

May 10, 2013

BY COURIER (2 COPIES) AND EMAIL

Ms. Kirsten Walli

Board Secretary

Ontario Energy Board

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Dear Ms. Walli:

**Re: Environmental Defence Interrogatories
EB-2012-0394 – Enbridge Gas Distribution Inc. (“Enbridge”)
2013-2014 Demand Side Management (“DSM”) Plan**

Pursuant to *Procedural Order No. 3*, enclosed please find Environmental Defence's interrogatories to Enbridge in this matter.

Please do not hesitate to contact me if anything further is required.

Yours truly,



Kent Elson

cc: Applicant and Intervenors

EB-2012-0394
Enbridge Gas Distribution Inc. ("Enbridge")
2013-2014 Demand Side Management ("DSM") Plan

Environmental Defence Interrogatories for Enbridge

Filed: May 10, 2013

Issue 1: "Is the 2014 DSM Budget (\$32.2M) reasonable and appropriate? Should the Board determine that the DSM budget for 2014 should be increased, what are the implications and required next steps."

Interrogatory No. 1-ED-1 Overall Bill Impacts and Total Resource Cost ("TRC")

Reference: Ex. B, Tab 2, Schedule 2 & Ex. B, Tab 2, Schedule 3, page 3, Table 2

- a) In 2014, the overall TRC benefit-cost ratio of Enbridge's proposed resource acquisition programs (including residential, commercial, and industrial programs) is 4.17.¹ Does that mean that, on average, a \$100 investment in Enbridge's resource acquisition programs will result in approximately \$417 in benefits to consumers (present value)? If not, please explain why not and provide an estimate of the resulting benefits. Do these benefits consist largely of the avoided costs of gas, electricity, and water saved as a result of the program?
- b) Overall, do Enbridge's resource acquisition programs result in net *savings* for customers as a whole after the costs and benefits of the programs are considered? Please explain why or why not.
- c) For Enbridge's 2014 resource acquisition programs as a whole, please state (i) the estimated cumulative gas savings (m³) resulting from the programs, and (ii) an estimate of the present value of those cumulative gas savings to customers (i.e. the present value of the lifetime bill reductions from lessened gas usage).
- d) In 2014, the overall TRC benefit-cost ratio of Enbridge's large industrial resource acquisition programs is 7.02.² Does that mean that, overall, every \$100 invested in Enbridge's industrial programs results in approximately \$702 in benefits to industrial consumers as a whole (present value)? If not, please explain why not and provide an estimate of the resulting benefits.

¹ Ex. B, Tab 2, Schedule 3, page 3, Table 2.

² Ex. B, Tab 2, Schedule 3, page 3, Table 2.

Interrogatory No. 1-ED-2 Free Riders

The *DSM Guidelines* define a free rider as a “program participant who would have installed a measure on his or her own initiative even without the program.”³ The *DSM Guidelines* further state that “[p]rograms that have high free ridership rates will be less cost effective (as measured by the TRC test) since their Program Costs will be included in the analysis while their benefits will not.”⁴

- a) Does the TRC calculation for Enbridge’s resource acquisition programs account for free riders (i.e. account for the fact that some DSM activities would have occurred without the program incentives)? Are the related program costs included in the TRC calculation but not the benefits? Please explain Enbridge’s answer.
- b) Please explain how Enbridge’s free-ridership rate for its resource acquisition programs is established, tested, evaluated, and approved.

Interrogatory No. 1-ED-3 Rate Impacts and Rate Predictability

Reference: Ex. B, Tab 2, Schedule 1

- a) In 2014, what would the rate impact be of Enbridge’s proposed DSM budget averaged across all rate classes as a percentage of total customer gas costs? Please make and state reasonable assumptions and estimates as needed.
- b) Please provide a chart of the monthly natural gas commodity price over the past ten years. Please choose a source (or sources) that best reflects the price fluctuations faced by Enbridge and its customers.

Interrogatory No. 1-ED-4 Comparison with Electricity Conservation Programs

Reference: Ex. B, Tab 1, Schedule 2, page 1-3 & Ex. B, Tab 2, Schedule 3, page 3, Table 2

A 2013 report of the Environmental Commissioner of Ontario states that “[o]verall utility spending on gas conservation was approximately \$55 million in 2011, ... quite small in comparison to spending on electricity conservation (\$270 million in 2011).”⁵

The report also notes that the OPA’s 2011 suite of programs has a TRC benefit-cost ratio of 1.23.⁶ By comparison, according to Enbridge’s evidence, the overall TRC benefit-cost ratio of

³ *DSM Guidelines*, p. 13.

⁴ *DSM Guidelines*, p. 15.

⁵ Environmental Commissioner of Ontario, *Restoring Balance – Results, Annual Energy Conservation Progress Report – 2011 (Volume II)*, submitted January 8, 2013, <http://www.eco.on.ca/uploads/Reports-Energy-Conservation/2012v2/12CDMv2.pdf>, p. 23.

Enbridge's 2014 proposed resource acquisition programs (including residential, commercial, and industrial programs) is 4.17.⁷

Relevant excerpts of the Environmental Commissioner's report are attached for your reference.

- a) In 2011, was overall spending on gas conservation approximately 5 times lower than the overall spending on electricity conservation in Ontario? If not, please provide Enbridge's best estimate of that ratio.
- b) Is the TRC benefit-cost ratio of Enbridge's proposed 2014 resource acquisition programs over 3 times as high as Ontario's electricity conservation programs in 2011? If not, please provide Enbridge's best estimate of that ratio.
- c) In proposing its 2014 DSM budget, did Enbridge consider the relative cost-effectiveness of Ontario's gas conservation programs vis-à-vis electricity conservation programs? Did Enbridge consider the relative magnitude of Ontario's gas conservation programs vis-à-vis electricity conservation programs?

Interrogatory No. 1-ED-5 Greenhouse Gas Emission Reductions

Reference: Ex. B, Tab 1, Schedule 2, page 1-3

Attached is a table containing a breakout of Ontario's energy-related greenhouse gas ("GHG") emissions in 2010 prepared for Environmental Defence and submitted in EB-2012-0337 (Exhibit K 1.5, Tab 4). In that proceeding, Union Gas agreed that the estimates in that table look reasonable.⁸

Also attached for your reference is a report from the Environmental Commissioner of Ontario which lists Ontario's GHG emission reduction targets as follows:

- i) 6% below 1990 levels by 2014 (to approximately 165 megatonnes or Mt);
- ii) 15% below 1990 levels by 2020 (to approximately 150 Mt); and
- iii) 80% below 1990 levels by 2050 (to approximately 35 Mt).⁹

The Environmental Commissioner report states that "[the] government, itself, has projected a 30 Mt gap by 2020."¹⁰

⁶ *Ibid.* p. 42.

⁷ Ex. B, Tab 2, Schedule 3, page 3, Table 2.

⁸ Transcript, EB 2012-0337, Vol. 1, January 31, 2013, p. 92, lns. 1-9.

⁹ Environmental Commissioner of Ontario, *A Question of Commitment: Annual Greenhouse Gas Progress Report 2012*, <http://www.eco.on.ca/uploads/Reports-GHG2/2012/Climate-Change-Report-2012.pdf>, page 12.

¹⁰ *Ibid.* p. 14.

- a) Does Enbridge believe that the estimates in the attached table appear to be reasonable? If not, please provide alternative estimates.
- b) According to the attached table, natural gas was responsible for 34.5 percent of Ontario's total energy-related GHG emissions in 2010. When the coal phase-out is complete and the Pickering nuclear station comes to an end of its life, is it more likely than not that the greenhouse gas emissions from natural gas-fired power plants will rise as a proportion of the total (all other things equal)?
- c) Is it reasonable to assume that a cost-effective strategy to achieve Ontario's 2020 GHG emission target will require a significant increase in the energy efficiency of Ontario's natural gas consumption?
- d) Are GHG emission reductions given a dollar value and factored into the TRC analysis for DSM programs?

Interrogatory No. 1-ED-6 DSM Benefits: Protection from Energy Price Fluctuations, etc.

Reference: Ex. B, Tab 1, Schedule 2, page 3

A report by the Canadian Council of Chief Executives concluded as follows:

Fundamentally, however, Canada needs to begin with a renewed commitment to energy conservation. We must use existing and future energy supplies as efficiently as possible, embracing the maxim that the cheapest form of energy is the unit that is not used. Better conservation practices will help to insulate Canadians from volatile energy prices, reduce costs for public institutions such as hospitals, and improve the international competitiveness of Canadian companies.

...

The bottom line is that governments must resist the temptation to shield Canadians from higher energy prices. By any reasonable measure, energy remains a comparative bargain for Canadians.¹¹

The relevant excerpts are attached for your reference.

- a) Does Enbridge agree with the Council of Chief Executives that “[b]etter conservation practices will help to insulate Canadians from volatile energy prices, reduce costs for

¹¹ Canadian Council of Chief Executives, *Energy-Wise Canada, Building a Culture of Energy Conservation*, December 2011, <http://www.ceocouncil.ca/wp-content/uploads/2011/12/Energy-Conservation-Paper-FINAL-December-20111.pdf>, pp. 2 & 4.

public institutions such as hospitals, and improve the international competitiveness of Canadian companies”? If no, why not?

- b) Please explain how better conservation practices will help to insulate Canadians from volatile energy prices.
- c) Please explain how better conservation practices will improve the international competitiveness of Canadian companies.
- d) Is the protection from volatile energy prices resulting from conservation given a dollar value and factored into the TRC analysis for DSM programs?

Interrogatory No. 1-ED-7 DSM Benefits: Increased Productivity, GDP, etc.

Reference: Ex. B, Tab 1, Schedule 2, page 3

In 2011, the former Governor of the Bank of Canada, Mark Carney, gave a speech to the Empire and Canadian Clubs and stated that:

In a world where deleveraging holds back demand in our traditional foreign markets, the imperative is for Canadian companies to invest in improving their productivity and to access fast-growing emerging markets.

This would be good for Canadian companies and good for Canada. Indeed, it is the only sustainable option available. A virtuous circle of increased investment and increased productivity would increase the debt-carrying capacity of all, through higher wages, greater profits and higher government revenues. This should be our common focus.¹²

The relevant excerpts are attached for your reference.

A report by Dr. Ernie Stokes of the Centre for Spatial Economics, which quantifies the economic benefits of energy efficiency investments which reduce Ontario’s natural gas consumption, found that a 16.1% reduction in Ontario’s natural gas consumption in 2021 would increase Ontario’s GDP by \$5.5 billion, increase employment by 33,800 jobs, raise corporate profits by \$446 million and reduce the provincial deficit by \$479 million.¹³ The relevant excerpts are attached for your reference.

¹² Mark Carney, *Growth in the Age of Deleveraging*, speech to Empire Club of Canada & Canadian Club of Toronto, December 12, 2011, <http://www.bankofcanada.ca/wp-content/uploads/2011/12/speech-121211.pdf>, p. 11.

¹³ Centre for Spatial Economics, *The Economic Impacts of Reducing Natural Gas Use in Ontario*, April 2011, <http://www.cleanairalliance.org/files/cse.pdf>, p. 7.

- a) Does Enbridge agree with Mark Carney that Ontario would benefit if its industries increased their investment and productivity? Does Enbridge agree that this could lead to higher wages, profits, and government revenues?
- b) When a business participates in one of Enbridge's resource acquisition DSM programs, is that an investment that increases productivity? Please explain.
- c) Generally speaking, will Enbridge's DSM programs increase productivity and GDP? If not, why not?
- d) Are the economy-wide benefits of conservation spending, such those resulting from increased productivity, given a dollar value and factored into the TRC analysis for DSM programs?

Interrogatory No. 1-ED-8 Factors Considered in Proposing 2014 DSM Budget

Reference: Ex. B, Tab 1, Schedule 2, page 1-3

- a) What factors did Enbridge consider in proposing an overall 2014 DSM budget of \$32.2 million?
- b) Did Enbridge consider whether a DSM budget greater than \$32.2 million would (i) be in the public interest, or (ii) would better further the three objectives set out on page 4 of the June 30, 2011 *Demand Side Management Guidelines for Natural Gas Utilities* ("*DSM Guidelines*")? If yes, please provide a copy of any reports and written documentation prepared by Enbridge in this regard and explain why Enbridge rejected the option of a larger budget. If no, please explain why not.
- c) Section 8 of the *DSM Guidelines* sets out certain budgets for Enbridge for the 2012 to 2014 DSM plan term. Enbridge's evidence in this proceeding refers to certain budget increases being "allowable" under the guidelines (Ex. B, Tab 1, Schedule 2, page 1). Is Enbridge's position that the budget figures set out in section 8 of the *DSM Guidelines* are binding? If yes, please explain how Enbridge's position differs from that of board staff in the attached affidavit, stating that the guidelines "are not binding on any party" and "the panel is not bound to follow them."

Interrogatory No. 1-ED-9 Lost Opportunities

- a) Can delaying DSM spending result in lost opportunities such as when capital equipment is replaced with a less energy efficient option due to a lack of incentives to purchase the more efficient option?

Schedule A to Interrogatory No. 1-ED-4



Environmental
Commissioner
of Ontario

RESTORING BALANCE – RESULTS

Annual Energy Conservation Progress Report – 2011 (Volume Two)



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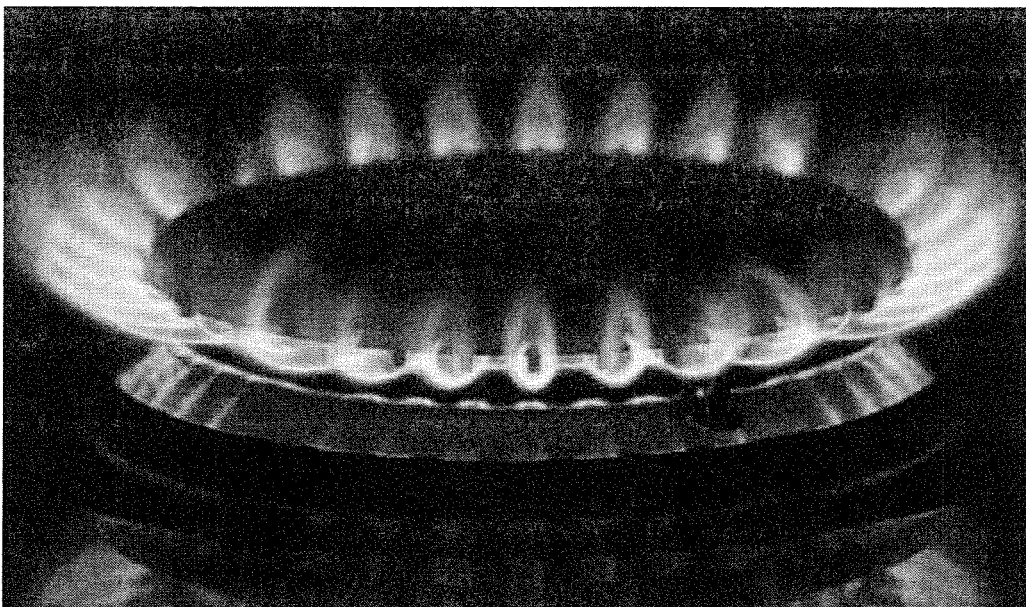
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2.2 UPDATE ON NATURAL GAS UTILITY CONSERVATION TARGETS

The conservation programs offered by natural gas utilities (Enbridge Gas Distribution and Union Gas) in 2011 remained similar to those of previous years. Each utility has developed new conservation plans that will come into effect in 2012, reflecting changes to the Ontario Energy Board's Demand Side Management Guidelines that govern the utilities' conservation actions.

