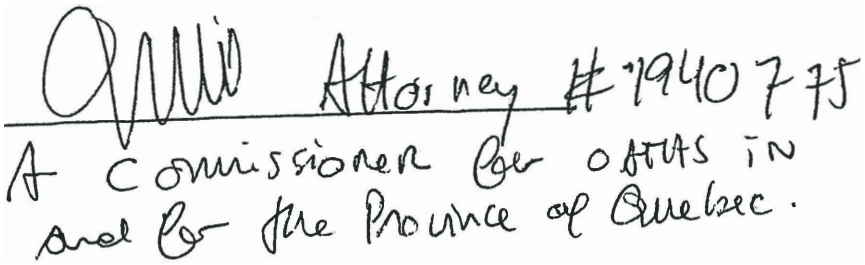
TAB E

This is Exhibit 5 referred to in the affidavit
of Christopher Ragan, sworn before me this
18 day of December, 2018, in the City of
Montreal in the Province of Quebec



This document – **Canada's Ecofiscal Commission, *Clearing the Air: How Carbon Pricing Helps Canada Fight Climate Change*** – may be found in the Affidavit of John Moffet, Record of the Attorney General of Canada, Volume 2, Exhibit P, 583-618

IN THE MATTER OF A REFERENCE to the Court of Appeal pursuant to section 8 of the *Courts of Justice Act*, RSO 1990, c. C.34, by Order-in-Council 1014/2018 respecting the constitutionality of the *Greenhouse Gas Pollution Pricing Act*, Part 5 of the *Budget Implementation Act, 2018, No. 1,* SC 2018, c. 12	Court of Appeal File No.: C65807

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PROCEEDINGS COMMENCED AT TORONTO

AFFIDAVIT OF CHRISTOPHER RAGAN

Stewart Elgie, LSM
LSO No. 38777P
Faculty of Law, University of Ottawa
57 Louis Pasteur St.
Ottawa, ON K1N 6N5
T. 613-562-5800 ext. 1270
Stewart.elgie@uottawa.ca

Counsel for Canada's Ecofiscal Commission

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RECORD OF CANADA'S ECOFISCAL COMMISSION

Stewart Elgie, LSM
LSO No. 38777P
Faculty of Law, University of Ottawa
57 Louis Pasteur St.
Ottawa, ON K1N 6N5
T. 613-562-5800 ext. 1270
Stewart.elgie@uottawa.ca

Counsel for Canada's Ecofiscal Commission