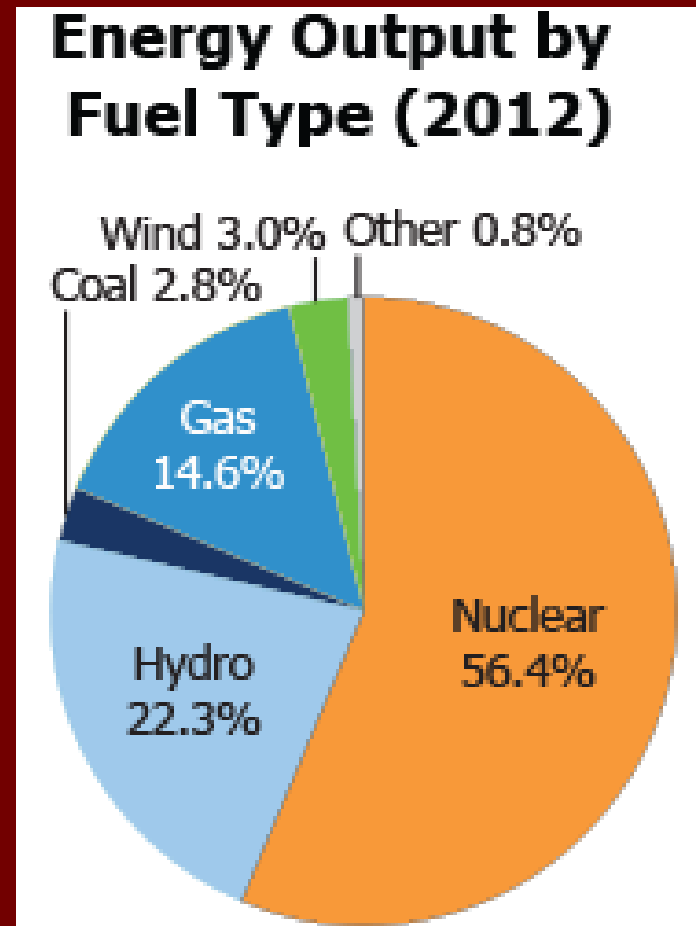


Energy, Politics and Sustainability: Electricity Policy in Ontario

Mark Winfield
York University

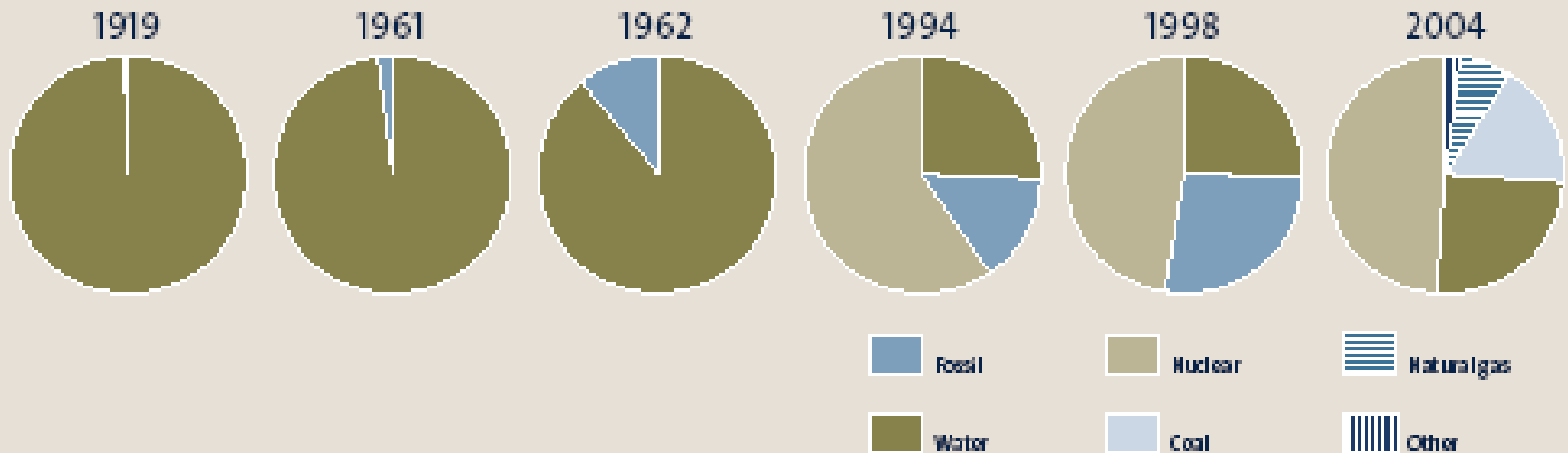
Ontario Electricity

- 'Hard' vs. 'soft' paths
- Markets vs. planning
- Transitions and Future roles of nuclear, coal, natural gas, renewables, conservation, smart grids and storage
- Relationships between energy, economy and environment



