

ACTING ON CLIMATE CHANGE

Solutions
from Canadian Scholars



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SUSTAINABLE CANADA DIALOGUES

Sustainable Canada Dialogues (SCD) seeks to motivate change and help Canada in its necessary transition toward a low carbon economy. Through mobilization of scientific expertise, the initiative identified positive solutions that overcome obstacles to sustainability.

The initiative is oriented around three central activities :

Mobilizing scholars and Canadian expertise

More than 60 Canadian scholars from all 10 provinces

Identifying possible futures by fostering public discussion

A possible pathway for a sustainable Canada

ACKNOWLEDGEMENTS

This project was made possible thanks to the support of the **Trottier Institute for Science and Public Policy** of **McGill University** to C.P. and **UNESCO-McGill Chair for Dialogues on Sustainability**.

Many dedicated people made this project possible, to whom we owe our deepest gratitude. We are grateful to **Rosine Faucher**, who ensured implementation of the Delphi survey. **Taysha Palmer** did a great job as copy editor. Thanks also to **Martine Larouche** for proofreading the document. We are most grateful to **David Aldred** who provided the information necessary to produce the map of sustainable energies in Canada. The magical touch of **Globaïa** and **Felix Pharand-Deschênes** gave life to our position paper. **Jocelyne Néron** came to help when fatigue was setting in. Last but not least, **Natalie Richards** helped keep the ship afloat over an intense 18 months of work.

Thanks to **M. Anjos, F. Bouffard, C. A. Cañizares, E. Feurtey, J. Gibbons, L.D. D. Harvey, R. Lanoue, W. Locke, G. Marleau, J. Meadowcroft, N. Mousseau, P.-O. Pineau, I. H. Rowlands, H. Tremblay, L. Trottier, M.S. Winfield, J. Whitmore** and **E. Yiridoe** for contributions to a stimulating discussion during a workshop on Energy in Eastern Canada.

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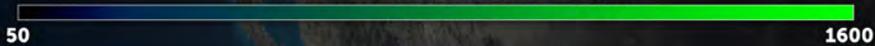
March 2015

To **Adèle** (2 months), **Alice** (4 years), **Arthur** (17 months), **Avery** (2 years), **Brookelyn** (7 years), **Camille** (3 years), **Elias** (5 years), **Emma** (1 week), **Evan** (8 years), **Gabriel** (2 days), **Hannah** (9 years), **Isis** (3 years), **Jai** (10 years), **Josh** (10 years), **Jules** (2 weeks), **Keestin** (5 years), **Louve** (11 years), **Maggie** (13 years), **Megan** (13 years), **Manami** (2 years), **Matthew** (6 years), **Mireille** (13 years), **Naomi** (13 years), **Penelope** (7 years), **Samantha** (18 months), **Tal** (16 months), **Wilson** (12 years), **Wusko** (9 years), and all other children:

YOUR FUTURE IS OUR INSPIRATION.

Canada's vast renewable energy potential

WIND ENERGY (W/m²) AT 50M



SOLAR ENERGY (kWh/kW)



 **Existing Dams**

 **Potential Dams**

 **Transmission Lines**

DATA
Solar Energy: Published by Natural Resources Canada and Environment Canada. Reproduced with the permission of Natural Resources Canada © Her Majesty the Queen in Right of Canada, 2007.
Wind Energy: Images downloaded from <http://www.windatlas.ca> on February 1 2015. Environment Canada.
Transmission Lines: Government of Canada, Natural Resources Canada, Earth Sciences Sector, Canada Centre for Mapping and Earth Observation.
Existing Dams: Natural Resources Canada, Atlas of Canada 1,000,000 National Frameworks Data, Hydrology - Dams (V6.0), 2010.
Potential Dams: Global Forest Watch Canada, Hydropower Developments in Canada: Number, Size and Jurisdictional and Ecological Distribution, 2012.
Earth: NASA, Globalia. | Thanks to David Aldred for providing several datasets.

DESIGN
 Félix Pharand-Deschênes, Globalia.

