ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998,* S.O. 1990, c. 15.

AND IN THE MATTER OF an Application by Dufferin Wind Power Inc. for an Order granting leave to construct a new transmission line and associated facilities.

RESPONDING SUBMISSIONS OF CONSERVE OUR RURAL ENVIRONMENT

I. OVERVIEW

1. The application for leave to construct that is presently before the Board represents the thin edge of a wedge designed to force a wind farm and associated transmission and distribution facilities on an unwilling community, and unwilling county and local governments.

2. The Board's jurisdiction is narrow on an application for leave to construct, and the transmission facilities it is being asked to consider appear, at first glance, to be benign. This application is therefore an easy place for Dufferin Wind Power Inc. to start the process of obtaining the regulatory approvals it requires to bring its wind farm to fruition.

3. The Board must scrutinize this application carefully, and really consider what it is being asked to approve: it is being asked to permit the connection of a *wind farm* to the Province's electricity grid. Connecting a wind farm to the grid engages important policy issues related to the cost and reliability of electricity in this Province.

4. On careful examination, the Board will see that Dufferin Wind Power Inc. is proposing a transmission project that is speculative, and whose design has been a moving target nearly since the day it was proposed, and remains so. Dufferin Wind Power Inc., is asking for an approval that will give it *carte blanche* to construct transmission facilities without any real regulatory oversight.

5. It is also asking for approval of forms of agreement for land matters, which are demonstrably unfair and misleading.

6. Dufferin Wind Power Inc. has not, and cannot demonstrate that what is proposes is in the public interest. The Board should not allow this application.

II. FACTS

7. On September 21, 2012, Dufferin Wind Power Inc. ("**DWPI**") filed an application (the "**Application**") with the Ontario Energy Board (the "**Board**"), pursuant to sections 92, 97 and 101 of the *Ontario Energy Board Act, 1998* (the "**Act**").[1]

8. DWPI seeks leave to construct the following electricity transmission facilities (the "**Facilities**"):

   (a) A 34.5/230 kV intermediate transformer station (the "**Project Substation**");

[1] Application for Leave to Construct, EB-2012-0365.

(b) a 230 kV switching station (the "**Switching Station**");

(c) a 230 kV three phase single circuit transmission line running from the Project Substation of the Switching Station (the "**Transmission Line**"); and

(d) a 100m 230 kV interconnection that will connect the Switching Station to the Orangeville Transformer Station (the "**Interconnection**").[2]

9. As late as March 28, 2013, DWPI amended the Application to alter the Transmission Line routing.[3]

10. DWPI also requests approval of certain forms of land agreement (the "**Agreements**"), pursuant to section 97 of the Act; and seeks authority to construct portions of the Facilities upon, under or over a highway, utility line or ditch.[4]

11. Numerous parties have taken an interest in these proceedings. The Board granted Intervenor Status to : the Independent Electricity System Operator (the "**IESO**"), the County of Dufferin (the "**County**") the Township of Melancthon (the "**Township**"), Conserve Our Rural Environment ("**CORE**"), the Highland Companies, Harvey J. Lyon and Lori Bryenton.[5]

12. The Facilities and Agreements are proposed to connect DWPI's proposed wind farm (the "**Proposed Wind Farm**") to the IESO-controlled grid.[6]

13. The Proposed Wind Farm is the subject of an application (the "**REA Application**") to the Ministry of the Environment (the "**MOE**") for a Renewable Energy Approval (an "**REA**"), pursuant to Part V.0.1 of the *Environmental Protection Act* and Ontario Regulation 359/09. The REA Application was filed in August 2012 but has not yet been approved. In November 2012, DWPI "clarified" the REA Application, and in March, 2013 changed it.[7]

14. The Proposed Wind Farm is also the subject of a contract (the "**FIT Contract**") with the Ontario Power Authority (the "**OPA**") pursuant to the OPA's Feed-in-Tariff ("**FIT**") Program. Pursuant to the FIT Contract, DWPI is required to achieve commercial operation by January 30, 2014 or face financial penalties.[8]

III. ISSUES AND ARGUMENT

15. In deciding the Application, the Board must apply section 96 of the Act, which provides:

(1) If, after considering an application under section 90, 91 or 92 the Board is of the opinion that the construction, expansion or reinforcement of the proposed work is in the public interest, it shall make an order granting leave to carry out the work.

(2) In an application under section 92, the Board shall only consider the following when, under subsection (1), it considers whether the construction, expansion or

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[2] Application, Exhibit B, Tab 1, Schedule 1, page 2 of 7.
[3] Second Amendment to Application and Pre-filed Evidence, March 28, 2013.
[4] Application, Exhibit B, Tab 1, Schedule 1, page 2 of 7.
[5] Procedural Order No. 2, page 3.
[6] Application, Exhibit B, Tab 1, Schedule 1, page 3 of 7.
[7] Application, Exhibit E, Tab 2, Schedule 1, page 1 of 8; Second Amendment to Application and Pre-Filed Evidence, Appendix A.
[8] Responses to Board Staff Interrogatories, Exhibit B, Tab 1, Schedule 3, page 6 of 38.

reinforcement of the electricity transmission line...or the making of the interconnection, is in the public interest:

1. The interests of consumers with respect to the prices and the reliability and quality of electricity service.

2. Where applicable and in a manner consistent with the policies of the Government of Ontario, the promotion of the use of renewable energy sources.[9]

16. CORE submits that, for the reasons set out below, DWPI has failed to demonstrate that this test has been satisfied, as *it* is required to do, in order to obtain the relief it seeks.

A. Wind Energy Drives Up the Price of Electricity for Consumers

17. DWPI argues that the proposed Facilities will not directly serve any "consumers" because they will be used only to convey electricity from the Proposed Wind Farm to the Hydro One transmission system, which forms part of the IESO-controlled grid. It says that it will take responsibility for the costs of constructing and operating the Facilities, and that these costs will not be passed on to consumers through transmission rates, but rather will be paid by DWPI from the revenues it expects to receive under the FIT Contract.[10]

18. DWPI's argument is flawed. While the cost of constructing these particular Facilities will be borne by DWPI, the costs of adding wind power to the IESO-controlled grid are enormous, and will be borne by consumers, through increased rates, across the Province.

19. A recent report by Professor Ross R. McKitrick, *Environmental and Economic Consequences of Ontario's Green Energy Act* is informative in this regard. Professor McKitrick is a Professor of economics at the University of Guelph. He specializes in environmental economics. His report investigates the effect of the *Green Energy Act* (the "**GEA**") on economic competitiveness in Ontario. Professor McKitrick states:

> Electricity supply is divided into base-load capacity, which comes from sources like hydroelectric and nuclear that deliver a fixed amount of power than cannot easily be adjusted up or down on short notice, and peak capacity, which can be scaled up and down as system demand changes through the day. Ontario power demand currently averages about 18,000 MW and reaches a maximum annual peak of about 26,000 MW. Using figures from the Ontario Power Authority and the Independent Electricity System Operator, the provincial Auditor-General projects average demand to decline to about 16,000 MW and peak demand to fall to about 24,000 MW. Nuclear and hydroelectric facilities alone currently provide 18,000 MW of base-load capacity. In addition, Ontario has 9,500 MW of gas capacity as well as 4,500 MW at the coal-fired power plants, much of which is unused. The Auditor General of Ontario (AGO) estimates Ontario will have at least 10,000 MW of surplus generating capacity through 2025.
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> Not only does Ontario have surplus power, but it has surplus baseload power, and this creates a problem for maintaining grid reliability as wind power expands. The GEA requires the system to buy all available wind energy. Depending on wind conditions, there can be a surge in production that needs to be absorbed.... [W]ind power tends to

[9] *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, s. 96.
[10] Amended Argument-in-Chief, para. 13.

peak when demand is at a minimum, so it either must displace baseload production or be dumped on the export market at a loss.[11]

20. Professor McKitrick goes on to explain the structural inefficiencies of wind energy, as follows:

> The mismatch between wind energy and demand is structural and unique to wind... [W]ind turbine output declines in the morning while demand is coincidentally ramping up, and rises in the evening as demand is winding down. Also, wind output peaks in the fall when seasonal demand is minimal because households are typically no longer using air conditioning nor have they yet started up wintertime electric heating systems.
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> ...
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> [M]ost wind energy in Ontario is surplus to base needs and must be exported at a significant loss per kWh.
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> Since 2006, 81.6% of the wind energy production in Ontario occurred at times when it was unneeded, in other words when at least as much power production was being dumped on the export market. Since 2009, the fraction was 81.8% and, since 2011, it was 78.5%. Because of the provisions of the GEA, the system operator is required to buy all available wind power at 13.5¢ per kWh, well above the domestic market price, and prices received for exported power are typically less than 4¢ per kWh. They are even negative at times, meaning that the electricity-system operator has to pay other jurisdictions to take the surplus power. The AGO estimated that from 2005 to 2011 Ontario lost $1.8 billion on these transactions. The IESO data, using the assumption that power is purchased at 13.5¢/kWh and sold at 4¢/kWh when exported, implies that the current wind power system imposed costs of just over $24,000 per hour of operation in 2011, and cost the Province $210 million. This amount must either be added to the provincial deficit or added to ratepayers' bills.[12]

21. Professor McKitrick reports that the IESO has confirmed that the cost of exports are being passed on to ratepayers.[13] Ontario's Long-Term Energy Plan further confirms that ratepayers have borne the cost of the energy policy changes that the Province has recently implemented.[14]

22. With the high cost of adding wind-generated energy to the grid in mind, it is incumbent on DWPI to demonstrate that it is in the public interest to permit the Facilities, having regard to the interests of consumers with respect to prices.

23. DWPI's evidence fails to satisfy this burden:

    (a) The IESO's System Impact Assessment Report for the Dufferin Wind Farm Project does not address the issue of costs to consumers. It was prepared "solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-

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[11] Ross R. McKitrick, *Environmental and Economic Consequences of Ontario's Green Energy Act,* page 8; attached hereto as Appendix A.

[12] Ross R. McKitrick, *Environmental and Economic Consequences of Ontario's Green Energy Act*, pages 12-15.

[13] Ross R. McKitrick, *Environmental and Economic Consequences of Ontario's Green Energy Act*, page 15 and footnote 5.

[14] Ontario's Long-Term Energy Plan: Building Our Clean Energy Future, page 4; attached hereto as Appendix B.

controlled grid would have an adverse impact on the *reliability* of the integrated power system..."[15]

(b) Similarly, Hydro One's Customer Impact Assessment only identifies "the impact on the transmission customer connected facilities and operating constraints based on facility voltage performance," and "assists to determine if any transmission system upgrade will be required to integrate the proposed interconnection during possible system conditions."[16] The costs to consumers have not been examined in this report.

24. DWPI argues that it is required to deliver renewable energy from the Proposed Wind Farm to its connection point on the IESO-controlled grid because of its obligations under the FIT Contract; and that the Facilities are required to convey electricity for this purpose.[17] DWPI's contractual obligations do not entitle it to a regulatory approval that is not in the public interest.

25. Having failed to lead *any* evidence or make *any* argument about the cost to consumers of connecting the Proposed Wind Farm to the IESO-controlled grid by way of the Facilities, DWPI cannot say that it has demonstrated that it is in the public interest for this Board to approve the facilities.

B. The Facilities Will Not Deliver Reliable and Quality Electricity to the IESO-Controlled Grid

26. DWPI has failed to demonstrate that it is capable of providing reliable and quality electricity service.

27. DWPI attempts to downplay the role of the Facilities by arguing that the only potential impacts on the interests of consumers with respect to reliability and quality of electricity service would be as a result of impacts from the proposed transmission project on Hydro One's transmission system or the IESO-controlled grid, which in turn directly and indirectly serve customers.[18] These potential impacts are not insignificant, though.

28. DWPI effectively admits with this argument that, in the event it is successful in implementing the Proposed Wind Farm and Facilities, the electricity it proposes to produce will directly serve customers. Any interruptions in service as a result of operational or financial difficulties on DWPI's part *will* impact the interests of consumers with respect to reliability and quality of electricity.

(i) Wind is an Unreliable Source of Energy

29. Even in the best of circumstances, wind is an unreliable source of energy, as described above.

(ii) Commercial Operation is Far From Guaranteed

30. The commercial viability of DWPI's entire project relies on achieving commercial operation in accordance with the FIT Contract.

31. Commercial operation by January 2014 is, however, a virtual impossibility, in light of all of the work that remains to be completed. Commercial operation requires that DWPI certify to OPA that

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[15] Application, Exhibit H, Tab 2, Schedule 2, Appendix A, System Impact Assessment Report - Final Addendum Report, Disclaimers.
[16] Application, Exhibit H, Tab 3, Schedule 1, Appendix A, Customer Impact Assessment - Final Report, page 3.
[17] Amended Argument-in-Chief, page 5 of 11.
[18] Amended Argument-in-Chief, page 6 of 11.

the Proposed Wind Farm is completed in all material respects, that it has been constructed, connected, commissioned and synchronized to the IESO-controlled grid, such that at least 90% of the capacity is available to deliver electricity.[19]

32. There are a number of real impediments to achieving commercial operation by January 30, 2014, including:

(a) there is significant public opposition to the project. CORE and others, in particular, have actively participated in the within proceedings, and in the REA proceedings. They have filed letters of opposition to the grant of the REA, and have rights of appeal to the Environmental Review Tribunal in the event that the REA is granted;[20]

(b) there is significant municipal opposition to the project:

(i) By way of example, on April 15, 2013, DWPI applied to the Board, pursuant to subsection 41(9) of the *Electricity Act*, for an order or orders establishing the location of DWPI's distribution facilities within the public streets, highways, and rights-of-way owned by the Township of Melancthon, because it has been unable to secure the Township's agreement as to the location of these facilities. This application sets out in detail the Township's opposition to DWPI's project.[21] The Township has also opposed the grant of the REA.[22]

(ii) The County of Dufferin has requested, of the Province of Ontario, a moratorium on all wind development until a two-year Health Canada Study on Wind Turbine Noise and Health has been completed; and has publicly objected to any overhead lines that will connect with any wind development projects in the County[23]

(iii) The Township of Mulmur has also opposed the grant of the REA.[24]

(c) DWPI does not have a single regulatory approval that it requires to implement the Proposed Wind Farm or the Facilities. [25] In particular, for the Facilities alone, DWPI states that it still requires the following permits:

(i) Authorization under subsection 35(2) of the *Fisheries Act* for watercourse crossings;

(ii) Navigational clearances under the *Navigable Waters Protection Act*;

(iii) Water crossings work permit for watercourse crossings under O. Reg. 453/96 of *Lakes and Rivers Improvement Act*;

(iv) Work permit for watercourse crossings under the *Public Lands Act*;

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[19] FIT Contract, section 26, Responses to Requests in Procedural Order No. 3, Appendix A.
[20] Correspondence from Davis LLP to Ministry of the Environment; attached hereto as Appendix C.
[21] Ontario Energy Board Application EB-2013-0102, Exhibit B, tab 5.
[22] Correspondence between the Township of Melancthon and the Ministry of Energy, attached hereto as Appendix D.
[23] Dufferin County Corporate Services memo, dated February 13, 2013, attached hereto as Appendix E.
[24] Township of Mulmur Report to Council, dated July 12, 2012; attached hereto as Appendix F.
[25] Responses to Board Staff Interrogatories, Exhibit B, Tab 1, Schedule 3.