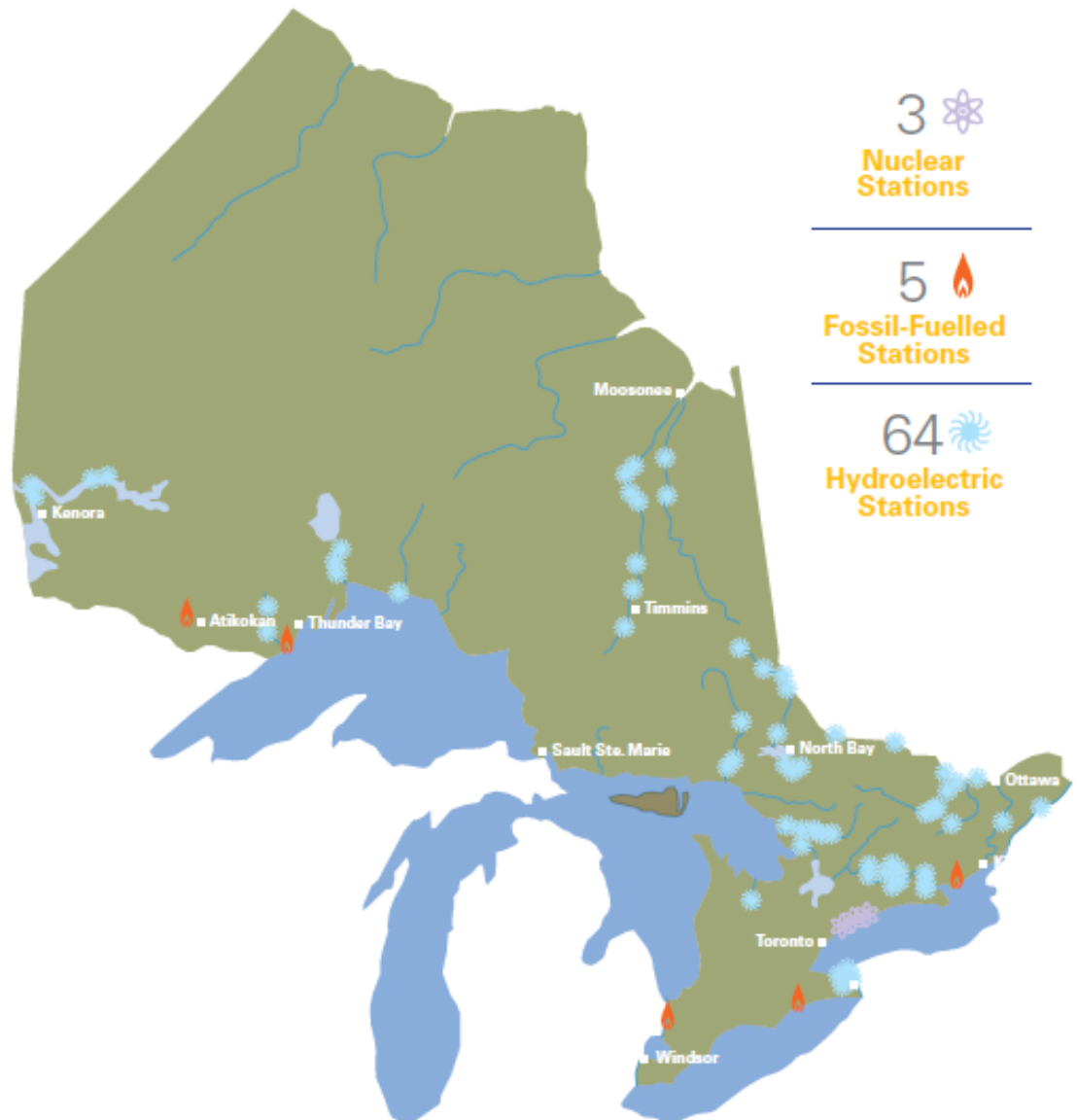
Ontario Electricity Supply Over 100 Years

Figure 2: Ontario's Electricity Supply Mix



2007 ONTARIO ELECTRICITY GENERATION MIX¹

Most of Ontario's electricity generating stations are located in the southern half of the province close to where the demand for power is greatest. The majority of these power stations are owned and operated by Ontario Power Generation (OPG), a government owned company that generates 70% of Ontario's electricity. To the right is a map of the 72 generating stations operated by OPG across Ontario.



¹Source: Independent Electricity System Operator – www.ieso.ca

Upheaval and Instability in Ontario's Electricity Sector

Vertically Integrated Monopoly



The Market Experiment

A 'Hybrid' System



In the meantime....