Both utilities easily exceeded their overall 2011 results targets, which are based on the net monetary savings that will be realized through conservation measures. The physical amount of natural gas saved by Enbridge's conservation measures has remained relatively flat over the past five years (approximately 77.3 million cubic metres [m^3] in 2011). In contrast, Union Gas has been able to take advantage of the opportunities for large savings among its industrial customers, and its gas savings have tripled between 2007 (55.9 million m^3) and 2011 (163.7 million m^3). Overall utility spending on gas conservation was approximately \$55 million in 2011, a slight increase over recent years, but quite small in comparison to spending on electricity conservation (\$270 million in 2011).

Both utilities also have conservation targets related to their market transformation program of installing drain water heat recovery systems in new residential construction. The percentage of new homes built with drain water heat recovery systems was much lower in Enbridge's service territory than in Union's in 2011 (9 per cent versus 21 per cent). Union Gas ended its incentives for drain water heat recovery at the end of 2011, noting



that the energy savings from drain water heat recovery systems are lower than originally predicted. However, Enbridge will continue to offer an incentive for drain water heat recovery in 2012.

Finally, both utilities have a target specific to a low-income weatherization program that offers home audits and retrofits at no cost to low-income residents in selected geographic areas. The Ontario Energy Board's decision to allow utilities to access additional funding earmarked for low-income conservation permitted both utilities to more than double participation in the low-income weatherization program in 2011 relative to 2010.

For these reasons, the ECO believes that the original forecasts in the CDM strategies are of little value, and does not find it worthwhile to compare the actual 2011 results of each LDC against these forecasts. In the ECO's view, comparison of results achieved to date against the final targets is of more value.

Program Cost and Cost Effectiveness

Total electricity conservation spending in 2011 was \$269.8 million dollars, including spending for OPA programs without LDC involvement.⁵⁶ This spending is recovered from all electricity ratepayers, through the Global Adjustment charge. With total Ontario electricity consumption of 141.5 TWh in 2011, this represents a charge of 0.19 cents (one-fifth of a penny) per kilowatt-hour on average. This represents about 2.5 per cent of the "electricity" charge on customer bills, and an even lower percentage if other charges such as delivery, regulatory charges and the Debt Retirement Charge are included.

A breakdown of spending for Tier 1 conservation programs by program and by type of cost is shown in Table 12. Approximately 80 per cent of funding went towards participant incentives.

Table 12: 2011 Province-Wide (Tier 1) Conservation Program Spending

Program	Central Program Services ¹ (\$)	Customer Incentives, Participant Based Funding, and Capability Building (\$)	LDC Administration Costs (\$)	Total Actual Charges (\$)
Consumer Program	17,837,841	40,879,372	9,013,772	67,730,984
Business Program	5,693,241	115,269,033	12,046,822	133,009,095
Industrial Program	833,952	4,954,272	1,961,333	7,749,557
Home Assistance Program	13,165	0	457,911	471,076
Total – All Province-Wide (Tier 1) Programs	24,378,199	161,102,677	23,479,837	208,960,712

Note:

1. Central Program Services include: program delivery services, evaluation, measurement, verification, marketing, awareness campaigns, IT support, call centre, technical review services, and settlement services.

Source: Ontario Power Authority.

The cost effectiveness of 2011 conservation programs is shown in Table 13, using several different tests.⁵⁷ The Total Resource Cost test compares the lifetime program benefits (primarily due to avoided electricity, transmission, and distribution costs) with the program costs (e.g., administration and program delivery costs, along with any incremental cost of energy-efficient equipment) to all parties, including the program administrator and program participant.

The Program Administrator Cost test compares the benefits and costs only from the perspective of the program administrator (i.e., the OPA). For both tests, a benefit:cost ratio greater than 1 means that the program benefits exceed the costs; the higher the ratio, the more desirable a program is. An ideal program scores highly on both tests. The OPA is required to ensure that its overall portfolio of Province-Wide programs is cost effective, although individual measures, initiatives and programs do not need to be cost effective. It should be noted that the OPA's cost-effectiveness tests currently assign no value to the environmental benefits of conservation, including the reduction in greenhouse gas emissions, thus undervaluing conservation from the ECO's point of view. By the ECO's calculation, the benefit of avoided greenhouse gas emissions from 2011 conservation program activities was at least \$22 million dollars, assuming a value of \$30 per tonne of avoided CO₂ emissions.⁵⁸

Table 13: Cost Effectiveness of 2011 Province-Wide (Tier 1) Conservation Programs

Program	Total Resource Cost Test (benefit:cost ratio)	Program Administrator Cost Test (benefit:cost ratio)	Levelized Delivery Cost	
			Energy Efficiency (cents/kWh)	Demand Response (dollars/MW-month)
Consumer	1.46	2.34	3.85	9,653.86
Business	1.14	2.73	2.83	
Industrial (Demand Response 3 only)	2.98	0.93		11,103.09
Total – All Province-Wide (Tier 1) Programs	1.23	2.52	3.07	10,179.00

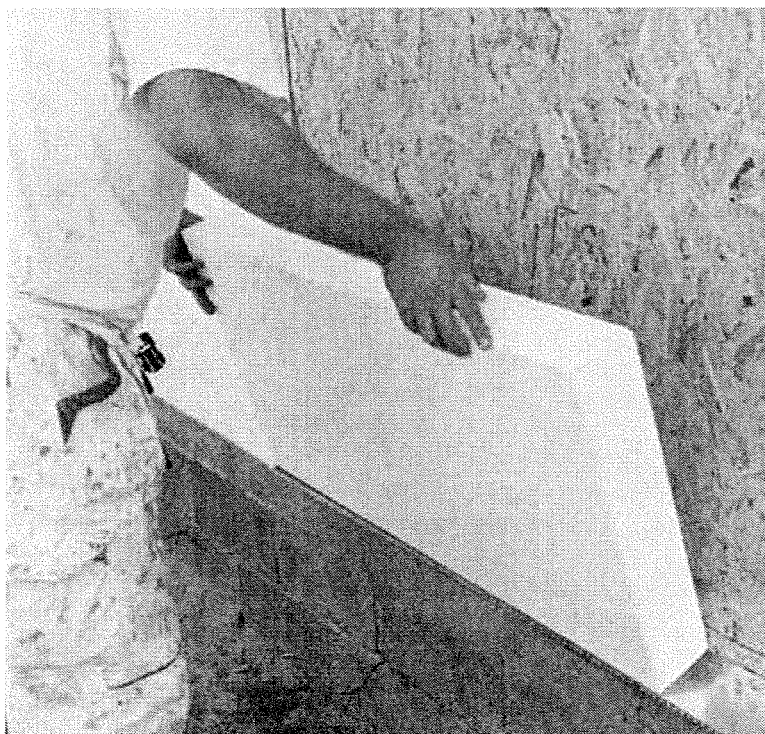
Note: Consumer program results also include commercial participants in Residential Demand Response initiative; Business program results also include industrial participants in Retrofit initiative.

Source: Ontario Power Authority.

As Table 13 shows, the portfolio of OPA programs was indeed cost effective in 2011 from the perspective of both tests. However, within this portfolio, not all initiatives have been cost effective (results at the initiative level are not shown in Table 13, with the exception of Demand Response 3). In particular, the *peaksaver* initiative (not *peaksaver* PLUS, which was not rolled out in 2011) has not been cost effective using either test. The Demand Response 3 initiative for larger industrial and commercial customers had a Program Administrator Cost test ratio less than 1, although this initiative is very effective from the perspective of the Total Resource Cost test.

The levelized delivery cost (also shown in Table 13) can be used to compare the cost of conservation with the cost of electricity supply, by calculating the average cost per unit of electricity saved (or produced). Each unit of electricity saved by the portfolio of 2011 energy efficiency programs cost ratepayers approximately 3 cents per kilowatt-hour, far less than the cost of any new source of supply.

The levelized delivery cost for demand response programs is provided as the monthly cost per MW. The average of \$10,179/MW-month for demand response programs compares favourably with an average of \$13,187 for gas-fired generation.⁵⁹



3.2.4 PROGRAM ISSUES

Operational Improvements

The OPA has attempted to work with LDCs to improve the effectiveness of Province-Wide programs. The primary vehicle for making improvements to conservation programs is the Change Management process. The OPA notes that substantial program improvements suggested by LDCs, based on their program delivery experiences, have been made through this process. In addition, an Expedited Change Management process has been developed, which will allow minor changes to programs to be made faster (reducing estimated time from 3-6 months down to 3-8 weeks). The Expedited Change Management process is expected to be available in fall 2012.

APPENDIX A: CURRENT ENERGY CONSUMPTION

Introduction

The ECO has chosen to examine energy consumption by fuel type in Ontario. This approach is taken because this office is responsible for reporting on the progress of government activities related to reducing or making more efficient use of electricity, natural gas, propane, oil and transportation fuels.

Like earlier ECO reports, this analysis relies on the energy consumption statistics contained in the Report on Energy Supply and Demand in Canada (RES-D) and produced by Statistics Canada. Unlike earlier ECO reports, however, only preliminary data were available for the 2009 calendar year due to significant methodological changes for data surveys that supply information to the RES-D.¹⁰⁰ Going forward, this office will use data from Statistics Canada that incorporate these methodological changes.

Analysis

According to the preliminary data for 2009, the total energy demand for Ontario was 2,374 petajoules (PJ). Figure 5 shows the breakdown of this energy demand by fuel type. Natural gas and transportation fuels accounted for about 73 per cent of the total energy used. Meanwhile, electricity accounted for 19 per cent of Ontario's overall energy demand. Propane, oil and other fuels accounted for roughly 8 per cent of Ontario's overall demand. This trend is virtually identical to what was observed in 2008 and 2007, as reported in previous years' ECO Annual Energy Conservation Progress Reports.

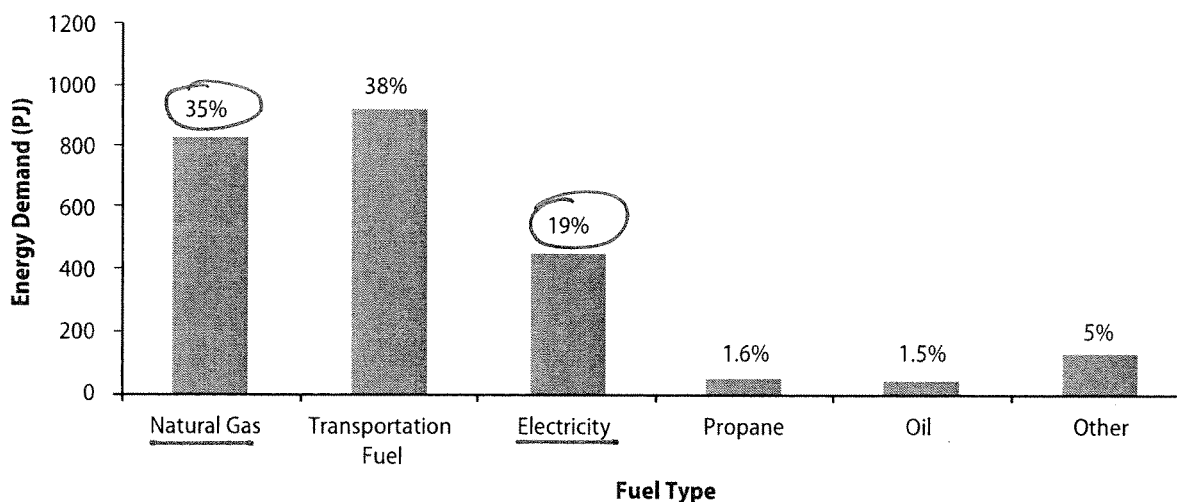


Figure 5: Ontario 2009 Total Final Energy Demand by Fuel Type

Notes:

Oil demand is based on kerosene, stove oil and light fuel oil amounts; Transportation Fuel is based on motor gasoline, diesel fuel oil, heavy fuel oil, aviation gasoline, and aviation turbo fuel amounts; details of Oil and Transportation Fuels come from Table 4-8 of Statistics Canada's 57-003-X report; Other fuel amount is based on Ontario's total final energy demand for 2009 (preliminary).

The information in this table should not be compared with information published in future ECO reports. After the 2009 preliminary data were released by Statistics Canada, significant methodological changes occurred (changes were made to improve data quality for the Annual Industrial Consumption of Energy survey, and a new survey – the Annual Survey of Secondary Distributors of Refined Petroleum – began in 2009). Next year's ECO report will incorporate these methodological changes.

Source: Statistics Canada – Catalogue no. 57-003-X *Report on Energy Supply and Demand in Canada – 2009 Preliminary*.