(v) Species at risk permit under the *Endangered Species Act*;

(vi) Generic Regulations permit for water crossings and works within floodplain;

(vii) Compliance with the *Highway Traffic Act* and *Road Safety Regulations* – Highway Entrance permit, transportation permits;

(viii) Notice of Proposal under section 81 of the *Ontario Energy Board Act*;

(ix) Notice of Project prior to commencing construction;

(x) Transmission Connection Agreement;

(xi) Facility Registration;

(xii) Metering Registration;

(xiii) Connection Assessment Approval;

(xiv) Connection Authorization;

(xv) Road Use Agreements and Building Permits; and

(xvi) Utility Crossing Agreements to cross existing distribution lines.[26]

(d) Of course, DWPI has not secured the REA, nor any permits to generate any electricity either.

(e) In the last six years of negotiation, DWPI has failed to secure property rights over most of the land it requires to construct the Facilities:

(i) It proposes a Transmission Line of approximately 47 km in length, and has secured property rights over less than one-third of that length. In particular, the planned route of the 230 kV Trasmission Line traverses approximately 32 km of former rail corridor owned by the County. At its April 11, 2013 meeting, the County received a report from its Chief Administrative Officer which outlined two options with respect to ongoing negotiations with DWPI over the Rail Corridor Lands. The County could either direct staff to resume negotiations for an agreement to grant an easement; or notify DWPI that the County is not willing to grant an easement and is not interested in further discussions with respect to an agreement. County Council received the report and has taken no further action to engage DWPI in negotiations. The Deputy Clerk of the County confirmed that the County has elected to take no further action.[27]

(ii) DWPI does not have the interest in land it requires to construct the Project Substation.[28]

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[26] Application, Exhibit E, Tab 2, Schedule 1, pages 5-8 of 8.

[27] Correspondence from CORE to K. Walli, April 17, 2013 and enclosures thereto; Responses to Board Staff Interrogatories, Appendix G.

[28] Second Amendment to Application and Pre-Filed Evidence, page 3.

(f) DWPI cannot say when or if it will have secured the rights that it needs. Although it believes it will be able to secure the rights it requires through negotiation, the best it can say is that it will "consider the options available to it in the event that it is unable" to do so.[29]

33. Any financial penalties for failure to achieve commercial operation in accordance with the FIT Contract will negatively impact the commercial viability of the project because the financial penalties provided for in the FIT contract are not insubstantial.[30]

34. DWPI's commercial viability has direct bearing on the interests of consumers with respect to the reliability and quality of electricity service. DWPI is a private corporation.[31] Corporations are accountable to their shareholders; not to those to whom they provide goods or services, which in this case are the IESO-controlled grid, and by extension electricity consumers in the Province of Ontario. Should its operations cease to be commercially viable, DWPI will do what is in the interests of its shareholders, rather than what is in the interest of the stability of the IESO-controlled grid and the consumers of the Province of Ontario, which may include ceasing operation.

35. If DWPI ceases to operate, any consumers who had come to rely on the electricity transmitted by DWPI will have to find another source of electricity.

36. Moreover, should DWPI not be able to fund the ongoing operation and maintenance of the Proposed Wind Farm (if it achieves commercial operation) because of higher than anticipated start-up costs associated with securing approvals and property rights, its ability to continue to generate and transmit electricity to consumers will be negatively impacted, with similar effect on the interest of consumers with respect to the reliability and quality of electricity service.

37. Although DWPI has provided financial statements for 2012, it has not tendered in evidence any forward-looking financial information, *i.e.* plans that demonstrate its ongoing commercial viability in light of uncertain regulatory and property-acquisition outcomes.

(iii) DWPI and the Project Proposal Are Unreliable

38. The nature of DWPI's project has, thus far, proven to be unreliable. The form of the Proposed Wind Farm and the Facilities have been moving targets since their inception:

(a) On August 13, 2012, DWPI submitted its REA Application to the MOE, which included two possible routes for the Transmission Line. The first option consisted of a dual-circuit, 69 kV line. The second option consisted of a single-circuit, 230 kV line, which is the subject of the within proceedings;[32]

(b) On September 21, 2012, DWPI made the within application, for only the 230 kV Transmission Line;

(c) On November 23, 2012, DWPI amended the within application;[33]

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[29] Responses to Supplementary CORE Interrogatories, Exhibit B, Tab 1, Schedule 4, page 38 of 44.
[30] Responses to Board Staff Interrogatories, Exhibit B, Tab 1, Schedule 3, page 6 of 38.
[31] Application, Exhibit B, Tab 1, Schedule 1, page 1 of 7.
[32] Clarification Request, page 2; Chapter 1 is attached hereto as Appendix G. The entire report is available at http://www.dufferinwindpower.ca/Portals/23/Downloads/Final/Changes%20Report/Chapter%201%20_%20Introduction.pdf
[33] Correspondence from Torys LLP to K. Walli, dated March 28, 2013.

(d) On December 17, 2012, DWPI notified the MOE that it was "clarifying" the REA Application by withdrawing the 69 kV power line option from consideration. It gave public notice of the withdrawal on December 20, 2012;[34]

(e) On March 28, 2013, DWPI amended the within application again; as well as its REA Application. Between the two applications, DWPI made seven changes:

(i) Expansion of transmission line easement on two turbine properties;

(ii) New alignment for underground collector line to connect two turbines;

(iii) Shift of feeder line within existing buildable area of a turbine;

(iv) Reroute feeder line between two turbines;

(v) Place the Transmission Line overhead through wetland features;

(vi) Potentially extend the underground section of the Transmission Line through Shelburne; and

(vii) Potentially extend the underground section the 230 kV Transmission Line in Amaranth.[35]

(f) Further changes to the Transmission Line route may be required as a result of DWPI's inability to secure an easement from the County over the Rail Corridor Lands.

39. It is significant that DWPI has changed the proposal so frequently. In making an application to a regulatory agency, such as the Board or the MOE, an applicant should put its best foot forward, and be able to ask with certainty for the permissions it actually requires to do what it proposes to do. DWPI has shown itself to be incapable of asking for what it needs with certainty. The Board should have serious doubts about whether the Facilities, if approved, will bear much resemblance to what is now proposed. This concern is relevant to DWPI's request for conditional approval, which is addressed in greater detail below.

40. Of further significance, DWPI says that the Transmission Line length is measured to be 47.29 km, as currently configured.[36] If, as a result of further changes to the route of the Transmission Line, the length of the Transmission Line exceeds 50km, DWPI will lose its FIT eligibility. The FIT eligibility of the Proposed Wind Farm has direct bearing on the interests of consumers with respect to the reliability and quality of the resultant electricity service. Without a FIT Contract, which guarantees the sale of electricity to the OPA at a fixed, above-market rate, the Proposed Wind Farm will not be financially viable. This concern is also relevant to DWPI's request for conditional approval, which will be discussed below.

C. The Facilities Fail to Implement the Policy of the Government of Ontario

41. DWPI must demonstrate that it is in the public interest to permit a transmission project, having regard to the promotion of the use of renewable energy sources in accordance with the policy of the Government of Ontario.

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[34] Clarification Report, page 2.

[35] Second Amendment to Application and Pre-Filed Evidence, Appendix A, pages 2-6.

[36] Amended Application, Exhibit B, Tab 1, Schedule 3, page 14 of 20.

42. The Province anticipated increased electricity costs as a result of bringing renewable energy online, when it released Ontario's Long-Term Energy Plan (the "**Plan**") in 2010. The Plan states:

> Based on the significant investments in clean, modern energy outlined in this plan, the government projects, based on current forecasts, that electricity prices will increase. Over the next 20 years, prices for Ontario families and small businesses will be relatively predictable. The consumer rate will increase by about 3.5 per cent annually over the length of the long-term plan.
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> Over the next five years, however, residential electricity prices are expected to rise by about 7.9 percent annually (or 46 percent over five years). This increase will help pay for critical improvements to the electricity capacity in nuclear and gas, transmission and distribution (accounting for about 44 per cent of the price increase) and investment in new, clean renewable energy generation (56 per cent of the increase).
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> Continued investments in transmission, conservation and supply are needed for a system that provides more efficient and reliable electricity to consumers whenever they need it and does not pollute Ontario's air or negatively affect the health of citizens and future generations.
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> After five years, Ontario will have largely completed the transition to a cleaner more reliable system due to the replacement of coal-fired generation and new renewable generation under the GEA. Once these investments have been made, price increases are expected to level off. The investments that the entire province is making in the future of electricity will help to ensure that Ontario never finds itself in the dire straights it was in just seven years ago.[37]

43. The Plan identifies four sources of renewable energy to meet the Province's long-term needs: hydroelectric, wind, solar, and bio-energy, the latter three *subject to "planned transmission expansion, overall demand for electricity, and the ability to integrate renewables into the system."*[38]

44. Just because a project is a renewable energy project does not mean that it automatically implements the policy of the Government of Ontario. If a renewable project cannot be integrated into the system, there are good policy reasons not to permit it to connect.

45. Applications for leave to construct entrust the Board with a gatekeeper function, and require the Board to examine whether a proposed transmission facility is in the public interest. Renewable projects should not be rubber-stamped just because they are renewable projects.

46. As previously noted, solar and bio-energy do not create the same structural inefficiencies and supply and demand mismatch as wind energy does. These problems are unique to wind energy. The negative impacts to consumers as a result of increased electricity prices could be mitigated, and the Province's policy directive to invest in renewable energy sources could be better implemented, by connecting solar and bio-energy generation facilities to the grid, rather than wind energy projects.

47. It is therefore a particular challenge to an applicant for transmission facilities connected to a wind farm to show that those facilities should be approved. DWPI has failed to do so. DWPI has failed

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[37] Ontario's Long-Term Energy Plan: Building Our Clean Energy Future, pages 58-59.
[38] Ontario's Long-Term Energy Plan: Building Our Clean Energy Future, page 30.

to demonstrate that the Facilities will be capable of integrating the Proposed Wind Farm into the system in a way that satisfies the public interest test.

D. Conditional Approval Will Not Remedy the Fundamental Problems with the Application

48. DWPI's legal right to construct the Facilities is speculative at best, both in terms of property rights and regulatory approvals. It currently has neither the property rights nor the regulatory approvals it requires to implement the Proposed Wind Farm or the Facilities.

49. With respect to both, DWPI takes the position that it is continuing to work to achieve the legal rights it requires, and that this Board should grant conditional leave to construct.

50. CORE fundamentally disagrees with the position that it is appropriate to grant conditional leave to construct the Facilities. The circumstances in this case are inappropriate for conditional approval:

(a) Notwithstanding that it has been working on obtaining it since April 2007, there is no substantial community support for this project;[39]

(b) DWPI cannot demonstrate any support from any public or regulatory agency for the Transmission Line or the other elements of the Facilities;

(c) If DWPI continues working with landowners to secure property rights, it may be that DWPI is able to do so, subject only to conditions, for example. One such condition may be that the Transmission Line be placed underground on a given property. Building the Transmission Line underground may also increase DWPI's operational costs, and detrimentally impact the reliability and quality of the resulting electricity service;[40]

(d) If the Board authorizes DWPI to expropriate certain lands, it is possible that disputes may arise as to the appropriate compensation to be paid to the landowner. Such disputes are to be settled in accordance with the *Expropriations Act* or by appeal to the Ontario Municipal Board. It is impossible to predict with certainty the outcome of an Ontario Municipal Board compensation hearing; or to estimate with certainty the cost of engaging in such disputes; or to predict how many such hearings might occur. These are significant financial matters, about which there is additional uncertainty, which further contribute to the uncertainty of DWPI's financial position and ability to deliver electricity in a reliable and timely manner; and

(e) In the face of significant public opposition, it is to be expected that the grant of a right to expropriate to DWPI by the Board may also be subject to challenge, which will cause further uncertainty.

51. Contrary to DWPI's reliance on the Board's ability to grant conditional approval, it is CORE's position that the Board cannot address these uncertain matters satisfactorily through conditions. Uncertainty cannot be addressed by way of condition. Only matters that are <u>certain</u> to occur in the future, but which have not yet occurred, can be addressed by way of condition.

52. There is simply too much uncertainty at this time about the Proposed Wind Farm, the Facilities, and DWPI's financial ability to manage the uncertainty. These uncertainties cannot be addressed by way of conditional approval. They need to be resolved before it is appropriate for this Board to consider granting leave to construct.

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[39] Application, Exhibit G, Tab 1, Schedule 1, page 2 of 6.

[40] Responses to CORE Interrogatories, Exhibit B, Tab 1, Schedule 3, page 7 of 20.

53. Granting conditional approval to uncertain matters can result in the grant of *carte blanche* to DWPI to do as it sees fit in the future, rather than as the regulatory agencies entrusted with preserving the public interest see fit.