Sarah's fair Lilith
Fair? Great! Page 42

U.S. invades SkyDome
American Bowl today

Semis set at York

THE SATURDAY **SUN**

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VOL. 11 NO. 45 TORONTO, AUGUST 16, 1997 88 PAGES 60 CENTS PLUS GST HIGHER OUTSIDE METRO

MORE BAD SNOOZE FROM PICKERING

ONTARIO HYDRO NUCLEAR STATION



Real-life Homers asleep at the switch as watchdog finds safety lapses common at nuke station: Page 4

DEWAR '97
OTTAWA
SUN

WITH APOLOGIES
TO MATT GROENING

NAOP Impacts

Appendix C

Ontario Power Generation's Coal Plants: Electricity Generation and Emissions, 1995 to 2001

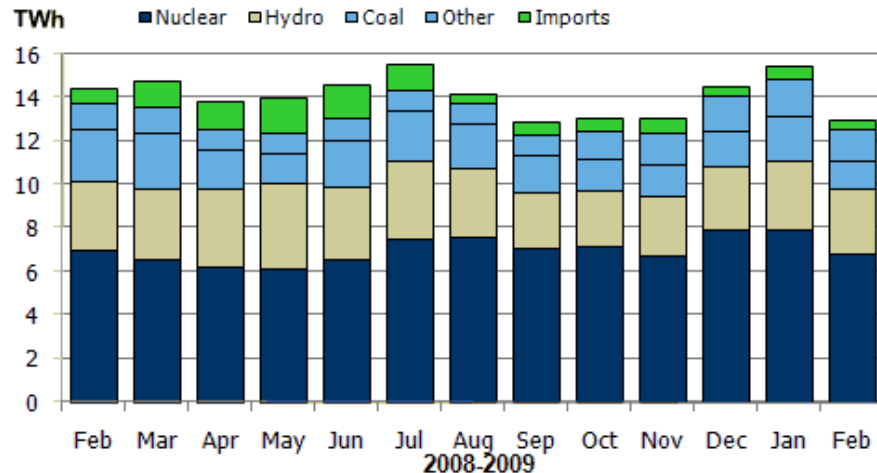
	1995	1996	1997	1998	1999	2000	2001
Electricity Generation (Gwh)	16,699	18,915	24,523	33,275	34,068	41,446	37,185
Greenhouse Gases (tonnes)	15,400,000	17,900,000	22,430,000	29,800,000	30,530,000	37,640,000	35,090,000
Sulphur Dioxide (tonnes)	74,100	84,500	123,150	140,810	140,580	163,510	147,090
Nitrogen Oxides (NO) (tonnes)	28,200	35,100	42,770	54,320	49,240	49,450	42,170

1 Gwh = 1,000,000 kilowatt-hours

Sources: Ontario Power Generation, *Towards Sustainable Development: 2001 Progress Report*, Appendix A; *Towards Sustainable Development: 1999 Progress Report*, Appendix A; Email from Bob Kozopas, Ontario Power Generation, August 22, 2000.

More Challenges...

