



NATIONAL
ROUND TABLE ON
THE ENVIRONMENT
AND THE ECONOMY

PLANNING FOR PROSPERITY: BUILDING CANADA'S LOW-CARBON GROWTH PLAN

NRT-ACOA

Stakeholder
Consultation Session



Atlantic Canada
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Agence de
promotion économique
du Canada atlantique

 **Canada**

**“HOW EACH NATION
ADAPTS TO A CARBON-
CONSTRAINED WORLD
WILL, TO A LARGE
EXTENT, DETERMINE
ITS FUTURE ECONOMIC
COMPETITIVENESS AND
ABILITY TO CREATE
PROSPERITY FOR ITS
RESIDENTS.”**

The Climate Institute & E3G in “G20
Low Carbon Competitiveness”



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Section ONE

IMPACTS OF A
LOW-CARBON GROWTH
PLAN FOR **CANADA**

MEETING PURPOSE

The National Round Table on the Environment and the Economy (NRT) is investigating the economic risks and opportunities of climate change for Canada. As part of this initiative the NRT is exploring what a low-carbon economy looks like for Canada. This meeting is one of ten regional events being held by the NRT and its Regional Partners across the country throughout November and December, 2011. The purpose of these sessions is to obtain stakeholder input and advice on the regional and pan-Canadian opportunities and challenges inherent in the global transition to a low-carbon economy, and how Canada can succeed and prosper in this new reality. This input will shape the findings and recommendations of the NRT in its development of a low-carbon growth plan for Canada.

The meeting will help:

- Solicit broad-based private sector input on how Canada should position itself in the global low-carbon transition;
- Improve our understanding of regional priorities and opportunities; and
- Ensure that our advice is grounded in the regional realities.

ABOUT THIS DOCUMENT

This document provides an overview of the subject matter, presenting the motivation for the work and how we approach it. It contains some initial ideas as to priorities and issues deserving further exploration. The intent is to provide you, the participant, with guidance on the input we are seeking without constraining the discussion and new ideas. Where helpful, we have included some preliminary findings from our research and analysis.

The relevance and quality of our research and advice depends on our ability to capture both the diversity of regional perspectives and business and industry views across sectors. Your engagement is critical in ensuring that your region's priorities are accurately represented and your industry's perspective is heard. Your input will influence our findings and recommendations and ultimately, the direction of the proposed low-carbon growth plan for Canada.

BACKGROUND

“This is not just about coping with climate change, but **Prospering** through it.”

The NRT – an independent federal policy advisory agency – has embarked on a comprehensive policy initiative called *Climate Prosperity*, exploring the economic risks and opportunities of climate change for Canada. This multi-year policy research program focuses on two streams of research – low-carbon transition and climate change adaptation – and will result in the publication of six policy reports. Four studies have already been released (*Measuring Up*; *Degrees of Change*; *Parallel Paths*; *Paying the Price*).

The focus of this discussion, Climate Prosperity Report 6 (Report 6), builds on the two completed reports in the low-carbon economy stream (*Measuring Up* and *Parallel Paths*) with the intent of charting a path forward to position Canada to prosper in the context of anticipated future global carbon constraints and new low-carbon economic opportunities.

It is fair to say that the global economy is already beginning a transition to a low-carbon economy. Climate change, rising energy costs, and security concerns are combining to create increasingly favourable conditions for countries and companies across the world to invest in and develop markets for “clean” or “green” technologies. This investment has the potential for transforming energy and transportation systems around the world. In order to remain competitive, Canada's economy will also need to transition to a lower carbon intensity.¹ The manner in which this is done, the timing, pace and scale with which this is accomplished, will have significant implications for the Canadian economy and for individual regions and sectors.

¹ Carbon intensity of the economy refers to the average quantity (mass) of carbon dioxide equivalent (CO₂e) associated with the generation of one dollar of gross domestic product (GDP). The inverse of this metric – carbon productivity, or how much income the economy generates per unit carbon expended – is also useful.

Climate Prosperity Report 6 will identify key components of this transition, examining the implications for Canadian regions and sectors with respect to both risks and opportunities. Ultimately we seek to identify the steps required to ensure a smooth transition – to best manage risks and harness opportunities for Canada. This low-carbon growth pathway will improve energy efficiency, drive innovation, create jobs, incite sustainable resource development and reduce environmental impacts. It will consider where Canada needs to invest, how private and public investment can be leveraged, what we need to do to develop and promote Canadian products domestically and in international markets, as well as what governance structures and mechanisms are required to facilitate this transition.

WHY A LOW-CARBON GROWTH PLAN ?

A global low-carbon transition is underway.

Canada's competitors and trading partners are active in planning for and initiating resource-efficient growth: the EU published its 2050 low-carbon growth roadmap this past March; UNEP published its Green Economy Report in early May; and the OECD released its series Towards Green Growth in May. The United Kingdom continues to be a leader in undertaking detailed studies, developing plans, and initiating action as exemplified most recently by the establishment of the U.K. Green Bank. Emerging economies are not to be left out of the picture: China released its 12th 5-year plan – its primary economic planning document – in March. This document highlighted climate change as a priority issue and the reduction of the carbon-intensity of the Chinese economy as an area for action (17% reduction in GHGs per unit GDP).



“At home and abroad, the opportunities are huge. For jobs, exports, and growth, the future is green. We are already feeling the benefits. Because the cost of investing in low-carbon energy and security of supply pales in comparison to the costs of dangerous climate change and energy dependency... There are real economic opportunities up for grabs.”

- Chris Huhne, UK Climate Change Secretary,
April 2011.

Significant investments are being made by both public and private sectors.

World-wide investment in “clean energy” (excluding R&D) has grown 630% to \$234 billion since 2004, growing 30% in the last year alone.¹ Following the financial crisis of 2008, the world’s major economies promised \$194.3 billion in clean energy stimulus funds.² Despite cuts in the 2011 budget, the United States is investing heavily in low-carbon energy as part of its economic recovery and job creation strategyⁱⁱ, and is ranked third globally in terms of attracting clean energy investment.³ In 2010, the Australian government announced a \$652 million Renewable Energy Future Fund as part of its \$5 billion Clean Energy Initiative.⁴ The EU, led by Germany (ranked second globally in attracting clean energy investment) is investing significantly in clean energy systems. Most interestingly, however, as documented in the Breakthrough Institute’s report, *Rising Tigers, Sleeping Giant*, China, Japan and South Korea are expected to out-invest the US in terms of public expenditure on “clean technology” (a significant portion of which is low-carbon energy) by a factor of 3 to 1 over the 2010 to 2014 period. The accuracy of this prediction is already being seen in the ability of Asia to attract private sector capital on the clean energy front.

ⁱⁱ While the US has long been a leader in clean energy investment, significant spending reductions in energy efficiency and renewable were introduced in the 2011 budget. Despite these cut-backs, public spending on clean energy remains significant (\$31.8 billion on energy and water). In addition, President Obama’s jobs plan includes mention of renewable energy, energy efficiency, sustainable green buildings, and high-speed rail transportation infrastructure.

The growth potential for low-carbon goods and services is substantial.

