

Ontario's Green Energy Experience

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February 2014

Understanding the Economic Impact of Renewable Energy Initiatives:



**Assessing Ontario's
Experience
in a Comparative
Context**



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with contributions from
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MES Masters Papers

Small Scale, Big Impact: A Comprehensive Evaluation of Ontario's microFIT Program

By Dawn Strifler, MES 2012



This paper presents a comprehensive evaluation of the energy production, economic, social, and political impacts of Ontario's microFIT Program - a feed-in tariff for micro-scale renewable energy projects. In an effort to determine whether the program can be justified from political and sustainability perspectives, the paper examines the government's goals for the program and determines whether they have been met; investigates the full range of program benefits and detriments, and utilizes sustainability assessment criteria to evaluate whether the program can be considered sustainable; and assesses whether policy acceptance has been achieved among various stakeholder groups.

The Sustainability Case for Community Power: Empowering Communities Through Renewable Energy

By Sarah Martin, MES 2011



Sarah's master's research paper, *The Sustainability Case for Community Power: Empowering Communities through Renewable Energy*, evaluates community models that support renewable energy projects, using a sustainability metric that was developed through her program.

Upheaval and Instability in Ontario's Electricity Sector

Vertically Integrated Monopoly



The Market Experiment

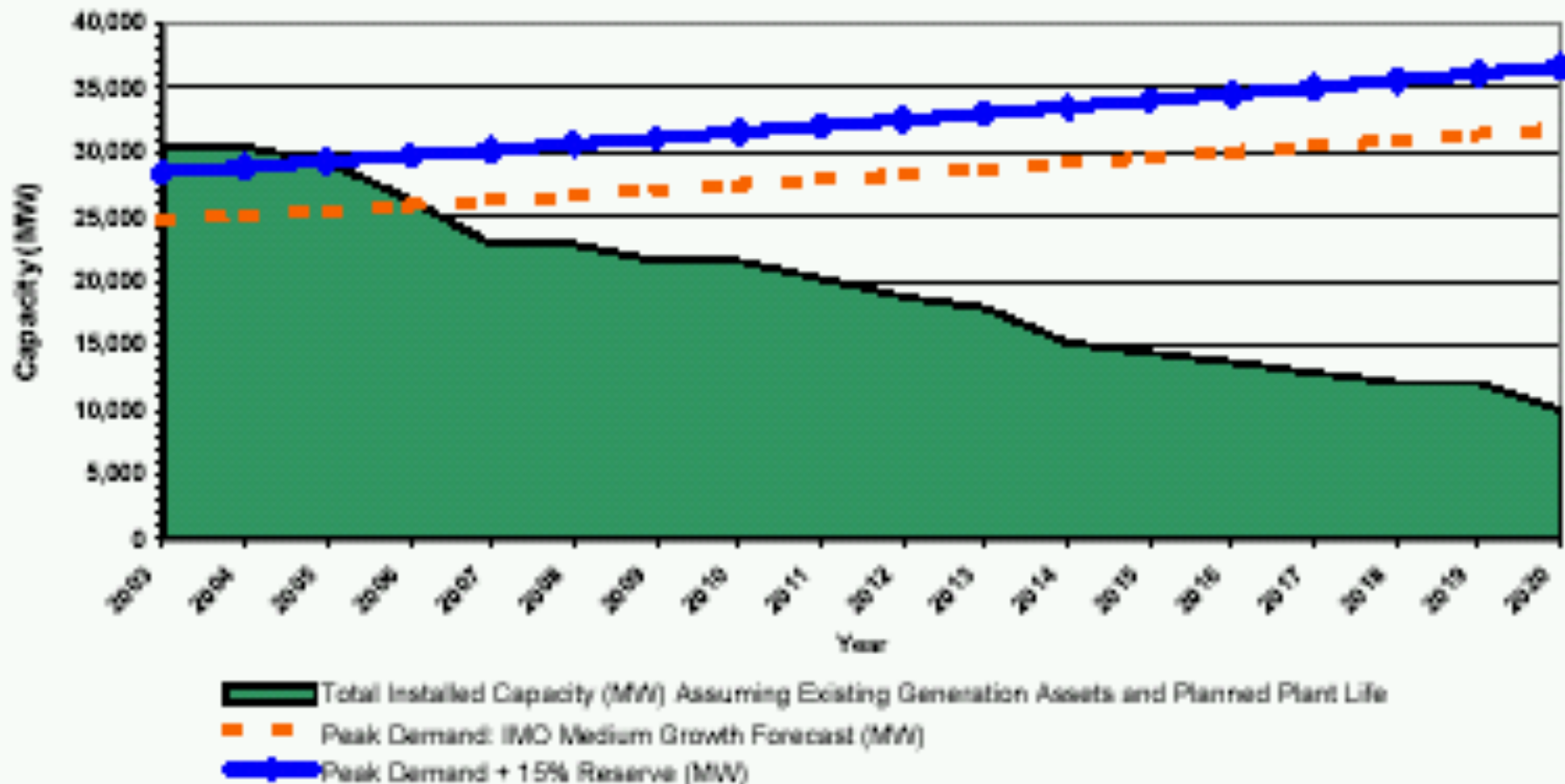
A 'Hybrid' System



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

GEGEA Goals

- Rapid deployment of renewable energy sources (wind, solar PV, Biogas, biomass, small hydro) in context of coal phase-out and growing demand
- Development of renewable energy manufacturing and services industry
 - 50,000 jobs by 2013



GEGEA Goals

- Rural economic development
 - Farm and aboriginal-based projects
- Community power development
- Public engagement/education on renewable energy
 - Microfit program (<10kW)



Ontario's Long-Term Energy Plan



Building Our Clean Energy Future

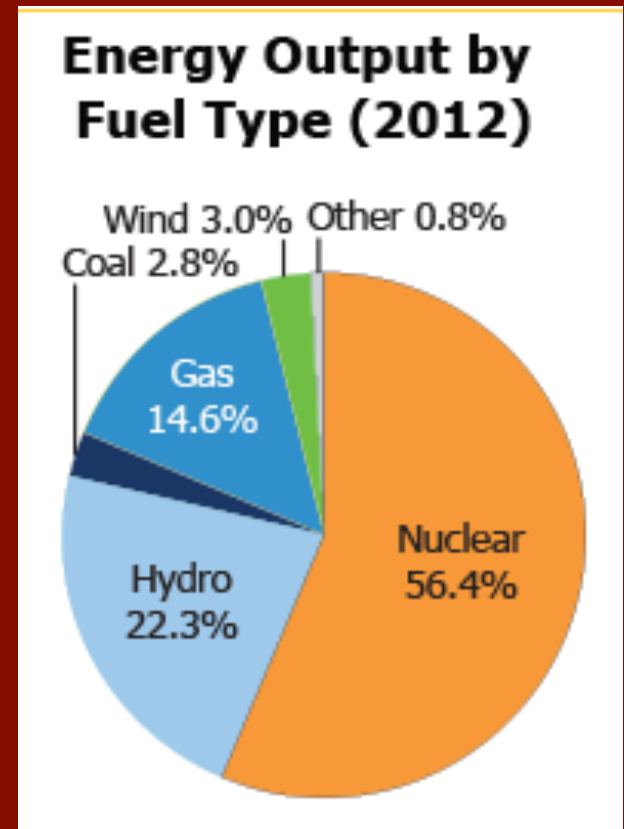


Long-Term Energy Plan and 2011 Supply Mix Directive

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

GEGEA Outcomes

- 1,725MW Wind Installed (October 2013)
 - 124 other non-hydro renewables
- 4,600 MW contracted through FIT program
- 16,000 renewable energy supply contracts