Table 16 provides numerical details for Figure 5, along with the demand values for 2007 and 2008 calendar years. For 2009, overall energy consumption in Ontario declined 7.4 per cent compared with 2008 levels. Statistics Canada attributes this decrease to declining energy demand in Ontario's manufacturing sector, although all sectors saw some reduction in energy demand.¹⁰¹ To provide greater context for this decrease, across Canada there was an observed decline in energy consumption for the second consecutive year and a decrease in final demand occurred across all major sectors of the economy. At the national level, the greatest decrease came from the residential and agriculture sectors. In Ontario, the greatest decrease came from the industrial sector, where total industrial demand for primary and secondary energy fell 16 per cent, followed by the agriculture sector (9 per cent), residential sector (7 per cent),

Schedule A to Interrogatory No. 1-ED-5

**Table of Ontario's Natural Gas-Related & Other
Greenhouse Gas ("GHG") Emissions in 2010**

Percent of Ontario's Total 2010 Energy-Related GHG Emissions from Certain Sources		
#	GHG Emission Source	Percent
1	Natural Gas Power Plants	8%
2	All Natural Gas Consumption	34.5%
3	Coal-Fired Power Plants	9%
4	Transportation	45.6%

Sources and Calculations

1. Ontario's total natural gas consumption in 2010 was 24,264.58 million cubic metres.¹
2. Emission Factors for Natural Gas²:
 - a) Carbon Dioxide: 1879 g/cubic metre
 - b) Methane: 0.037 g/cubic metre
 - c) Nitrous Oxide: 0.033 g/cubic metre
3. Natural Gas Consumption Emissions (m3 of gas multiplied by emission factors)
 - a) Carbon Dioxide: 45,593,145.82 tonnes
 - b) Methane: 897.79 tonnes
 - c) Nitrous Oxide: 800.73 tonnes
4. IPCC Global Warming Potentials – 100 – Year Time Horizon (Second Assessment Report)³
 - a) Carbon Dioxide: 1
 - b) Methane: 21
 - c) Nitrous Oxide: 310
5. Natural Gas Consumption GHG Emissions (Carbon Dioxide Equivalent)
 - a) Carbon Dioxide: 45,593,145.82 tonnes
 - b) Methane: 18,853.59 tonnes

¹ Statistics Canada, Catalogue 57-601, *Energy Statistics Handbook*, Tables 6.6 & 6.7, <http://www.statcan.gc.ca/pub/57-601-x/2012001/tablelist-listetableaux6-eng.htm>.

² Environment Canada, *GHG Emissions Quantification Guidance: Fuel Combustion*, <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1>.

³ Environment Canada, *Global Warming Potentials*, <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=CAD07259-1>.

- | | | |
|----|----------------|-------------------------|
| c) | Nitrous Oxide: | <u>248,226.3 tonnes</u> |
| d) | Total | 45,860,225.71 tonnes |
6. Ontario's Natural Gas Consumption GHG Emissions (45,860,225.71 tonnes) as a percent of Ontario's Total Energy-Related GHG Emissions (133,000,000 tonnes):
- 34.5%⁴
7. Ontario's transportation-related GHG emissions as a percent of Ontario's Total Energy-Related GHG Emissions in 2010:
- 45.6%⁵
8. Ontario's coal-fired electricity-related GHG emissions as a percent of Ontario's Total Energy-Related GHG emissions in 2010:
- 9%⁶
9. Ontario's natural gas-fired electricity-related GHG emissions as a percent of Ontario's Total Energy-Related GHG emissions in 2010:
- 8%⁷

These emissions are a sub-component of Ontario's total Natural Gas Consumption GHG emissions.

⁴ Calculated as 45,860,225.71 divided by 133,000,000. Ontario's total energy-related GHG emissions in 2010 were 133,000,000 tonnes. Environment Canada, *National Inventory Report 1990-2010 Part 3*, Table A14-12.

⁵ Environment Canada, *National Inventory Report 1990-2010 Part 3*, Table A14-12.

⁶ Environment Canada, *National Inventory Report 1990-2010 Part 3*, Table A14-12; and Environmental Commissioner of Ontario, *A Question of Commitment: Annual Greenhouse Gas Progress Report 2012*, (December 2012), page 21.

⁷ Environment Canada, *National Inventory Report 1990-2010 Part 3*, Table A14-12; and Environmental Commissioner of Ontario, *A Question of Commitment: Annual Greenhouse Gas Progress Report 2012*, (December 2012), page 21.

Related GHG Figures

Ontario's GHG Emission Reduction Targets⁸

1. 6% below 1990 levels by 2014 (to approximately 165 megatonnes or Mt);
2. 15% below 1990 levels by 2020 (to approximately 150 Mt); and
3. 80% below 1990 levels by 2050 (to approximately 35 Mt).

GHG Emissions Gap

According to the Government of Ontario, in the absence of additional policy action, Ontario's GHG emissions in 2020 will be 30 Mt greater than its target.⁹

⁸ Environmental Commissioner of Ontario, *A Question of Commitment: Annual Greenhouse Gas Progress Report 2012*, page 12.

⁹ Environmental Commissioner of Ontario, *A Question of Commitment: Annual Greenhouse Gas Progress Report 2012*, page 14.

Schedule B to Interrogatory No. 1-ED-5

A QUESTION OF COMMITMENT

Review of the Ontario Government's Climate Change Action Plan Results

Annual Greenhouse Gas Progress Report 2012
Environmental Commissioner of Ontario

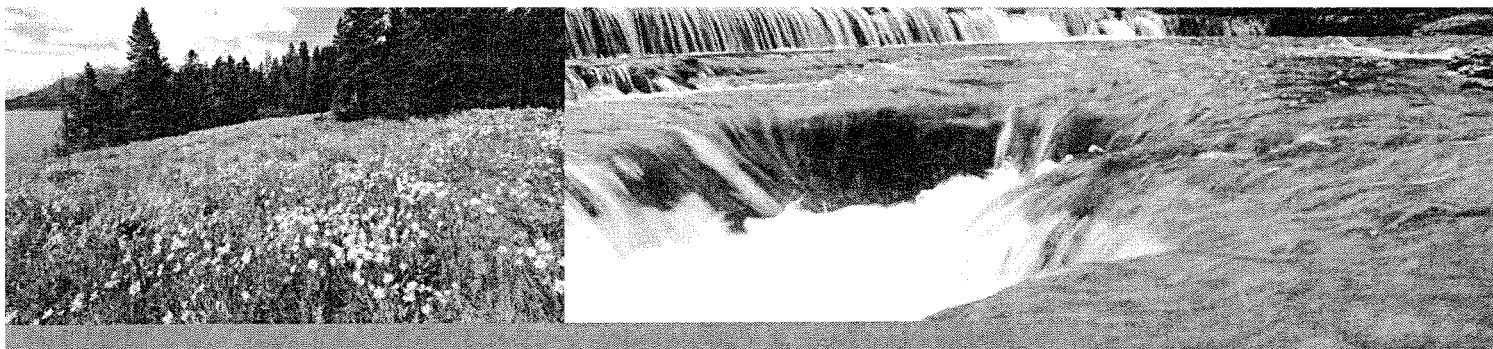
December 2012



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The long-term concentration of CO₂ in the atmosphere must be reduced to no more than 350 ppm if global climate conditions, similar to those in which our ecosystems and our civilization have evolved, are to be maintained.

Targets

In 2007, the government released Go Green: Ontario's Action Plan on Climate Change ("Climate Change Action Plan"), which established three GHG emissions reduction targets:³

- 6 per cent below 1990 levels by 2014 (to approximately 165 megatonnes or Mt);
- 15 per cent below 1990 levels by 2020 (to approximately 150 Mt); and
- 80 per cent below 1990 levels by 2050 (to approximately 35 Mt).

These targets are based on the internationally agreed-upon goal of limiting the increase in global average temperatures to 2°C above pre-industrial levels. In order to have a reasonable chance of preventing temperatures from exceeding this amount, the Intergovernmental Panel on Climate Change recommended in 2007 that the concentration of GHGs in the atmosphere would have to be stabilized at, or below, 450 ppm. More recent analysis of paleoclimatic data has led James Hansen, head of the NASA Goddard Institute for Space Studies, to conclude that the long-term concentration of CO₂ in the atmosphere

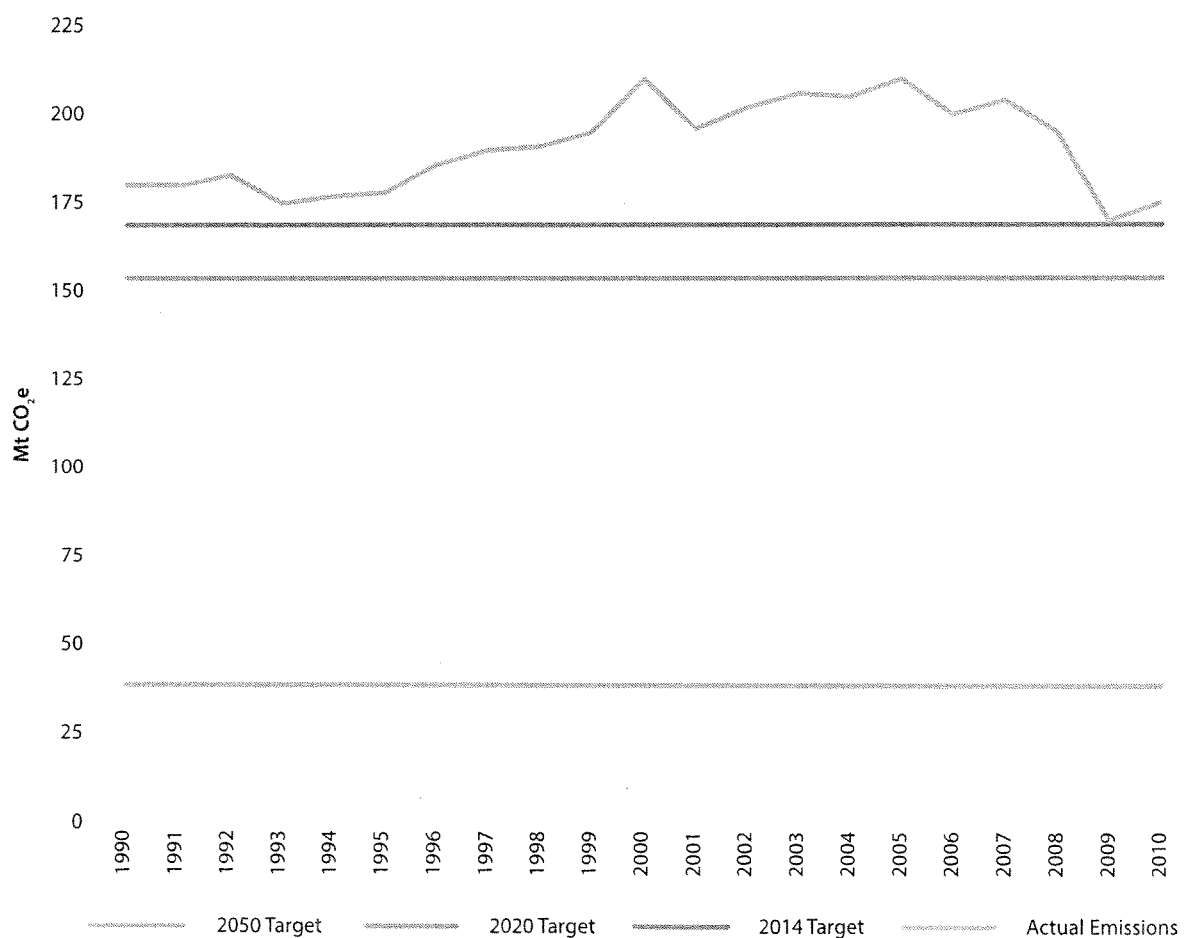


must be reduced to no more than 350 ppm if global climate conditions, similar to those in which our ecosystems and our civilization have evolved, are to be maintained. Unfortunately, the Ontario action plan and targets have not been adjusted to reflect this new understanding of the climate system.

Progress Toward the Targets

In 2010, Ontario's emissions of 171 Mt were 3 per cent below the 1990 base year level (176 Mt). Figure 1 tracks Ontario's emissions over the past 20 years against the targets in the Climate Change Action Plan.

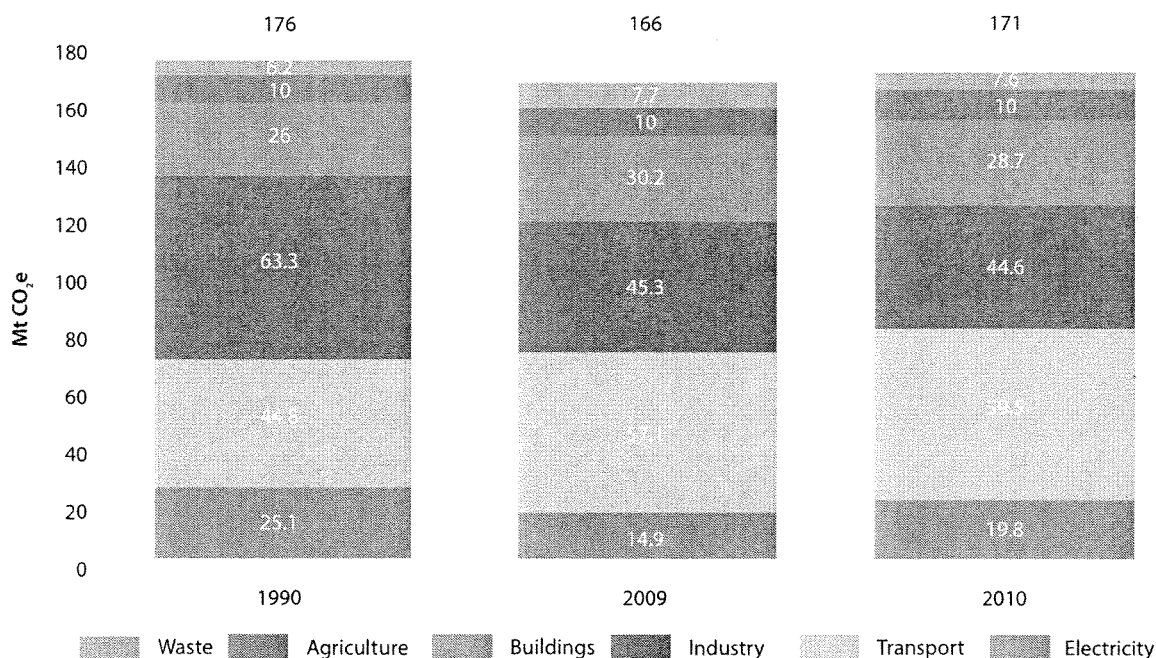
Figure 1: Actual Emissions versus Climate Change Action Plan Targets



Source: Environment Canada. (2012). *National Inventory Report – Greenhouse Gas Sources and Sinks in Canada 1990–2010*. Part 3, p. 61. Government of Ontario (2007). *Go Green: Ontario's Action Plan on Climate Change*.