- August 2003 Blackout and Reliability/Security of Supply Concerns



- Difficulties in meeting summer peaks

Ontario's Electricity Sector and Climate Change

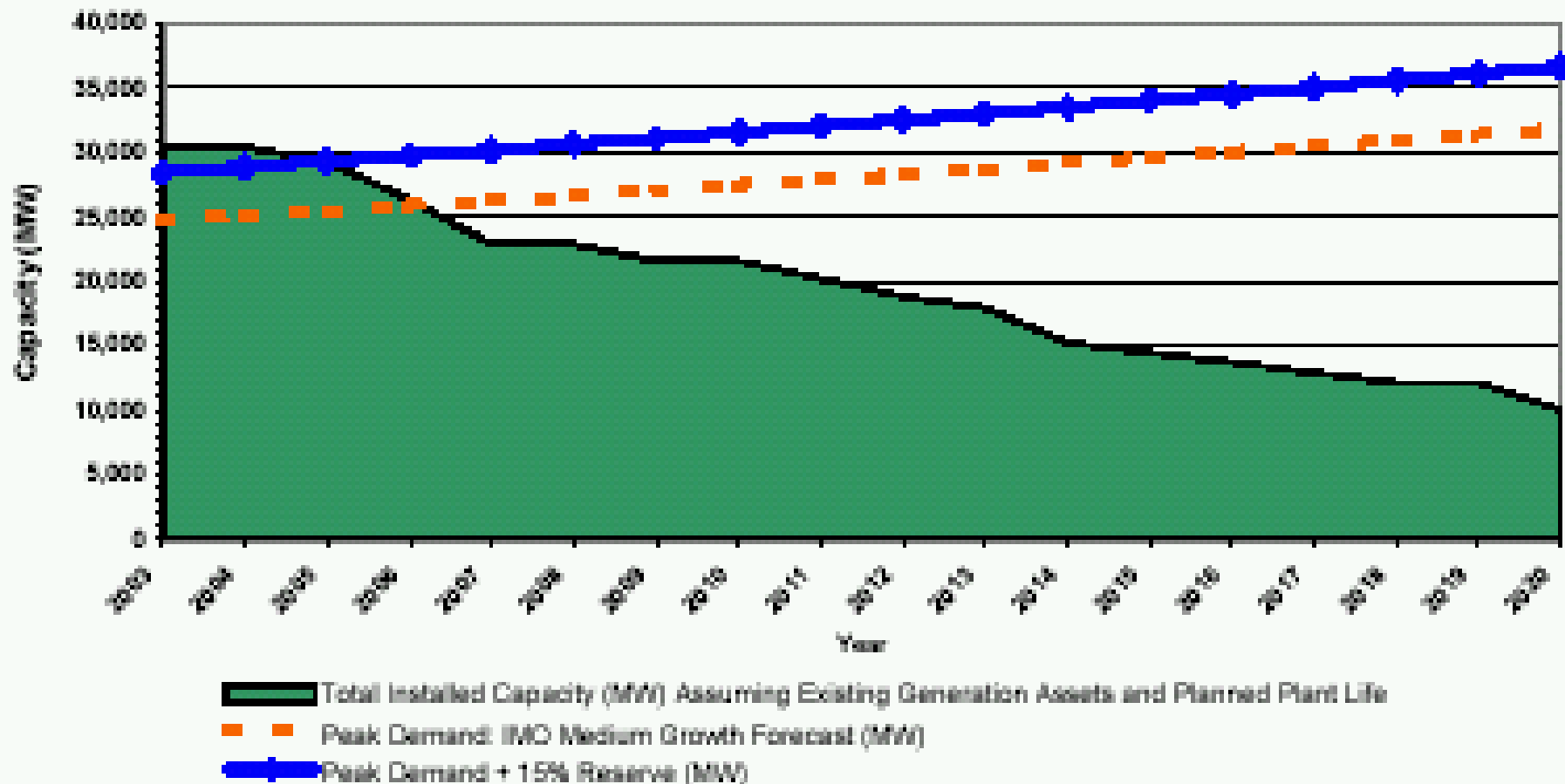


- Electricity generation was responsible for 17% of Ontario's greenhouse gas emissions
 - Second only to transportation
- There is no viable means of reducing greenhouse gases emissions from Ontario's existing coal plants

Anticipated retirement of 80% of existing generating assets over next 20-25 years

FIGURE 2.C

Existing Generation vs. Peak Demand



Electricity Restructuring Act 2004

- Creates Ontario Power Authority, including Conservation Bureau
- Mandates OPA to develop an 20-year Integrated Power System Plan (IPSP)



Supply Mix Directive I

June 2006

- 14,000MW nuclear for baseload
- Reduce peak demand by 6300MW
- 7500MW new renewables
- High-value, high-efficiency uses of natural gas
- Coal Phase-out deferred



IPSP

- Review of IPSP required by Minister of Energy September 2008
 - Results postponed to March 2009
- ...OEB Hearing Suspended September 2008



In the meantime....

- *The Green Energy and Green Economy Act, 2009*



Green Energy and Green Economy Act, 2009

- Feed-in Tariffs and Grid Integration for Renewables
- One-Window approvals system for renewables (REA)
- Restructures approach to conservation

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Ontario Suspends Nuclear Procurement

June 29, 2009 11:20 AM

Queen's Park — The Government of Ontario today announced that it has suspended the competitive RFP to procure two replacement nuclear reactors planned for the Darlington site. Deputy Premier and Minister of Energy and Infrastructure George Smitherman indicated that the government remains committed to the modernization of Ontario's nuclear fleet.

"Emission-free nuclear power remains a crucial aspect of Ontario's supply mix," Smitherman said. "Unfortunately, the competitive bidding process has not provided Ontario with a suitable option at this time," he added.

Proposal submissions were received from AREVA NP, Atomic Energy of Canada Limited and Westinghouse Electric Company on February 27, 2009 and carefully evaluated. Only the submission from AECL was compliant with the terms of the RFP and the objectives of the Government. However, concern about pricing and uncertainty regarding the company's future prevented Ontario from continuing with the procurement at this time.

In March 2008, Ontario undertook a two phase competitive procurement process to select a nuclear vendor to build a two unit nuclear power plant at Darlington. The units are to replace older units as part of a strategy to renew Ontario's nuclear fleet. Nuclear power accounts for about 50 percent of Ontario's electricity needs and provides a reliable, stable and clean supply of base load electricity.

