

CAN CANADA REALLY MANAGE AN ENERGY TRANSITION?

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INSTITUT DE L'ÉNERGIE **TROTTIER**



Mission:

Train a new generation of engineers, scientists and innovators with a systemic and transdisciplinary understanding of energy issues;

Seek sustainable solutions that will help secure the energy future, supporting knowledge production and innovation in the energy field to help address the challenges that society will face in the coming decades;

Disseminate knowledge related to energy to help raise the level of social debate on energy issues.



NORMAND
MOUSSEAU

GAGNER LA GUERRE DU CLIMAT

DOUZE MYTHES
À DÉBOULONNER

BORÉAL

MYTH NO. 1. The reduction in greenhouse gas emissions will inevitably improve our quality of life

MYTH NO. 2. Quebec, a leader in green energy

MYTH NO. 3. Hydropower is Quebec's oil

MYTH NO. 4. The fight against climate change begins with the electric car

MYTH NO. 5. Quebecers use too much electricity

MYTH NO. 6. The 37.5% GHG reduction target is based on a detailed strategy

MYTH NO. 7. Oil is here for a long time

MYTH NO. 8. A price on carbon is all we need

MYTH NO. 9. Canada, an energy power

MYTH NO. 10. The provinces have taken over from the federal government

MYTH NO. 11. Canada is a real country

MYTH NO. 12. A selfie is all we need

MYTH : The federal government leads the energy transition

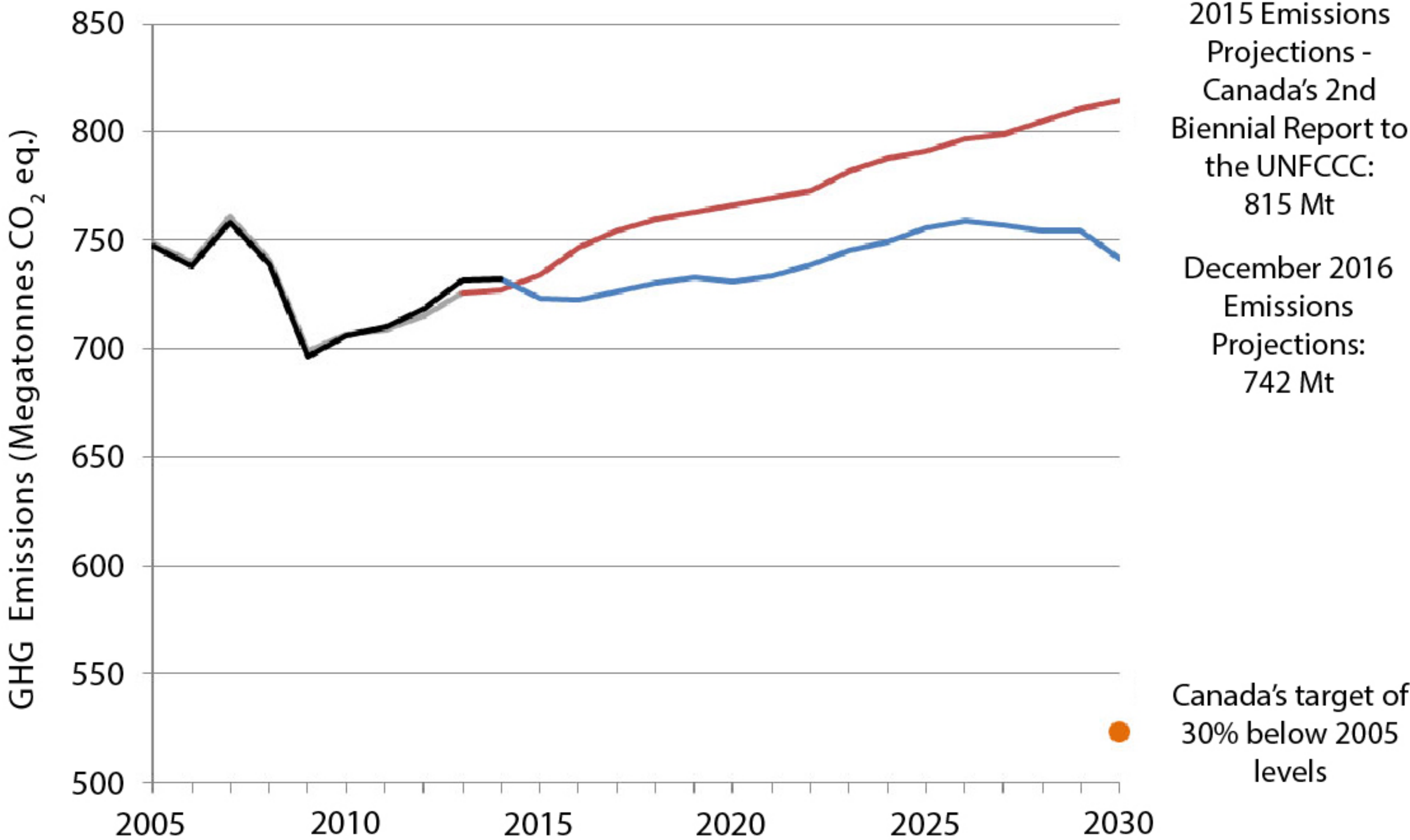
GHG emissions Canada

PAN-CANADIAN FRAMEWORK



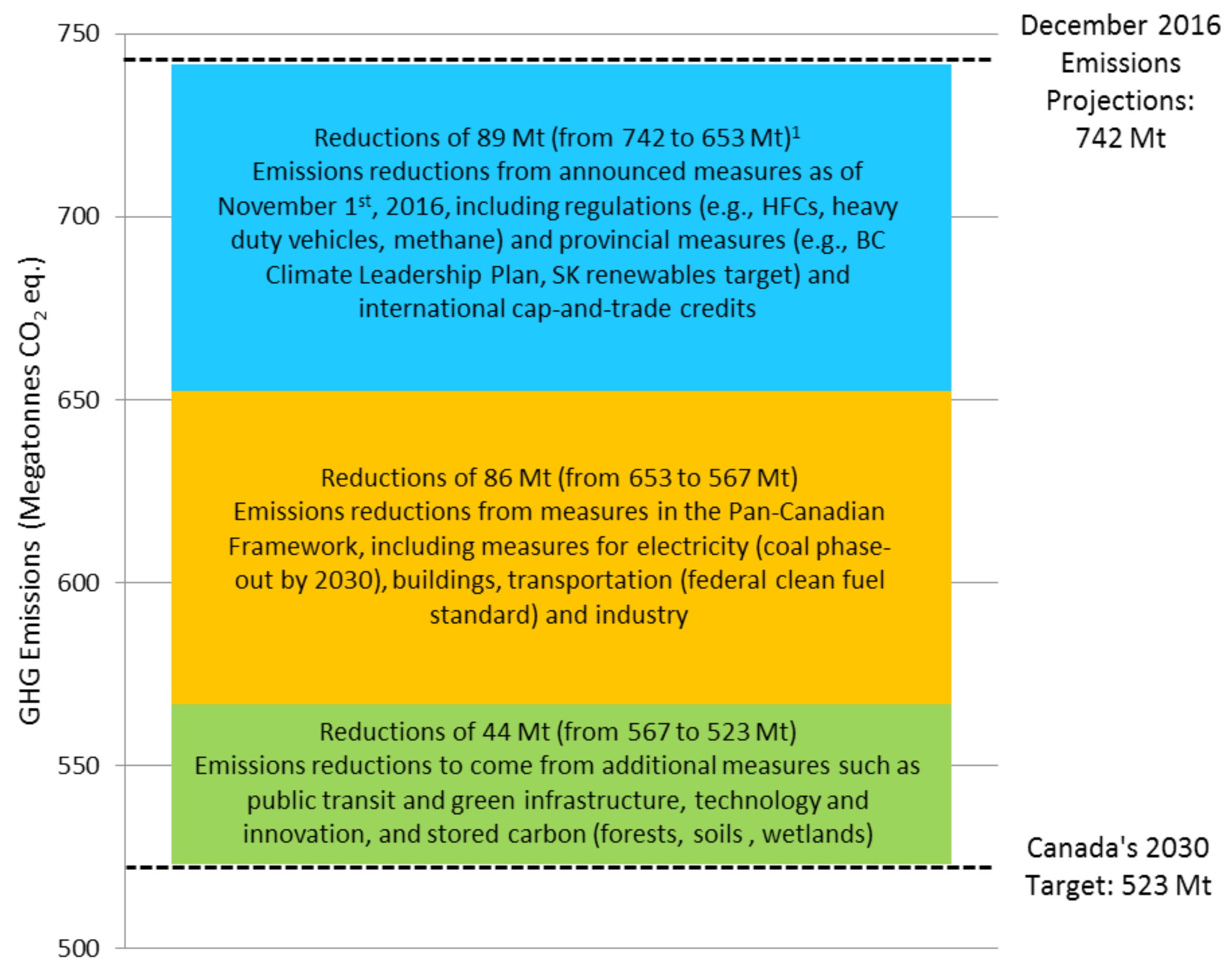
on Clean Growth
and Climate Change

Canada's Plan to Address Climate
Change and Grow the Economy



Source: Pan-canadian framework on clean growth and climate change (2016)