While some sectors (such as electricity and industry) have experienced an overall decline since 1990, others (such as transportation) have witnessed an equally significant increase (Figure 2). In 2010, similar to previous years, the transportation sector was responsible for the largest volume of emissions, followed by industry and buildings.

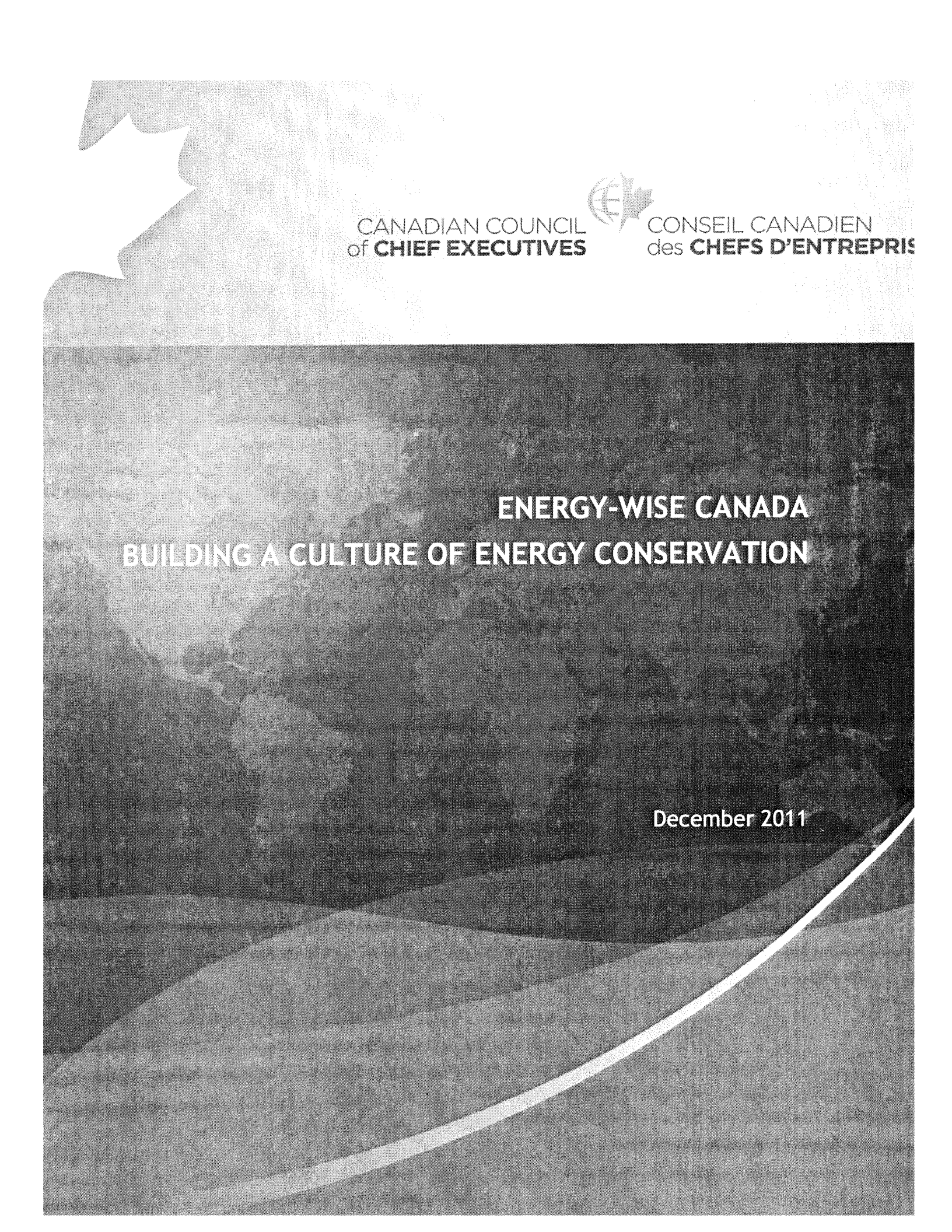
Figure 2: Emissions by Sector, 1990, 2009 and 2010 in Megatonnes



Source: Environment Canada. (2012). *National Inventory Report – Greenhouse Gas Sources and Sinks in Canada 1990–2010*. Part 3, p. 61.

The Ontario government indicates that progress has been made toward meeting the 2014 and 2020 targets, primarily by phasing out the use of coal for electricity generation. The coal phase-out is a significant commitment that, on its own, takes Ontario most of the way toward meeting the 2014 target and at least halfway toward the 2020 target. Unfortunately, the ambition displayed in the electricity sector has not been matched in other areas over the past year, and the Ontario government will not reach its 2020 emissions target without additional policy action. The government, itself, has projected a 30 Mt gap by 2020, an amount that is almost equal to what will have been achieved through coal phase-out.

Schedule A to Interrogatory No. 1-ED-6



CANADIAN COUNCIL
of **CHIEF EXECUTIVES**



CONSEIL CANADIEN
des **CHEFS D'ENTREPRISES**

ENERGY-WISE CANADA
BUILDING A CULTURE OF ENERGY CONSERVATION

December 2011

Executive Summary

A key driver of Canada's future prosperity, and a source of comparative advantage for the country, is our diverse array of energy resources. By combining smart government policy with private sector commitment and innovation, Canada can demonstrate to the world that it can be a reliable and environmentally responsible energy supplier and partner.

In previous papers, the Canadian Council of Chief Executives has advocated a multi-pronged strategy, aimed at bringing on a larger and varied supply of energy to meet growing domestic and international demand. This includes investing in advanced energy technologies that can create new business and employment opportunities and position Canada to compete successfully in a world of rising energy prices.

Fundamentally, however, Canada needs to begin with a renewed commitment to energy conservation. We must use existing and future energy supplies as efficiently as possible, embracing the maxim that the cheapest form of energy is the unit that is not used. Better conservation practices will help to insulate Canadians from volatile energy prices, reduce costs for public institutions such as schools and hospitals, and improve the international competitiveness of Canadian companies.

Cutting our energy use would bring other benefits to society as well. Reduced use of carbon-based fuels would make urban air more breathable. Smart transportation choices would diminish traffic congestion and improve workplace productivity. And better urban design would make cities more livable and help Canadians achieve a better work-life balance.

Few of us deliberately waste energy. Yet the choices we make cause energy waste that cascades through the system. For instance, because of inefficiencies and losses at nearly every stage in production, transmission and end use, the amount of energy actually delivered to a light bulb in our home or to a fuel tank in our car is usually at least 50 percent, and sometimes as much as 90 percent, less than the energy content at source.

There are some signs of progress in our quest for energy efficiency. The overall energy intensity of our economy – the amount of energy consumed per unit of GDP – improved 22 percent between 1990 and 2008. The manufacturing sector overall used 8 percent less energy and produced 25 percent more output in 2008 compared to 1995. In the agriculture sector, energy intensity has declined steadily over the past 20 years. Some

municipal governments are ahead of the curve and are embracing sustainability in urban design and transportation planning. And programs such as LEED (Leadership in Energy and Environmental Design) are re-defining how new commercial and public buildings are designed for overall energy and environmental coherence.

In too many instances, however, such gains are outweighed by trends toward greater energy consumption. New building codes and better construction materials are helping to make Canadian homes more energy-efficient, yet the number of houses continues to grow with immigration and shifting demographics. Moreover, the average size of a house is larger and the percentage of homes with air conditioning has doubled since 1990, to 45 percent. Today's televisions and computers are more efficient than those manufactured as recently as five years ago, but many homes now have more than one of each, operating for many more hours. Vehicle fuel efficiency is set to increase significantly with the new North American standards recently announced, but overall passenger-kilometres travelled continues to increase. As well, there has been a significant shift to trucks as the mode of choice for freight transportation and to airlines for passenger travel.

This paper analyzes energy consumption trends and conservation initiatives in each of the major segments of Canadian society: industry, residential, commercial and institutional, transportation, municipalities and agriculture. Needless to say, there is scope for significant improvement in all of these areas.

A review of these trends leads us to two main conclusions. First, governments, industry and public-spirited groups should work together to improve Canadians' energy literacy. We do not underestimate the challenge of changing consumers' behaviour. After all, governments have been preaching the merits of energy conservation and efficiency since the first oil-price shocks of the mid-1970s, with limited success. Nevertheless, Canadians need to understand the energy choices that the country faces so that they can make informed decisions based on realistic assessments of their respective costs and benefits.

A second, closely related, conclusion is that the most effective means of promoting energy conservation is to allow energy prices to rise. It seems clear that higher prices will influence Canadians' behaviour in a way that public exhortation and appeals to the greater good have not. That is why the CCCE has previously stated its support for a broad-based carbon pricing scheme in Canada. Canadians – as business owners, farmers, building

managers and individual consumers – need to see the everyday cost of inefficient use of energy and be motivated to change their energy consumption patterns and investment decisions. To be sure, carbon pricing would have to be introduced gradually, both to allow businesses and consumers time to adjust and to avoid any disproportionate impact on Canada's competitive position. (For Canadians on fixed incomes, the impact could be offset through other social or fiscal policies.)

The bottom line is that governments must resist the temptation to shield Canadians from higher energy prices. By any reasonable measure, energy remains a comparative bargain for Canadians. Electricity in particular is cheaper today on an inflation-adjusted basis than it was 20 years ago. In most provinces the regulated electricity rates paid by households and some industries do not even cover the cost of producing and delivering it, but ultimately these costs will have to be recouped through the broader tax base.

Canada's vast array of natural resources, our growing population, our climate and geography push us towards above-average energy consumption. But the present trend is unsustainable. It is time for Canadians to get serious about energy conservation, for the health of our economy as well as the environment.

Schedule A to Interrogatory No. 1-ED-7



BANK OF CANADA
BANQUE DU CANADA

**Remarks by Mark Carney
Governor of the Bank of Canada
Empire Club of Canada / Canadian Club of Toronto
12 December 2011
Toronto, Ontario**

Growth in the Age of Deleveraging

Introduction

These are trying times.

In our largest trading partner, households are undergoing a long process of balance-sheet repair. Partly as a consequence, American demand for Canadian exports is \$30 billion lower than normal.

In Europe, a renewed crisis is underway. An increasing number of countries are being forced to pay unsustainable rates on their borrowings. With a vicious deleveraging process taking hold in its banking sector, the euro area is sinking into recession. Given ties of trade, finance and confidence, the rest of the world is beginning to feel the effects.

Most fundamentally, current events mark a rupture. Advanced economies have steadily increased leverage for decades. That era is now decisively over. The direction may be clear, but the magnitude and abruptness of the process are not. It could be long and orderly or it could be sharp and chaotic. How we manage it will do much to determine our relative prosperity.

This is my subject today: how Canada can grow in this environment of global deleveraging.

How We Got Here: The Debt Super Cycle

First, it is important to get a sense of the scale of the challenge.

Accumulating the mountain of debt now weighing on advanced economies has been the work of a generation. Across G-7 countries, total non-financial debt has doubled since 1980 to 300 per cent of GDP. Global public debt to global GDP is almost at 80 per cent, equivalent to levels that have historically been associated with widespread sovereign defaults.¹

The debt super cycle has manifested itself in different ways in different countries. In Japan and Italy, for example, increases in government borrowing have led the way. In the United States and United Kingdom, increases in household debt have been more significant, at least until recently. For the most part, increases in non-financial corporate debt have been modest to negative over the past thirty years.

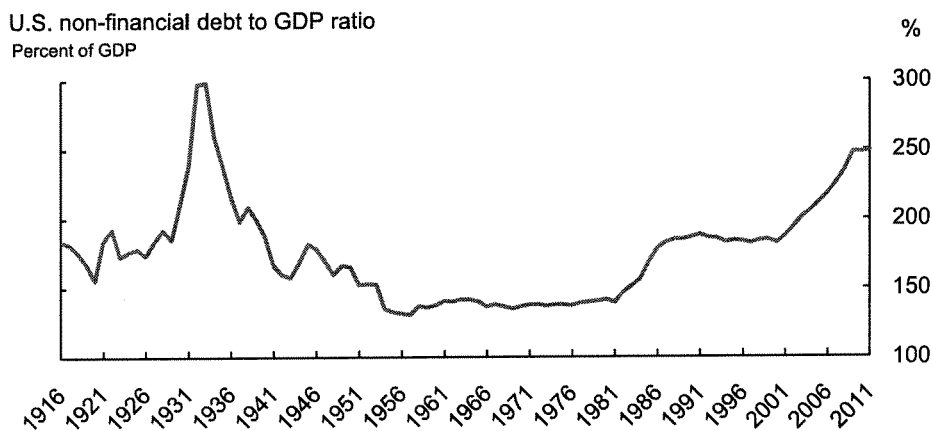
In general, the more that households and governments drive leverage, the less the productive capacity of the economy expands, and, the less sustainable the overall debt burden ultimately is.

Another general lesson is that excessive private debts usually end up in the public sector one way or another. Private defaults often mean public rescues of banking sectors; recessions fed by deleveraging usually prompt expansionary fiscal policies. This means that the public debt of most advanced economies can be expected to rise above the 90 per cent threshold historically associated with slower economic growth.²

The cases of Europe and the United States are instructive.

Today, American aggregate non-financial debt is at levels similar to those last seen in the midst of the Great Depression. At 250 per cent of GDP, that debt burden is equivalent to almost US\$120,000 for every American (Chart 1).³

Chart 1: U.S. non-financial debt near levels of the Great Depression



Sources: U.S. Census Bureau data from 1916 to 1953,
U.S. Flow of Funds data from 1954 to 2011, Bureau of Economic Analysis

Last observation: 2011Q3

Several factors drove a massive increase in American household leverage. Demographics have played a role, with the shape of the debt cycle tracking the progression of baby boomers through the workforce.