Preliminary NRT analysis suggests that global investment in low-carbon goods and services (LCGS) sectors is currently in the range of \$2 trillion.⁵ Going forward under a business-as-usual scenario, this investment is expected to grow to over \$4.5 trillion in 2050. If carbon mitigation policies were broadly implemented, this annual investment would be expected to be twice as large.ⁱⁱⁱ Our analysis also estimates that under a business-as-usual scenario for Canada, domestic LCGS investment would grow from about \$10 billion (currently) to almost \$60 billion in 2050. The domestic growth rate in low-carbon goods and service sectors is close to double the expected overall annual economic growth rate. This represents a significant opportunity in terms of both domestic and international markets.

Carbon is increasingly central to trade.

Low-carbon and clean energy have increasingly been cited as factors or motivations in trade discussions and bilateral relations. The UK-China Low Carbon Cooperation agreement was signed in January 2011, a memorandum of understanding aimed at increasing collaboration on energy markets and low-carbon technology. France is considering carbon labelling under its “Grenelle 2” law, potentially introducing non-tariff trade barriers to imported products. Low-carbon fuel standards are under discussion in numerous jurisdictions, and the relative carbon content of oil from Canada’s oil sands has been a subject of much discussion south of the border. Given Canada’s heavily resource-oriented economy, this focus presents obvious trade risks but also opportunities.

ⁱⁱⁱ In estimating potential growth in LCGS sectors, two possible future scenarios published by the International Agency (IEA) were considered: the Baseline; and the Blue Map. The Baseline is a business-as-usual projection whereas the Blue Map is target-oriented with an objective of halving global energy-related CO₂ by 2050 (compared with 2005 levels). The BAU follows the IEA’s World Energy Outlook reference scenario to 2030 and then extends it to 2050. It assumes that governments introduce no new energy and climate policies. The Blue Map scenario would be close to achieving the emissions reductions necessary for the atmospheric concentration of CO₂ to remain within 450 ppm.

Canada needs to position itself to most effectively manage the risks and harness the opportunities inherent in the global low-carbon transition.









While it is not necessarily a matter of “being left behind”, Canada does need to position itself to compete in those areas where we have economic advantage – if we don’t occupy the space, someone else will. There are windows of opportunity that will close if we are not prepared and positioned to take advantage of them. We may not be leaders in all areas related to “low-carbon”, and we must continue to exploit our comparative natural resource advantage; however, we will lose opportunities and incur higher costs if we approach this inevitable transition in an ad-hoc or delayed manner. Planning and investing now provides opportunity to shape possibilities and secure our prosperity for the future.

WHERE DOES CANADA STAND?

Traditional measures of competitiveness are inadequate in assessing the implications of the manner in which countries respond to the opportunities and costs inherent in the global low-carbon transition.⁶ Low-carbon competitiveness is not simply a matter of where a country is now, but of its direction, how fast it is changing direction, and the magnitude of the challenge, especially when compared to others.

NRT’s 2010 report, *Measuring Up*, published a unique low-carbon performance index for Canada, comparing our performance within the G8. Seen below, it considers Canada’s performance in terms of five categories: Emissions and Energy, Innovation, Skills, Investment, and Policy and Institutions (Governance). This analysis found that while Canada was competitive on some fronts, it placed sixth out of the G8 and was not yet well-positioned overall to compete in a carbon-constrained world.

OVERALL RANKING OF G8 COUNTRIES BY CATEGORY AND TIER

	OVERALL	EMISSIONS & ENERGY	INNOVATION	SKILLS	INVESTMENT	POLICY & INSTITUTIONS	NORMALIZED FINAL SCORE
TIER 1 (AVERAGE SCORE: 53 POINTS)							
 France	1	1	4	3	1	4	58
 Germany	2	5	2	2	3	2	52
 United Kingdom	3	4	6	5	5	1	48
TIER 2 (AVERAGE SCORE: 40 POINTS)							
 Japan	4	2	1	8	7	5	43
 United States	5	3	5	4	2	7	40
 Canada	6	6	3	1	4	6	38
TIER 3 (AVERAGE SCORE: 17 POINTS)							
 Italy	7	7	7	6	6	3	27
 Russia	8	8	8	7	8	8	7

* NORMALIZED SCORE IS ROUNDED UP TO A WHOLE NUMBER.

Both the approach and this conclusion are supported by other international studies, one of which considers a cross-section of three indices – low-carbon competitiveness; low-carbon improvement; and low-carbon gap – and suggests that Canada requires a “significant turnaround in performance” to be carbon-competitive going forward. This study ranks Canada 7th place with respect to low-carbon competitiveness (consistent with NRT’s “carbon productivity” ranking under the emissions & energy category) but goes on to highlight that this ranking is not expected to improve without directed action as evidenced by Canada’s ranking (9th and 15th) in the low-carbon improvement and low-carbon gap indices. These metrics build on the carbon-competitiveness index and consider the future rate of reduction in carbon-intensity as a function of the existing policy framework, anticipated changes in this framework, and the investments and policy direction required to improve carbon productivity across the economy.⁷

“A good hockey player plays where the puck is. A great hockey player plays where the puck is going to.”

- Wayne Gretzky

We have some work to do. It is not simply a question of low-carbon vs. high-carbon. It is not necessarily the abandonment of our past and present for a radically different future. In this time of economic uncertainty it is an opportunity for transformative thinking. This transition could lead to a re-thinking of how we do things, how we invest, and how we position ourselves for the long-term. Significant investments have been made in establishing economic advantage in our resource sectors – we need to build on this and to look at new and innovative ways of sustainably developing these resources. We need to avoid “locking-in” to a carbon intensive future while making good use of the natural resources on which our current wealth is based. We have a comparatively low-carbon electricity system – we need to determine what must be done so that we can effectively use it as a backbone for growth. The very expansive nature of our country which, on the one hand is a benefit, is also a burden with respect to transportation and freight GHG emissions. We need to make investments today to realize a more carbon-competitive network in the future. *We need a plan to position Canada to be competitive and prosperous through the global low-carbon transition.*

BUILDING CANADA'S LOW-CARBON FUTURE

An assumption underpinning the research and analysis for Report 6 is that carbon constraints abroad (through policies in other jurisdictions) will eventually have economic implications for Canada. The nature, scale and timing of these carbon constraints are uncertain. From this assumption, we identify two areas of opportunity for Canada moving forward:

1. In the short run, there are opportunities to supply goods and services in response to growing domestic and international demand for low-carbon goods and services (LCGS); and

2. In the long run, carbon constraints, whether explicit (carbon price) or implicit (policies and regulations, high fossil fuel prices, non-tariff trade and market access barriers, etc.), national or international, are likely to expand in scope across the economy and to increase in magnitude. The second area of opportunity is in maintaining and enhancing competitiveness in non-LCGS sectors in an increasingly carbon-constrained world.

LCGS Sectors

Upstream	Wind
	Solar PV
	Wave & Tidal
	Biomass (power)
	Geothermal
	Hydro
	Nuclear Power
	Biofuels (transportation and non-transportation)
	Carbon Capture & Storage
Combined Downstream	Efficient manufacturing and industrial processes
	Energy management
	Low-carbon buildings
	Efficient vehicles
	Low-emission agricultural practices
	Low-emission forestry practices

The objective of this work is to articulate a coherent policy pathway (*a low-carbon growth plan*) to respond to these opportunities – to ensure Canadian economic growth and competitiveness under future global carbon constraints.