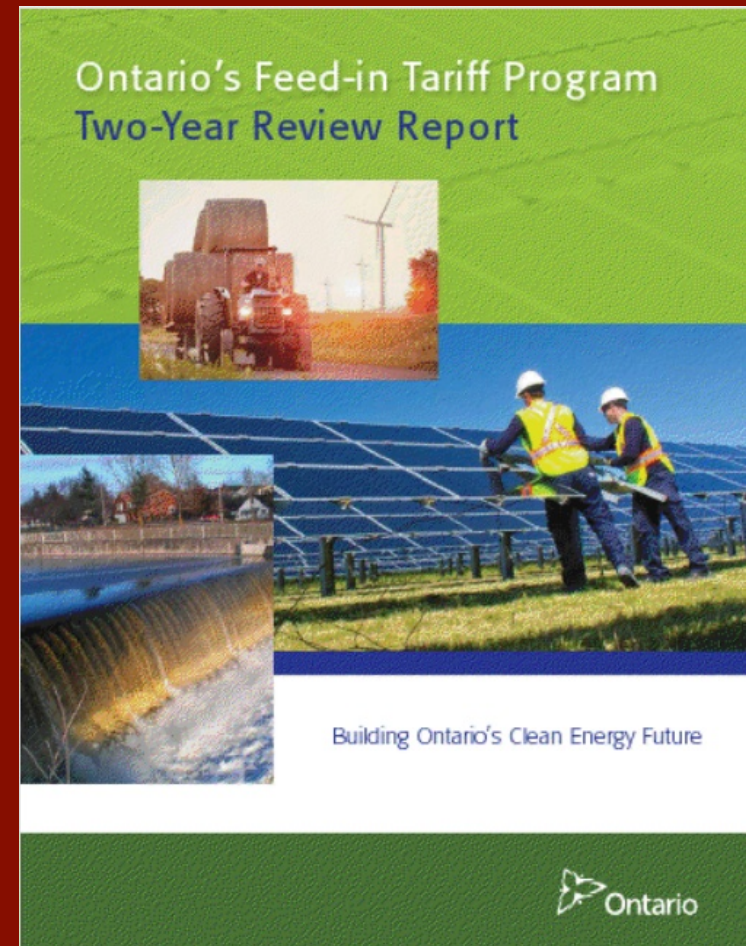
GEGEA Outcomes

- Individual, cooperative and community based proponents constitute 4% of total FIT contracts and 9% of contracted power



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%
 - 2500MW to 1125MW
 - Domestic content requirements reduced in face of WTO decision



Green Energy Withdrawal

- Termination of Domestic Content Requirements (December 2013)
- LTEP 2013 Extension of 2010 LTEP 2018 Renewables Targets to 2021



Germany's energy transition

Sunny, windy, costly and dirty

Germany's new "super minister" for energy and the economy has his work cut out

Jan 18th 2014 | BERLIN | From the print edition

SIGMAR GABRIEL has been on a roll. The boss of Germany's centre-left Social Democrats (SPD) has herded his party into a coalition with Chancellor Angela Merkel and become vice-chancellor. He is jovial, convivial and aligned with the *Zeitgeist*. Demonstrating the SPD's vision of work-life balance, he plans to take Wednesday afternoons off to pick up his two-year-old daughter from her crèche.

But Mr Gabriel, who is mulling a run for chancellor in 2017, will by then be judged on a more daring project. As part of his coalition deal with Mrs Merkel, he is now a "super minister" combining two portfolios, energy and the economy. He is thus in charge of rescuing Germany's most ambitious and risky domestic reform: the simultaneous exits from nuclear and fossil-fuel energy, collectively known as the *Energiewende*, a term that means energy "turn" or "revolution".

More a marketing slogan than a coherent policy, the *Energiewende* is mainly a set of timetables for different goals. Germany's last nuclear plant is to be switched off in 2022. The share of renewable energy from sun, wind and biomass is meant to rise to 80% of electricity production, and 60% of overall energy use, by 2050. And emissions of greenhouse gases are supposed to fall, relative to those in 1990, by 70% in 2040 and 80-95% by 2050.