The stagnation of middle-class real wages (itself the product of technology and globalisation) meant households had to borrow if they wanted to maintain consumption growth.⁴

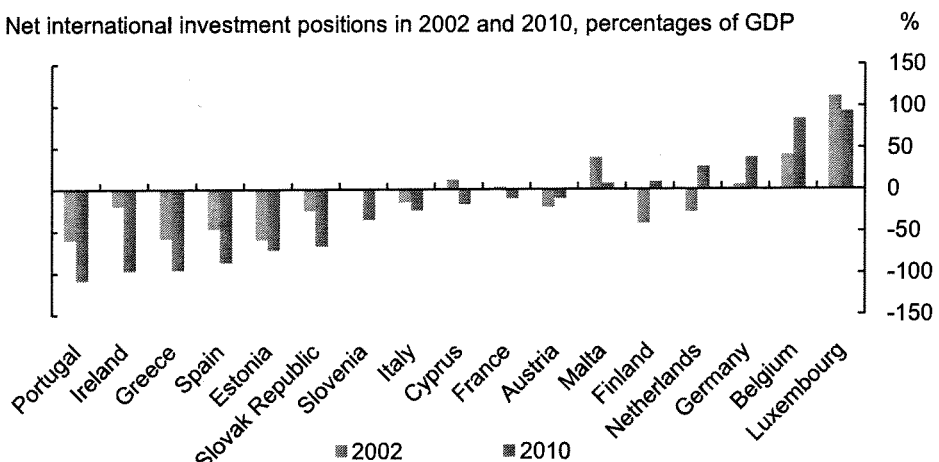
Financial innovation made it easier to do so. And the ready supply of foreign capital from the global savings glut made it cheaper.

Most importantly, complacency among individuals and institutions, fed by a long period of macroeconomic stability and rising asset prices, made this remorseless borrowing seem sensible.

From an aggregate perspective, the euro area's debt metrics do not look as daunting. Its aggregate public debt burden is lower than that of the United States and Japan. The euro area's current account with the rest of the world is roughly balanced, as it has been for some time. But these aggregate measures mask large internal imbalances. As so often with debt, distribution matters (Chart 2).

Chart 2: Euro-area imbalances have widened

Net international investment positions in 2002 and 2010, percentages of GDP



Sources: International Monetary Fund International Financial Statistics, International Monetary Fund World Economic Outlook

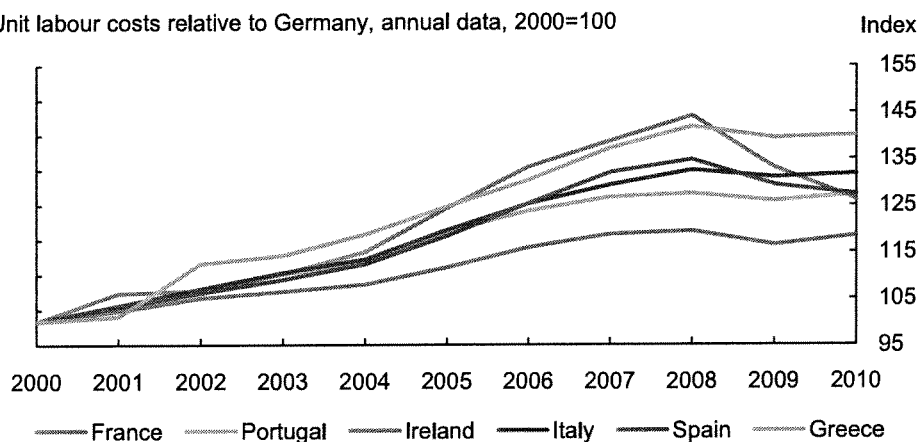
Last observation: 2010

Europe's problems are partly a product of the initial success of the single currency. After its launch, cross-border lending exploded. Easy money fed booms, which flattered government fiscal positions and supported bank balance sheets.

Over time, competitiveness eroded. Euro-wide price stability masked large differences in national inflation rates. Unit labour costs in peripheral countries shot up relative to the core economies, particularly Germany. The resulting deterioration in competitiveness has made the continuation of past trends unsustainable (Chart 3). Growth models across Europe must radically change.

Chart 3: Unit labour costs in peripheral countries up, relative to core

Unit labour costs relative to Germany, annual data, 2000=100



Sources: Deutsche Bundesbank, national statistics agencies

Last observation: 2010

It's the Balance of Payments, Stupid!

For years, central bankers have talked of surplus and deficit countries, of creditors and debtors. We were usually ignored. Indeed, during a boom, the debtor economy usually feels more vibrant and robust than its creditors. In an era

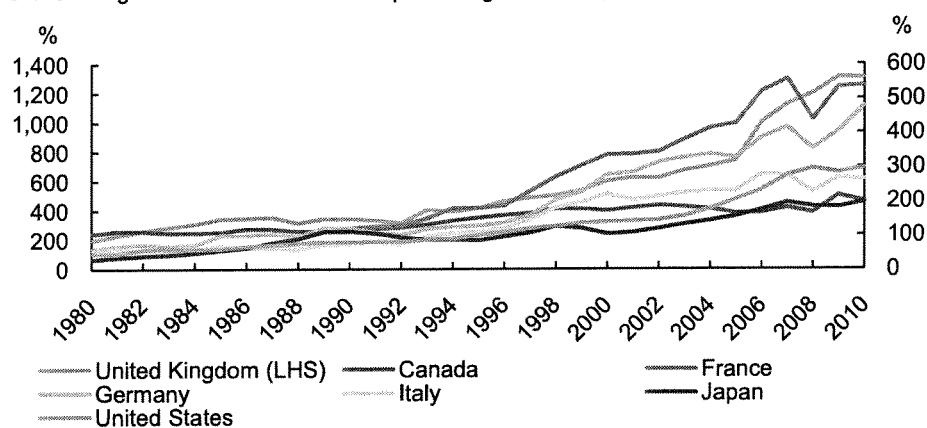
of freely flowing capital, some even thought current account deficits did not matter, particularly if they were the product of private choices rather than public profligacy.

When the leverage cycle turns, the meaning and implications of these labels become tangible. Creditors examine more closely how their loans were spent. Foreign financing constraints suddenly bind. And to repay, debtors must quickly restore competitiveness.⁵

Financial globalisation has provided even greater scope for external imbalances to build (Chart 4). And its continuation could permit larger debt burdens to persist for longer than historically was the case. However, experience teaches that sustained large cross-border flows usually presage liquidity crunches.⁶

Chart 4: Capital flows have expanded rapidly

Gross foreign assets and liabilities as percentages of GDP, annual data



Source: International Monetary Fund International Financial Statistics, International Monetary Fund World Economic Outlook

Last observation: 2010

The Global Minsky Moment Has Arrived

Debt tolerance has decisively turned. The initially well-founded optimism that launched the decades-long credit boom has given way to a belated pessimism that seeks to reverse it.

Excesses of leverage are dangerous, in part because debt is a particularly inflexible form of financing. Unlike equity, it is unforgiving of miscalculations or shocks. It must be repaid on time and in full.

While debt can fuel asset bubbles, it endures long after they have popped. It has to be rolled over, although markets are not always there. It can be spun into webs within the financial sector, to be unravelled during panics by their thinnest threads. In short, the central relationship between debt and financial stability means that too much of the former can result abruptly in too little of the latter.

Hard experience has made it clear that financial markets are inherently subject to cycles of boom and bust and cannot always be relied upon to get debt levels right.⁷ This is part of the rationale for micro- and macroprudential regulation.

It follows that backsliding on financial reform is not a solution to current problems. The challenge for the crisis economies is the paucity of credit demand rather

than the scarcity of its supply. Relaxing prudential regulations would run the risk of maintaining dangerously high leverage—the situation that got us into this mess in the first place.

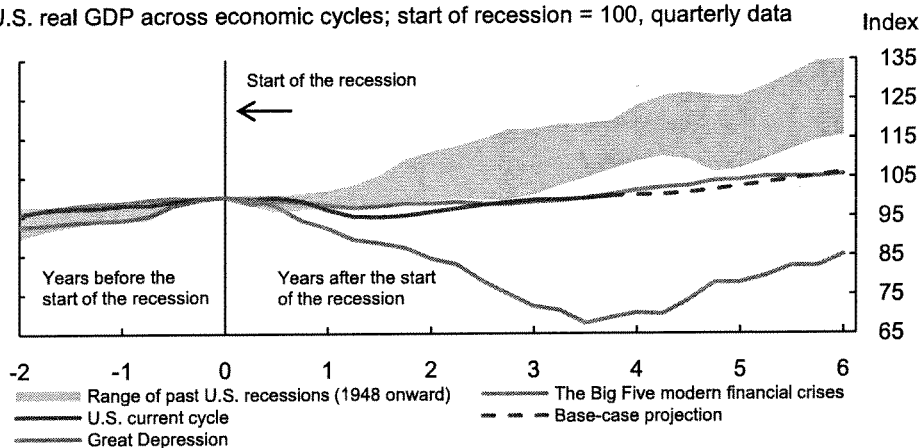
The Implications of Deleveraging

As a result of deleveraging, the global economy risks entering a prolonged period of deficient demand. If mishandled, it could lead to debt deflation and disorderly defaults, potentially triggering large transfers of wealth and social unrest.

History suggests that recessions involving financial crises tend to be deeper and have recoveries that take twice as long.⁸ The current U.S. recovery is proving no exception (**Chart 5**). Indeed, it is only with justified comparisons to the Great Depression that the success of the U.S. policy response is apparent.

Chart 5: Weakest U.S. recovery since Great Depression

U.S. real GDP across economic cycles; start of recession = 100, quarterly data



Note: The Big Five modern financial crises include Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992).
Sources: U.S. Bureau of Economic Analysis and Organisation for Economic Co-Operation and Development

Such counterfactuals—it could have been worse—are of cold comfort to American households. Their net worth has fallen from 6 ½ times income pre-crisis to about 5 at present (**Chart 6**). These losses can only be recovered through a combination of increased savings and, eventually, rising prices for houses and financial assets. Each will clearly take time.

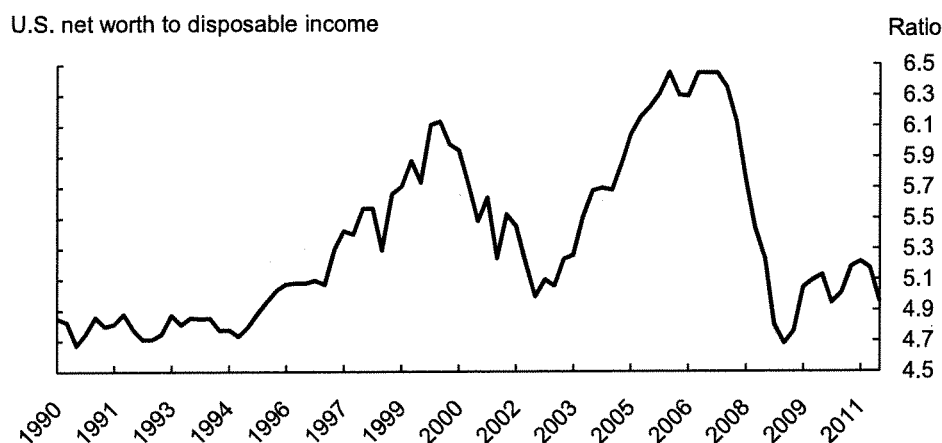
In Europe, a tough combination of necessary fiscal austerity and structural adjustment will mean falling wages, high unemployment and tight credit conditions for firms. Europe is unlikely to return to its pre-crisis level of GDP until a full five years after the start of its *last* recession (**Chart 7**).

Managing the Deleveraging Process

Austerity is a necessary condition for rebalancing, but it is seldom sufficient. There are really only three options to reduce debt: restructuring, inflation and growth.

Whether we like it or not, debt restructuring may happen. If it is to be done, it is best done quickly. Policy-makers need to be careful about delaying the inevitable and merely funding the private exit. Historically, as an alternative to restructuring,

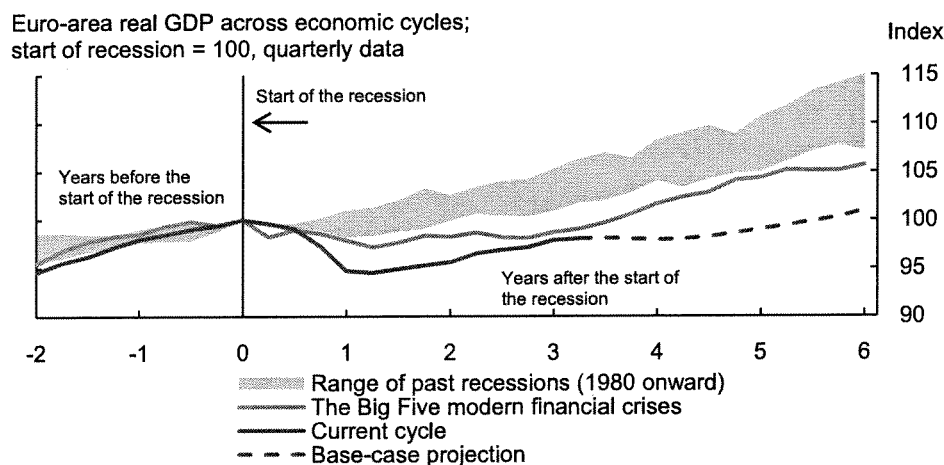
Chart 6: Large drop in U.S. household wealth



Sources: U.S. Federal Reserve, Bureau of Economic Analysis, and Bank of Canada calculations

Last observation: 2011Q3

Chart 7: Euro-area recovery was weak, is over



Note: The Big Five modern financial crises include Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992)
Sources: Eurostat and Organisation for Economic Co-Operation and Development

financial repression has been used to achieve negative real interest rates and gradual sovereign deleveraging.

Some have suggested that higher inflation may be a way out from the burden of excessive debt.⁹

This is a siren call. Moving opportunistically to a higher inflation target would risk unmooring inflation expectations and destroying the hard-won gains of price stability. Similarly, strategies such as nominal GDP level targeting would fail unless they are well understood by the public and the central bank is highly credible.^{10, 11}

With no easy way out, the basic challenge for central banks is to maintain price stability in order to help sustain nominal aggregate demand during the period of real adjustment. In the Bank's view, that is best accomplished through a flexible

inflation-targeting framework, applied symmetrically, to guard against both higher inflation and the possibility of deflation.