We are approaching the examination of Canada's low-carbon growth, competitiveness, and prosperity from two high-level perspectives: investment and governance. In addition to these two high-level, cross-cutting lenses, we are considering four policy categories in the development of a low-carbon growth plan:

- Emissions and Energy;
- Trade;
- Innovation; and
- Labour Markets.

Investment

Investment is the means by which actions are taken, by which the future is defined. But investment is more than simply dollars spent. There is a role for direct public investment, and there are questions around where government dollars are best spent, particularly in this era of economic uncertainty and fiscal restraint. Government spending can also be leveraged through the private sector to increase the potential return on public-sector investment. Government policy also directly and indirectly affects private sector investment, encouraging or discouraging it, and guiding where it occurs. In this work we are seeking to answer the following questions in the context of positioning Canada for competitiveness and prosperity in a carbon-constrained future:

- Where should Canada be investing?
- How can public-sector investment be most effectively leveraged?
- What can government do outside of direct investment to stimulate private-sector investment?
- What are the barriers to private-sector investment?
- What are the barriers to effective public-sector investment?

Prosperity and Competitiveness

Prosperity

Prosperity, in the context of this work, refers to economic well-being – the continued growth and development of our economy. However, the term also implies that this economic well-being is sustainable over the long-term.

Competitiveness

Competitiveness, in the context of this discussion paper, is Canada's ability to secure future prosperity – if we are competitive today we are well positioned to thrive tomorrow. Competitiveness is thus not necessarily premised on a zero-sum game.

Governance

Governance defines who makes decisions, the manner in which decisions are made, and the framework within which the outcomes of decisions – performance – is assessed. Governance can be defined as the sum of organizations, policy instruments, financing mechanisms, rules, procedures and norms.⁸ The governance of low-carbon economic growth and innovation is a complex challenge, with responsibility for emissions reduction and investment decision-making spread across multiple public- and private-sector actors. Even strictly within government, responsibility may lie across multiple ministries and/or agencies in addition to the shared responsibilities between levels of government. The objective of governance for low-carbon growth is to narrow the gaps (e.g. information, capacity, funding, administrative, policy, etc.) among different actors so as to improve coordination of efforts – create the enabling conditions for effective action. This can be done through streamlining and/or as necessary, establishing new structures, processes, institutions, etc. As we look at how Canada needs to position itself for competitiveness and prosperity in the carbon-constrained future, we are asking:

- Are existing Canadian governance structures and mechanisms best suited for seeing us through the global low-carbon transition?
- How can existing governance structures be adapted to ensure successful vertical and horizontal coordination of government efforts?
- Are there innovative governance structures, processes, and/or institutions from elsewhere that Canada could employ to increase the effectiveness of its efforts?

Emissions & Energy

As a resource-rich country, an important contributor to our current economic well-being – and certainly our economic growth in recent years – is energy and emissions intensive industrial activity and manufacturing as well as services that cater to these industries. Any plan for low-carbon growth must consider the role of these sectors, the opportunity going

forward, and the risks to which they may be exposed under future global carbon constraints. Given our climate and the expansive nature of our geography, energy consumption in buildings and transportation is fundamental to the carbon-competitiveness of our country. Our electricity system is relatively carbon-competitive, but there is untapped potential and opportunities exist both with respect to electricity generation and transmission. Our transportation system is highly oriented around the personal vehicle (intra-regionally) and aviation (inter-regionally). Changes to the status quo involve significant investment. New fuels may require step changes in innovation and substantial changes in infrastructure investment, climate policy targets and plans. We need to identify where the key opportunities lie, where there are significant risks, and those situations where the window of opportunity is limited – either for positioning Canada to take advantage of an opportunity or to effectively manage a risk.

- What are the elements (actions, investments, etc.) that need to be included in a low-carbon growth plan for Canada?
- What are the immediate windows of opportunity for transitioning cost-effectively to a low-carbon economy? Where do we need to act in the next ten years to avoid technological lock-in and path dependency?

Trade

There are uncertainties associated with the potential magnitude of LCGS sector growth, just as there are uncertainties with respect to potential risks and costs associated with operating in a carbon-constrained world. In the short term, certain trade policies and/or approaches could be employed to assist in harnessing the export opportunity for Canadian LCGS sectors and to develop the Canadian domestic market. For example, trade negotiations and special agreements could be initiated in order to secure better access to priority markets and import technology that could help Canada to be more resilient over the long term (e.g. where Canada has no competitive advantage). In the long term, if Canada does not start to reduce the carbon-intensity of its economy and continues to depend heavily on energy and emission-intensive competitive advantages

for growth, it may face risks in the form of potential trade barriers and other measures employed by countries to protect the environment and their industrial interests by preventing carbon leakage or to meet national and international climate goals. We are seeking to better understand:

- What are the key trade risks and opportunities for Canada with respect to global carbon constraints in both the short- and long-terms?
- What should Canada be doing to bolster international trade in LCGS sectors?
- How can trade policies / measures contribute to Canada's transition to a low-carbon economy?
- Are there domestic barriers to trade that hamper our carbon competitiveness?

Going forward, how important will the carbon foot-print of our consumption (i.e. embodied carbon of imported products) be relative to the footprint of our production?

Innovation

Innovation^{iv} is fundamental to the transition to a low-carbon economy – in terms of technology and research & development. In addition to providing the opportunity to develop first mover advantages and increase opportunity in export markets, technological innovation can be seen as the very basis for carbon-competitiveness. The question to answer is how low-carbon innovation can be encouraged. While at a national level competitiveness can be considered in terms of a zero-sum game in which market share is the predominant determinant of competitiveness, competitiveness can also be considered in terms of productivity.⁹ This perspective suggests that a country's standard of living depends heavily on its own domestic performance and less on how it performs in international markets. The more efficiently an economy produces goods and services, the more wealth is generated and the higher the standard of living. Innovation is fundamental to increasing resource efficiency. There has been significant critique and analysis of Canada's performance in innovation,

^{iv} Innovation can be considered from a number of perspectives: product/service innovation, process innovation, system innovation, organizational innovation, and policy innovation (Wolff et al., 2007).

particularly in terms of our capacity for commercialization of R&D, with the most recent analysis undertaken by the Federal Review Panel on Research & Development scheduled for release in October. Two questions come to mind:

- Are there actions that need to be taken specific to low-carbon innovation, or are the challenges and recommendations generally consistent with innovation writ large?
- What are the priority areas for low-carbon innovation – where is innovation most needed in the short- and long-term?

Labour Markets

The global transition to a low-carbon economy will involve changes to the Canadian economy over the long-term, including changes in technology and energy systems, and possibly the emergence of new industries alongside those that underpin today's economy. In particular, increased investment in LCGS sectors is expected to influence the number and nature of jobs that will be created in Canada over the coming decades. It is estimated that investment in Canada's LCGS sectors will increase substantially over the next 40 years (2010-2050) positively influencing employment both directly within the LCGS sectors and in the industries supplying them.¹⁰ Preliminary analysis suggests that the employment resulting from investment in LCGS sectors could grow from under one hundred thousand full time jobs in 2010 to several hundred thousand jobs in 2050 under a business-as-usual scenario.¹¹ Workers and employers across Canada will need to adjust to this new reality and the post-secondary education system might have to provide new types of workers.