54. It is dangerous to grant *carte blanche* to DWPI in circumstances where DWPI may lose its FIT eligibility, and the route of the Transmission Line is far from being established.

55. DWPI has not given the Board the evidence it needs to satisfy itself that it is in the public interest to grant leave to construct in these circumstances.

E. It is Inappropriate to Approve the Proposed Forms of Agreement

56. DWPI's request for approval of the Agreements provided in Exhibit F, Tab 2 to the Application should also be turned down.

57. It is premature to approve the forms of Agreement. As previously described, the Application is a moving target. Less than a month ago, the Application was amended, six months after it was filed. Not only has the Applicant not secured the property rights it requires to construct the Facilities, it has not demonstrated that it even knows with finality what those property rights are. Amendments to the Agreements may be required.

58. Approving the forms of agreements at this time puts parties who have not yet entered into agreements with DWPI at a disadvantage in negotiations with DWPI. Whether the landowners wish to grant DWPI the property rights that DWPI seeks, and on what terms, are live issues. The easement sought from the County over the Rail Corridor Lands is a good example. A form of Agreement to Grant Easement is found at Exhibit F, Tab 2, Schedule 1, Appendix 6. The first clause of that form of agreement proposes to grant to DWPI an easement "in, over, upon, and through" the lands for the purpose of "surveying, constructing, operating, using, inspecting, repairing and maintaining" an electrical transmission line and related infrastructure and systems. As noted above, the County has taken the position that overhead transmission lines are inappropriate. The form of agreement does not require DWPI to place the proposed transmission line in the Rail Corridor Lands underground. Were the Board to approve this form of agreement, it would be stripping the County of its bargaining power in relation to the Rail Corridor Lands, and setting the terms of a deal with which one of the parties does not agree. Landowners who are in the same position as the County in respect of negotiations over their lands will be placed in the same manifestly unfair situation by the Board, should these forms of agreement be approved.

59. The Agreements have generally not been shown to be appropriate. The Agreement at Appendix 5, the Wind Turbine and Transmission Lease (for Private Lands) for example contains a clause which is misleading:

> **15.11 <u>Independent Legal Advice</u>**
>
> Each of Parties acknowledges that this Lease has been prepared by the Landlord's lawyers, _____. With respect to this Lease and all matters related thereto _____ has acted for the Landlord and is not acting as lawyers for the Tenant. The Tenant hereby acknowledges that the Tenant has had the opportunity and has been advised by the Landlord and its lawyers to review this Lease and all matters related thereto with independent legal counsel of the Tenant's own choice prior to the Tenant's execution of this Lease.

The Tenant confirms to the Landlord that the Tenant has reviewed this Lease with the Tenant's independent legal counsel and fully understands the Tenant's rights and obligations under this Lease.[41]

60. Although the names of the Tenant and Landlord have been blanked out in the copy of the Lease provided to the Board, it can be inferred from the balance of the Lease that the Tenant is DWPI and the Landlord is an individual landowner.

61. The legitimacy of this clause rests on several assumptions:

(a) That all of the Landlords who execute the Lease are aligned in interest;

(b) That all of the Landlords have acted together to retain counsel;

(c) That the counsel that the Landlords have retained has drafted the Lease; and

(d) That the Lease is drafted in favour of the Landlords, such that it is the Tenant who requires independent legal advice ("**ILA**") and not the Landlords.

62. DWPI has not led any evidence to support the truth of any of these assumptions. DWPI has in fact, redacted information about the identity of the Landlords and of their counsel, such that it is impossible for the Board to properly evaluate the Lease.

63. There is, in fact, evidence, which undermines the legitimacy of these assumptions:

(a) There is evidence that not all of the Landlords are aligned in interest. DWPI notes that there are at least two hold-out landowners whose interests it seeks to secure by way of the Lease.[42]

(b) There is evidence that DWPI uses the Lease and another one of the Agreements as a standard-form agreement, which suggests that the agreements were prepared for DWPI's use, rather than for the Landlords' use.

(c) Some of the other Agreements, namely those at Appendices 1 and 4 indicate that Shibley Righton is acting for the Landlords. Shibley Righton is counsel for Farm Owned Power, Ltd., the minority shareholder of DWPI.[43] As counsel for a shareholder of the Tenant, Shibley Righton cannot independently advise any Landlord whose interests are not aligned with Farm Owned Power Inc. and DWPI.

64. As such, to the extent that there are land owners whose interests are not aligned with Farm Owned Power Inc.'s and DWPI's (and there is evidence to suggest that such people exist), the Board cannot approve an Agreement that contains this language about ILA.

(a) First, in those circumstances, the language is necessarily false, as Shibley Righton cannot act for such a Landlord;

(b) Second, it does not require the Landlord to seek ILA. The Landlord, whose property is proposed to be encumbered by DWPI for lengthy periods of time by intrusive

[41] Application, Exhibit F, Tab 2, Appendix 5.
[42] Application, Exhibit F, Tab 1, Schedule 1, page 3 of 6.
[43] Correspondence from Shibley Righton to Davis LLP, May 8, 2012, attached hereto as Appendix H; Application, Exhibit B, Tab 2, Schedule 2, page 1 of 2.

infrastructure, is the party that requires ILA, in particular if the Lease has been drafted by counsel who cannot act for such a Landlord; and

(c) Third, rather than the agreement providing for the landowner to obtain ILA, the Lease misleadingly provides for DWPI to get ILA, which is backwards.

65. The Form of Lease for Project Substation (Appendix 1) and the Form of Transmission Lease (Appendix 4) contain identical language about ILA.

66. CORE submits that if a fundamental clause - the clause about ILA - in the Lease, or the other Agreements, is not fair or accurate, the Board cannot rely on the Agreements as being appropriate.

67. This Board should not countenance any form of agreement that may contain misleading language, or that permits the distortion of the balance of power between parties to an agreement. It is not in the public interest for the Board to do so.

68. DWPI has led no evidence as to whether the proposed Agreements represent industry-standard agreements or whether they are fair to the counterparties, or whether they are otherwise justifiable. The Board has no basis upon which to approve these forms of agreement.

IV. RELIEF REQUESTED

69. CORE requests that the Application be refused in its entirety, with costs to CORE.

70. CORE also requests that any Agreement with DWPI that has been executed, and that contains a false and misleading clause regarding ILA be set aside.

All of which is respectfully submitted this 25th day of April, 2013.

CONSERVE OUR RURAL ENVIRONMENT
By its counsel
Davis LLP

David Crocker

Laura K. Bisset

Appendix A Ross R. McKitrick, Environmental and Economic Consequences of Ontario's Green Energy Act

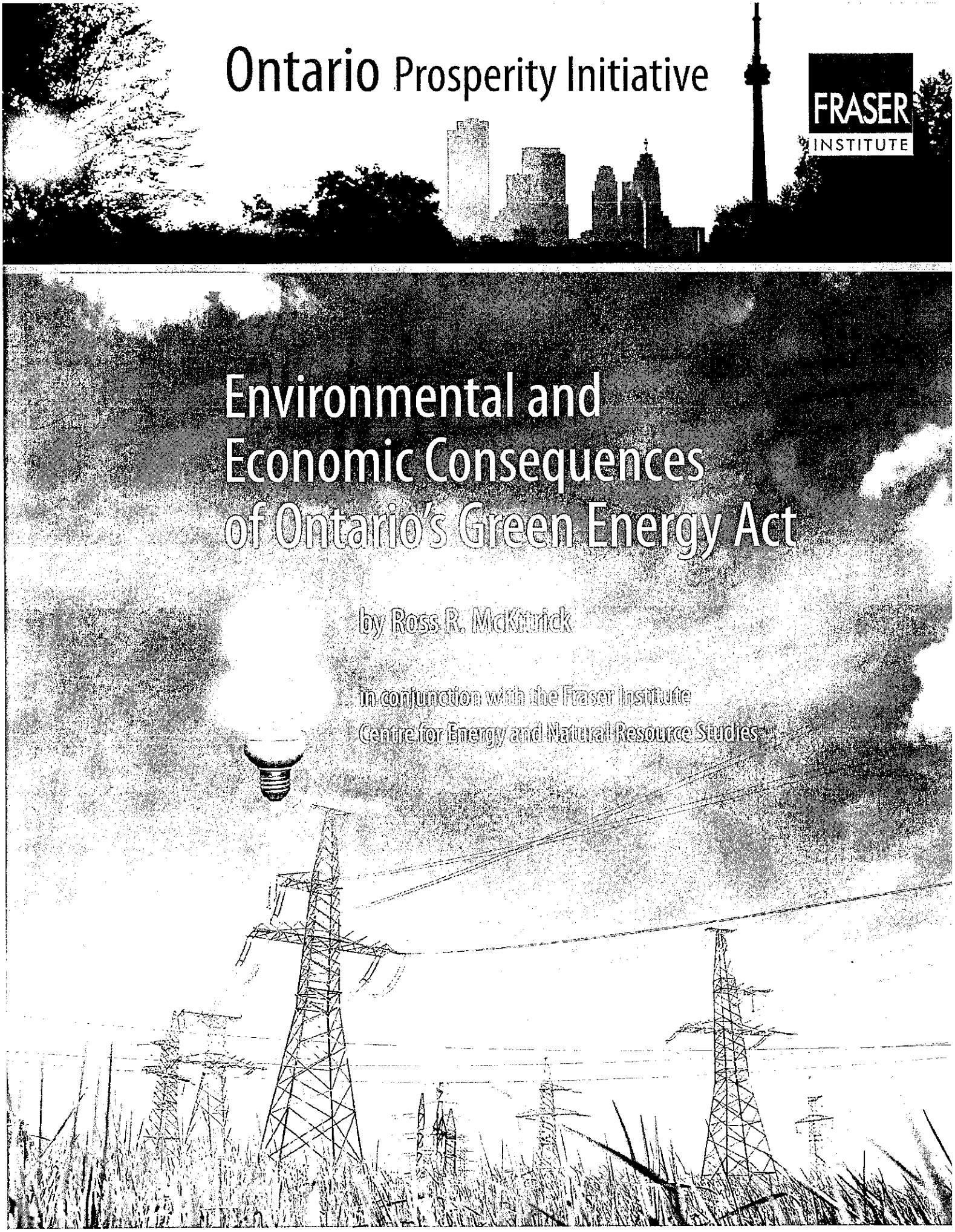
Ontario Prosperity Initiative

FRASER INSTITUTE

Environmental and Economic Consequences of Ontario's Green Energy Act

by Ross R. McKitrick

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



Contents

Executive summary

The Ontario Green Energy and Green Economy Act (herein the GEA) was passed in May 2009 with the purpose of addressing environmental concerns and promoting economic growth in Ontario. Its centerpiece is a schedule of subsidized electricity purchase contracts called Feed-in-Tariffs (FITs) that provide long-term guarantees of above-market rates for power generated by wind turbine farms, solar panel installations, bio-energy plants and small hydroelectric generators. Development of these power sources was motivated in part by a stated goal of closing the Lambton and Nanticoke coal-fired power plants.

This report investigates the effect of the GEA on economic competitiveness in Ontario. It focuses on three questions: (1) Will the GEA materially improve environmental quality in Ontario? (2) Is it a cost-effective plan for accomplishing its goals? (3) Are the economic effects on households and leading economic sectors likely to be positive? The answer to each question is unambiguously negative. The specific findings of the report are as follows.

1 **It is unlikely the Green Energy Act will yield any environmental improvements other than those that would have happened anyway under policy and technology trends established since the 1970s. Indeed, it is plausible that adding more wind power to the grid will end up increasing overall air emissions from the power generation sector.**

As of 2009, air quality in Ontario had improved considerably compared to the 1960s, and showed no tendency to be getting worse. A confidential 2005 cost-benefit analysis for the provincial government, often cited by the Province as a defence of the GEA, in fact predicted that the closure of the coal-fired power plants would yield such tiny effects on air quality as to be unnoticeable in most places.

Because of the fluctuating nature of wind and solar power, adding renewable capacity to the grid requires additional backup power from natural gas plants. Because Ontario currently has a surplus of base-load generating capacity, further additions to base-load in the form of wind or solar power may require removing a nuclear plant from operation and replacing it with a combination of renewable and gas-fired generation, yielding a net increase in air emissions.

2 **The plan implemented under the Green Energy Act is not cost effective. It is currently 10 times more costly than an alternative outlined in a confidential report to the government in 2005 that would have achieved the same environmental goals as closing the coal-fired power plants.**

The province's continued reliance on the confidential 2005 "DSS" analysis in defence of the GEA is misleading since that report did not consider or recommend use of wind or solar energy as a replacement for coal. The analysis by DSS Management Consultants actually shows that a relatively low-cost retrofit option for the coal plants was available that would have yielded environmental improvements (including reductions in greenhouse gases) effectively equivalent to those of closing the plants, at about one tenth the current cost of the GEA, and one seventieth what it will cost if the Province follows its stated plans to completion.

The focus on wind generation is especially inefficient because production peaks when it is least needed and falls off when it is most needed. Surplus power is regularly exported at a considerable financial loss. On average, due to daily and seasonal wind patterns in Ontario, a 1% increase in wind power production coincides with a 1% reduction in consumer power demand. Eighty percent of Ontario's generation of electricity from wind power occurs at times and seasons so far out of phase with demand that the entire output is surplus and is exported at a substantial loss. The Auditor-General of Ontario estimates that the province has already lost close to $2 billion on such exports. Data from the Independent Electricity System Operator shows Ontario now loses, on average, $24,000 per operating hour on such sales, totaling $200 million annually. The loss rate will continue to grow with every new wind turbine installation because the mismatch between the timing of wind-powered generation and Ontario electricity demand is structural.

The wind-power grid is also inherently inefficient due to the fluctuating nature of the power source. Output of Ontario's wind turbines is below one fifth of rated generating capacity about half the time, and below one third of the rated capacity about two thirds of the time. **Because of the unreliability of output, 7MW of rated wind energy are needed to provide a year-round replacement of 1MW of conventional power generating capacity.** Consequently, the cost of achieving the provincial targets for renewable energy in the coming years will be much higher than currently acknowledged.