PATHWAY TO MEETING CANADA'S 2030 TARGET



PAN-CANADIAN FRAMEWORK



on Clean Growth and Climate Change

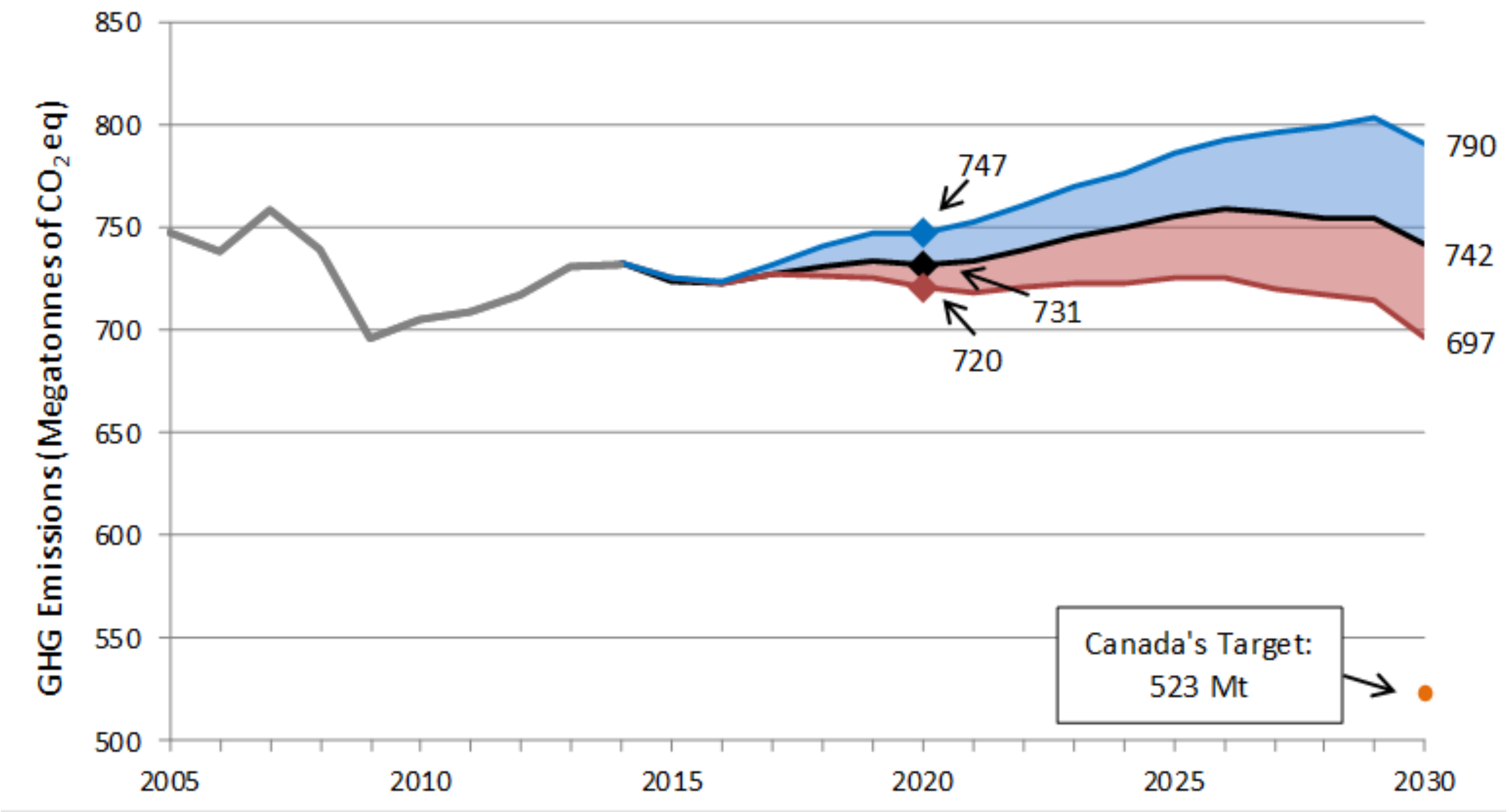
Canada's Plan to Address Climate Change and Grow the Economy

Note: Reductions from carbon pricing are built into the different elements depending on whether they are implemented, announced, or included in the Pan-Canadian Framework. The path forward on pricing will be determined by the review to be completed by early 2022.

¹ Estimates assume purchase of carbon credits from California by regulated entities under Quebec and Ontario's cap-and-trade system that are or will be linked through the Western Climate Initiative.