10 KEY POLICY ORIENTATIONS

SHORT TERM	MIDDLE TERM	LONG TERM
POLICY ORIENTATION 1 Put a price on carbon.		
Adopt either a national carbon tax or a national cap and trade program.		
POLICY ORIENTATION 2 Include aggressive goals for low-carbon electricity production in federal and provincial climate action plans.		
Adopt ambitious sectorial targets for low-carbon electricity production.		
Support interprovincial electricity transportation infrastructure.		
POLICY ORIENTATION 3 Integrate the oil and gas production sector in climate policies.		
Eliminate all direct and indirect subsidies to the fossil fuel industry.		
Develop a clear regulatory framework coherent with the transition to a low-carbon economy.		
POLICY ORIENTATION 4 Adopt a multi-level energy policy with energy efficiency and cooperation in electrification at its core.		
Develop a national energy policy with long-term plans for transitioning to low-carbon energy.	Implement efficiency targets for energy use in the extractive industry.	
Ensure government efficiency standards and procurement.		
POLICY ORIENTATION 5 Throughout Canada, rapidly adopt low-carbon transportation strategies.		
Update emissions standards for vehicles and support fuel diversification.	Electrify road transport.	
Support new models of transportation.		
Favor active transportation.	Improve and increase intercity rail and intermodal transportation.	
POLICY ORIENTATION 6 Integrate landscape, land use, transportation and energy infrastructure planning policies at multiple scales to ensure climate change mitigation.		
Integrate climate change into the heart of territorial and urban planning and identify new avenues for financing.		
Acknowledge the importance of, and support, green infrastructure and "smart growth" ¹ city planning.		
POLICY ORIENTATION 7 Support evolution of the building sector toward a carbon neutral or carbon- positive sector.		
Adopt ambitious targets for energy demand and efficiency of buildings and include climate change mitigation in national building codes.		
Invest in renewable and ambient energy for new and existing buildings.		
POLICY ORIENTATION 8 Safeguard biodiversity and water quality during Canada's transition to a low-carbon society, while aiming for net positive approaches.		
POLICY ORIENTATION 9 Support fisheries, forestry and agriculture practices offering opportunities to limit GHG emissions, enhance carbon sequestration, protect biological diversity and water quality.		
POLICY ORIENTATION 10 Facilitate the transition to a low-carbon sustainable society through the implementation of more participatory and open governance institutions.		

¹ "Smart growth" cities are designed for high amenity, mixed land use and medium to high dwelling density, with all systems (water, waste, energy, transportation, buildings, etc.) made sustainable, clean, accessible, integrated, and connected using advanced technologies.

EXECUTIVE SUMMARY

In fall 2014, UN Secretary Ban Ki-moon exhorted all countries in the world to raise the ambition of their climate change policies to avoid a global temperature increase of more than 2°C during this century. Answering this call, the scholars of *Sustainable Canada Dialogues*¹ (SCD), an initiative that mobilizes over 60 researchers from every province, worked collectively to identify a possible pathway towards a low carbon economy in Canada. Our network of scholars represents disciplines crossing engineering, the sciences and social sciences, where sustainability is at the heart of our research programs.

Acting on Climate Change: Solutions from Canadian Scholars identifies ten policy orientations illustrated by actions that could be immediately adopted to kick-start Canada's necessary transition towards a low carbon economy and sustainable society. **We unanimously recommend putting a price on carbon.**

Climate simulations, carried out in the context of SCD by the Consortium OURANOS² based on the mitigation scenarios of the Intergovernmental Panel on Climate Change, show that immediate global action would successfully limit temperature increases in Canada. We must act today to ensure tomorrow.

Besides putting a price on carbon, *Acting on Climate Change: Solutions from Canadian Scholars* examines how Canada can reduce its greenhouse gas emissions (GES) by: 1) producing electricity with low carbon emissions sources; 2) modifying energy consumption through evolving urban design coupled with a transportation revolution; and 3) linking transition to a low-carbon economy with a broader sustainability agenda, through creation of participatory and open governance institutions that engage the Canadian public. Our proposals take into account Canada's assets and are based on the well-accepted "polluter pays" principle. They are presented in detail in the core document that can be downloaded from the SCD website.