3 **The Green Energy Act will not create jobs or improve economic growth in Ontario. Its overall effect will be to increase unit production costs, diminish competitiveness, cut the rate of return to capital in key sectors, reduce employment, and make households worse off.**

The claim by the government of Ontario that 50,000 jobs will be created by the GEA was a guess without any basis in formal analysis, and the Province has since admitted both that the vast majority of any GEA-related jobs will be temporary and that the figure of 50,000 does not account for offsetting permanent job losses caused by increases in the price of electricity under the GEA.

Electricity costs for large users in Ontario were moderate compared to surrounding jurisdictions as recently as 2008, but have since risen almost to the highest level in our comparison group. Further price increases of 40% to 50% are forecast, in large part to pay for costs incurred under the GEA. These will result in Ontario being at or near the top end of North American electricity costs over the next few years. Such price increases, were they to occur, would strongly affect the unit cost of production in mining and manufacturing and, to a smaller extent, forestry. I estimate they will drive down the rate of return to capital in manufacturing in Ontario by 29%, in mining by about 13%, and in forestry by about 0.3%, leading to a net loss of investment and employment in the province.

Provincial efforts to shield these industries through energy subsidy programs only transfer the costs onto households, who are already dealing with increases in the price of residential electricity because of GEA-related initiatives. There would also be uncertainty as to whether the Province will remain committed to such subsidy measures in the face of its ongoing budget deficit. There are additional costs to households in regions afflicted with new wind turbine installations arising from lost property values, degradation of the rural environment, and increased health and stress problems. Were these to be taken into account, the overall cost burden of the GEA would be even higher.

1 Introduction

The Green Energy and Green Economy Act (herein the GEA) was passed in May 2009 with the purpose of addressing environmental concerns and promoting economic growth in Ontario. Its centerpiece is a schedule of subsidized electricity purchase contracts, called Feed-in-Tariff rates (FIT), that provide long-term guarantees of above-market rates for power generated by wind turbine farms, solar panel installations, bioenergy, and small hydro generators. The Province of Ontario has stated that the GEA was motivated by three goals: reduction of greenhouse gas emissions, reduction of criterion air contaminants by replacing coal-fired power plants with renewable power generation, and job creation (AGO, 2011: 92). *Environmental and Economic Consequences of Ontario's Green Energy Act* shows that the GEA will impair competitiveness and job creation in Ontario. It also shows that the GEA will not yield meaningful reductions in air pollution, and that much less costly approaches to achieving the same environmental goals could have been taken, and that this was known prior to the Act's introduction.

Section 2.1 sets the context of the GEA by showing that Ontario air quality had already improved dramatically in most respects between 1960 and 2009. The only area in which progress was slow was ground-level ozone, but Section 3.1 shows that the provincial government was informed in 2005 that closing the coal-fired power plants would have only a minuscule effect on this, and a comparable outcome could have been obtained by completing the installation of relatively low-cost scrubbers on the power plants. Combined with purchase of carbon-offset credits, this approach would have yielded an outcome statistically identical to closing the power plants, for well under $800 million per year, about one tenth of the pro-rated costs currently being incurred under the GEA. Section 3.1 shows that the embrace of wind turbines for power generation in Ontario is intrinsically inefficient since the technology operates well below rated capacity, and tends to produce power when it is least needed, requiring it to be exported at a substantial loss. Hence, the planned expansion of wind energy under the GEA is highly cost-inefficient and will, if pursued, raise the costs to provincial households another seven-fold.

Section 4 examines the competitiveness impacts on Ontario, showing that if the projected electricity price increases go through, the rates of return to capital in manufacturing and mining will be impaired, leading either to capital flight and job losses, or requiring the province to make a costly commitment to subsidies, neither of which are in the public interest.

2 The Green Energy Act and Ontario's Air Quality

2.1 Air quality trends in Ontario since the 1960s

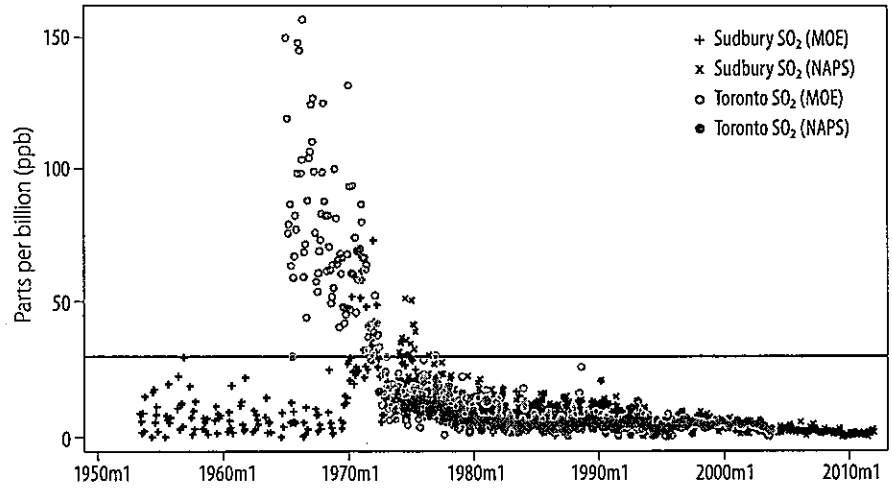
Air quality in Ontario is measured by a network of 40 monitoring stations operated by the Ministry of Environment (MOE).[1] Some of the MOE records also go into the federal National Air Pollution Surveillance (NAPS) system, which has archived records since 1974. The earliest MOE record is a Sudbury sulphur dioxide (SO_2) series spanning 1953 to 1981 (another Sudbury location began in 1974 and continues to the present). A downtown Toronto record extends from 1965 to the present. As shown in **figure 2.1**, SO_2 levels in these archives exhibit a dramatic decline, especially in Toronto, and daily readings now are typically 0 to 5 parts per billion (ppb). SO_2 is now only monitored at five locations in Ontario.

Figure 2.2 shows the MOE and NAPS data for Total Suspended Particulates (TSP) and Particulate Matter smaller than 10 microns (PM_{10}), both measured in $\mu g/m^3$. TSP were measured up to 1997. Except for a spike near the end of the sample, levels had fallen in half by 1990 compared to the 1960s, generally hovering around the Ontario clean-air standard of 60 $\mu g/m^3$. PM_{10} was measured for two years in Ontario around the turn of the century and the levels were much lower than that, through TSP is a broader category than PM_{10}.

Carbon monoxide (CO) is often mentioned as an air pollutant of concern because it is lethal in high doses but, as **figure 2.3** shows, levels in Toronto declined steadily from 1974 to the end of the record in 2004, and in Sudbury it was always quite low. This is especially noteworthy since CO is mainly associated with motor vehicles and the number of cars on the road grew every year of the sample. CO is only measured in four locations in Ontario now and rarely exceeds one part per million (PPM), well below the clean-air standard of 6 ppm.

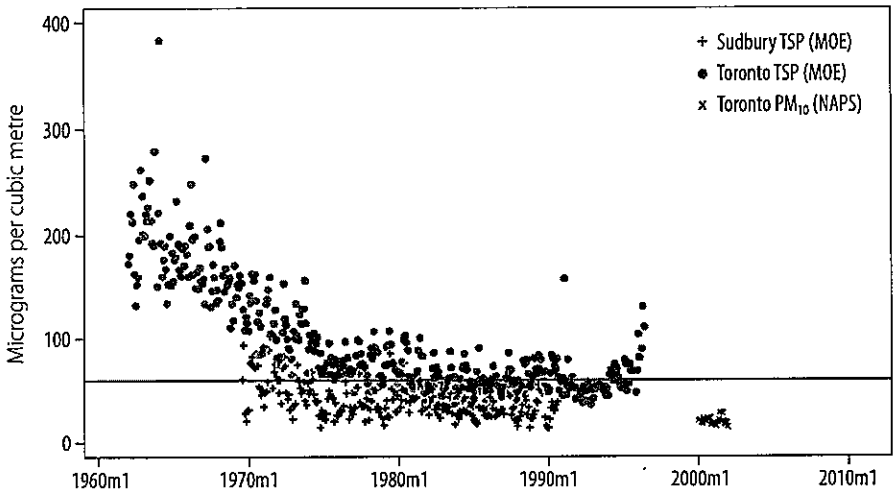
1 Hourly readings are posted online at <www.airqualityontario.com>.

Figure 2.1: Toronto and Sudbury SO_2 concentrations, 1961 to the present



Note: Horizontal line shows the Ontario most stringent air quality standard for SO_2.
Sources: MOE: Ontario Ministry of Environment, unpublished data; NAPS: Environment Canada, 2012.

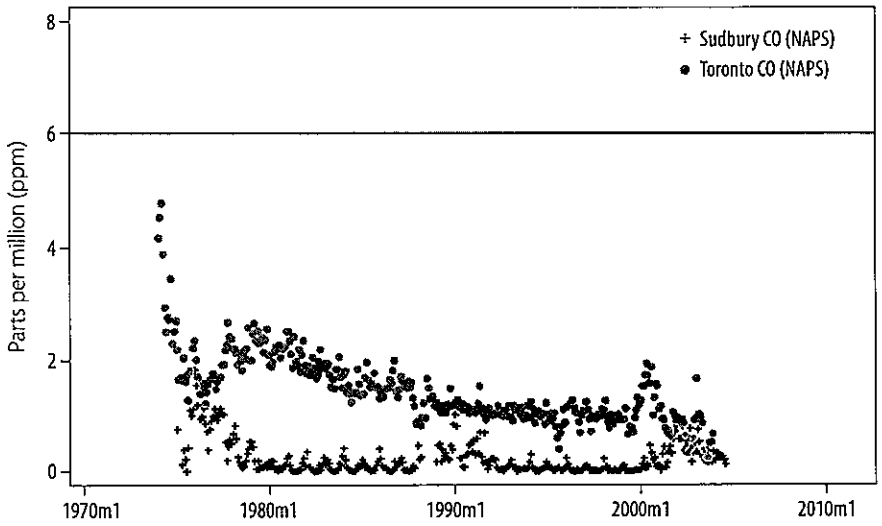
Figure 2.2: Toronto and Sudbury TSP and PM_{10} concentrations, 1965 to 2002



Note: Horizontal line shows the Ontario most stringent air quality standard for Suspended Particulate Matter.
Sources: MOE: Ontario Ministry of Environment, unpublished data; NAPS: Environment Canada, 2012.

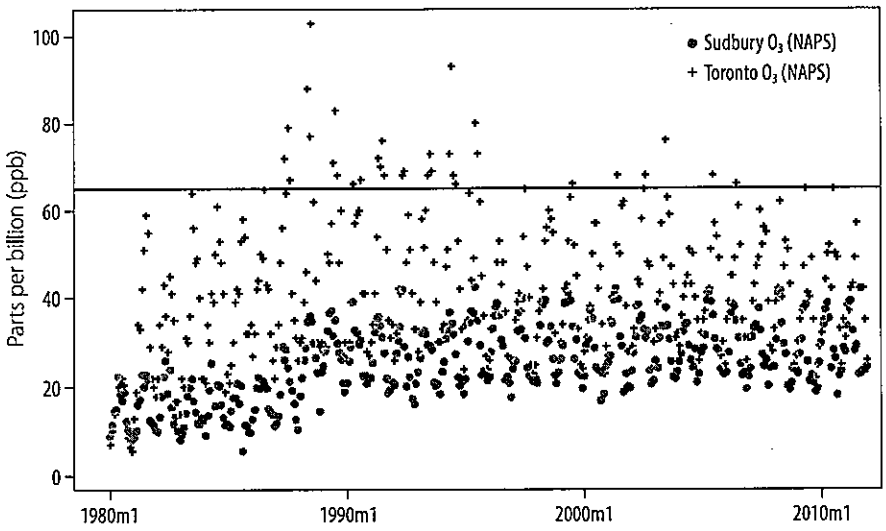
Average ground level ozone (O_3) levels rose slightly from the 1970s to 1990, then remained relatively constant thereafter to the present. Average monthly levels have not exceeded 40 ppb in either Toronto or Sudbury since 1974. Of more concern are the summertime peaks, since ozone formation occurs on hot, still days when conditions are right for the chemical reaction to occur. Figure 2.4 shows the monthly 99th-percentile levels of O_3 in Toronto and Sudbury since 1974 (in other words, the cut-off for the top 1%

Figure 2.3: Toronto and Sudbury CO concentrations, 1974 to the present



Note: Horizontal line shows the Ontario most stringent air quality standard for CO.
Source: NAPS: Environment Canada, 2012.

Figure 2.4: Toronto and Sudbury O_3 monthly 99th percentile concentrations, 1974 to the present



Note: Horizontal line shows the Ontario air quality standard for O_3.
Source: NAPS: Environment Canada, 2012,

of readings in each month). Toronto peak readings were highest in the late 1980s and have declined since then. For the past seven years, they have remained below the Ontario standard of 65 ppb. Sudbury peak ozone levels have remained constant at between 15 and 40 ppb since 1990, well below the clean air standard.

The pattern of improvement in Ontario's air quality is no secret. Every year, the Ontario MOE publishes its report, *Air Quality in Ontario*, presenting a detailed survey of the data and a review of trends, mainly over the previous decade.[2] The 2010 report begins, as many of the previous ones do as well, with the observation: "Overall, air quality has improved significantly over the years, especially for nitrogen dioxide (NO_2), carbon monoxide (CO) and sulphur dioxide (SO_2)—pollutants emitted by vehicles and industry". The 2010 report noted that: "The provincial Ambient Air Quality Criteria (AAQC) for NO_2 and CO were not exceeded at any of the ambient air monitoring locations in Ontario during 2010" (MOE, 2010: i). Nor were 24-hour standards for SO_2 exceeded anywhere, nor were standards for fine particulate ($PM_{2.5}$) exceeded.