The Canadian labour market has the capacity to adjust to changes, but these adjustments will likely take years, depending on factors such as specific skills needs, labour market information, the rate and scale of technological changes, worker mobility, and the capacity of the post-secondary education system to provide new workers and of the private sector to train existing workers.¹² It is not yet clear which types of jobs will most be in demand or in low demand, which jobs will change, and what new jobs will emerge in a low-carbon economy. In

addition, labour market pressures and the capacity to adjust to them might not be the same across the different regions of Canada, depending on regional factors such as industrial mixes and demographics.¹³ Two questions arise:

1. Will the low carbon economic transition change the types and/or proportion of skills needed in any given sector(s) or region(s)?
2. Does the Canadian labour market (On a regional basis) have the inherent capacity to adjust to these changes in a timely manner, or is policy intervention and/or targeted investment required?

DISCUSSION QUESTIONS: NATIONAL FOCUS

1. What are the key drivers for developing a national low-carbon growth plan for Canada?
2. What are the most important elements of a low-carbon growth plan? What are the “must haves”?
3. What is needed to implement a national low-carbon growth plan? What do you see as the most significant barriers / challenges to implementation? How would you overcome these barriers?

SNAPSHOT: CANADA AT-A-GLANCE

ENVIRONMENT

GHG Emissions: 731 Mt (2005) or 2% of global emissions

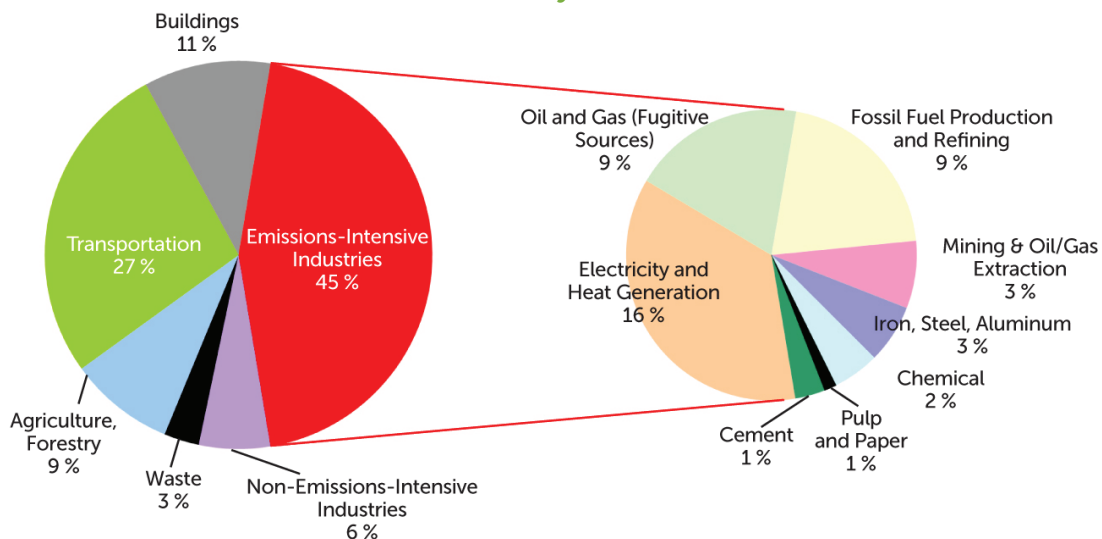
Canada's GHG Emission Reduction Target: 17% below 2005 levels

Oil Sands: Emissions from oil sands activities grew 40% between 2005 and 2009, but were offset by reduced production in conventional oil (12%) and natural gas (1%); overall emissions from fossil fuel production rose by 4 Mt (2%).

Projected Emissions growth in 2020: oil & gas (46%), transportation (16%) and waste /other (15%)

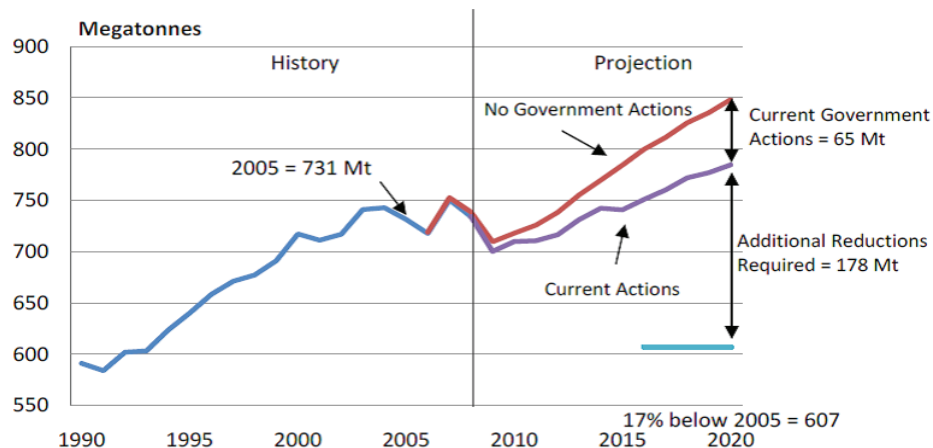
Impacts: The effects of a changing climate are already apparent across the country; reduced sea ice extent, earlier spring snow melt, longer growing seasons, shifts in the distribution of plants and animals are but a few (NRT, 2010. Degrees of Change).

GHG Emissions by Sector (2008)



Source: Environment Canada (2010), Canada's GHG Emission Inventory

GHG Emissions Projections (Mt of CO₂e, 1990-2020)



Source: Environment Canada (2011), Canada's Emissions Trends.

SNAPSHOT: CANADA AT-A-GLANCE

ECONOMY

GDP (2010): \$ 1.23 trillion (2002 chained dollars) – world's ninth largest economy

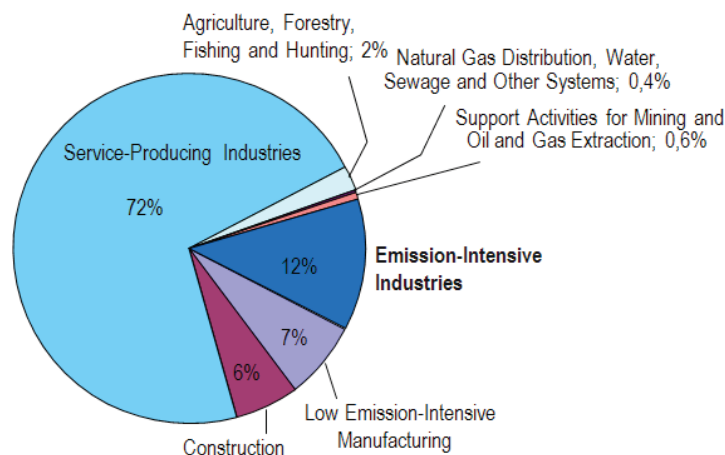
Avg. GDP Growth Rate: 2% (Real GDP from 2001-2010)

Economic Growth Overview: Canada's economic growth has been dominated over the last decade by services producing industries (primarily finance, insurance and real estate) as well as by growth in oil & gas extraction and the construction sector. Despite recent resurgence from recession levels, manufacturing's contribution to overall GDP has declined over the long-term.

Trade: Canada's trade in goods is dominated by manufactured products with exports in this sector doubling exports from mining and oil & gas and other primary industries (primarily forestry and agricultural unprocessed goods); however, we have a significant trade deficit in this same area which outweighs the positive trade balance in the other sectors.