<http://www.economist.com/>

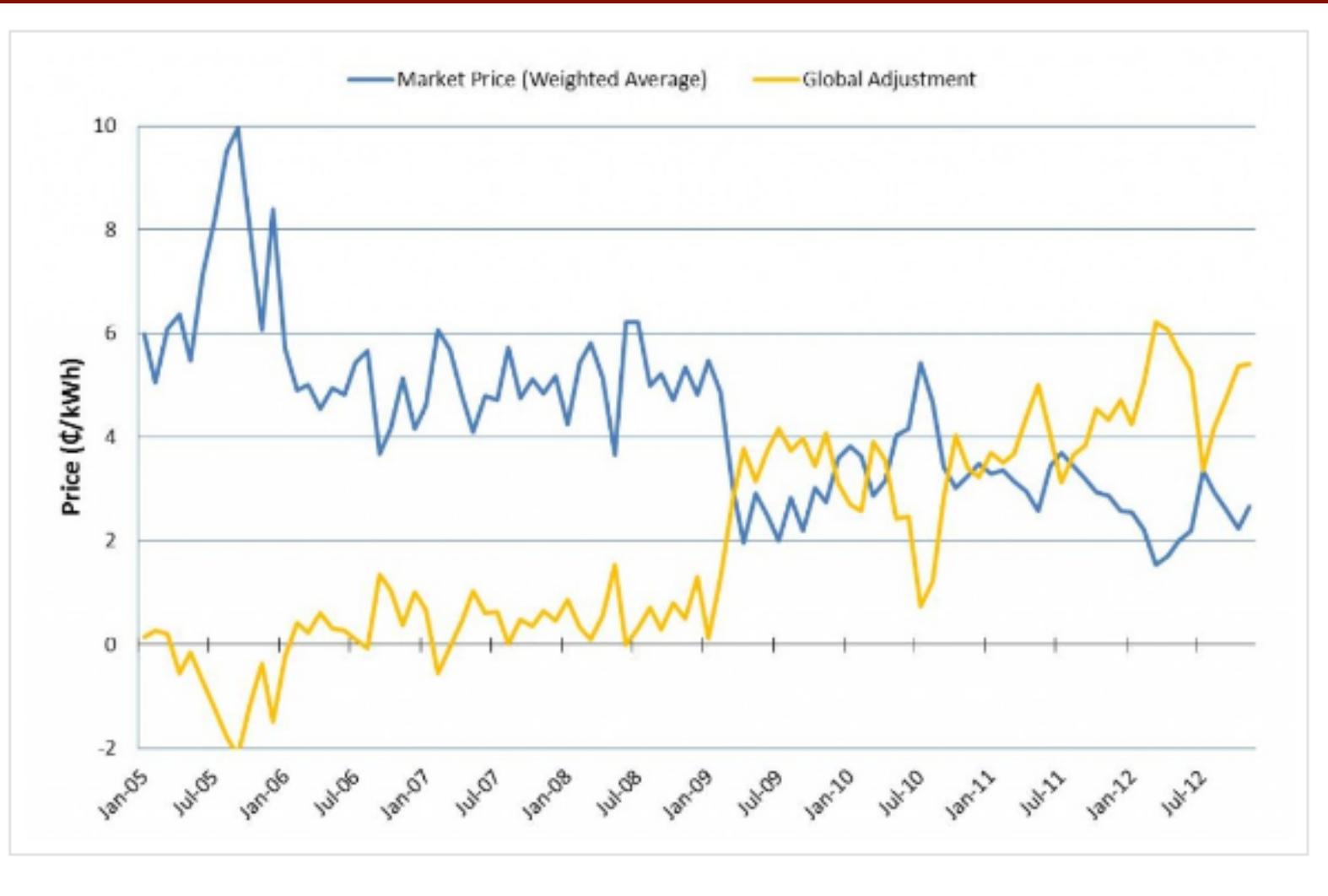


Getty Images

The GEGEA: What Went Wrong?