Ontario's Long-Term Energy Plan



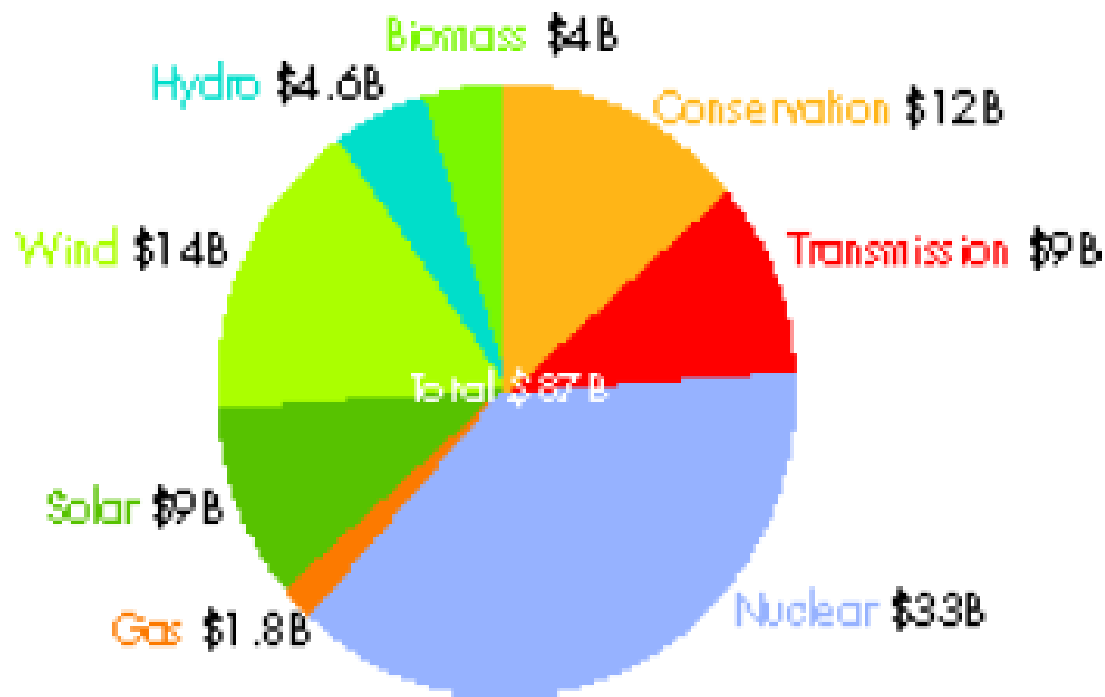
Building Our Clean Energy Future



Long-Term Energy Plan and 2011 Supply Mix Directive

Installed Capacity	2003	2010 (Projected)	2030 (Projected)
Nuclear	10,061	11,446	12,000
Renewables – Hydroelectric	7,880	8,127	9,000
Renewables – Wind, Solar, Bioenergy	155	1,657	10,700
Gas	4,364	9,424	9,200
Coal	7,546	4,484	0
Conservation	0	1,837	7,100
Total	30,006	36,975	48,000

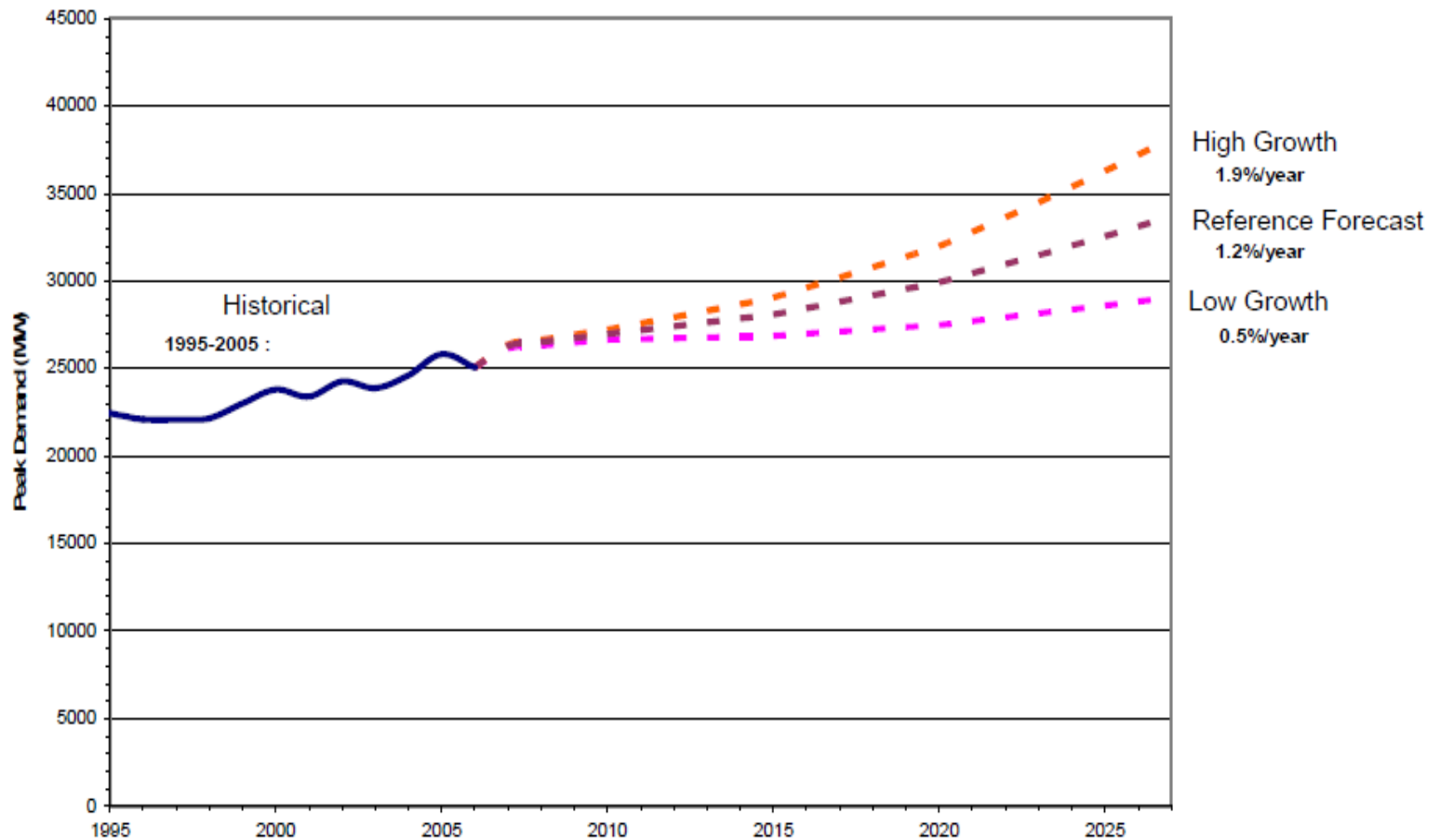
FIGURE 13: ESTIMATED CAPITAL COST OF LONG-TERM ENERGY PLAN:
2010 TO 2030 (\$ BILLIONS)



Complications....