Signed December 2016

GHG emissions Canada



Source: Environment Canada (2018)

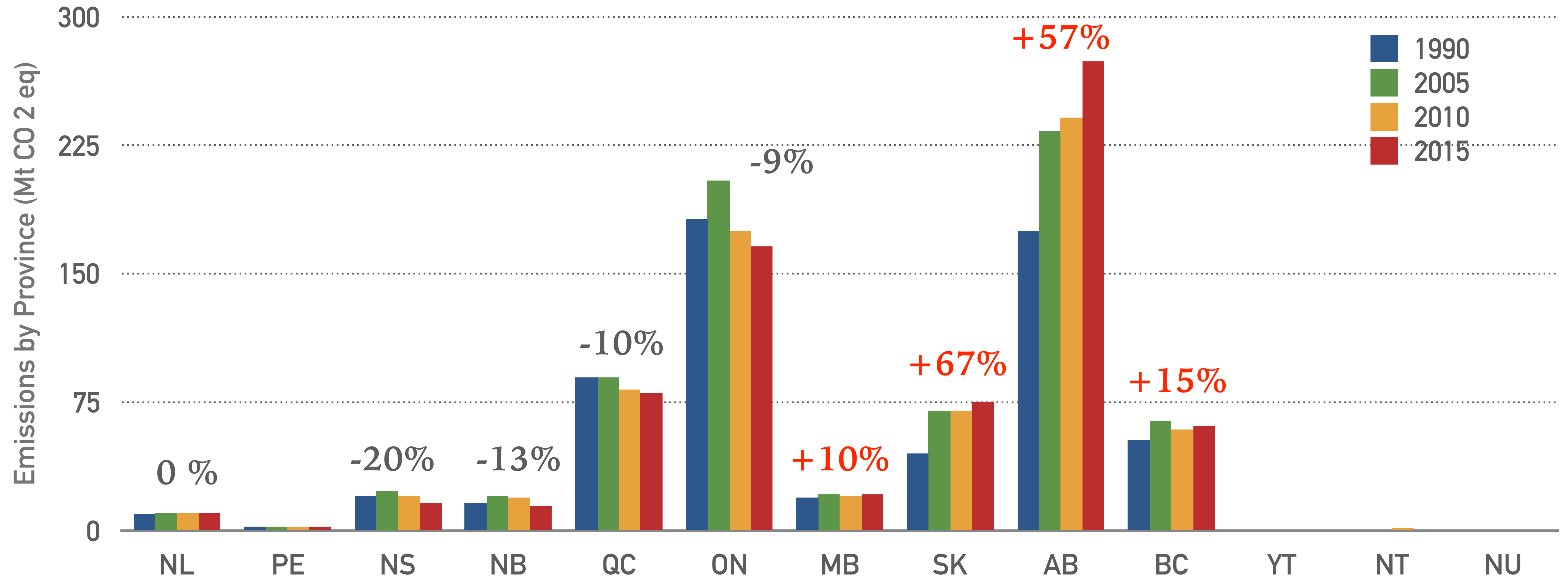
Blank	Incremental Reduction (Mt)	Total Emissions in 2030 (Mt)	Notes on Modeling Assumptions
Canada’s Second Biennial Report to UNFCCC	—	815	See Annex 3 of Canada’s Second Biennial Report on Climate Change for more details.
December 2016 Reference Case (dotted line in graph)	73	742	Updated GDP and energy price and production assumptions are revised downwards Federal measures included: <ul style="list-style-type: none">• Federal Budget 2016 measures for increasing energy efficiency of equipment in buildings Provincial measures included: <ul style="list-style-type: none">• Alberta: coal phase-out, \$30 carbon levy, 100Mt cap on oil sands emissions• Ontario: cap-and-trade under WCI• Quebec: building regulations for new commercial, institutional and residential high-rise buildings
FPT Announced Measures (as of November 1st) (blue bar in graph)	89	653	Federal measures included: <ul style="list-style-type: none">• HFC regulations• Heavy-duty vehicles (phase 2) regulations• Methane regulations for oil and gas sector Provincial measures included: <ul style="list-style-type: none">• Saskatchewan: renewable electricity announcement• Alberta: methane regulations• British Columbia: Climate Leadership Plan Assumes ON & QC meet emissions targets through international purchases of WCI allowances.
Measures in Pan-Canadian Framework (yellow bar in graph)	86	567	Measures included in Pan-Canadian Framework in all sectors. Also includes federal measures announced in November 2016 (coal phase-out by 2030 and clean fuel standard).
Additional Measures (green bar in graph)	44	523	Including emissions reductions to come from a combination of: <ul style="list-style-type: none">• Investments in public transit and green infrastructure• Investments in innovation and clean technology RD&D• Increases in stored carbon in forest, soils and wetlands• Any future actions by governments