- Program Rate Structure and the Cost Debate
- Local opposition to renewable energy projects
- Impact of declining demand
- Institutional resistance to renewables development
- Failure to develop strategy for development of renewable energy sector
- Failure to develop strategies for grid scale storage and role of smart grids in renewables integration

'Market' Price



FIT Rates

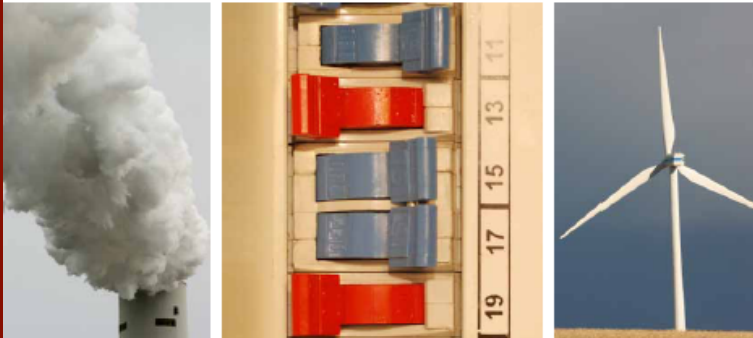
FIT rates: The original FIT rates and the rates as updated April 5, 2012 and August 26, 2013 are as follows:¹⁸

Renewable Fuel	Project Size Tranche	Original FIT Price (¢/kWh)	FIT Price (¢/kWh) April 5, 2012	FIT Price (¢/kWh) August 26, 2013
Solar (PV) Rooftop	≤ 10 kW	80.2	54.9	39.6
	> 10 ≤ 100 kW	71.3	54.8	34.5
	> 100 ≤ 500 kW	63.5	53.9	32.9
	> 500 kW	53.9	48.7	N/A
Solar (PV) Non-Rooftop	≤ 10 kW	64.2	44.5	29.1
	> 10 ≤ 500 kW	44.3	38.8	28.8
	> 500 kW ≤ 5MW	44.3	35.0	N/A
	> 5 MW	44.3	34.7	N/A
On-Shore Wind	All Sizes	13.5	11.5	11.5
Waterpower	≤ 10 MW	13.1	13.1	14.8
	> 10MW ≤ 50MW	12.2	12.2	14.8
Renewable Biomass	≤ 10 MW	13.8	13.8	15.6
	> 10 MW	13	13	15.6