2.2 Effects on Ontario's air quality of the coal phase-out

The Province has always focused on the goal of closing the coal-fired power plants as a key rationale for the GEA. For example, the foreword to the Provincial Long-Term Energy Plan states:

> Worst of all, Ontario relied heavily on five air-polluting coal plants. This wasn't just polluting our air, it was polluting our lungs. Doctors, nurses and researchers stated categorically that coal generation was having an impact on health increasing the incidence of various respiratory illnesses. A 2005 study prepared for the government found that the average annual health-related damages due to coal could top $3 billion. For the sake of our well-being, and our children's well-being, we had to put a stop to coal. (Ontario, Ministry of Energy, 2010: 2)

In response to criticisms of the GEA in a report of the Provincial Auditor-General the Province again pointed to the closure of the coal plants as a priority (AGO, 2011: 92).

The Province's reliance on the 2005 study prepared for the Ministry of Energy (DSS, 2005) cited in the quotation above is highly misleading. For one thing, the report neither examined nor recommended adoption of wind, solar, or other renewable energy as a replacement for coal. And, more importantly, it ignores the most important finding of that report, which is that closing the Lambton and Nanticoke power plants would have extremely small effects on Ontario air quality.

This (confidential) report to the Ontario Ministry of Energy (DSS, 2005) was prepared by DSS Management Consultants using air-quality simulations performed by analysts at RWDI Engineering. DSS examined four scenarios for

2 They are available annually since 1998 at <http://airqualityontario.com/press/publications.php>.

the future of Ontario's electricity generating system. Scenario 1 was the base case, a continuation of business-as-usual. Scenarios 2 and 3 examined different combinations of extra nuclear and gas facilities to replace the Lambton and Nanticoke coal-fired power plants, and Scenario 4 looked at completing a retrofit of the coal plants that would entail upgrading its pollution control equipment. None of the scenarios studied considered or recommended investment in wind, solar, or other renewable forms of energy.

DSS found (2005: 72) that shutting down the coal-fired power plants would have extremely small effects on the two air contaminants that currently determine the Ontario Air Quality Index: ground-level ozone (O_3) and PM_{10}. In the City of Toronto, shutting down the power plants would yield a an ozone reduction of only 0.02 parts per billion (PPB), roughly $^{2}/_{100}$ of 1% of average daily readings. This is identical to the predicted reductions under the retrofit scenario. PM_{10} levels would fall by 1.1 $\mu g/m^3$, essentially the same as the reduction under the retrofit scenario (0.8 $\mu g/m^3$) and, again, only a small percentage of average daily levels. The same minuscule changes were projected in 57 locations across the province, except for Haldimand-Norfolk Region, in the vicinity of the Nanticoke plant, where ozone levels would fall by just under 1 ppb and PM_{10} levels by 2.7 $\mu g/m^3$.

The report by by DSS Management Consultants used some simple spreadsheet calculations to attach massive health and environmental benefits to these small changes, which led to their conclusion that shutting down Lambton and Nanticoke and replacing them with new nuclear and gas-fired power plants would pass a cost-benefit test. The modeling technique used to compute such large health effects from very small changes is rather implausible (see Green et al., 2002; McKitrick, 2004). For example, it relies on assumed health impacts from current low levels of air pollution that, if applied to the much higher levels observed in the past, would predict that more than 75% of all non-traumatic deaths in Ontario in the late 1960s and early 1970s were due to air pollution rather than the causes reported at the time (such as old age, cancer, stroke, and infectious diseases), and even in some cases it would predict more deaths due to air pollution than there were deaths from all causes. But, notwithstanding the implausible health effects model, the main point to emphasize is that the 2005 report to the Minister of Energy clearly showed that closing the Lambton and Nanticoke coal plants would have very small effects on air quality, and the outcome would be effectively indistinguishable from simply completing the retrofit then underway.

An additional benefit to retaining the pre-2009 generating fleet is that the province's distribution grid is configured to support it. By shutting down generating capacity at existing plant sites and developing new capacity in locations far away from the current grid, the Province must now incur the costs of developing a new transmission system. Figures from the Auditor-General's report (AGO, 2011: 115) show that, of the $2 billion in committed

expenditure on transmission grid upgrading, between $1.3 and $1.7 billion is related to new renewables generating capacity. This spending would not have been necessary if the Province had pursued the retrofit option on the existing power plants. And, even with these new transmission projects, the majority of planned renewable power sources will still not be connected and will require even further spending.

2.3 Potential growth in air emissions from expanding renewables

Electricity supply is divided into base-load capacity, which comes from sources like hydroelectric and nuclear that deliver a fixed amount of power that cannot easily be adjusted up or down on short notice, and peak capacity, which can be scaled up and down as system demand changes through the day. Ontario power demand currently averages about 18,000 MW and reaches a maximum annual peak of about 26,000 MW. Using figures from the Ontario Power Authority and the Independent Electricity System Operator, the provincial Auditor-General projects average demand to decline to about 16,000 MW and peak demand to fall to about 24,000 MW (AGO, 2011: 99). Nuclear and hydroelectric facilities alone currently provide 18,000 MW of base-load capacity (Ontario, Ministry of Energy, 2010: 22–26). In addition, Ontario has 9,500 MW of gas capacity as well as 4,500 MW at the coal-fired power plants, much of which is unused. The AGO estimates Ontario will have at least 10,000 MW of surplus generating capacity through 2025 (AGO, 2011: 99).

Not only does Ontario have surplus power, but it has surplus base-load power, and this creates a problem for maintaining grid reliability as wind power expands. The GEA requires the system to buy all available wind energy. Depending on wind conditions, there can be a surge in production that needs to be absorbed. As will be shown below (section 3.2), wind power tends to peak when demand is at a minimum, so it either must displace base-load production or be dumped on the export market at a loss. Currently, the latter is the case, but if the next phase of expansion of the wind fleet is undertaken, the base-load capacity itself will have to be reduced, most likely by taking a nuclear generating unit offline. Calculations by the Ontario Society of Professional Engineers (Acchione, 2012) show that this not only inflates the cost of power generation unnecessarily but, since wind power must be nearly 50% matched by spinning gas-fired power as a backup in case of drops in wind (AGO, 2011: 91), shutting down nuclear facilities and replacing them with wind turbine installations will result in higher greenhouse gas and air pollution emissions. Consequently, further expansion of wind (or solar) power will work against the province's environmental goals.

2.4 Conclusions

- There has been a long-term pattern of improvement in Ontario's air quality beginning at least in the 1980s. By 2000, most types of air contamination had fallen or stabilized at levels below the most stringent provincial air quality standards.

- While Toronto average ozone levels in the 1990s were above those in the 1980s, summertime peak ozone levels declined after 1990 and by 2009 were within the clean air standard. Summertime peak ozone levels were also steady or declining elsewhere in the province, as were fine particulate levels.

- There was no pattern of non-compliance in Ontario with air quality objectives as of 2009 when the Green Energy Act was introduced, nor was there a trend towards non-compliance.

- Data in the DSS report supplied confidentially to the Ontario Ministry of Energy in 2005 estimates that closing down the coal-fired power plants would have yielded such minuscule changes to air quality as to be unnoticeable in most locations. Nearly identical changes could have been obtained using conventional pollution control measures.

- The DSS report did not consider or recommend adoption of wind or solar energy to replace coal, hence its continued citation by the Province as a rationale for this decision is misleading.

- Further expansion of wind power in Ontario will require expensive changes to the transmission grid since the new generating facilities are not in the same locations as the current ones. About $1.5 billion in new spending will be required to accommodate renewable power initiatives under the GEA.

- Ontario not only has surplus power, but has surplus base-load power. Consequently, further expansion of wind generating capacity will likely displace nuclear facilities and lead to an increase in air pollution emissions due to the need for expanded gas-fired backup capacity to match new wind turbine installations.

3 Cost-effectiveness analysis of the GEA path

3.1 Conventional abatement as an alternative to the GEA

Ignoring for a moment the problem of surplus power, we turn to the question of whether switching to renewables (mainly wind) is a cost-effective strategy for achieving environmental improvements associated with closing the coal-fired power plants. DSS Management Consultants (2005) concluded that the average annual financial cost (in $2004) of maintaining and upgrading the existing power generating mix would be $985 million over the 2005 to 2026 horizon, which is $1.09 billion in $2010.[3] Scenario 4, the coal plant retrofit, would yield the emission reductions shown in **table 3.1**, and would raise the annual financial cost to $1.513 billion per year. Thus, for an additional $423 million per year, continuing with the partially completed retrofit and upgrade of the existing power plants would have cut NO_x emissions by about 75%, SO_2 by over 80%, and PM_{10} by 95%, yielding improvements in air quality that were projected to be effectively the same as those from shutting down the plants altogether.

Greenhouse gas costs were also considered by DSS (2005). Their figures show (2005: 32–33) that, if offset credits sufficient to cover annual CO_2 emissions were purchased at $15/tonne, the cost of the retrofit scenario would increase by $394 million per year. This would bring the total cost of the retrofit scenario up to $817 million ($2010) per year. By comparison, the province is now spending far more on GEA-related options that have not even begun to provide the same capacity as the coal-fired power plants. In addition to the $1.3 to 1.7 billion in new grid spending mentioned above, the Ontario government spends over $1.1 billion annually just on the Clean Energy Benefit (Ontario, Ministry of Finance, 2012: line 2905), which only provides partial relief to households to compensate for GEA-related increases in the cost of electricity. According to the Auditor-General of Ontario (AGO, 2011), this benefit offsets about half the additional cost to households arising

3 The January 2004 All-Items Ontario CPI was 103.4 and at January 2010 it was 114.5, implying an inflation factor of 1.107, which is applied throughout this section to convert $2004 to $2010.

Table 3.1: Estimated reductions in air pollutant emissions (grams/kWh) from completing the retrofit on the Lambton and Nanticoke generating stations

Generating Station	Generating Unit	NOx	SO2	PM10
Lambton	1	–73%	–87%	–95%
	2	–73%	–87%	–95%
	3*	0*	0*	0*
	4*	0*	0*	0*
Nanticoke	1	–75%	–82%	–95%
	2	–75%	–82%	–95%
	3	–75%	–82%	–95%
	4	–75%	–82%	–95%
	5	–71%	–82%	–95%
	6	–75%	–82%	–95%
	7*	0	–82%	–95%
	8*	0	–82%	–95%

Note: *: units partially or completely retrofit already at the time of the study.

Source: DSS, 2005: 55, 63.

to date from implementation of the GEA, implying that the GEA provisions are already costing Ontario households over $2.2 billion annually. The AGO also estimated (2011: 94) that by 2014 the total cost of the Global Adjustment will be $8.1 billion annually, of which about one third ($2.7 billion) will be attributable to renewable energy contracts. Taking the renewable-related grid spending to be worth $120 million[4] annually, the foregoing considerations add up to just over $5 billion annual costs to Ontario households from the GEA, more than six times the cost of the retrofit option that would have yielded essentially equivalent environmental benefits.

But, the comparison is still not valid, since the renewable power contracts signed under the GEA do not yield anywhere near sufficient power to replace the Lambton and Nanticoke plants. Due to the fluctuating nature of wind generation, new wind-turbine capacity must be matched almost 50% by coal- or gas-fired backup generators. Since the coal plants are slated for closure, this requires new gas generators to be built but, during the last election campaign, the province canceled construction plans for two such plants (owing to political pressure), setting the construction process back and raising the eventual cost by at least $800 million (Carr, 2012, November 28). Adding the annualized cost to the numbers so far yields a $5.1 billion annual burden

4 A 20-year annuity at 5% interest yields a adjustment factor of 12.5, so $1.5 billion total divided by 12.5 implies $120 million annually.

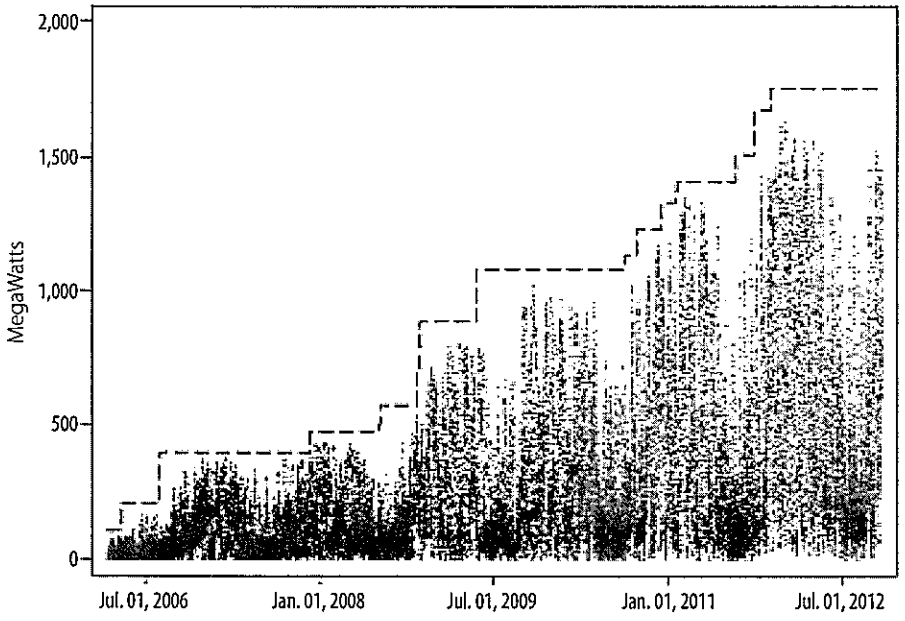
on households from the GEA. And this is just the tip of the iceberg. Structural inefficiencies associated with wind energy mean the costs of replacing the lost generating capacity associated with Lambton and Nanticoke are many multiples of those incurred so far, as is explained in the next section.

3.2 Structural inefficiencies of wind energy

Figure 3.1 shows the development of wind energy in Ontario from 2006 to the present, based on figures from the website of the Independent Electricity System Operator (IESO). The dashed line traces out the growing total capacity over time, and the dot pattern shows hourly total production from installed wind turbines. Current total capacity is 1,754 MW. As is clear, output rarely gets close to installed capacity. Figure 3.2 plots a histogram of hourly output as a fraction of total available capacity. Over the entire period from 2006 to 2012, wind output averaged 27.5% of rated capacity, and since 2009 it averaged 28.7% of rated capacity. Power output was one tenth or less of rated capacity nearly a quarter of the time, and less than a third of rated capacity nearly two thirds of the time.