Sectoral Reductions

Sector 2	Reductions from December 2016 Reference Case to Pan-Canadian Framework (742 Mt to 567 Mt in 2030)	
Electricity	17 Mt (from 34 to 17 Mt)	<i>Comment: The announcement a year ago was mentioning rather 5 Mt</i>
Buildings	28 Mt (from 94 to 66 Mt)	
Transportation	15 Mt (from 157 to 142 Mt)	
Heavy Industry (including oil and gas)	56 Mt (from 330 to 274 Mt)	
Agriculture, Waste and Others	4 Mt (from 127 to 123 Mt)	
Purchase of WCI Allowances (Ontario and Quebec)	55 Mt	

1 Reductions in this table correspond to federal, provincial and territorial announced measures as of November 1, 2016 (blue bar) and measures contained in the Pan-Canadian Framework on Clean Growth and Climate Change (yellow bar).

2 Sectors as defined in Canada’s 2016 Greenhouse Gas Emissions Reference Case



The provinces have taken over from the federal government

Jurisdiction	GHG Emissions	Energy mix	Renewables	Electrification	Efficiency
Federal	<ul style="list-style-type: none"> ➤ -30% 2005 by 2030³ ➤ -80% 2005 by 2050 ➤ -40% 2005 by 2030 for federal operations (government buildings and fleets)¹ ➤ -40-45% 2012 by 2025 methane from the oil and gas sectors 	Renewable fuel standards, in place since 2010, mandate 10% reduction in the carbon content of fuels by 2020, 5% renewable content in gasoline and 4% in diesel	<ul style="list-style-type: none"> ➤ 90% non-emitting source for power generation by 2030 ➤ 100% long term ➤ By 2025, contribute to the North American goal of 50% clean power generation³ 		
British Columbia	<ul style="list-style-type: none"> ➤ -33% 2007 by 2020 ➤ -80% 2007 by 2050⁴ 			➤ 5% EVs by 2020	
Alberta	<ul style="list-style-type: none"> ➤ Oil sands emissions <100MT ➤ Methane emissions from upstream oil and gas -45% 2014 by 2025⁶ ➤ Coal-generated electricity pollution 0% by 2030⁶ 	➤ Coal phase-out by 2030	➤ 30% renewable sources by 2030 ⁶		
Saskatchewan	➤ 40% 2005 by 2030 from electricity sector		➤ 50% renewable-energy generation capacity by 2030		
Manitoba		Target of 2.3GW of new hydro and 1 GW of wind power			
Ontario	<ul style="list-style-type: none"> ➤ 15% 1990 by 2020 ➤ 37% 1990 by 2030 ➤ 80% 1990 by 2050 	<ul style="list-style-type: none"> ➤ Target of 10,700MW of RES, wind, solar PV, biomass, excluding hydro by 2018 ➤ 50% renewable electricity by 2025 			
Quebec	<ul style="list-style-type: none"> ➤ -20% 1990 by 2020 ➤ -37.5% 1990 by 2030 ➤ between -80% and -95% 1990 by 2050 	<ul style="list-style-type: none"> ➤ -40% 2013 oil products consumption by 2030 ➤ +25% 2013 renewable energy in total energy production by 2030 ➤ Eliminate thermal coal ➤ +50% 2013 bioenergy production by 2030 		<ul style="list-style-type: none"> ➤ 3.5% sales of EV (or PH or hydrogen) for new vehicles for 2018, increasing progressively to 22% in 2025 ➤ 100,000 EVs by 2020 ➤ 1,000,000 by 2030 	➤ -15% 2013 energy efficiency by 2030

Ontario	<ul style="list-style-type: none"> ➤ 15% 1990 by 2020 ➤ 37% 1990 by 2030 ➤ 80% 1990 by 2050 	<ul style="list-style-type: none"> ➤ Target of 10,700MW of RES, wind, solar PV, biomass, excluding hydro by 2018 ➤ 50% renewable electricity by 2025 			
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New Brunswick		<ul style="list-style-type: none"> ➤ RPS 40% by 2020 	<ul style="list-style-type: none"> ➤ The Regulation under the Electricity Act requires NB Power to achieve by 2020 40% of in-province electricity sales being provided from renewable energy (to verify: auditor general report) 		
Nova Scotia	<ul style="list-style-type: none"> ➤ Caps on GHG emission from the electricity sector (7.5 Mt 2020; 4.5 Mt 2030) 	<ul style="list-style-type: none"> ➤ RPS 40% renewables in the electricity mix by 2020 			
Prince-Edward-Island					
Newfoundland-and-Labrador		98% of electricity from renewable in 2019			

The report were produced by **Sustainable Canada Dialogues**, an independent volunteer network of more than 80 academics. The network includes researchers from multiple disciplines, such as engineering, sciences and social sciences, working in universities in all provinces.