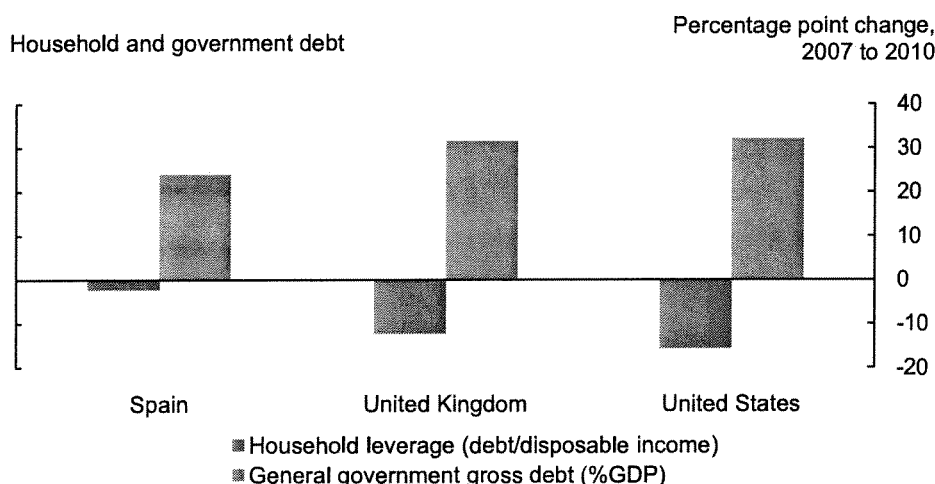
The most palatable strategy to reduce debt is to increase growth. In today's reality, the hurdles are significant.

Once leverage is high in one sector or region, it is very hard to reduce it without at least temporarily increasing it elsewhere.

In recent years, large fiscal expansions in the crisis economies have helped to sustain aggregate demand in the face of private deleveraging (**Chart 8**).

However, the window for such Augustinian policy is rapidly closing. Few except the United States, by dint of its reserve currency status, can maintain it for much longer.

Chart 8: Private deleveraging, public leveraging



Sources: Bank for International Settlements, IMF World Economic Outlook September 2011

In most of Europe today, further stimulus is no longer an option, with the bond markets demanding the contrary.

There are no effective mechanisms that can produce the needed adjustment in the short term. Devaluation is impossible within the single-currency area; fiscal transfers and labour mobility are currently insufficient; and structural reforms will take time.

Actions by central banks, the International Monetary Fund and the European Financial Stability Facility can only create time for adjustment. They are not substitutes for it.

To repay the creditors in the core, the debtors of the periphery must regain competitiveness. This will not be easy. Most members of the euro area cannot depreciate against their major trading partners since they are also part of the euro.

Large shifts in relative inflation rates between debtor and creditor countries could result in real exchange rate depreciations between euro-area countries. However, it is not clear that ongoing deflation in the periphery and higher inflation in the core would prove any more tolerable than it did between the United

Kingdom and the United States under the postwar gold standard of the 1920s and 1930s.

The route to restoring competitiveness is through fiscal and structural reforms. These real adjustments are the responsibility of citizens, firms and governments within the affected countries, not central banks. A sustained process of relative wage adjustment will be necessary, implying large declines in living standards for a period in up to one-third of the euro area.

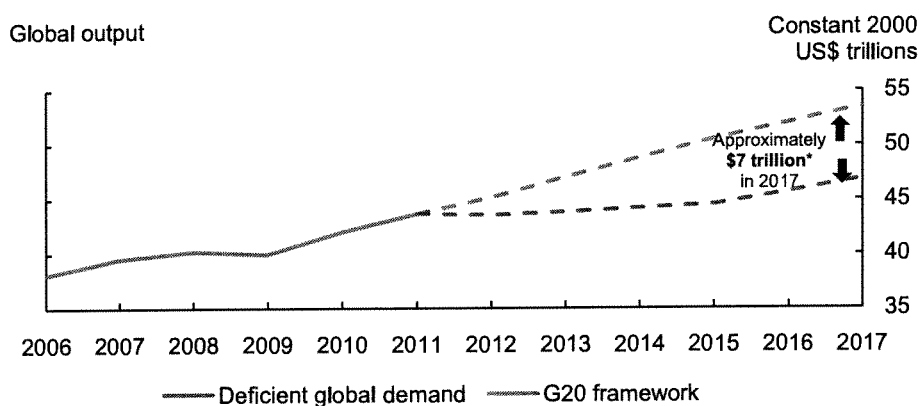
We welcome the measures announced last week by European authorities, which go some way to addressing these issues.

With deleveraging economies under pressure, global growth will require global rebalancing. Creditor nations, mainly emerging markets that have benefited from the debt-fuelled demand boom in advanced economies, must now pick up the baton.

This will be hard to accomplish without co-operation. Major advanced economies with deficient demand cannot consolidate their fiscal positions and boost household savings without support from increased foreign demand. Meanwhile, emerging markets, seeing their growth decelerate because of sagging demand in advanced countries, are reluctant to abandon a strategy that has served them so well in the past, and are refusing to let their exchange rates materially adjust.

Both sides are doubling down on losing strategies. As the Bank has outlined before, relative to a co-operative solution embodied in the G-20's Action Plan, the foregone output could be enormous: lower world GDP by more than US\$7 trillion within five years (**Chart 9**). Canada has a big stake in avoiding this outcome.

Chart 9: The \$7-trillion question



*This estimate is a rough approximation. Depending on the assumptions, it could range from \$6 trillion to \$9 trillion.
Sources: Bank of Canada, World Bank

To Summarize Thus Far

The market cannot be solely relied upon to discipline leverage.

It is not just the stock of debt that matters, but rather, who holds it. Heavy reliance on cross-border flows, particularly when they fund consumption, usually proves unsustainable.

As a consequence of these errors, advanced economies are entering a prolonged period of deleveraging.

Central bank policy should be guided by a symmetric commitment to the inflation target. Central banks can only bridge real adjustments; they can't make the adjustments themselves.

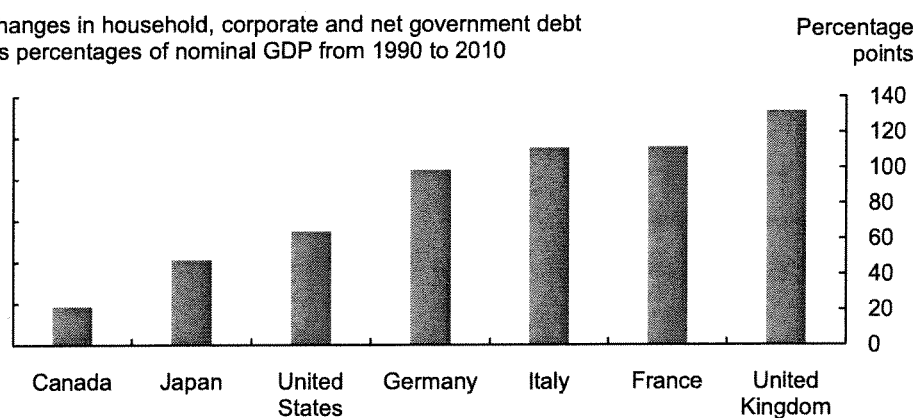
Rebalancing global growth is the best option to smooth deleveraging, but its prospects seem distant.

What It Means for Canada

Canada has distinguished itself through the debt super cycle (**Chart 10**), though there are some recent trends that bear watching. Over the past twenty years, our non-financial debt increased less than any other G-7 country. In particular, government indebtedness fell sharply, and corporate leverage is currently at a record low (**Chart 11**).

Chart 10: Canadian debt has risen less than its G-7 peers

Changes in household, corporate and net government debt as percentages of nominal GDP from 1990 to 2010

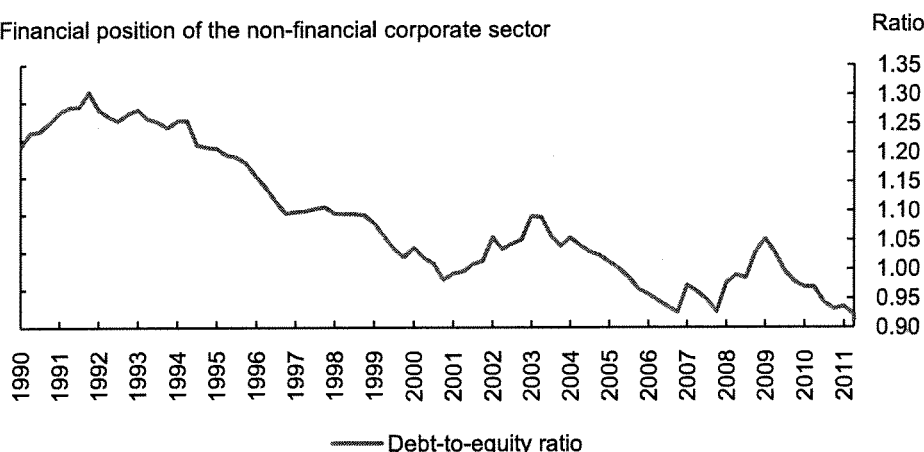


Note: German data prior to 1991 reflects West Germany.
Sources: Cecchetti, Mohanty and Zampolli 2011, Organisation for Economic Co-operation and Development, and Bank of Canada calculations

Last observation: 2010

Chart 11: Corporate leverage at a record low

Financial position of the non-financial corporate sector



Source: Statistics Canada, Quarterly Financial Statistics for Enterprises

Last observation: 2011Q3

In the run-up to the crisis, Canada's historically large reliance on foreign financing was also reduced to such an extent that our net external indebtedness was virtually eliminated.

Over the same period, Canadian households increased their borrowing significantly. Canadians have now collectively run a net financial deficit for more than a decade, in effect, demanding funds from the rest of the economy, rather than providing them, as had been the case since the Leafs last won the Cup.

Developments since 2008 have reduced our margin of manoeuvre. In an environment of low interest rates and a well functioning financial system, household debt has risen by another 13 percentage points, relative to income. Canadians are now more indebted than the Americans or the British. Our current account has also returned to deficit, meaning that foreign debt has begun to creep back up.

The funding for these current account deficits has been coming largely from foreign purchases of Canadian portfolio securities, particularly bonds. Moreover, much of the proceeds of these capital inflows seem to be largely, on net, going to fund Canadian household expenditures, rather than to build productive capacity in the real economy. If we can take one lesson from the crisis, it is the reminder that channelling cheap and easy capital into unsustainable increases in consumption is at best unwise.

Canada's relative virtue throughout the debt super cycle affords us a privileged position now that the cycle has turned. Unlike many others, we still have a risk-free rate and a well-functioning financial system to support our economy. It is imperative that we maintain these advantages. Fortunately, this means largely doing what we have been doing—individuals and institutions acting responsibly and policy-makers executing against sound fiscal, monetary and regulatory frameworks.

It cannot entirely be business as usual. Our strong position gives us a window of opportunity to make the adjustments needed to continue to prosper in a deleveraging world. But opportunities are only valuable if seized.

First and foremost, that means reducing our economy's reliance on debt-fuelled household expenditures. To this end, since 2008, the federal government has taken a series of prudent and timely measures to tighten mortgage insurance requirements in order to support the long-term stability of the Canadian housing market. Banks are also raising capital to comply with new regulations. Canadian authorities are co-operating closely and will continue to monitor the financial situation of the household sector.

To eliminate the household sector's net financial deficit would leave a noticeable gap in the economy. Canadian households would need to reduce their net financing needs by about \$37 billion per year, in aggregate. To compensate for such a reduction over two years could require an additional 3 percentage points of export growth, 4 percentage points of government spending growth or 7 percentage points of business investment growth.

Any of these, in isolation, would be a tall order. Export markets will remain challenging. Government cannot be expected to fill the gap on a sustained basis.

But Canadian companies, with their balance sheets in historically rude health, have the means to act—and the incentives. Canadian firms should recognize four realities: they are not as productive as they could be; they are under-exposed to fast-growing emerging markets; those in the commodity sector can expect relatively elevated prices for some time; and they can all benefit from one of the most resilient financial systems in the world. In a world where deleveraging holds back demand in our traditional foreign markets, the imperative is for Canadian companies to invest in improving their productivity and to access fast-growing emerging markets.

This would be good for Canadian companies and good for Canada. Indeed, it is the only sustainable option available. A virtuous circle of increased investment and increased productivity would increase the debt-carrying capacity of all, through higher wages, greater profits and higher government revenues. This should be our common focus.

The Bank of Canada is doing its part by fulfilling its mandate to keep inflation low, stable and predictable so that Canadian households and firms can invest and plan for the future with confidence. It is also assisting the federal government in ensuring that Canada's world-leading financial system will be there for Canadians in bad times as well as good and in pushing the G-20 Action Plan because it is in Canada's interests.

Conclusion

It makes sense to step back and consider current challenges through the longer arc of financial history. Today's venue is an appropriate place to do so. A century ago, when the Empire Club and the Canadian Club of Toronto would meet, the first great leveraging of the Canadian economy was well under way. During the three decades before the First World War, Canada ran current account deficits averaging 7 per cent of GDP. These deficits were largely for investment and were principally financed by long-term debt and foreign direct investment.

On the eve of the Great War, our net foreign liabilities reached 140 per cent of GDP, but our productive capacity built over the decades helped to pay them off over time. Our obligations would again swell in the Great Depression. But in the ensuing boom, we were again able to shrink our net liabilities.

When we found ourselves in fiscal trouble in the 1990s, Canadians made tough decisions, so that on the eve of Lehman's demise, Canada was in the best fiscal shape in the G-7.

We must be careful, however, not to take too much comfort from these experiences. Past is not always prologue. In the past, demographics and productivity trends were more favourable than they are today. In the past, we deleveraged during times of strong global growth. In the past, our exchange rate acted as a valuable shock absorber, helping to smooth the rebuilding of competitiveness that can only sustainably be attained through productivity growth.

Today, our demographics have turned, our productivity growth has slowed and the world is undergoing a competitive deleveraging.

We might appear to prosper for a while by consuming beyond our means. Markets may let us do so for longer than we should. But if we yield to this temptation, eventually we, too, will face painful adjustments.

It is better to rebalance now from a position of strength; to build the competitiveness and prosperity worthy of our nation.

Endnotes

¹ C. M. Reinhart and K. S. Rogoff, "A Decade of Debt," National Bureau of Economic Research Working Paper No. 16827, Cambridge, 2011.

² C. M. Reinhart and K. S. Rogoff, "Growth in a Time of Debt," *American Economic Review* 100, no. 2 (May 2010): 573–78.

³ These figures, daunting as they are, actually understate the extent of the problem. They do not include the liabilities stemming from the pension and health care promises made by governments but not yet funded, which some estimate to be even larger than the current explicit stock of debt.

⁴ R. G. Rajan, *Fault Lines: How Hidden Fractures Still Threaten the World Economy* (Princeton: Princeton University Press, 2010).

⁵ Japan illustrates the importance of whether one's creditors are domestic or foreign. The public and total non-financial debt burdens in Japan have risen well beyond levels that have proved unsustainable in other countries, owing largely to the fact that the preponderance of that debt is owed domestically. From an external perspective, Japan is the largest net creditor in the world.