The Cost Debate

Behind the Switch

PRICING ONTARIO ELECTRICITY OPTIONS



PEMBINA
Institute
Sustainable Energy Solutions

Tim Weis • P.J. Partington
July 2011

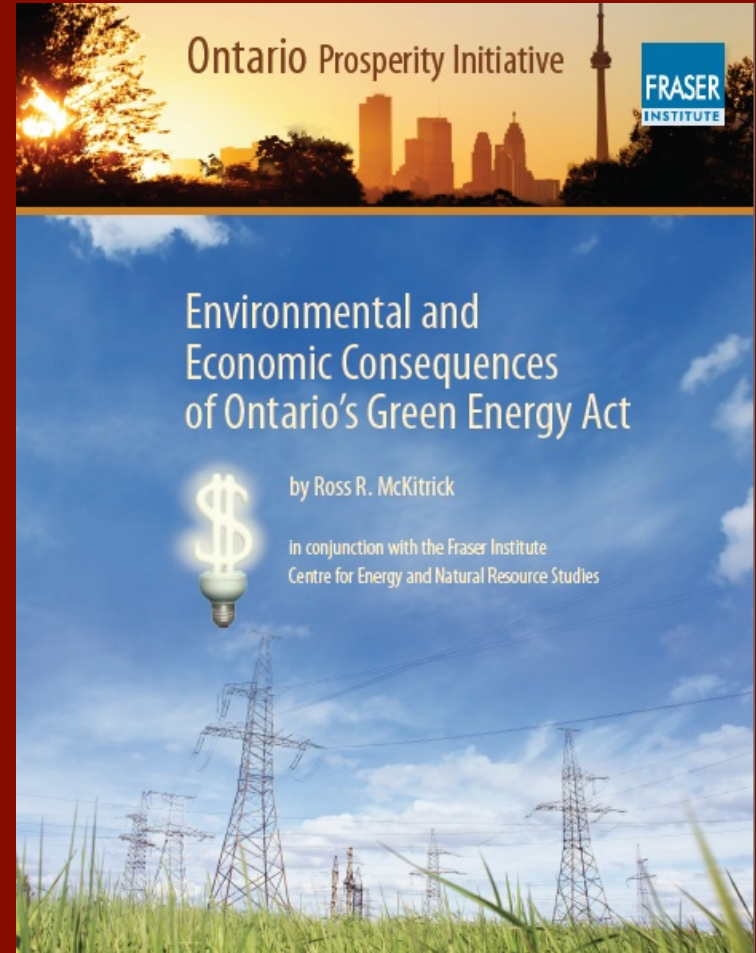
Ontario Prosperity Initiative

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



The Cost Debate

- Rate structure oriented to needs of community developers, but program dominated by commercial developers
 - Limited capacity among community power developers relative to Germany and Denmark
- Failure to incorporate Degression rates, link rates to pace of development, market prices, avoided externalities

Green Energy Challenges

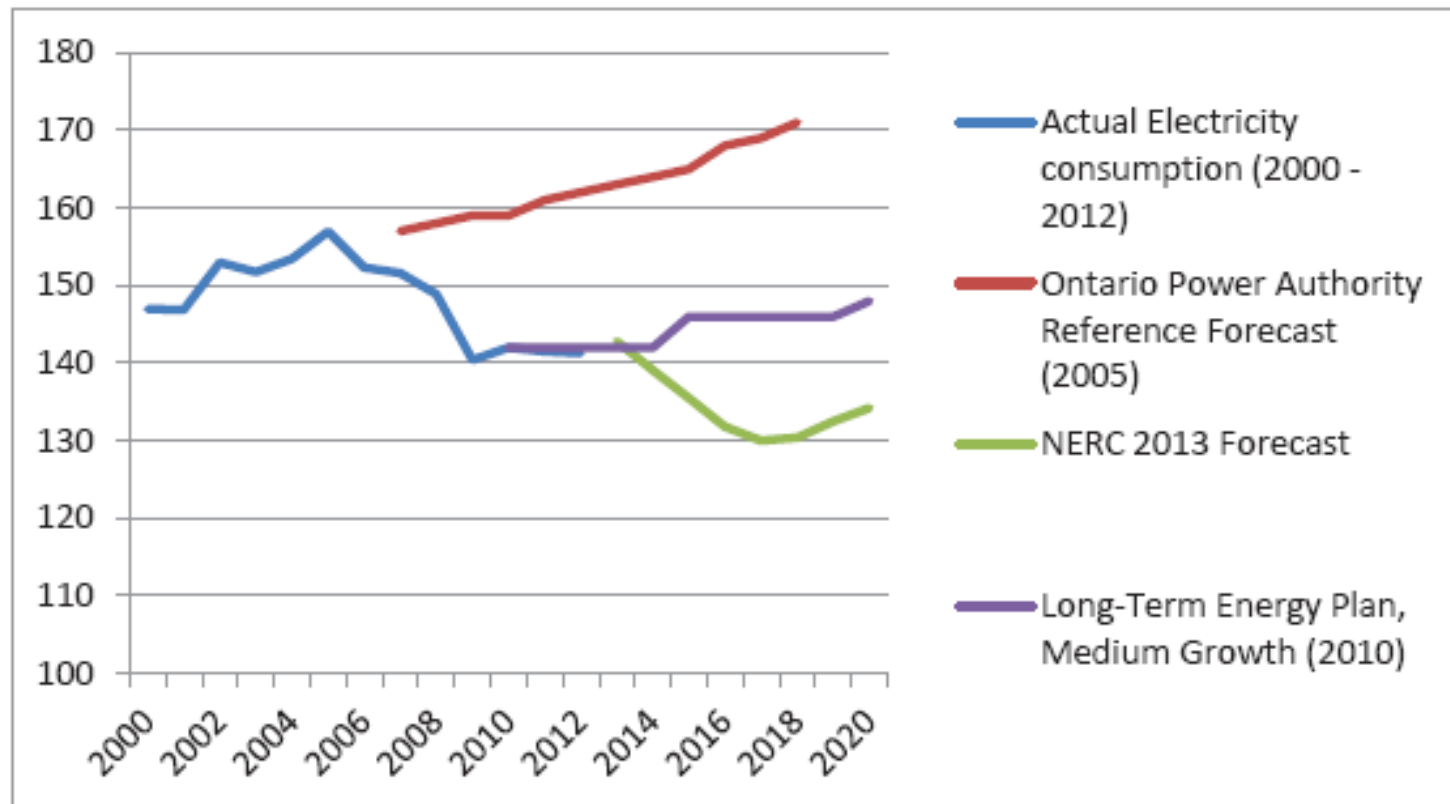
- Local Opposition to wind energy and impact on 2011 Election