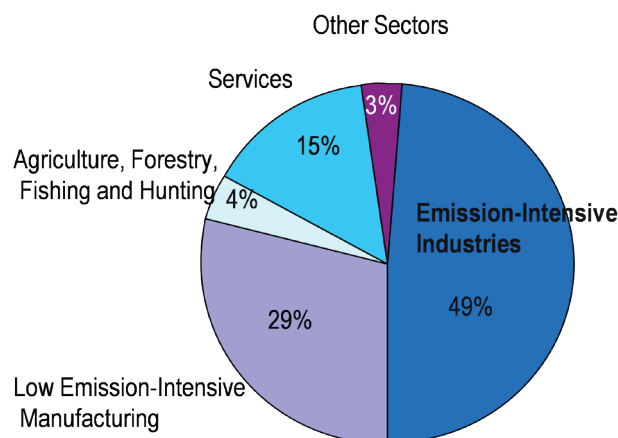
Export Markets: The primary market for Canada's exports is the U.S. with the exception of the mining sector whose primary market is the U.K., followed by the U.S.

Share of Canadian GDP by Sector (2010)



Source: Statistics Canada, 2011.

Share of Canadian Exports by Sector (2010)

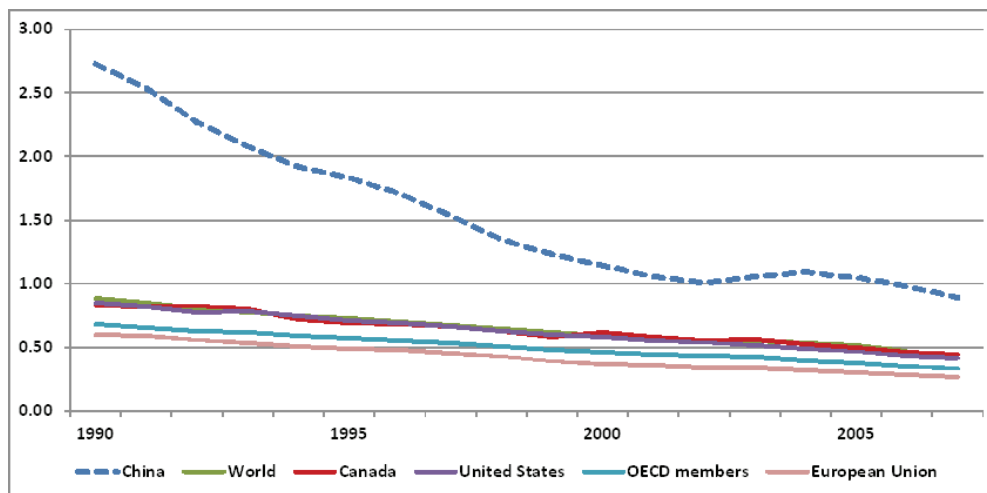


Source: Statistics Canada, 2011.

SNAPSHOT: CANADA AT-A-GLANCE

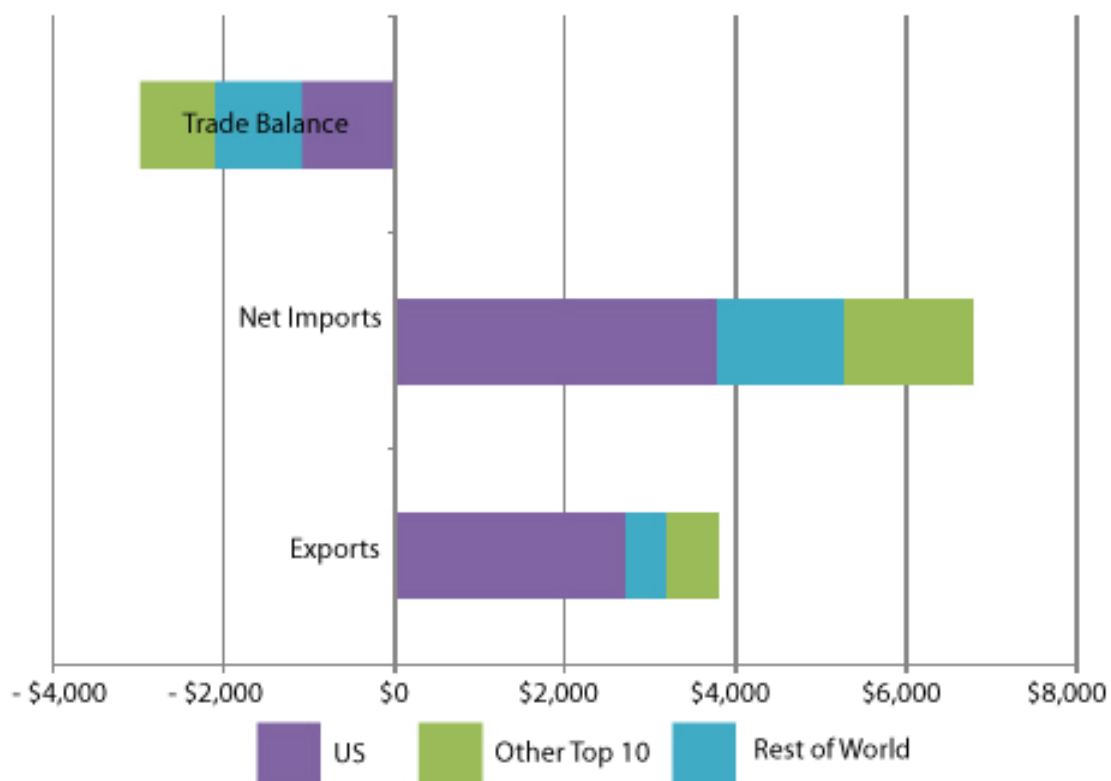
ENVIRONMENT AND ECONOMY

Emissions Intensity (Kg CO₂ / PPP \$ GDP) for Select Jurisdictions and Country Groups (1990 – 2007)



Source: Environment Canada (2011), Canada's Emissions Trends.

Canada's Trade in Low-Carbon Goods in 2010 (\$ millions)