In the short term, policy orientations that could trigger climate action include:

- Implementing either a national carbon tax or a national economy-wide cap and trade program;
- Eliminating subsidies to the fossil fuel industry and fully integrating the oil and gas production sector in climate policies;
- Integrating sustainability and climate change into landscape planning at the regional and city levels to ensure that, amongst other goals, maintenance and new infrastructure investments are consistent with the long-term goal of decarbonizing.

1 <http://www.sustainablecanadialogues.ca/en/scd>

2 <http://www.ouranos.ca>

In the short to middle term, the transition could be facilitated by:

- East-West smart grid connections that allow provinces producing hydro-electricity to sell electricity to their neighbors to take full advantage of Canada's low-carbon energy potential;
- Well-managed energy efficiency programs that produce significant positive economic returns across the board, through cost savings as well as job creation. Energy efficiency programs could target the building sector as well as businesses and industries.

In the short to long term, the transition could support a transportation “revolution”:

- Transportation strategies that move the sector away from its dependence on fossil fuel could rest on the implementation of a basket of options, ranging from electrification of transport to collective and active transportation.

Because renewable energy resources are plentiful, we believe that Canada could reach **100% reliance on low-carbon electricity by 2035**. This makes it possible, in turn, to adopt a long-term target of at least an **80% reduction in emissions by mid-century**, consistent with Canada's international climate mitigation responsibility. In the short-term, we believe that Canada, in keeping with its historical position of aligning with US targets, could adopt a **2025 target of a 26-28% reduction in GHG emissions relative to our 2005 levels**.

We envision climate policy as the ongoing, long-term project of making the *transition* to a low-carbon society and economy. This notion of transition has many advantages: the 80% target establishes the direction of change, allowing Canada to plan for the future while recognizing that goals will take time to accomplish. It permits governments, businesses and citizens to situate their activities within a dynamic context. As with other past and future major transitions, e.g. industrialization or electrification, there will be controversies and setbacks. Some economic sectors will contract as others expand. The most important aspect of Canadian climate policies is to build a sustainable future *starting today*.

Recognition that certain forms of economic development cause environmental damage led to the notion of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” We have adopted a more recent definition of sustainability that emphasizes the importance of desired futures. We propose that the specific transition pathways to low-carbon economy in Canada could rest on the hopes of Canadians for social and environmental well-being and help to articulate a vision for the country.

The transition to a low-carbon sustainable society will usher in great opportunities for innovation by developing new technologies, businesses and employment. The international landscape has changed substantively since Canada withdrew from the Kyoto Protocol in December 2011. Canada's major trade partner, the USA, doubled their GHG emissions reduction target in 2014. For example in 2011, the International Energy Agency (IEA) estimated that investments for energy efficiency were worth USD 310-360 billion³. A clear climate policy framework would reduce uncertainty in the business environment, encouraging companies to invest in low-carbon technologies.

We have identified policy orientations designed to deliver substantial, viable change based on our expertise and dialogue among our members. We do not claim to offer all possible policies or incentives to achieve sustainability, and we understand that further analyses, debate and refinement will be required. However, in virtually all cases, our proposals are in line with a number of international and national analyses of viable policy options to decarbonize.

We believe that putting options on the table is long overdue in Canada and hope that our input will help governments at all levels to make ambitious and thoughtful commitments to emissions reductions before December 2015 and the *2015 Paris-Climat Conference*. We wish for an intense period of consultation and policy development to identify the policy instruments, regulations and incentives best suited to Canada. We offer our full cooperation to all levels of government in this challenging, but exciting, period. The time is now ripe to initiate ambitious climate change mitigation efforts.

3 http://www.iea.org/bookshop/463-Energy_Efficiency_Market_Report_2014

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MAP OF SUSTAINABLE CANADA DIALOGUES SCHOLARS