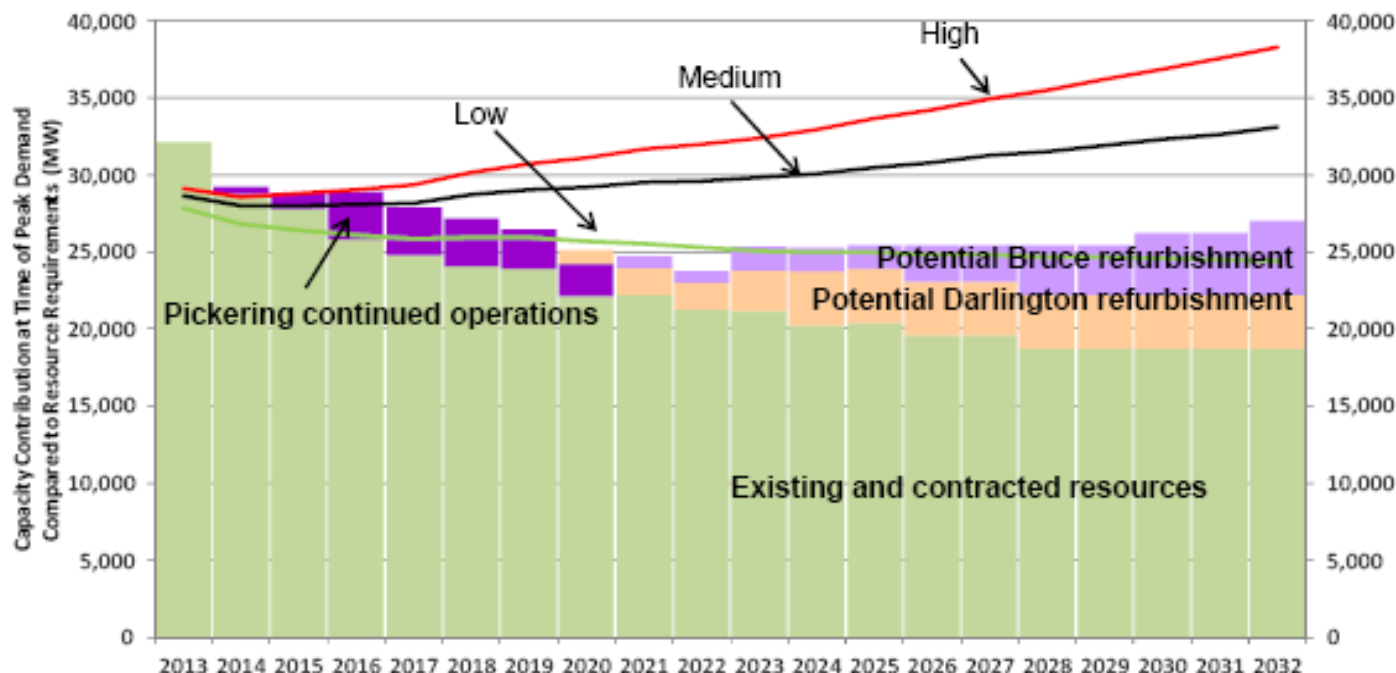
Lynne DiCocco (holding GEA Green Fascism sign), is surrounded by neighbours protesting the Armow Wind Farm