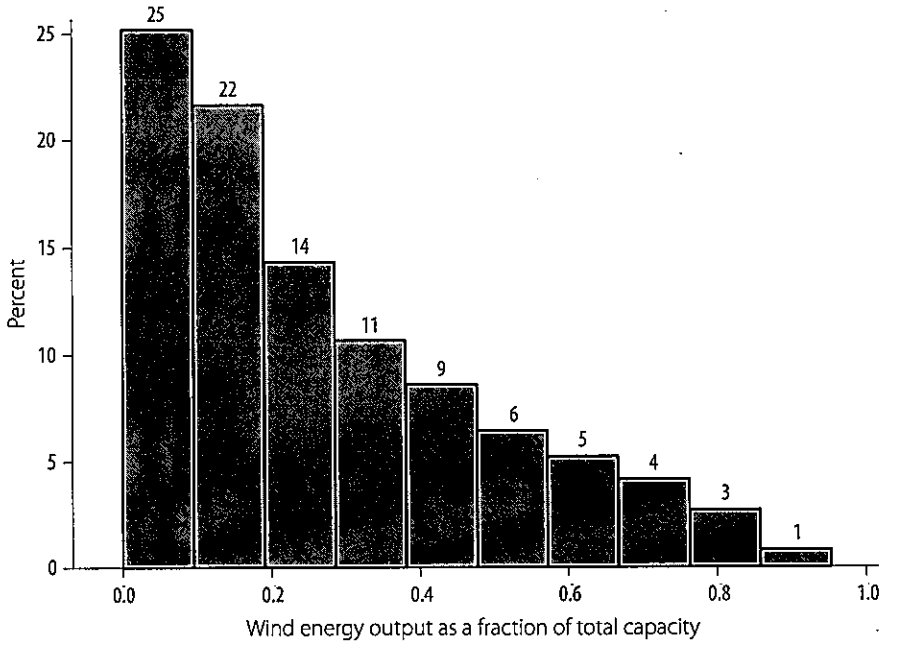
The mismatch between wind energy and demand is structural and unique to wind. As the AGO report noted (2011: 111), wind turbine output declines in the morning while demand is coincidentally ramping up, and rises

Figure 3.1: Development of wind energy production in Ontario



Note: Figure shows hourly output compared to total available capacity.
Sources: IESO, 2012; author's calculations.

Figure 3.2: Percentage histogram showing distribution of hourly wind production in Ontario relative to total capacity

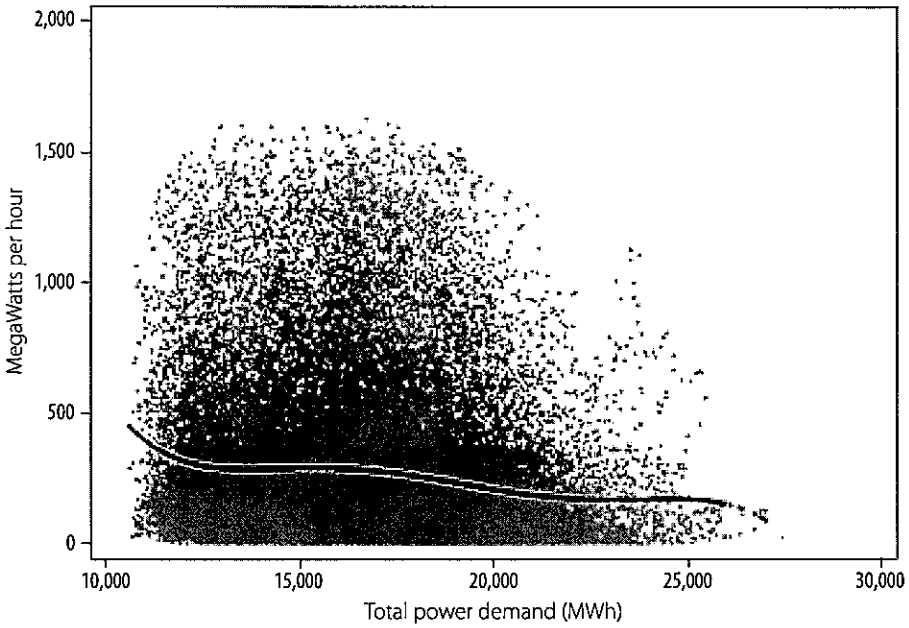


Note: Numbers on top of bars show percentages associated with each bin. Leftmost bar indicates that 25% of the time, output is about 10% of available capacity; two leftmost bars show that 47% of the time output is under 20% of available capacity, and so on.
Sources: IESO, 2012; author's calculations.

in the evening as demand is winding down. Also, wind output peaks in the fall when seasonal demand is minimal because households are typically no longer using air conditioning nor have they yet started up wintertime electric heating systems. Figure 3.3 shows a scatter plot of total wind production against total Ontario-wide system demand. The black line is a smoothed polynomial regression fit. On average, as power demand increases by 1%, wind production coincidentally declines by 1.1%. This is not a cause-and-effect relationship, but reflects the fact that wind conditions favour power generation at times that coincide with minimal system power demand, and vice versa.

Closing the Lambton and Nanticoke power stations removes a total of about 7,500 MW of generating capacity in Ontario, and wind power is eventually supposed to replace about 4,800 MW (64%) of that (Ontario, Ministry of Energy, 2010). To make an apples-to-apples comparison with the retrofit option we need to take into account the intermittence and seasonal concentration of wind. The output level of a coal-fired power plant is not affected by seasons, and can be varied (up to the rated capacity) by the operator to match variations in demand. But the maximum output level of a wind turbine is not controllable since it depends on wind strength. Over the course of a year, we have seen that output averages just under 30%

Figure 3.3: Total Ontario hourly wind power output (MWh) compared to total system demand, 2006–2012



Sources: IESO, 2012; author's calculations.

of the rated output. Since 2009, the monthly average output fraction has tended to peak in November at 41%, and reaches a minimum in July at 14%. Thus, to be assured of getting a monthly average of 1 MW of power from wind turbines during any month of the year would require a minimum of 2.4 MW of available wind turbine capacity in November, rising to 7.0 MW in July. Consequently, to get 4,800 MWh from wind turbines in July would require installing 33,600 MW in new capacity.

If we aim only to get 4,800 MW of wind energy averaged over the whole year, rather than over each month, we will need 16,000 MW of installed capacity, roughly ten times the amount installed to date. The Province's *Long Term Energy Plan* assumes that 78% of new renewable energy installed between now and 2030 will be wind power (Ontario, Ministry of Energy, 2010: figure 5). Assigning this fraction to the annualized costs of renewable energy estimated above ($5.1 billion) implies a current burden of $4 billion annually to Ontario households. To expand this 10-fold from current levels, even if we ignore the Mississauga gas plant debacle and the costs of transmission line expansion, would imply liabilities rising to $38 billion annually, to replace only 64% of the generating capacity lost with the closure of Lambton and Nanticoke.

An additional problem for Ontario, as highlighted by the AGO report (2011: 112) is the fact that most wind energy in Ontario is surplus to base

needs and must be exported at a significant loss per kWh. **Figure 3.4** plots hourly wind production against hourly net exports of electricity since 2009. Ontario is a net exporter when domestic production exceeds demand. The 45° line indicates the level of production below which wind output is less than net exports, in other words, is not needed domestically. Since 2006, 81.6% of the wind energy production in Ontario occurred at times when it was unneeded, in other words when at least as much power production was being dumped on the export market. Since 2009, the fraction was 81.8% and, since 2011, it was 78.5%. Because of the provisions of the Green Energy Act, the system operator is required to buy all available wind power at 13.5¢ per kWh, well above the domestic market price, and prices received for exported power are typically less than 4¢ per kWh (AGO, 2011: 112). They are even negative at times, meaning that the electricity-system operator has to pay other jurisdictions to take the surplus power. The AGO estimated (2011: 112) that from 2005 to 2011 Ontario lost $1.8 billion on these transactions. The IESO data, using the assumption that power is purchased at 13.5¢/kWh and sold at 4¢/kWh when exported, implies that the current wind power system imposed costs of just over $24,000 per hour of operation in 2011, and cost the Province $210 million.[5] This amount must either be added to the provincial deficit or added to ratepayers' bills.

The numbers examined so far indicate that in the years leading up to 2009 the province had two options for developing the power generating infrastructure, both of which would yield roughly equivalent environmental benefits:

- complete the retrofit of the Lambton and Nanticoke generating stations and purchase carbon offsets at a combined cost of $817 million annually;

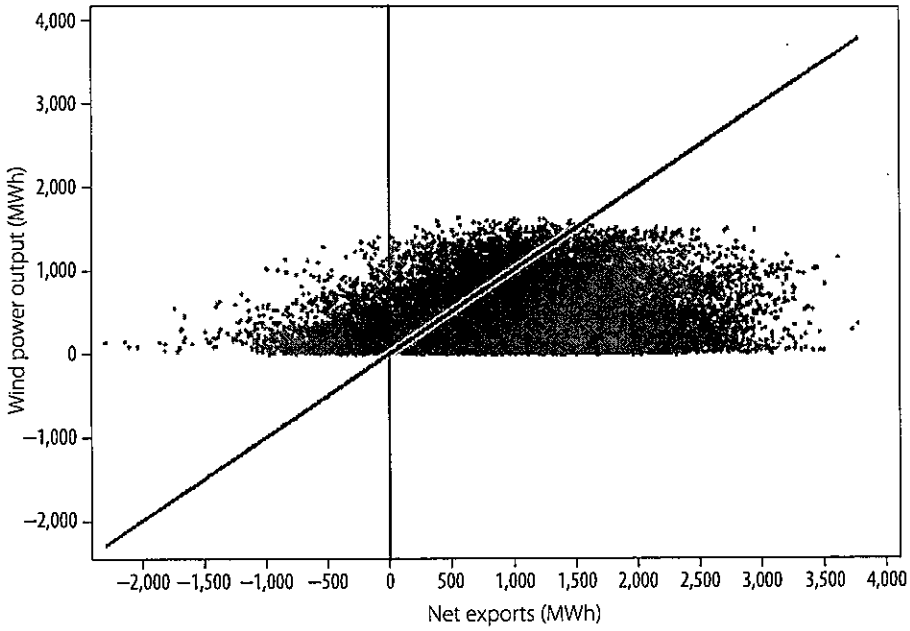
- pursue the renewable power strategy under the GEA, which currently costs $5.2 billion annually to supply about one tenth of the eventually intended level of power, and will eventually cost about $38 billion annually if implemented on a scale sufficient to provide 12-month replacement of at most 64% of the capacity lost by closing Lambton and Nanticoke.

On a cost-ratio basis this implies the GEA path is currently ten times costlier than the retrofit option, and will eventually be 73 times costlier if pursued to the point of providing 4,800 MW of year-round generating capacity.[6]

5 The IESO has now confirmed that exports are costing it about $200 million annually, and that these costs are passed on to ratepayers; see Spears, 2013, February 26.

6 ($5.2b ÷ $0.817b) ÷ 0.64 = 9.9; ($38b ÷ $0.817b) ÷ 0.64 = 72.6.

Figure 3.4: Ontario wind power output compared to net electricity exports, 2009–2012



Note: 45° line shows level below which wind power is less than net exports; that is, is not needed in Ontario that hour.
Sources: IESO, 2012; author's calculations.

Summary

- The 2005 report by DSS Management Consultants routinely cited by the Province in defence of its decision to implement the GEA never recommended renewable power. It outlined a plan based on retrofitting the existing power plants that would yield effectively identical environmental benefits to phasing out coal at a cost of about one tenth of what is currently being spent on renewable energy.

- Wind power in Ontario is heavily concentrated at times of the year when demand is at a minimum, and declines during times when demand is rising. Consequently about 80% of Ontario wind energy is generated at times when there is no demand for it domestically, requiring it to be exported at a loss of about 9¢/kWh, at an annual cost of about $200 million. The Ontario power system loses about $24,000 every hour wind turbines operate.

- Wind turbines operate at about 27% of rated capacity on average over the year, falling to 14% during the peak demand periods in summer. Hence, to replace 1 MW of coal power with year-round wind power will require 7 MW of new wind capacity.

- Based on the observed costs of the small amount of renewable (mainly wind) generation installed to date, to achieve 4,800 MW of year-round generating capacity from renewables will end up costing about 73 times the annual cost of the retrofit option.

- This calculation does not take into account the economic harm from higher industrial power costs, nor the loss of property values and quality of life from installation of wind turbines in rural areas.

4 Economic impacts on mining, manufacturing, and forestry

4.1 Lack of provincial analysis

This section considers the economic impacts of the electricity price increases under the GEA. Unfortunately, the government of Ontario provides no numbers to compare against, since it did not conduct its own analysis prior to bringing in the Act. The Auditor-General of Ontario (AGO, 2011) has criticized the carelessness of the process behind the adoption of the GEA:

> Because the ministerial directions were quite specific about what was to be done, both the Ministry and the OPA directed their energies to implementing the Minister's requested actions as quickly as possible. *As a result, no comprehensive business-case evaluation was done* to objectively evaluate the impacts of the billion-dollar commitment. Such an evaluation would typically include assessing the prospective economic and environmental effects of such a massive investment in renewable energy on future electricity prices, direct and indirect job creation or losses, greenhouse gas emissions, and other variables.(AGO, 2011: 89, emphasis added).