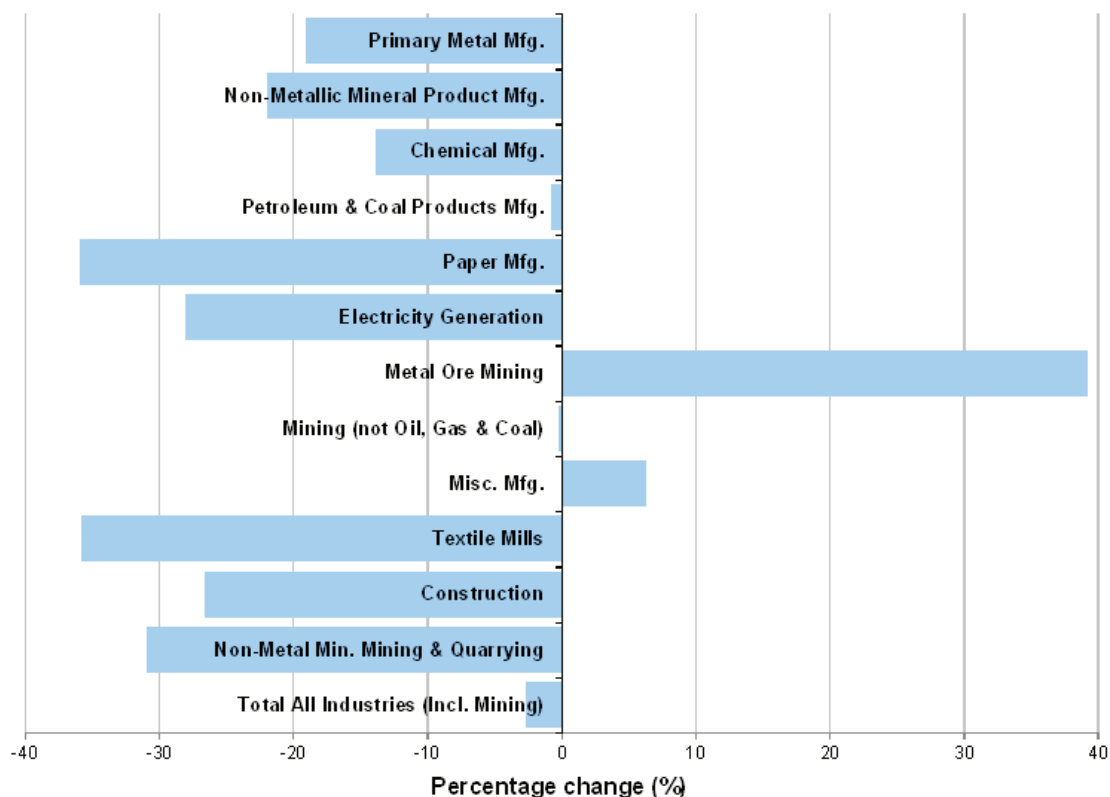
Source: Environment Canada (2011), Canada's Emissions Trends.

Change in Emissions Intensity of National Economies for Select Jurisdictions and Country Groups

	2000 – 2007	1990 – 2007	2007 GHG Intensity
China	-22%	-67%	0.89
World	-21%	-47%	0.47*
Canada	-28%	-47%	0.44
U.S.	-28%	-51%	0.42
OECD	-28%	-51%	0.33
Japan	-23%	-41%	0.29
Germany	-31%	-56%	0.27
E.U.	-29%	-56%	0.26
U.K.	-30%	-59%	0.25
France	-26%	-56%	0.18

*World economy GHG intensity only available for 2006.
GHG intensity presented in units of Kg CO₂ / PPP \$ GDP.
Source: World Bank. World Development Indicators.

Percentage Change in Canadian Industry Emission Intensities (kg CO₂e / PPP\$ GDP) (2000 – 2009)



Source: Canadian Industry Energy End-Use Data and Analysis Centre, 2011.

END NOTES

- ¹ <http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Report/G-20Report-LOWRes-FINAL.pdf>
- ² <http://bnef.com/PressReleases/view/142>
- ³ <http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Report/G-20Report-LOWRes-FINAL.pdf>
- ⁴ <http://www.ret.gov.au/energy/clean/cei/Pages/default.aspx>; http://www.budget.gov.au/2010-11/content/at_a_glance/html/at_a_glance.htm
- ⁵ Research undertaken for the NRT by the Delphi Group and EnviroEconomics (2011).
- ⁶ http://www.e3g.org/images/uploads/G20_Low_Carbon_Competitiveness_Report.pdf
- ⁷ Ibid.
- ⁸ IISD (2011). Research undertaken for the NRT.
- ⁹ Wolff et al. (2007). Competitiveness, innovation and sustainability – clarifying the concepts and their interrelations. Oko-Institut e.V. URL: <http://www.oeko.de/oekodoc/596/2007-142-en.pdf>
- ¹⁰ Delphi Group & EnviroEconomics (2011). Research undertaken for NRT.
- ¹¹ Ibid.
- ¹² Government of Canada, The Skills Research Initiative, “Adjustments in Markets for Skilled Workers in Canada: A Synthesis of Key Findings and Policy Implications”, 2008.
- ¹³ HRSDC, “Looking-Ahead: a 10-Year Outlook for the Canadian Labour Market (2006-2015)”, 2006.

Section TWO

IMPACTS OF A LOW- CARBON GROWTH PLAN FOR ATLANTIC CANADA

Section Two contributed by:
the Atlantic Provinces Economic Council



BACKGROUND

It is evident from the discussion above that a global low-carbon transition is underway and that Canada as a whole will require a significant turnaround in performance to be carbon competitive going forward. For the four Atlantic provinces, this represents a challenge but more importantly a key opportunity. The Atlantic region is fortunate to have a diverse range of energy assets, including hydro, offshore and onshore oil and gas, and renewable energy including marine, wind and biomass. It is also home to Canada's largest refinery, the Point Lepreau nuclear power plant, an LNG plant and numerous generating facilities including the Churchill Falls hydroelectric station. As a strategic partner in the north Atlantic, the region plays a key role in satisfying US demand for a variety of energy products including crude and refined oil, natural gas and LNG, and electricity. In 2010, Atlantic Canadian energy exports to the US totaled \$15.2 billion.

On a per capita basis, GHG emissions are high in Atlantic Canada, reflecting long established patterns of consumption and lack of availability of low-emission alternatives. Most households continue to use furnace oil for home heating, with natural gas only starting to be available on a limited basis in urban areas. Emissions from the transportation sector are high reflecting less developed mass transit in Atlantic Canada's smaller cities plus long trucking distances to supply a dispersed population. Electricity generation has been dominated by fossil fuel combustion mostly from coal and oil.

Atlantic provincial governments are increasing their efforts to improve energy efficiency and security, as well as reducing emissions in key sectors. For a number of years, provincial governments have offered energy retrofit programs in order to reduce energy consumption in the region's older housing stock. As part of its Renewable Energy Plan, Nova Scotia has legislated targets which require 25% of all electricity generated in the province to come from renewable sources by 2015 and 40% by 2020 – the toughest targets in Canada. Both Nova Scotia and New Brunswick have introduced Feed-In Tariff programs to provide incentives for the production of renewable electricity. The three Maritime provinces have also in-

vested substantially in wind power generation. In Newfoundland and Labrador, the Muskrat Falls hydroelectricity project is slated to come into production by 2017, and is intended to replace existing fossil fuel generation in that province, in Nova Scotia and potentially through into the rest of the Maritimes.

The early lead on renewable energy has boosted the clean technology sector. For example, the Prince Edward Island Energy Corporation developed Atlantic Canada's first utility-grade wind farm in 2001, allowing the province to become a North American leader in the development of wind energy. In addition, there is considerable interest in exploiting other renewable opportunities such as tidal energy. However the challenge will be to find the necessary investment to move ahead quickly. Fiscal constraints in the three Maritime provinces and the sheer size of financing requirements for large projects and new technologies pose a challenge, particularly given the current volatility in global energy markets. Slowing growth in the demand for energy products in North America and the rapid escalation in the estimates for recoverable gas reserves could also reduce the willingness to invest in renewable power well into the future.

ATLANTIC CANADA'S POSITION IN CANADA

The four Atlantic provinces currently account for about 6% of Canadian total economic output and 7% of Canada's population. As in the rest of Canada, most of Atlantic Canada's labour force and population growth is now occurring in service industries and in urban areas. Nevertheless, a significant proportion of the region's population – 46% – continues to live outside of major metropolitan areas. Atlantic Canada is the least urbanized region in Canada.