03/29 09:54 HIES284 marksw ScreenHunter

1 **Figure 18: Reference Forecast Growth Scenarios – Peak Demand**

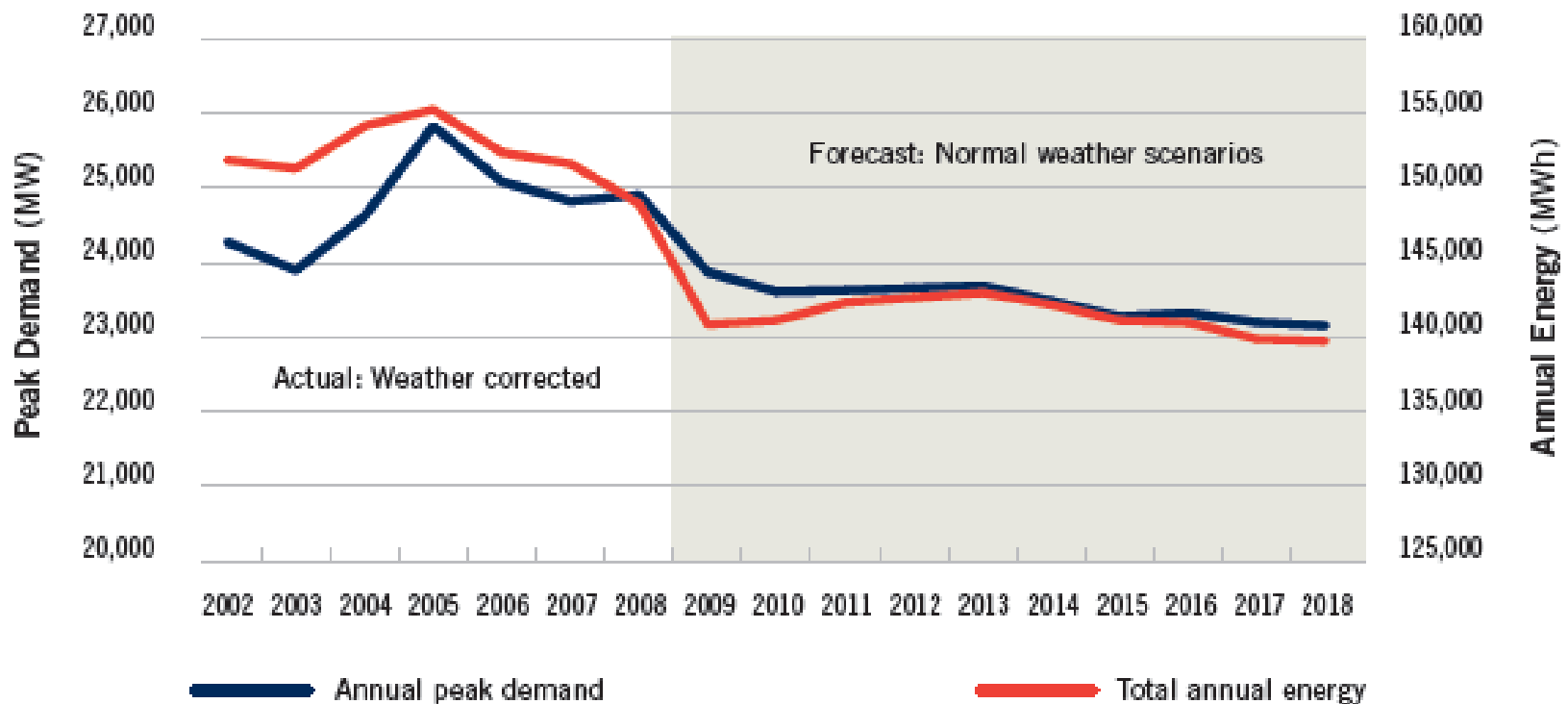


Source: IESO/OPA

Economic Downturn and Declining Demand (IESO December 2009)

PEAK AND ENERGY DEMANDS – HISTORIC AND FORECAST

Source: Independent Electricity System Operator, Ontario Power Authority



Fukushima



Green Energy Challenges

- Local Opposition to wind energy and impact on 2011 Election

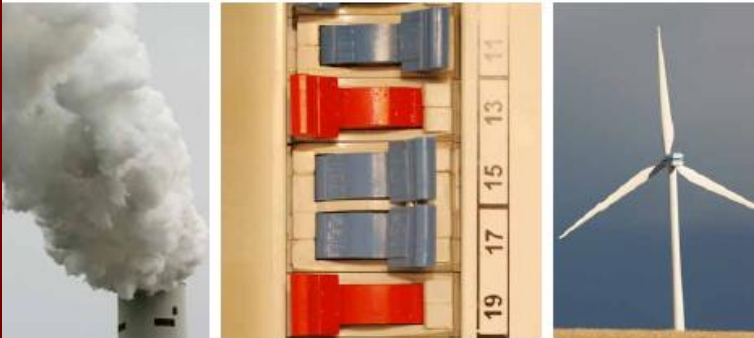


Lynne DiCocco (holding GEA Green Fascism sign), is surrounded by neighbours protesting the Armow Wind Farm