The AGO report goes on to say:

> Billions of dollars were committed to renewable energy without fully evaluating the impact, the trade-offs, and the alternatives through a comprehensive business-case analysis. Specifically, the OPA, the OEB, and the IESO acknowledged that
>
> - no independent, objective, expert investigation had been done to examine the potential effects of renewable-energy policies on prices, job creation, and greenhouse gas emissions; and
> - no thorough and professional cost/benefit analysis had been conducted to identify potentially cleaner, more economically productive, and cost-effective alternatives to renewable energy, such as energy imports and increased conservation. (AGO, 2011: 97)

The analysis in this section attempts partially to remedy that by undertaking a basic economic evaluation of the effects of the price increases that will be required to support the GEA. Other authors have also attempted to fill in the gaps left by the Province's failure to provide a proper analysis of its own policy. Angevine et al. (2012) reported simulations from a Statistics Canada Input-Output model that predicted the GEA provisions would lead to an overall employment drop of 2,200 to 2,500 Full-Time-Equivalent jobs in Ontario. The Ontario Task Force on Competitiveness, Productivity and Economic Progress (2010) estimated that each of the jobs claimed to have been created under the GEA would cost the province $42,000 per worker, and noted that German experience with similar feed-in-tariff subsidies led only to short-term job creation, followed by longer term decline as the effects of higher electricity costs began to emerge.[7] The model developed in this section focuses on predicting the impact on unit costs and the return to capital should the forecast increase in electricity prices come to pass in the years ahead.

4.2 Comparison of electricity costs between Ontario and other jurisdictions

The AGO report (2011) indicates that by 2014, the Global Adjustment will likely be 6¢ per kilowatt hour (kWh). Since, prior to 2006, the retail price in Ontario used to be about 5¢/kWh, this reflects a doubling of electricity costs in under a decade, mitigated somewhat by an expected reduction of the wholesale generating price to about 3¢/kWh.

A comparison of Ontario electricity prices to those of other jurisdictions shows how much the prices faced by large power users have worsened in relative terms. **Table 4.1** lists average costs in ¢/kWh inclusive of taxes for Toronto, Ottawa and nine other North American cities. In 2008, Toronto and Ottawa were in the middle of the range when ranked by rates for large power consumers and residential customers. But, by 2012 these two cities had become the second- and third-most expensive after yielding the second- and third-largest price increases in each category.

It is noteworthy that New York was roughly twice as expensive as Toronto in 2008 for medium- and large-demand power users but, by 2012, the differential for medium-sized power users was just over 50%, and 9% for large power users. Also, the US Energy Information Administration points out that because natural gas prices in the United States are declining, so are electricity prices, and this trend will continue over the next few years (EIA, 2012).

7 A similar failure of green energy subsidies to create jobs has been noted in California; see Carroll, 2013, February 27.

Table 4.1: Comparison of electricity rates in 11 North American cities for residential, medium, and large consumers, 2008 and 2012

City	Province	Residential	Medium	Large
			2008 (¢/kWh)	
Winnipeg	Manitoba	7.38	5.70	3.55
Vancouver	British Columbia	7.55	6.02	4.31
Montreal	Quebec	7.69	8.02	5.05
Regina	Saskatchewan	12.55	9.79	6.16
Nashville	Tennessee	9.45	9.15	6.56
Toronto	**Ontario**	**11.72**	**10.08**	**8.88**
Ottawa	**Ontario**	**11.14**	**9.98**	**9.09**
Chicago	Illinois	12.72	12.79	9.77
Edmonton	Alberta	14.12	12.76	10.18
Boston	Massachusetts	19.12	17.64	15.17
New York	New York	22.93	20.10	16.83
			2012 (¢/kWh)	
Winnipeg	Manitoba	8.54	6.58	3.92
Montreal	Quebec	7.77	8.27	5.18
Chicago	Illinois	13.60	7.98	6.12
Regina	Saskatchewan	14.42	10.94	6.84
Edmonton	Alberta	13.55	11.63	7.32
Vancouver	British Columbia	9.42	7.92	7.38
Nashville	Tennessee	10.29	9.72	7.44
Boston	Massachusetts	16.45	13.00	10.45
Toronto	**Ontario**	**13.81**	**12.91**	**11.82**
Ottawa	**Ontario**	**13.37**	**12.91**	**11.95**
New York	New York	24.54	19.52	12.88
			% change	
Winnipeg	Manitoba	15.7%	15.4%	10.4%
Montreal	Quebec	1.0%	3.1%	2.6%
Chicago	Illinois	6.9%	−37.6%	−37.4%
Regina	Saskatchewan	14.9%	11.7%	11.0%
Edmonton	Alberta	−4.0%	-8.9%	−28.1%
Vancouver	British Columbia	24.8%	31.6%	71.2%
Nashville	Tennessee	8.9%	6.2%	13.4%
Boston	Massachusetts	−14.0%	−26.3%	−31.1%
Toronto	**Ontario**	**17.8%**	**28.1%**	**33.1%**
Ottawa	**Ontario**	**20.0%**	**29.4%**	**31.5%**
New York	New York	7.0%	−2.9%	−23.5%

Note: medium consumer: power demand = 1,000 kW; large consumer: power demand = 50,000 kW.

Source: Hydro Quebec (2008, 2012).

Based on projections by the AGO (2011), as well as a detailed analysis by Sharp (2012), electricity costs in Ontario for users in all categories are expected to rise by between 40% and 60% by 2015. This will put Ontario's cities into the most expensive category in North America, wiping out a relative cost advantage that persisted up to about 2008.

In an attempt to avoid these price shocks, the Province has recently announced a conditional subsidy program for large industrial power users in Ontario. The proposal requires users to commit to substantial additional hiring in exchange for subsidies to reduce electricity rates. There are several problems with this proposal. First, its implementation has been repeatedly delayed and, like much else in the GEA, the costs have not been calculated. Since the province is facing a serious deficit problem as it is, there is some difficulty making a credible commitment to a new, open-ended subsidy program. Second, the requirement to add unintended hiring imposes direct costs on firms that will, depending on how stringently they are enforced, offset the benefit of the subsidy. Third, the announcement of the subsidy adds yet another distortion to the Ontario energy pricing mix. Feed-in-Tariff (FIT) rates distort the energy-supply decision by inducing excess production of unnecessary and costly wind power, then the Clean Energy Benefit and the large-user subsidy distort the consumption decision in a partially offsetting way. These price distortions waste tax revenues and create excess burdens throughout the economy. The analysis in this section proceeds on the assumption that electricity prices will rise by 50%, since the measures proposed to partially offset this increase in some sectors will impose other costs, and may only be temporary in any event.

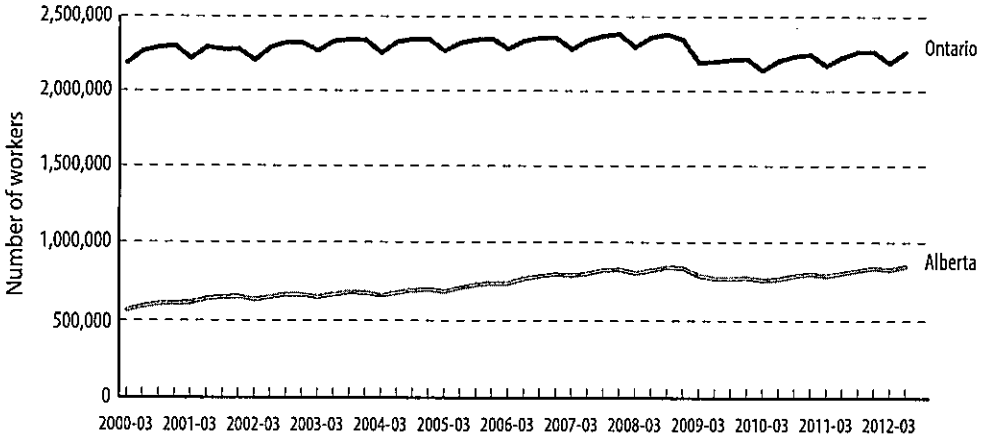
4.3 Effects on competitiveness

Overall employment has been stagnant in Ontario for a decade. Figure 4.1 shows the evolution of total industrial employment in Ontario and, for comparison, Alberta since 2000. This graph includes all employment in forestry, extraction, utilities, construction, manufacturing, wholesale and retail trade, and transportation. While employment in Ontario remained static, in Alberta employment grew by about 50% from 2000 to 2012.

The hardest-hit sectors in Ontario were manufacturing and forestry, in which employment fell by 30% and 50%, respectively. Figure 4.2 shows employment indexes by sector since 2000. The job losses in forestry and manufacturing offset gains in other sectors. Over the 13 years from 2000 to 2012, total employment in Ontario grew only 3.5%.

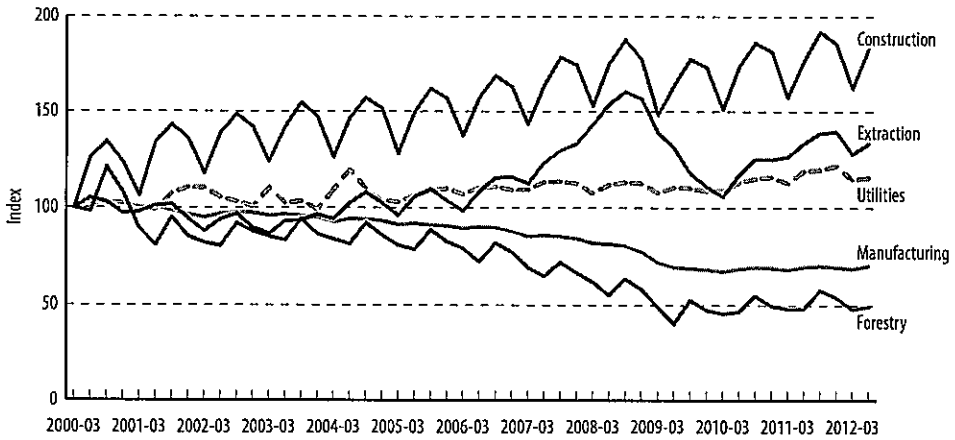
Hence the situation for Ontario employers for the past 10 to 15 years can be described as challenging. Manufacturing was traditionally the largest employer in the province and as of 2000 had almost 80% more employees

Figure 4.1: Total industrial employment in Ontario and Alberta, 2000–2012



Source: Statistics Canada (CANSIM) Employment series; author's calculations.

Figure 4.2: Employment indexes by sector in Ontario, 2000–2012



Note: first quarter 2000 = 100.
Source: Statistics Canada (CANSIM) Employment series; author's calculations.

than the retail trade sector. Its decline over the subsequent 12 years was so steep that it now has a smaller workforce than the retail sector.

The prospect for growth in any sector depends ultimately on the return to investment. Basic economic theory tells us that sectors that earn high rates of return on capital attract investment and expand, creating new employment opportunities. Similarly, where the rate of return on investment declines, so does investment, and employment in turn stagnates or declines. To assess the likelihood that the GEA will lead to gains or losses in employment in manufacturing and other major sectors, we need to assess the likely effects on the return to investment. The next section employs an econometric model to do this, and shows that in each of mining, manufacturing, and forestry, the rate of return to capital will likely fall, leading to net job losses.

These losses will be of a permanent nature, persisting as long as energy prices remain elevated. The AGO report notes that, with regard to the province's claim that 50,000 jobs would be created by the GEA, 75% of them would be temporary construction jobs lasting at most a few years, and the province did not account for jobs lost in other sectors as a result of higher energy costs when arriving at the 50,000 figure (2011: 117–118). The AGO report cited studies from Europe that green-energy schemes led to job losses in other sectors two to four times larger than the employment gains in the renewables sector. The Ministry of Energy admitted (2011: 118) that it had not estimated potential job losses in other sectors, nor calculated the costs per renewable-energy job.

4.4 Estimated cost effects of GEA on the mining, manufacturing, and forestry sectors

Deriving quantitative estimates of the impact of a 50% increase in electricity prices on the mining, manufacturing, and forestry sectors requires estimating an econometric model of input demands per unit of output, then using the estimated parameters to predict the effects on unit costs. Input-output data are available from Statistics Canada for the 1961-to-2008 interval, but only for the country as a whole, so it is here assumed that the essential features of the Ontario industries are captured by data at the national level.

The econometric modeling work is described in the Appendix (p. 30). In general, an overall increase in unit costs can be predicted to have several short-run and long-run impacts. The short-run impacts are:

- loss of competitiveness in national and international markets;
- diminished profitability in the sector;
- downward pressure on wages and reduced returns for investors.

The long-run impacts derive from reduced profitability and competitiveness. At the margin, investment capital will exit the sector in response to a permanent loss in profitability. This will reinforce the short-run losses until a long-run equilibrium point is reached, in which marginal operators have left the industry and the remaining operators are able to generate competitive returns for investors at the new, higher operating costs.

An increase in the price of electricity can be expected to lead to decreased electricity demand, although the direct effects are unlikely to be large since energy demand elasticities tend to be small. There will also be cross-price effects, such that a short-run increase in labour demand might even be observed, since labour and energy are substitutes. However, this is

with reference to a preliminary outcome in which output remains constant and firms substitute away from the input that has become relatively more costly. The second-order effect is that the overall cost of production has risen, so the firm's output must fall as it gets priced out of markets at the margin. Also, with a reduced rate of return, capital will exit. This will lead to reduced demand for labour. The long-run effect on employment will therefore reflect the offsetting impacts of these changes and may, in principle, be positive or negative; but, for an input price shock of this size, it is very unlikely to be positive. The elasticities resulting from the estimation exercise are listed in table 4.2.

The largest elasticities are associated with labour demand. As expected, own-price energy-demand elasticities are smaller, especially in manufacturing where a 10% increase in the cost of energy leads only to a 0.6% reduction in demand in the short run. The largest own- and cross-price effects on energy demand are in the mining sector, which suggests it will experience the largest unit-cost effects from an electricity price shock. The cross-price effects between energy and other inputs are small across all three industries.

To set the stage for the empirical results, I first examine some historical trends related to electricity and energy in manufacturing, mining, and forestry in Canada. Figure 4.3 shows the reduction from 1961 to 2008 in energy per unit of output by sector. The graph is constructed so that each sector's index equals 1.0 in 1975. Each sector's energy efficiency showed substantial improvements over the 33 years after 1975. The energy needed to produce a unit of output fell by 55% in the mining sector, 62% in manufacturing, and 65% in forestry.