The region's manufacturing base has changed significantly in the past two decades, responding to changes in the US and the global economy. Since the early 1990's, the Atlantic region's share of output in low end manufacturing, including fish and forest products has steadily declined. High energy costs, par-

ticularly high electricity costs have been cited as a key factor behind the closure of seven pulp and paper plants between 2004 and early 2009. Output from higher-end manufacturing has steadily increased, in sectors such as ocean engineering, aerospace and defense, medical devices, nutraceuticals and functional foods, and some automotive products. Nevertheless, high-end manufacturing's footprint is still relatively small, and only New Brunswick comes close to matching Canadian levels in terms of manufacturing's share of economic activity.

The energy sector is the key driver of output growth in the region and energy exports accounted for 56.2% of all Atlantic Canadian exports in 2010. Energy projects are also the leading source of investment in the region's economy. More than \$37 billion or over 50% of the projects identified in APEC's 2011 Major Projects Inventory, are energy-related. Energy investment is particularly strong in Newfoundland and Labrador which currently produces 23% of Canada's conventional crude oil in three producing offshore oil fields, with a fourth due to come on stream in 2017. Foreign investment has tripled in that province over the last decade.

THE CHALLENGE IN MOVING TO A LOW CARBON ECONOMY

Although Atlantic Canada produces a small share of national GHG emissions in absolute terms - approximately 7.4% of the Canadian total - its emissions are above the national average when measured against levels of economic activity. About 75% of Atlantic GHG emissions are generated in Nova Scotia and New Brunswick, with GHG intensity well above the national average in both provinces.

Dependence on oil and coal for electricity production is the main factor behind the region's high GHG emissions - accounting for about 34.6% of the total. In 2009, the burning of coal and oil accounted for 70% of Nova Scotia's electricity generation and 58% of New Brunswick's. Seven of the twelve

largest GHG emitters in the region are electricity generating stations. In addition to the negative environmental impact, the high import content of fossil fuels exposes utilities and consumers to escalating prices and on-going price volatility. Oil refineries are another leading source of emissions: the country's largest oil refinery in Saint John, New Brunswick accounts for 13.6% of regional GHG emissions.

However, emissions in Atlantic Canada are now lower than ten years ago, down by 9.8% between 2005 and 2009. In New Brunswick, a significant reduction in manufacturing output, largely in the forest sector, reduced direct emissions as well as the industry's electricity requirements. The province has also replaced a significant amount of coal and oil power generation with natural gas, as well as increasing the contribution from hydro and wind power to 24.7%. Wind power has also grown in Nova Scotia, which also increased its share of electricity generation from natural gas from 1.7 to 13.3% over the period. As a result, GHG emissions from electrical generation in Nova Scotia and New Brunswick fell by 24.4 and 28.4%, respectively, from 2005 to 2009.

Prince Edward Island maintains a low GHG intensity due to importing most of its electricity from New Brunswick, with wind power now providing over 30% of its electricity consumption. Newfoundland and Labrador's emissions are currently increasing, however this is due to the growth of its mining and oil sector. Overall, the province's GHG intensity remains low as hydroelectricity accounts for 96.5% of all electricity generated, much of which is exported.

LOOKING AHEAD

Development of abundant energy resources has played a key role in the growth of the Atlantic region in recent years and the steps industry and government are now taking to reduce emissions and improve energy efficiency could significantly aid the transition towards a low-carbon future.

The development of the Muskrat Falls hydroelectric project is particularly important to the process, highlighting the benefits of greater regional cooperation in electrical generation and transmission. The \$6.2 billion dollar project between power utilities in Nova Scotia and Newfoundland and Labrador is expected to replace 12% of electricity generated from fossil fuels in Nova Scotia and nearly all of the fossil fuel power generated on the island of Newfoundland. With support from governments, including the provision of federal loan guarantees, the project is expected to come into production by 2017.

However, the path towards a low-carbon future will also be a difficult adjustment for many in Atlantic Canada. Rising costs for electricity have already had negative consequences for business and consumers and new environmental regulations are expected to increase costs further. Effective mitigation strategies will be required, to ensure that the burden of adjustment does not fall disproportionately on important industry sectors or certain classes of consumers.



DISCUSSION QUESTIONS:

ATLANTIC CANADA

Given Atlantic Canada's geographic and economic strengths, what low-carbon economic opportunities exist in the region? What types of institutions and programs are necessary to capitalize on these opportunities?

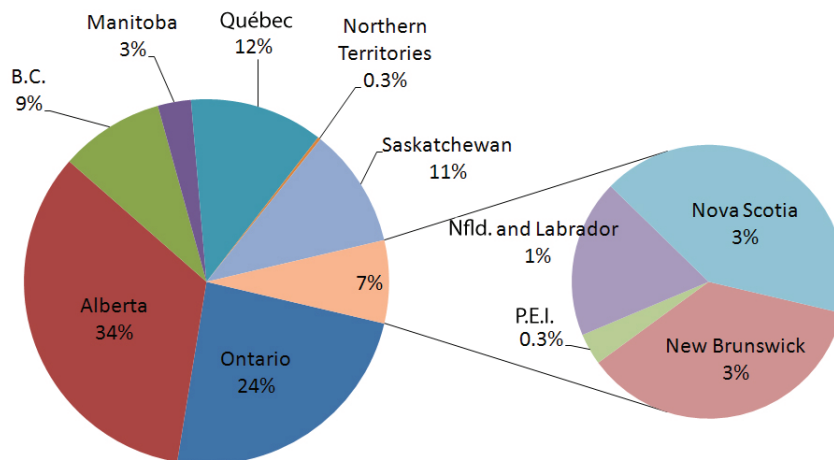
- What are the significant barriers/challenges to realizing these opportunities? How can these challenges be met?
- What should be the role of the private sector in moving forward? The public sector?
- What role does regional cooperation play in building and maintaining competitiveness in a carbon-constrained context? Are there specific ways in which the federal government can assist in facilitating regional cooperation?

SNAPSHOT: ATLANTIC CANADA AT-A-GLANCE

ENVIRONMENT

National Share: In 2009, the Atlantic provinces accounted for about 51 MT of GHG emissions - 7.4% Canada's total.

Per Capita GHG Emissions by Province (2009)



GHG Emissions by Sector and Province (2009)

	New Brunswick		P.E.I.	
	MT of CO ₂ eq	T per capita	MT of CO ₂ eq	T per capita
Electricity & heat generation	6.94	9.25	0.0028	0.02
Fossil fuels, mining-related	2.77	3.69	-	-
Transportation	4.63	6.17	0.79	5.62
Manufacturing/industrial	1.68	2.24	0.09	0.67
Commercial/residential	1.43	1.90	0.49	3.48
Agriculture	0.41	0.55	0.37	2.62
Waste	0.52	0.69	0.12	0.85
Other	0.02	0.03	0.02	0.12
Total	18.4	24.53	1.89	13.39

	Nova Scotia		Nfld. & Labrador	
	MT of CO ₂ eq	T per capita	MT of CO ₂ eq	T per capita
Electricity & heat generation	9.75	10.37	0.87	1.70
Fossil fuels, mining-related	1.45	1.54	3.15	6.20
Transportation	5.15	5.48	3.64	7.15
Manufacturing/industrial	0.88	0.94	0.20	0.38
Commercial/residential	2.77	2.95	0.87	1.71
Agriculture	0.37	0.39	0.07	0.13
Waste	0.44	0.47	0.64	1.26
Other	0.19	0.20	0.03	0.06
Total	21.0	22.33	9.46	18.59