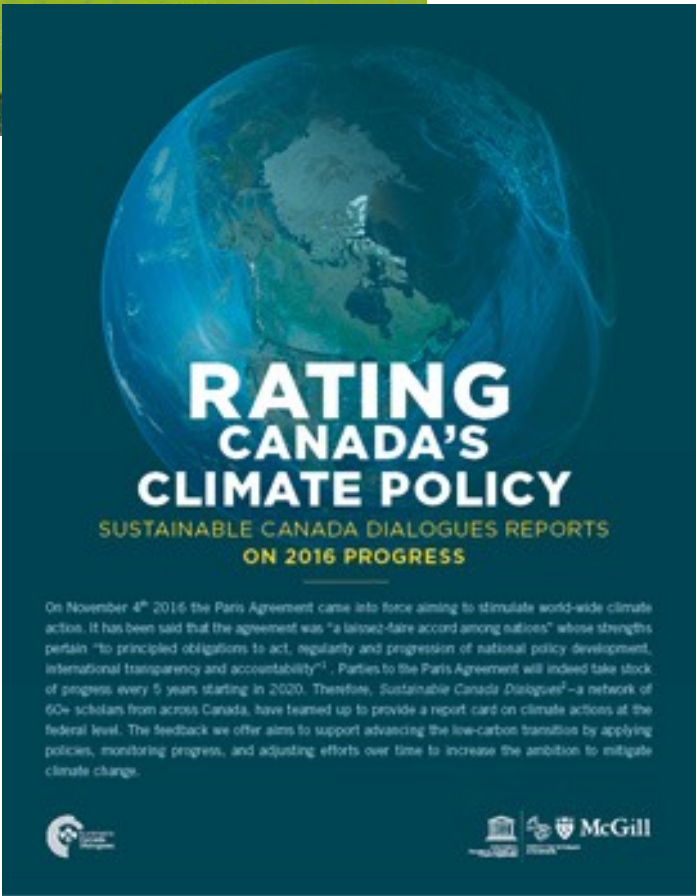
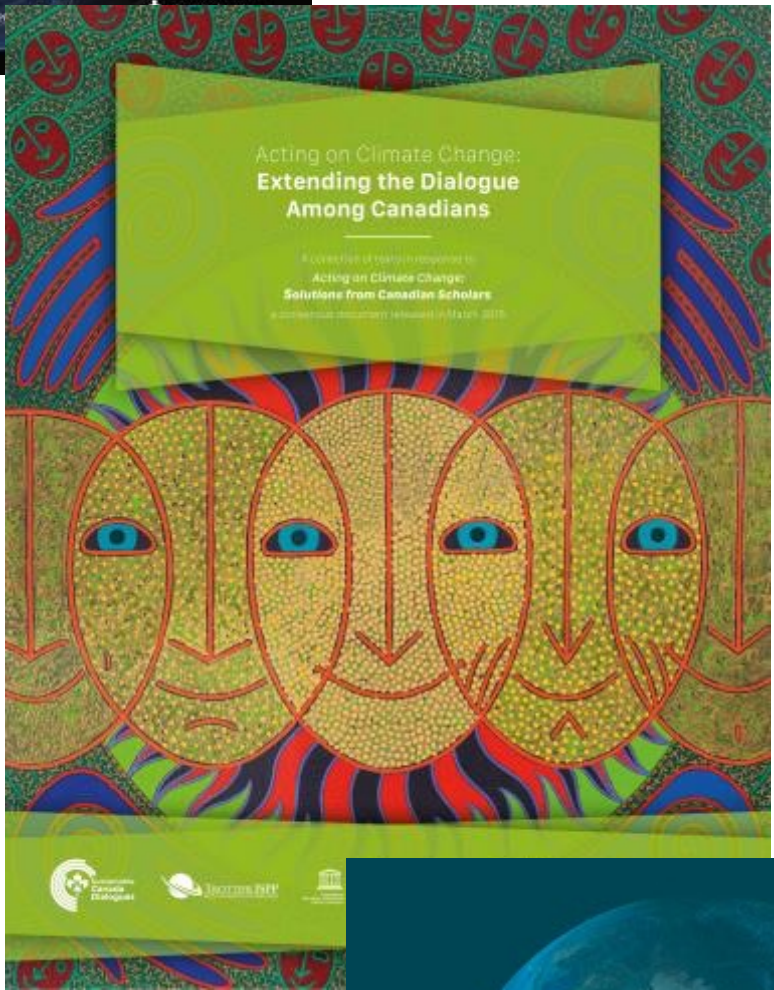
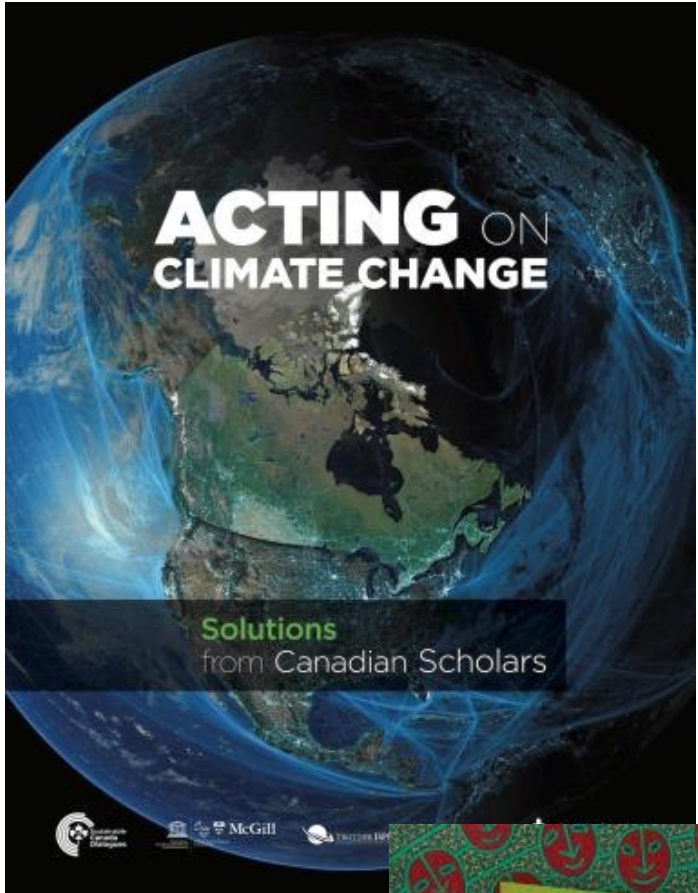
Commissioned by Natural Resources Canada in Fall 2016,