⁶ See M. Carney, "Global Liquidity," a speech delivered to the Canada-United Kingdom Chamber of Commerce in London, United Kingdom, 8 November 2011.

⁷ See A. Turner, "Debt and Deleveraging: Long Term and Short Term Challenges," a speech delivered to the Centre for Financial Studies, Frankfurt, Germany, 21 November 2011. Turner argues, in fact, that the current situation is the result of "decades of cumulative, massive policy errors," particularly the over reliance on free markets, (p.6).

⁸ See C. M. Reinhart and V. R. Reinhart, "After the Fall," *Macroeconomic Challenges: The Decade Ahead*, Federal Reserve Bank of Kansas City 2010 Economic Policy Symposium. Available at: <<http://www.kansascityfed.org/publicat/sympos/2010/reinhart-paper.pdf>>.

⁹ K. Rogoff, "Inflation Is Now the Lesser Evil," *Project Syndicate*, December 2008.

¹⁰ See J. Hatzius, Z. Pandl, A. Phillips, and S. J. Stehn, A. Tilton, S. Wu, and M. Acosta-Cruz, "The Case for a Nominal GDP Level Target," *US Economics Analyst*, No: 11/41; Goldman Sachs Global ECS Research, 2011; and C. Romer, "Dear Ben: It's Time for Your Volcker Moment," *New York Times*, 29 October 2011.

¹¹ Indeed, if inflation is both higher and more uncertain, a higher inflation risk premium might result, prompting an increase in real interest rates that would exacerbate unfavourable debt dynamics.

Schedule B to Interrogatory No. 1-ED-7



THE CENTRE FOR SPATIAL ECONOMICS

The Economic Impacts of Reducing Natural Gas Use in Ontario

**Prepared for
Ontario Clean Air Alliance
and
Ontario Clean Air Alliance Research Inc.**

The Ontario Clean Air Alliance and Ontario Clean Air Alliance Research Inc.
thank the following for their financial support:
The EJLB Foundation, The Toronto Atmospheric Fund and
The Taylor Irwin Family Fund at the Toronto Community Foundation



April 2011

INTRODUCTION

The Ontario Clean Air Alliance and the Ontario Clean Air Alliance Research Inc. requested the Centre for Spatial Economics (C₄SE) to undertake a study that looks at the economic impacts of reducing the use of natural gas in Ontario. The possibility of achieving a significant reduction in the use of natural gas has been shown in a study undertaken for Enbridge Gas Distribution that estimated possible reductions in natural gas use on the part of its customers. The current study examines the economic impacts of reducing natural gas in the province by creating a projection for the future economic performance of the Ontario economy that contains a reduction in the use of natural gas that is similar in nature to that shown in the Enbridge Gas Distribution analysis and compares the results of this scenario against a projection that does not contain this reduction.

The next section provides a description of the approach adopted to estimate the impacts of reducing the use of natural gas and the assumptions behind the approach. The third section discusses the expected impacts of reducing the use of natural gas on the economy from a qualitative point of view. The fourth section then presents the quantitative estimates of the impacts found using the assumptions for the reduction in natural gas considered.

STUDY APPROACH AND ASSUMPTIONS

Enbridge Gas Distribution commissioned a study regarding the possibility of reducing the use of natural gas by its customers in Ontario using a Demand Side Management (DSM) approach (Marbek Resource Consultants Ltd. “Natural Gas Energy Efficiency Potential: Update 2008, Residential, Commercial and Industrial Sectors Synthesis Report,” September 2009). The results of the study suggest estimates of possible reductions in natural gas use for industrial, commercial, and residential customers under different assumptions regarding DSM costs. Under its Economic Potential Forecast, for example, reductions in residential, commercial, and industrial, natural gas usage over a 10-year period are estimated at 18, 29, and 34 percent, respectively. These reductions are to be realized (Marbek, op. cit. page 4):

“.. if all equipment and building envelopes were upgraded to the level that is cost-effective from Enbridge’s perspective. All the energy efficiency technologies and measures that have a positive measure TRC.. (net benefits that result from an investment in an efficiency technology or measure).. are incorporated into the Economic Potential Forecast. These technologies and measures are applied at either natural stock turnover rates or at designated years for immediate application.”

The Ontario Clean Air Alliance is interested in estimating the impact on the Ontario economy if a reduction in natural gas use could be achieved in the province as a whole. The assumptions adopted for the reduction in natural gas use found in the Enbridge study serve as a starting point for those used in this study. The reduction is assumed to take place over the 10-year time period 2012 to 2021.

The approach adopted to estimate the economic impacts on Ontario of reducing the use of natural gas employs the C₄SE macroeconomic model of the Ontario economy. This model is used to prepare two economic projections for the future performance of the economy. The first projection shows the performance of the economy without the reduction in the use of natural gas. The second one shows the performance when the usage of natural gas is reduced. The impacts on the economy are then estimated by comparing the results of the two projections for key economic and fiscal variables such as real Gross Domestic Product (GDP), the Consumer Price Index (CPI), employment, population, and government budget balances.

The C₄SE macroeconomic model is a multi-sector (industry) model that assumes the existence of a gross output (total value of production) KLEM production technology for the different sectors – KLEM stands for the production inputs of capital, labour, energy, and materials. It incorporates variable input-output coefficients that respond to changes in relative prices for production inputs. For example, increases in the price of natural gas will lead to a reduction in natural gas's share of total inputs to gross output and an increase in the share for the other inputs. The model also incorporates a Green House Gas emissions component that estimates CO₂ equivalent emissions by industry.

The projection that does not contain the reductions in natural gas is called the base case projection. It is created by making assumptions about the key drivers for the Ontario economy such as economic growth and inflation in Ontario's major trading partners, oil prices, natural gas prices, fiscal policy, and so on. The projection with the reductions in natural gas is created using the base case assumptions and then reducing the input shares of natural gas for the various industries along with the consumer expenditure share of natural gas for households. The input shares are variables in the macroeconomic model.

The Enbridge study does not cover all of Ontario's economy. The current study wishes to expand the coverage to the province as whole. The reductions in natural gas use employed are 25 percent for the industrial sector, 20 percent for the commercial sector, and 15 percent for the residential sector. These reductions are lower and, therefore, more conservative than those found in the Enbridge Economic Potential Forecast.

It is assumed that an increase in the share of capital in gross output will occur with the reduction in natural gas use in gross output as firms purchase new energy efficient technologies. As a result, there will be an increase in the share of value-added (net output or GDP) in gross output in the economy. In the case of households, the reduction in the share of natural gas in consumer expenditures is replaced by an increase in the share of the other consumer expenditure categories.

While the Enbridge study provides estimates of reductions in natural gas use, it does not contain estimates of the amount of capital expenditures that would be required to achieve these reductions. The C₄SE model suggests that the "incremental" increase in the stock of capital over the projection period required to achieve the non-residential natural gas reductions

measured in \$2010 would be about \$4 billion. For the residential sector it is assumed that a \$3 billion increase in the value of residential structures would be required – which is about \$500 per household (occupied housing unit). This assumption is a “rough” estimate, but is similar to the ratio of the increases in non-residential capital stock to natural gas reductions produced by the model. Lower amounts of residential expenditures would reduce the economic impact on the economy and higher ones would increase the impact.

It is also assumed that the prices for capital goods purchased to reduce natural gas usage will not rise from those found in the base case projection other than through possible increases in wholesale and retail trade margins for local firms as demand pressures rise. The prices for imported capital goods remain unchanged from base case values.

While the reductions in natural gas use are assumed to take place over the 10-year period 2012 to 2021, the projection period is extended for another 5 years to 2026. The longer time period is adopted to allow the economy to fully adjust to both the direct and indirect impacts of the reductions in the use of natural gas on the economy.

A final set of assumptions includes the absence of a response of fiscal and monetary policy on the part of governments. The Bank of Canada will not respond to changes in inflation associated with the reduction in natural gas use. Governments will not change policies in the face of changes in their budget balances. Any improvements or deterioration in budget balances will lead to changes in government debt.

EXPECTED IMPACTS

Before presenting the quantitative estimates of the impact of the reduction in natural gas use it is worthwhile to review the nature of impacts expected from a qualitative point of view – that is, directions of change rather than the estimated size of change.

The reduction in the use of natural gas is to be accomplished by replacing natural gas with more energy efficient capital equipment. This replacement is expected to allow firms to produce the same amount of goods and services they did when using natural gas because the more productive capital replaces the contribution of natural gas use in gross output. It should be noted that the reductions in natural gas use implemented through the model's input shares will not likely reduce natural gas use in the same proportion. This difference is a result of changes in economic performance caused by the changes in technology. While the share of natural gas in the economy is reduced, the actual size of the economy will increase, which in turn, will lead to additional use of natural gas. Nevertheless, the latter increase will be small in relation to the decline that results from introducing more efficient capital equipment.

Significant increases in investment expenditures in the economy are expected to be observed over the period relative to the base case projection when firms substitute capital for natural gas. Over the long run when the more efficient capital begins to wear out, additional replacement expenditures are expected with the higher valued capital in contrast to the

relatively lower replacement values for the old capital.

The purchase of new equipment and the construction of structures needed to achieve lower gas use will increase production and employment in industries throughout the economy. The increased employment and disposable income will lead to increases in consumer and housing expenditures. These increases, in turn, will lead to additional production and employment, and so on.

Because Ontario does not produce natural gas the reduction in its use will not have a major negative impact on the economy. Nevertheless, firms in the natural gas distribution system are likely to see a reduction in their sales, which will offset somewhat the increases in GDP resulting from the more productive capital.

The fall in natural gas use will be observed through a reduction in provincial imports, which will lead to an improvement in the trade balance (exports minus imports) over the long run. During the period in which the capital is being replaced, nevertheless, the reduction in natural gas imports will be offset by imports of machinery and equipment. The import share of the machinery that will be purchased to reduce natural gas use is high for the province.

The higher GDP associated with the increase in capital to replace natural gas will lead to increases in labour productivity, which, in turn, will result in increases in wages and personal income. The latter will cause an increase in consumer expenditures, in addition to that observed as a result of the increased investment activity mentioned above.

The increased economic activity resulting from the reduction in gas use will also result in an improvement in the budget balances of the federal and provincial governments. This improvement comes from increases in revenues from both income taxes – personal and corporate – and indirect taxes such as the HST. Expenditures also rise as the increase in employment results in additional persons moving into the province, but this increase will be lower than the increase in revenues.

The reduction in the use of natural gas will lead to a reduction in CO₂ emissions. This reduction will be somewhat offset by increases in emissions resulting from a higher level of economic activity associated with replacing the natural gas with more energy efficient capital.

ESTIMATED IMPACTS

Estimates of the impacts of reducing natural gas use in the province for key economic indicators are shown in Table 1. The impacts for many indicators refer to the percentage differences and level differences from the base case projection values. The level differences for expenditure or income variables are measured in millions of 2010 dollars.

The results for real GDP show a 0.6 percentage point increase from the base case in 2026. This increase represents \$5.1 billion measured in 2010 dollars. It should be noted that part of the

TABLE 1: IMPACT ON KEY ECONOMIC INDICATORS
(Level or Percentage Difference from Base Case)

	2016	2021	2026
Real GDP \$2010 Millions			
% Difference	0.2	0.7	0.6
Difference	1706	5497	5144
GDP Deflator % Difference	0	0.1	0
Consumer Expenditures \$2010 Millions			
% Difference	0.2	0.6	0.5
Difference	787	2694	2630
Residential Investment \$2010 Millions			
% Difference	1.4	3	0.6
Difference	686	1651	394
Non-Residential Investment \$2010 Millions			
% Difference	0.5	1.3	0.7
Difference	346	891	559
Exports \$2010 Millions			
% Difference	0	-0.1	0
Difference	-49	-284	142
Imports \$2010 Millions			
% Difference	0.1	0	-0.1
Difference	204	126	-628
CPI % Difference	0	0.1	0
Hourly Wage Rate \$ % Difference	0.2	0.5	0.2
Employment 000s			
% Difference	0.2	0.4	0.4
Difference	12.2	33.8	28.5
Productivity (GDP/Hour) % Difference	0	0.2	0.2
Personal Income \$2010 Millions			
% Difference	0.3	0.7	0.5
Difference	1215	3738	2612
Corporate Profits Before Tax \$2010 Millions			
% Difference	0.1	0.7	0.6
Difference	73	446	451
Federal Net Lending \$2010 Millions Difference	231	496	148
Provincial Net Lending \$2010 Millions Difference	159	479	443
Natural Gas Final Demand (BCF)			
Difference	-69	-196	-192
% Difference	-6.9	-16.1	-15.4
Total Provincial CO2 Equivalent Emissions (KT)			
Difference	-4107	-13742	-13061
% Difference	-2.1	-6.1	-5.5

increase in GDP and some of its components is a result of an increase in population caused by higher employment leading to additional migration to the province.

Consumer expenditures account for the largest amount of the increase in GDP in 2026 where the percentage difference in expenditures is 0.5. The increase in consumer expenditures is the result of an increase in personal income, which rises 0.5 percent.

The increase in personal income results from increases in employment and wages. The wage rate rises 0.2 percent above base case values while there is a 0.4 percent increase in employment. The increase in employment in level terms is 29 thousand in 2026. Part of the increase in wages is due to the higher productivity that results from the increase in capital with the reduction in the use of natural gas. The fact that the Consumer Price Index (CPI) does not change over the period adds to the purchasing power of the wage increase.

As expected non-residential investment expenditures show a noticeable increase reaching 0.7 percent above base case values in 2026. The latter increase is less than the 1.3 percent observed for 2021 when the use of natural gas is being reduced through investments in energy saving capital.

There is also a 3.0 increase in residential investment to 2021, which falls to 0.6 percent in 2026 as the additional residential capital needed to reduce natural gas consumption is put in place. Some of the higher residential investment is accounted for by an increase in population associated with the higher employment attracting more people to the province.

Imports rise to 2021 in the projection where natural gas use is reduced, which is a result of both higher investment and consumer expenditures. Nevertheless, they fall later as the higher level of investment and associated activity is reduced. The increase in productivity that is caused by the reduction in the use of natural gas reduces business costs enough to cause exports to rise slightly by 2026. This latter increase leads to an improvement in the trade balance of almost \$800 million that year. The reduced costs are also responsible for the increase in corporate profits before taxes over the projection period.