Impact of Declining Demand

Figure 6: Ontario Electricity Consumption 1975-2013 (Forecast 2013-2018) tWh/yr¹⁰³



Different scenarios may unfold that result in different electricity demands and consequent infrastructure needs



Notes:

Resource requirements under low, medium and high scenarios are comprised of demand plus planning reserve as required by reliability standards.

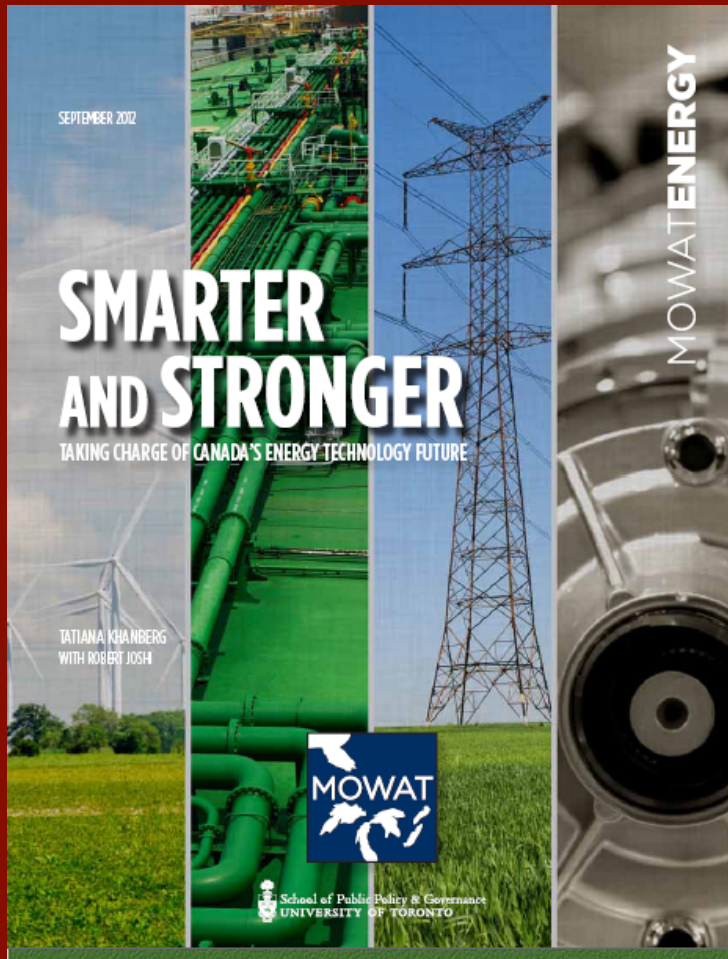
Contracted resources include contracted renewables and contracted natural gas.

Values are presented in Appendix B.

Institutional Resistance

- GEGEA FIT as rejection of directions of 2007 Integrated Power System Plan
- Capacity needs for implementation underestimated
 - OPA contract processing
 - LDC capacity for local connection tests and implementation
 - IESO capacity/grid to manage resources

Failure to Establish Economic Development Strategy



Studies in Ontario Electricity Policy Series | Paper No. 5

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Enabling Tomorrow's Electricity System

Report of the Ontario Smart Grid Forum



Recommendations

- Focus FIT program on Community/Farm/Aboriginal developers
 - Provide support to community-based developers
 - Address financing and collateralization issues
- Deal with commercial developers through competitive RFP program
- Integration of renewables development and land-use planning
- Ensure institutional capacity to process contracts and implement connections
- Develop and implement energy storage and smart grid strategies to support the integration of renewable energy resources into the province's energy systems up to their full potential.

<http://sei.info.yorku.ca/>

Studies in Ontario Electricity Policy Series | Paper No. 5

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