Unveiled on May 26th 2017

RE-ENERGIZING CANADA

Pathways to a Low-Carbon Future





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George Hoberg
John Calvert
John Robinson
Lauchlan Fraser
Meg Holden
Ralph Matthews
Sally Aitken
Sally Otto
Shauna M. Sylvester
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Andreas Athienitis
Laure Waridel

Ashlee Cunsolo Willox
Howard Ramos
Ken Oakes
Martin Mkandawire
Tarah Wright

Chris Bataille



Steps proposed

PREPARATION

Co-create a common vision

High-level joint transition task force

Independent monitoring commission

Intergovernmental structure

Transition experiments

Possible economy-wide
emission reduction targets

2017
747 Mt CO₂-eq

Implement

2020

EARLY IMPLEMENTATION

Navigate energy pathways

Low-carbon development strategy

Monitor | Learn

Review

Adjust

2030

523 Mt CO₂

DEEP DECARBONISATION

Learning-by-doing to accelerate
decarbonisation

Monitor | Learn

Review

Adjust

2040

336 Mt CO₂

Monitor | Learn

Review

Adjust

2050

149 Mt CO₂

Did we make it?

Conclusion

Towards an effective governance structure

Near economic decision centers

Breaks the silos

Linked to innovation

Based on data and research

Top-down and bottom-up

Relies on experimentation and dissemination of results

Monitors, evaluates and adapts



We are a group of academic experts who spontaneously formed in the summer of 2017 to imagine and propose a new model of environmental governance that would allow Quebec to achieve its objectives in environment, climate and energy

*Yvan Allaire (UQAM)
Luc Bernier (Ottawa)
Pascale Biron (Concordia)
Julie Caron-Malenfant (INM)
Catherine Choquette
(Sherbrooke)
Jérôme Dupras (UQO)
Kathryn Furlong (UdeM)
Corinne Gendron (UQAM)
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James Meadowcroft (Carleton)
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Marie-Christine Trottier
(ÉNAP)
Hélène Trudeau (UdeM)
Claude Villeneuve (UQAC)
Jean-Philippe Waub (UQAM)
Johanne Whitmore (HEC)*



This initiative is led by a small group

Composed of five academics

Luc Bernier, Jarislowsky Chair in management in the public sector, University of Ottawa

Pascale Biron, professor and chair of the Geography, Planning and Environment Department, Concordia University

Normand Mousseau, professor of physics, Université de Montréal and Academic Director of the Trottier Energy Institute, Polytechnique Montréal ;

Stéphane Paquin, director of the Groupe d'études et de recherche sur l'International et le Québec, ÉNAP ;