The federal and provincial governments see an improvement in their budget balances with the increased economic activity. The federal budget balance by 2026 is nearly \$150 million higher while that for the provincial government is about \$445 million higher. The sum of these differences over the period suggests about a \$3.8 and \$4.4 billion decline in federal and provincial government debt, respectively.

The percentage reduction in natural gas use for total final demand – which excludes natural gas used to produce electricity – is 15.4 percent in 2026. The reduction in physical units is 192 billion cubic feet of natural gas (BCF). This reduction divided into the increase in GDP in 2026 shows a \$26 million dollar increase in GDP for each 1 BCF of natural gas reduction.

The reduction in the use of natural gas has a noticeable impact on total provincial CO₂ emissions over the projection period. By 2026 the level of CO₂ equivalent emissions is reduced 5.5 percent or 13.1 megatonnes with the replacement of natural gas by the more energy efficient capital.

The estimated percentage impacts on the industries in the economy that are covered in the C₄SE model are shown in Table 2. The impacts on the various industries reflect their relative intensities of natural gas use as well as their involvement in producing and installing capital goods. The construction industry, for example, will see a larger increase in activity as it builds and installs new capital. Industries with high shares of their production represented by natural gas such as primary metals will tend to have larger responses to the reduction in gas use.

The mining and manufacturing industries see relatively large increases in GDP because they use relatively large amounts of natural gas. Within the manufacturing industry the two automobile related industries show the smallest increase while primary metals and other manufacturing, which includes the pulp and paper industry, show relatively large increases in GDP.

As expected the construction industry registers a large increase to 2021 with a 2.0 percent difference between the base case projection and the reduced natural gas projection. This impact declines to 0.7 percent once the conversion to more efficient capital is completed.

The impacts on the service industries reflect in part the higher population associated with the employment increase as well as a reduction in natural gas use. The retail and wholesale trade, finance, insurance, and real estate, and accommodation and food services show the largest increases among private services.

TABLE 2: IMPACT ON INDUSTRY GDP (%)
(Percentage Difference from Base Case)

	2016	2021	2026
Total	0.2	0.7	0.6
Agriculture	0.1	0.2	0.2
Forestry	0.2	0.4	0.4
Mining	0.4	1.3	1.3
Manufacturing	0.4	1.3	1.1
Plastics	0.2	0.6	0.5
Motor Vehicle Assembly	0.1	0.4	0.3
Motor Vehicle Parts	0.1	0.4	0.4
Machinery	0.3	0.7	0.7
Fabricated Metals	0.3	0.8	0.6
Primary Metals	0.7	2.1	1.9
Other Manufacturing	0.6	1.8	1.6
Construction	0.8	2	0.7
Utilities	0.1	0.5	0.4
Transportation & Warehousing	0.1	0.3	0.3
Trade	0.2	0.6	0.5
Finance, Insurance & Real Estate	0.2	0.7	0.6
Professional, Scientific & Management Services	0.1	0.3	0.2
Accommodation & Food	0.2	0.6	0.5
Health Services	0.1	0.4	0.4
Other Services	0.2	0.6	0.5
Education Services	0.2	0.7	0.6
Government Services	0.1	0.4	0.5

APPENDIX: THE CENTRE FOR SPATIAL ECONOMICS

The Centre for Spatial Economics (C₄SE) monitors and forecasts economic and demographic change throughout Canada at virtually all levels of geography. The C₄SE also prepares customized studies on the economic, industrial and community impacts of various fiscal and other policy changes, and develops customized impact and projection models for in-house client use. Our clients include government departments, crown corporations, manufacturers, retailers and real estate developers.

The C₄SE was formed in July 2000 through an initiative of two consulting firms: Strategic Projections Inc. and Stokes Economic Consulting Incorporated. These two firms specialize in demographic and economic research. A key part of this research has been the geographical distribution of demographic and economic activity. The C₄SE was established as a partnership of SPI and SEC to improve the quality of information and research conducted in Canada and to make the information and research available to organizations requiring such information, and to the public as the opportunity arises. The C₄SE draws from a list of academics and research consultants on an as needed basis to minimize overhead costs and to obtain the best researchers for the topic at hand.

The staff of the C₄SE is currently as follows:

Ernie Stokes - Managing Partner

Tom McCormack - Partner

Robert Fairholm - Partner

Robin Somerville - Partner

Aaron Stokes - Staff Economist

Tara Schill - Staff Economist

Adam Papp – Staff Economist

Robert Daniells - Consultant

Sam Patayanikorn – Consultant

Ernie Stokes, the author of this report, is the Managing Partner of the C₄SE, as well as the President of Stokes Economic Consulting. He has more than 30 years experience as an economic advisor in both the private and public sectors. Ernie has worked both in North America and developing countries. He has a Ph. D. in economics from Queen's University (1979). Prior to establishing Stokes Economic Consulting in 1995 he served as Managing Director, the WEFA Group, Canada (1989 to 1994), as senior economist with the Alberta Energy Company (1987 to 1989), as a senior official with the Canada Department of Finance (1985 to 1987) and as Director of the National Forecasting Group with the Conference Board (1978 to 1984).

Stokes is currently a member of the B.C. Minister of Finance Forecast Council and the Ontario Minister of Finance Forecast Council as well as an expert on the Ontario Minister of Infrastructure Strategy Panel.

For more information on the C₄SE see our website: www.c4se.com

Schedule A to Interrogatory No. 1-ED-8

ONTARIO
SUPERIOR COURT OF JUSTICE
(Divisional Court)

BETWEEN:

POLLUTION PROBE FOUNDATION

Applicant

- and -

ONTARIO ENERGY BOARD

Respondent

AFFIDAVIT OF MICHAEL MILLAR
(affirmed March 15, 2012)

I, Michael Millar, of the city of Toronto, AFFIRM:

Introduction

1. I am an employee of the Ontario Energy Board (the "Board"), where I have been employed as legal counsel since 2004. I have acted as counsel for Board staff on numerous matters before the Board, including some of the matters at issue in this judicial review. I thus have knowledge of the matters hereafter deposed to, and I hereby declare that I verily believe that all of the information referred to herein is true.
2. I am authorized by the Board to make this affidavit on behalf of the Board in response to this application for judicial review, and in support of a motion by the Board to quash this application, and for no other or improper purpose. In authorizing me to make this affidavit, the Board does not waive any privilege in respect of any advice or communication made to the Board, whether involving myself or others.
3. I have read the Affidavit of Jack Gibbons herein, sworn on February 3, 2012 ("Gibbons Affidavit"). Without in any way accepting or adopting the commentary, characterizations, arguments and conclusions in the Gibbons Affidavit, and particularly those in paragraphs 3 (first sentence), 4, 11 (last sentence), 15, 16 (second

sentence), 21 (second sentence) and 26 thereof, the Board does accept that the documents and excerpts from documents referred to and marked as Exhibits therein are documents or excerpts of documents filed with the Board or exchanged between parties to the proceedings referred to. Clean copies of those documents are contained in the electronic "record" filed by the Board herein, or are attached hereto as Exhibits.

Prior Demand Side Management Hearings

4. In simple terms, Demand Side Management ("DSM") programs considered in this Application are programs that are designed to reduce the consumption of gas by consumers, and hence reduce the overall demand for gas consumption. These programs therefore reduce the amount of gas sold by gas distributors that are regulated by the Board, resulting in the environmental and other benefits referred to by the Applicant. As a result, since those gas distributors obviously have no economic incentive to pay for such programs, a key feature of Board regulation in this area is to ensure that the costs of these programs are recovered by distributors from gas consumers through the rates they pay for gas distribution. However, different consumers or classes of consumers benefit from different DSM programs, because take-up of the programs by consumers is not uniform. Therefore, another important policy interest of the Board's regulation in this area concerns issues of fairness, within and between consumers and consumer groups, and the cross-subsidization that results from these programs.
5. As noted by the Applicant, the Board has held prior proceedings in 1991-1993 (Board File No. E.B.O. 169) and in 2006 (EB-2006-0021). Those proceedings resulted in the issuance by the Board of binding instruments that have governed the development and approval of distributors' DSM plans and programs since 1993. Clean and complete copies of relevant documents from those proceedings (two of which are referred to in the Gibbons Affidavit) are included on the CD-ROM which is attached, together with an Index of its contents, as Exhibit "A" to this Affidavit.

DSM Plan Approval Hearings Since This Application was Commenced

6. Since the issuance by the Board of its "Demand Side Management Guidelines for Natural Gas Utilities" dated June 30, 2011 (the "DSM Guidelines") that are challenged by the Applicant in this proceeding for judicial review, both Union Gas Ltd. ("Union") and Enbridge Gas Distribution Inc. ("Enbridge") have filed rate applications with the Board, in which each of them sought approval for their respective DSM plans. The Board has now received all relevant filings and interventions, conducted hearings, and issued decisions and orders for both of these applications as follows.

The Union Application

7. Under Board file number EB-2011-0327, Union filed its application for approval of a 3 year DSM plan on September 23, 2011. A notice of hearing was issued at the Board's direction on October 13, 2011. A variety of interested parties, including the Applicant herein, intervened in the proceeding.
8. Through various procedural orders, the Board established a process for setting a final issues list, the filing of written interrogatories to test Union's evidence, and for holding a settlement conference. There were 26 issues and sub-issues on the final issues list. Thirteen intervenors (including the Applicant herein) participated with Union in the settlement conference.
9. The settlement conference resulted in no agreement on 2 of the 26 issues; a complete agreement amongst all parties, including the Applicant herein on 21 of the remaining 24 issues; and a "partial settlement" on three issues, involving complete agreement amongst all parties with the exception of the Applicant herein, which was opposed to the settlement reached by the other parties on those three issues. With the exception of the Applicant, all parties agreed that the 24 partially settled issues were "non-severable".
10. The Applicant herein objected to the non-severability clause, and asked the Board to not accept that portion of the settlement agreement. The "non-severable" clause

provided that if the Board rejected any element of the settlement agreement the entire settlement agreement would collapse and there would be no agreement on any issues. After hearing argument from parties on the matter, the Board rejected the Applicant's position in a decision dated February 8, 2012. That decision also included the Board's decision on the two unsettled issues, for which it had previously heard argument.

11. The Board subsequently held an oral hearing to hear the Applicant's objections to the three "partially settled" issues. Union called a witness to address the matters, who was cross examined by the Applicant. The Board then heard argument from the parties on the three partially settled issues. In a decision dated February 21, 2012, the Board accepted the entire settlement agreement, including the three partially settled issues that had been objected to by the Applicant herein.
12. Relevant documents from the EB-2011-0327 proceeding are included in a CD-ROM attached as Exhibit "A" to this Affidavit.

The Enbridge Application

13. Enbridge filed its rate application, including a request for approval of a DSM plan on November 4, 2011. The Board assigned the application file number EB-2011-0295. A notice was issued at the Board's direction on November 16, 2011. A variety of interested parties, including the Applicant, intervened.
14. Prior to filing its application, Enbridge had entered into negotiations with many of the parties who intervened in the case. As a result, Enbridge was able to file a settlement agreement with its application. The settlement agreement encompassed all DSM issues relevant to the 2012 rate year, except for two issues for which there was no agreement. Twelve intervenors (including the Applicant) were parties to the settlement agreement with Enbridge. Unlike in the Union proceeding, there were no "partially settled" issues. There was a complete settlement on all but two issues, for which two issues there was no agreement at all. Five intervenors had not participated in the settlement agreement.

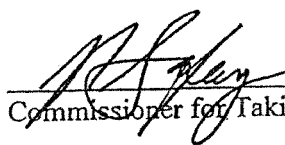
15. On February 2, 2012, the Board held an oral hearing to hear both the settlement agreement and the unsettled issues. No party objected to the settlement agreement (including the five intervenors that had not been signatories to the agreement), and the Board approved the settlement agreement. The Board also heard submissions on the two unsettled issues, and issued a decision on these issues on February 9, 2012.
16. Relevant documents from the EB-2011-0295 proceeding is included in a CD-ROM attached as Exhibit "A" to this affidavit.

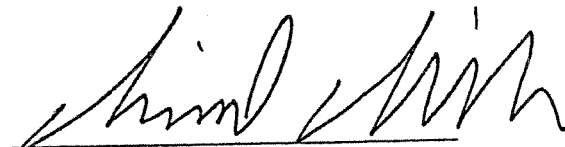
The Board's use of Guidelines

17. The use of non-binding guidelines to inform and structure proceedings before the Board is not uncommon. Non-binding guidelines assist both parties and the Board in navigating a busy and complex regulatory calendar, and have been adopted by the Board to serve a variety of functions. In some cases they are used to assist applicants in understanding what they should file to support their applications: for example the *Environmental Guidelines for Hydrocarbon Pipelines and Facilities in Ontario*.
18. Other such guidelines can have a more direct impact on the rates that are set by the Board through a subsequent hearing process. For example, the *Report of the Board on the Cost of Capital for Ontario's Regulated Utilities* establishes a methodology for establishing a utility's allowed cost of capital, which is a significant component of the revenue requirement that is recovered through rates. Similarly, the Board's Guidelines and Reports on 3rd Generation Incentive Regulation Mechanism establish the methodology by which many electricity utility's rates are adjusted annually.
19. However, the Board acknowledges that because these guidelines are not orders of the Board, they are not binding on any party. In order to actually issue an order with respect to the matters covered by these guidelines, the Board must still conduct a hearing. Generally speaking, these guidelines will be considered by the Board panel assigned to any hearing to which they are relevant, but the panel is not bound to follow them.

20. The process the Board adopts in considering and adopting guidelines varies depending on the nature of the guideline. In most cases, at a minimum, the Board will takes steps to give notice to potentially affected parties, and provide an opportunity to comment. In some cases, for example the *Report of the Board on the Cost of Capital for Ontario's Regulated Utilities*, the Board invited the parties to file their own independent expert reports relevant to the subject matter for the Board's consideration, and held a technical conference, in which interested parties, and their legal counsel and experts, were involved in discussing the issues under consideration.
21. The process followed by the Board to develop the DSM Guidelines that are challenged by the Applicant in this judicial review lies somewhere between these examples, in terms of formality and the involvement of interested parties.
22. However, the Board acknowledges that the process used to develop the DSM Guidelines at issue in this judicial review was not a "hearing" for the purposes of ss. 21(2) of the *Ontario Energy Board Act*, and that the DSM Guidelines are not an order of the Board.

AFFIRMED BEFORE ME at the city of
Toronto on March 15, 2012.


Commissioner for Taking Affidavits


MICHAEL MILLAR