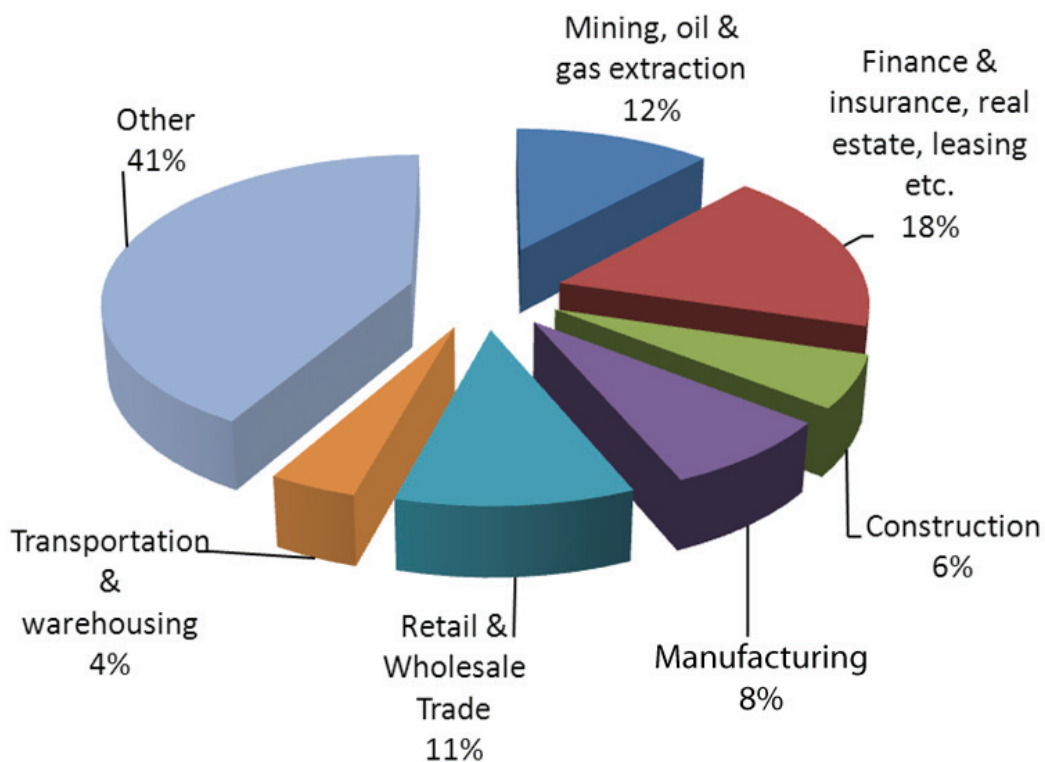
SNAPSHOT: ATLANTIC CANADA AT-A-GLANCE

ECONOMY

Gross Domestic Product

	GDP Growth Rate			GDP / capita x\$1000/ person (2009)
	Avg. 2000-2007	2008	2009	
New Brunswick	2.4%	-0.2%	-0.3%	31.1
Prince Edward Island	2.2%	0.4%	-0.1%	29.5
Nova Scotia	1.8%	1.3%	-0.1%	30.8
Nfld. and Labrador	5.1%	2.0%	-10.2%	35.6

GDP by Sector for Atlantic Canada (2009)



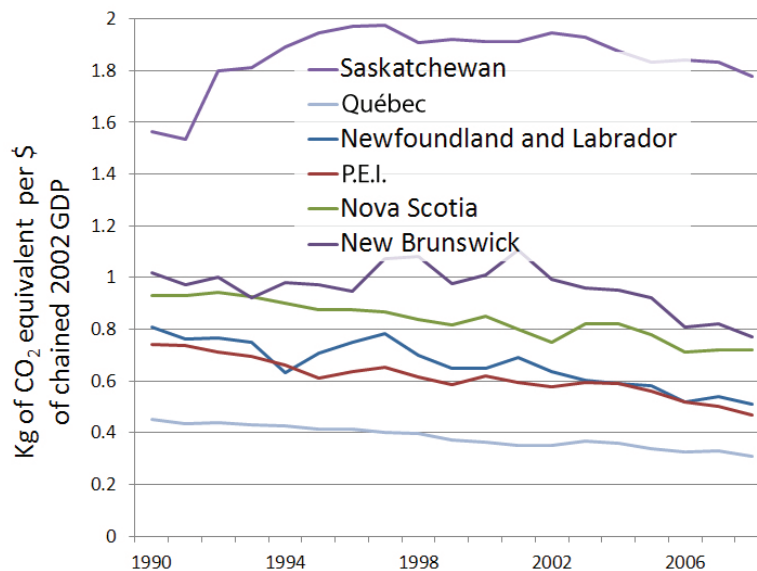
Key Exports: Atlantic Canada continues to rely on exports from its fisheries and forestry sector. Other exports are dominated by resource and intermediate products rather than finished capital goods. Exports from the mining and oil and gas sector are responsible for much of the export growth, and the majority of these exports are directed to the U.S.

SNAPSHOT: ATLANTIC CANADA AT-A-GLANCE

ENVIRONMENT AND ECONOMY

Emissions Intensity: Emissions intensities are similar between the Atlantic provinces and have followed a general downward trajectory.

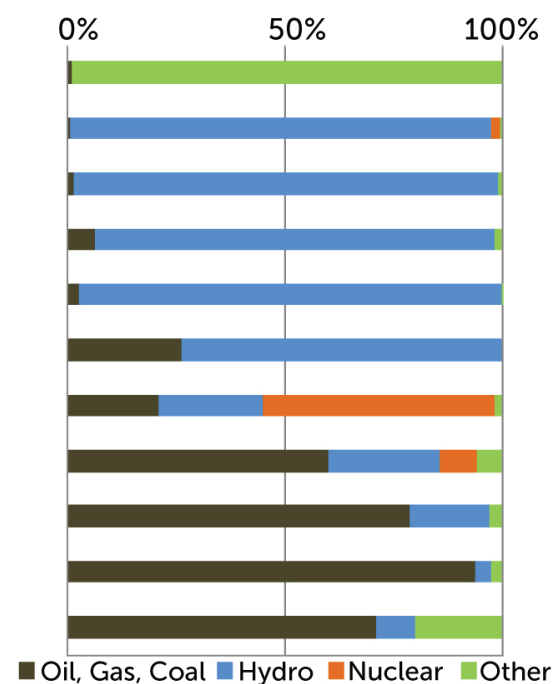
Emissions Intensity by Province (1990 - 2008)



Emissions Intensity of Electricity (2008)

Province	g CO ₂ e/ KWh
P.E.I.	1
Québec	2
Manitoba	10
B.C.	20
Nfld. and Labrador	28
Northern Territories	52
Ontario	170
New Brunswick	560
Saskatchewan	710
Alberta	880
Nova Scotia	890

Electricity by Source (2008)



Sources: Government of Canada, Government of Nova Scotia, Government of New Brunswick, Government of Newfoundland and Labrador, Government of Prince Edward Island, Atlantic Provinces Economic Council