Marie-Christine Therrien, Professor at the Centre de recherche sur la gouvernance, ÉNAP

and two external members

Julie Caron-Malenfant, Chief executive of the Institut du Nouveau Monde

Roger Lanoue, expert in strategic management, energy and access to clean water

Fall 2017: Meetings of experts, preparation of a proposal

February 6th, 2018: Publication of the proposal

Call for contributions from the public

April 12th, 2018: National Forum

October 2018: Elections in Quebec



LE CLIMAT L'ÉTAT ET NOUS

Repenser l'action publique en environnement



LE CLIMAT L'ÉTAT ET NOUS

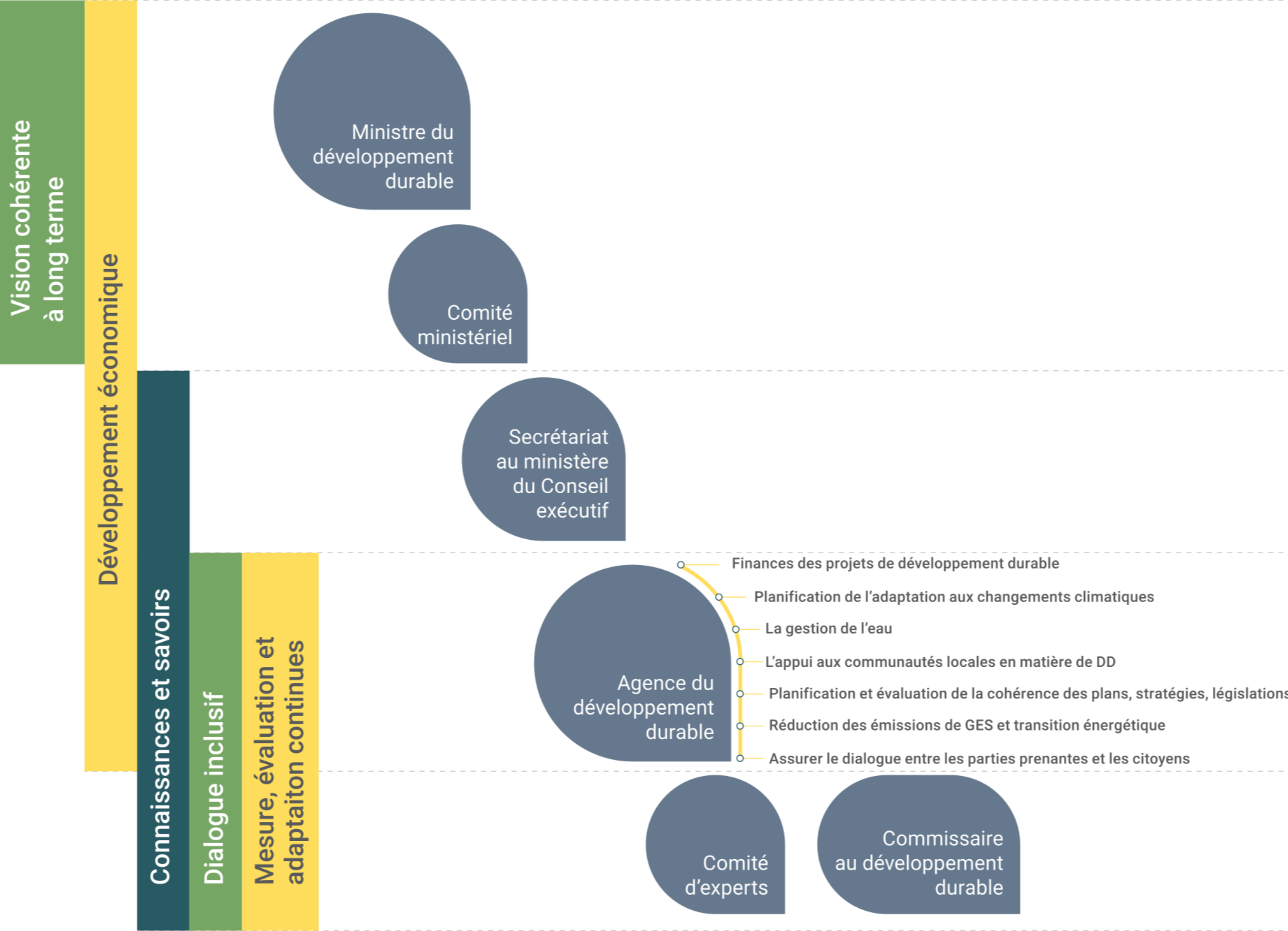
Repenser l'action publique en environnement

Five principles to adopt

1. A long-term and coherent vision
2. An integration to economic development
3. Decisions based on best evidences, science and local and traditional knowledge
4. An inclusive dialogue
5. Continuous measure, evaluation, feed-back and adaptation

Principes

Proposition





LE CLIMAT L'ÉTAT ET NOUS

Repenser l'action publique en environnement

What do you think?

climat-etat-nous.org