The Cost Debate

Behind the Switch

PRICING ONTARIO ELECTRICITY OPTIONS



PEMBINA
Institute
Sustainable Energy Solutions

Tim Weis • P.J. Partington
July 2011

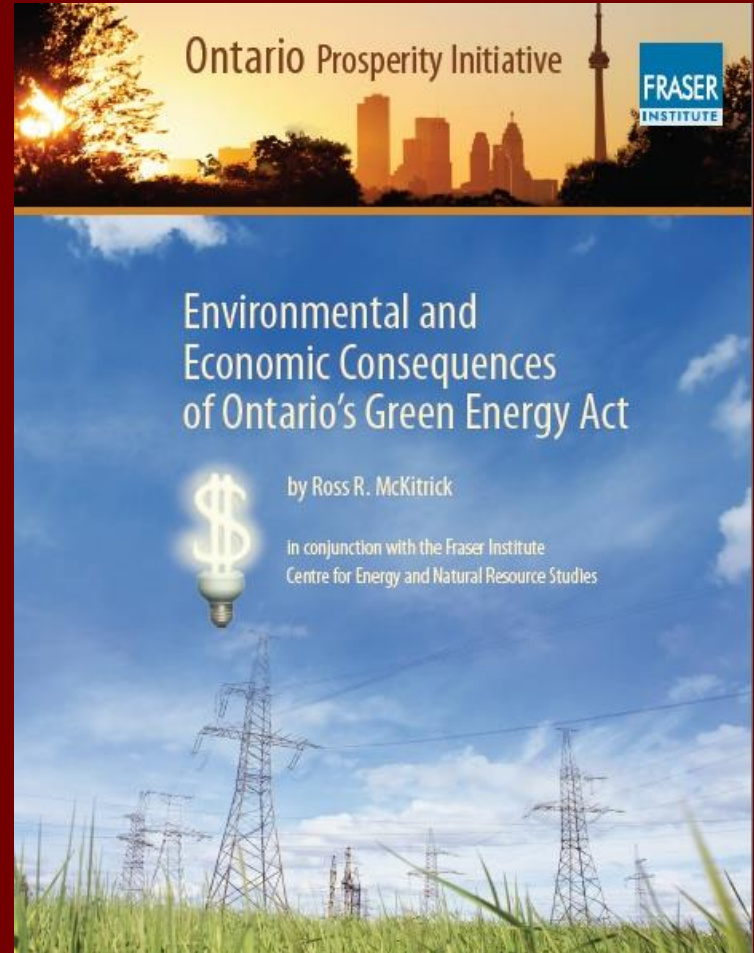
Ontario Prosperity Initiative

FRASER
INSTITUTE

Environmental and Economic Consequences of Ontario's Green Energy Act

by Ross R. McKittrick

In conjunction with the Fraser Institute
Centre for Energy and Natural Resource Studies



Green Energy as Industrial Strategy

FP COMMENT

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Ontario's Power Trip: Discounts and windmills

FP TOM ADAMS, SPECIAL TO FINANCIAL POST | 12/06/27 | Last Updated: 12/06/27 8:55 PM ET
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Ontario Premier Dalton McGuinty works a solar panel assembly line during last year's election campaign. National Post

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Granting discounts to industry while spending on wind means chaos

Studies in Ontario Electricity Policy Series | Paper No. 5

Understanding the Economic Impact of Renewable Energy Initiatives:



Assessing Ontario's Experience in a Comparative Context



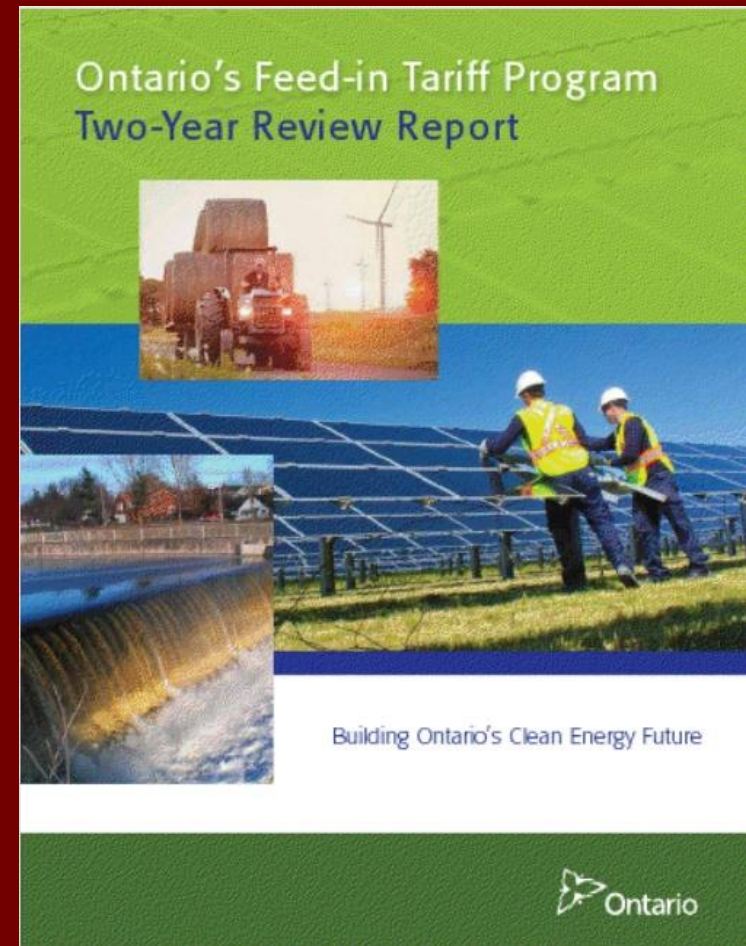
Mark Winfield, PhD.
Associate Professor, Faculty of Environmental Studies
Co-Chair, Sustainable Energy Initiative
York University

with contributions from
Nageen Rehman, Mariana Eret, Dawn Stifler and Paul Cockburn

YORK UNIVERSITY
redefine THE POSSIBLE.

Green Energy Withdrawal

- Off-shore wind moratorium February 2011
- Fit Review and moratorium October 2011
- FIT rates reduced April 2012



Green Energy Withdrawal

- May/June 2013
 - FIT Program terminated for projects >500kw
 - Samsung agreement targets reduced by 45%
 - Domestic content requirements reduced in face of WTO decision
 - No commitment on renewables beyond 2018



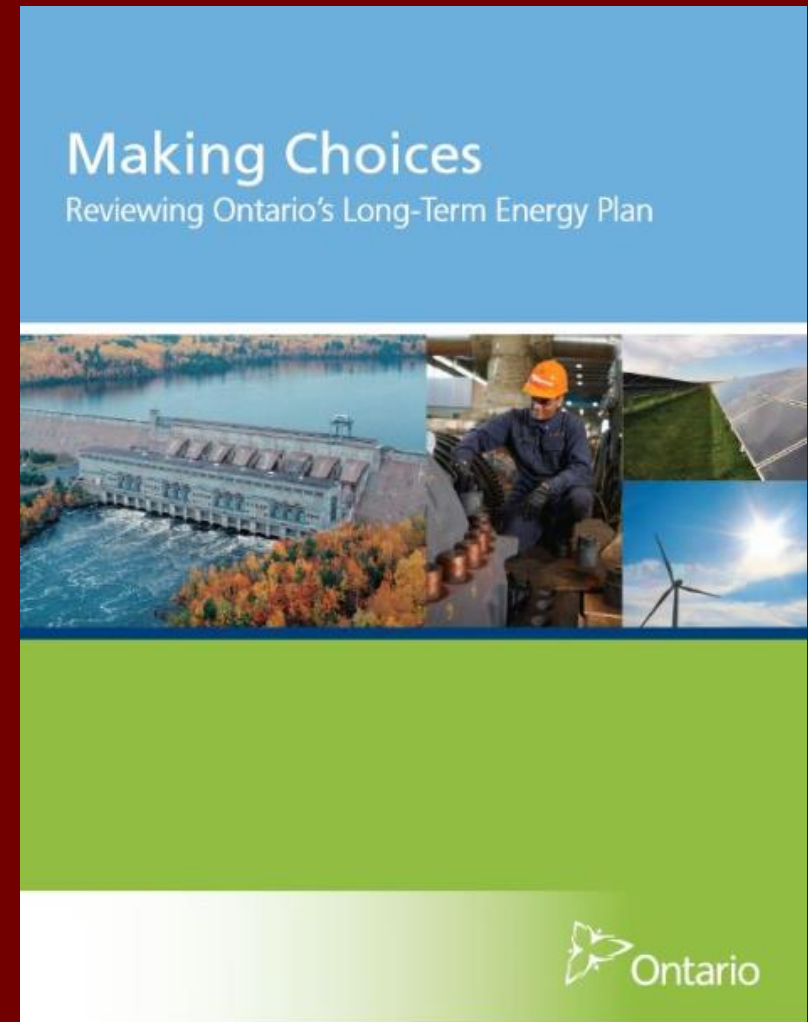
No Nuclear New Build – October 2013



AECON

Where Now?

- Gas plant cancellation saga continues
- Declining Demand
- Conservation
- Nuclear Refurbishments?
- Renewables Future?
- Smart Grids and Storage?
- Quebec relationship
- Bill 75 and Abandonment of Planning concept



Planning Implications

- Need for more flexible and adaptive approach to planning
- Incorporate insights from complex systems, socio-ecological resilience and socio-technological transitions perspectives
- Comparative policy analysis
 - Germany, California, BC, UK.