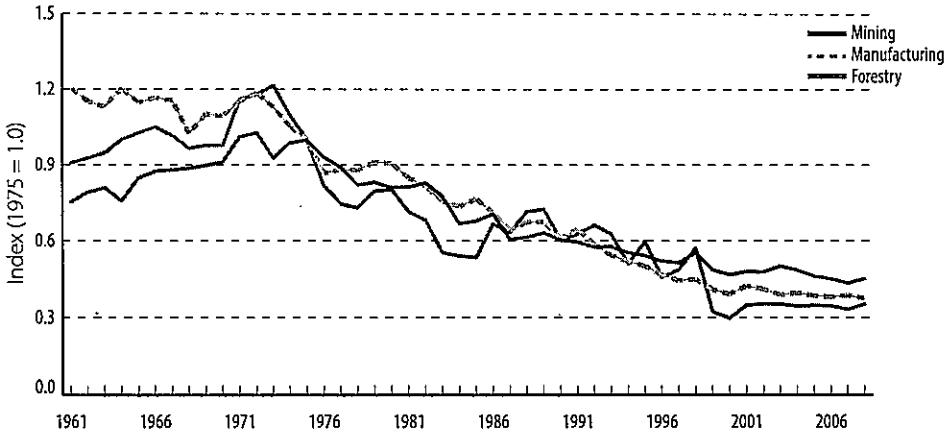
Spending on electricity as a proportion of total energy use is shown in figure 4.4. The forestry sector obtains about 90% of its energy from fuels, rather than electricity purchases, which leads us to predict that it will experience the

Table 4.2: Own- and cross-price elasticities relating input-output ratios to input prices for three Canadian industries

Elasticity	Mining	Manufacturing	Forestry
σ_{LL}	−0.467	−0.345	−0.566
σ_{LE}	0.348	0.102	0.162
σ_{LO}	−0.063	0.099	0.152
σ_{EE}	−0.273	−0.061	−0.207
σ_{EO}	0.093	0.013	−0.029
σ_{OO}	−0.012	−0.018	−0.229

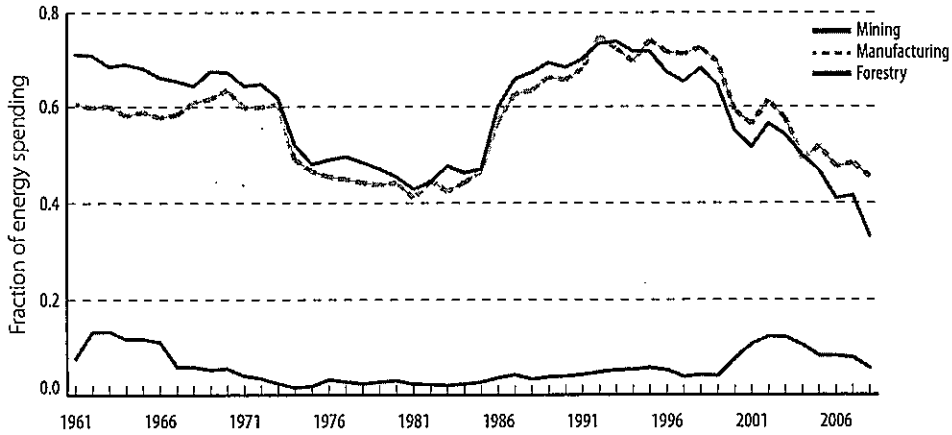
Codes for subscripts: *L*: labour per unit of output; *E*: energy per unit of output; *O*: other inputs per unit of output. Each entry shows the percentage change in first subscript (e.g., labour per unit of output) resulting from a 1% change in the price of the second subscript. For instance, a 1% increase in the price of energy would, other things being equal, increase demand for labour per unit of output in mining by 0.348%. Other cross-price elasticities follow by symmetry.

Figure 4.3: Energy required per unit of output for three Canadian industries, 1961–2008



Sources: Statistics Canada (CANSIM); author's calculations.

Figure 4.4: Spending on electricity as a fraction of total energy spending for three Canadian industries, 1961–2008

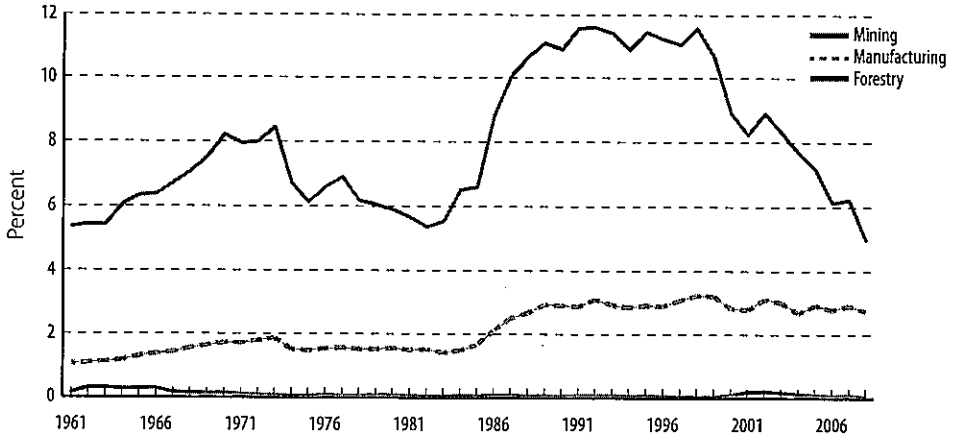


Sources: Statistics Canada (CANSIM); author's calculations.

smallest unit-cost impacts of the three sectors from an increase in electricity prices. Mining and forestry historically spent between 40% and 70% of their energy budgets on electricity, but since 2000 that fraction has fallen to 33% in the case of mining, while it was at 45% in the case of manufacturing as of the end of the sample. Hence, these two sectors can be predicted to exhibit larger impacts from increased electricity prices, although the final effect will depend on the input elasticities.

Figure 4.5 shows the results from the econometric model. As anticipated, the electricity price shock will have the largest effect on unit costs in the mining sector, followed by the manufacturing sector, and then forestry. Based on the input-output characteristics of Canadian industries as of 2008,

Figure 4.5: Estimated percentage increase in short-run unit costs resulting from a 50% increase in electricity price for three Canadian industries, by year from 1961 to 2008



Source: Statistics Canada (CANSIM); author's calculations.

the electricity cost increases forecast for Ontario under the Green Energy Act will increase unit costs of production by 5.0% in mining, by 2.7% in manufacturing, and by 0.04% in forestry. While the vulnerability of the manufacturing sector is below that of mining, the two have been converging in recent years. The mining sector's exposure to a unit cost shock through major electricity price hikes has fallen by about half since the 1990s, while that in manufacturing has held steady.

Finally, we can compute the effect on the industry rates of return using a simple model of capital shares. Suppose that the cost of production c is 80% of the selling price p and the profit rate π is 20%, or in other words $\pi = 0.2p$ and $c = 0.8p$. Then since $\pi = p - c$, we can compute the percentage change in profit per unit resulting from a 1% change in costs as follows:

$$\%\Delta\pi/\%\Delta c = \partial\pi/\partial c \times c/\pi = -c/\pi = -0.8p/0.2p = -4.$$

Thus, in an industry with a 20% margin on sales, a 3% unit cost increase will lead to a $-4 \times 3\% = -12\%$ change in the profit margin. In the same way, if the margin is only 10%, the reduction in profitability per unit from a 3% increase in unit costs is $3 \times -0.9\%.1 = 27\%$

According to the Statistics Canada Input-Output Tables (381-0028), the operating surplus for Ontario forestry firms averaged 11% of total costs in 2009 (the most recent year available), while for mining it averaged 28% and for manufacturing it averaged 8.6%. Combining these with the unit-cost elasticities estimated above implies that the rates of return in forestry, mining, and manufacturing will drop, respectively, by 0.3%, 12.9%, and 28.7% as a result of a 50% increase in electricity prices, as shown in **table 4.3**.

Table 4.3 Changes in unit costs and rates of return to capital in Ontario as a result of 50% increase in electricity costs

	Percentage change in unit costs due to 50% increase in electricity price	Percentage change in rate of return to capital
Mining	+5.0%	−12.9%
Manufacturing	+2.7%	−28.7%
Forestry	+0.04%	−0.3%

Source: author's calculations (see Appendix, p. 30).

Summary

The proposed modifications to the Ontario electricity system are expected to lead to a 50% increase in the price of electricity in the coming years. While the Province might try to cushion the blow with subsidy programs, they have not succeeded in doing so to date, the measures announced so far impose other costs (namely requirements for surplus hiring), and under conditions of a major deficit crisis there is diminished credibility to a long-term commitment for such spending. Hence, it is worth examining the potential effects on major sectors of a 50% increase in electricity costs. The short-run competitiveness effects of this rate increase can be estimated as follows:

- the mining sector will experience a 5% increase in the cost of production per unit of output, manufacturing 3%, and forestry less than 0.1%;
- based on 2009 operating surplus rates, this translates into expected reductions in the rate of return to capital of 0.3% in forestry, 12.9% in mining, and 28.7% in manufacturing.

Of particular note is the decline in the rate of return to manufacturing in Ontario, since this will exacerbate a long-term pattern of decline in that sector. The overall reductions in output and employment will depend on the number of firms that need to exit each sector in order to bring the marginal rate of return back to a competitive level.

5 Concluding comments

From the analyses above, we can draw the following conclusions.

1 As of 2009, air quality in Ontario had improved considerably compared to the 1960s, and showed no tendency to be getting worse. A confidential 2005 cost-benefit analysis for the provincial government, often cited by the Province as a defence of the GEA, in fact predicted that the closure of the coal-fired power plants would yield such tiny improvements to air quality as to be unnoticeable in most places.

2 The plan implemented under the Green Energy Act is already 10 times more costly per year than an alternative retrofit plan examined in 2005 that would have yielded the same environmental benefits as closing the coal-fired power plants. And, the GEA-based plan has so far only yielded a fraction of the electricity necessary to replace the coal-fired power plants. Expansion of renewables up to the scale outlined in the Long Term Energy Plan would make the GEA strategy 73 times more costly than the retrofit option.

3 Eighty percent of Ontario's wind power generation occurs at times and seasons so far out of phase with demand that the entire output is surplus and is exported at a substantial loss. The province has already lost close to $2 billion on such exports and currently loses, on average, $24,000 per operating hour on such sales, totaling $200 million annually. The loss rate will continue to grow with every new wind turbine installation, because the mismatch between the timing of wind-powered generation and Ontario electricity demand is structural.

4 Output of Ontario's wind turbines is below one-fifth of rated generating capacity about half the time, and below one-third of the rated capacity about two-thirds of the time. Due to fluctuating output, 7 MW of rated wind energy are needed to replace 1 MW of conventional power generating capacity. Consequently the cost of achieving the provincial targets for wind energy in the coming years will be far greater than has been acknowledged or, alternatively, will entail relying on sources that are unreliable depending on the season.

5 Electricity prices for large users in Ontario are now among the highest in North America and are expected to increase by 40% to 50% further, in large part to pay for costs incurred under the GEA. As a result, the effect of the Green Energy Act on Ontario industry will be to increase unit costs, diminish competitiveness, cut the rate of return to capital in key sectors, reduce employment, and make households worse off. The rate of return to capital in manufacturing will drop by about 29% if the projected increases in electricity prices are realized. The rate of return in mining will drop by about 13% and in forestry by about 0.3%.

6 The Province's claim that 50,000 jobs will be created by the GEA was unsupported by any formal analysis, and the Province has since admitted both that the vast majority of any GEA-related jobs will be temporary, and that the 50,000 figure does not account for offsetting permanent job losses due to electricity price increases under the GEA. Consequently, the claim has no basis in fact.

7 In regions afflicted by the proliferation of wind turbine installations, there are additional costs to households due to lost property values, rural environmental degradation, and increased health and stress problems. These have not been taken into account in this analysis but, were they to be considered, the overall cost burden of the GEA would be even higher.

Appendix Technical details of econometric model estimation for section 2

According to economic theory (e.g., Varian 1984), the function relating a firm's short-run total costs C to the vector of input costs and the output level can be written

$$C = c(\boldsymbol{p}, t, y) \tag{A.1}$$

where, in this case, $\boldsymbol{p} = \{p_l, p_e, p_o\}$ is the vector of input prices of, respectively, labour l, energy e, and other inputs o; t is a time index capturing technical progress and y is the output level. Capital is assumed to be exogenous, making this a short-run analysis. By Sheppard's lemma the input demand equations v_i can be computed using the first derivatives of (A.1) with respect to the corresponding prices. If we additionally assume constant returns to scale, we can express inputs per unit of output as functions of prices and technology:

$$\frac{v_i}{y_i} = \frac{\partial c(\boldsymbol{p},t)}{\partial p_i} \tag{A.2}$$

where $i = (l, e, o)$. I used a reduced-form translog cost function to obtain the system

$$\begin{aligned}
Log\,(v_l/y) &= a_{10} + a_{11}\,log(p_l) + a_{12}\,log(p_e) + a_{13}\,log(p_o) + a_{1t}\,t + e_1 \\
Log\,(v_e/y) &= a_{20} + a_{12}\,log(p_l) + a_{22}\,log(p_e) + a_{23}\,log(p_o) + a_{2t}\,t + e_2 \\
Log\,(v_o/y) &= a_{30} + a_{13}\,log(p_l) + a_{23}\,log(p_e) + a_{33}\,log(p_o) + a_{3t}\,t + e_3
\end{aligned} \tag{A.3}$$

where e_i, $i = (1, 2, 3)$ are the random terms. Note that the cross-price elasticity terms (a_{ij}, $i = (1, 2, 3)$, $j = (1, 2, 3)$) form a matrix $\boldsymbol{A}$ upon which symmetry was imposed. Also, the restriction $a_{1t} + a_{2t} + a_{3t} = 0$ was imposed to be consistent

with the linear homogeneity property of the cost function. All variables are time-series but the time index is ignored for notational simplicity, as are the sector subscripts in (A.3). For the system (A.3) to be a valid cost function, the matrix A must be negative semidefinite, which can be confirmed by examining the eigenvalues after estimation: each one must be less than or equal to zero. The estimation of system (A.3) was done using seemingly unrelated regressions subject to the linear constraints mentioned above. In the estimation on the mining sector, two of the three eigenvalues were negative and one was slightly positive (0.034) representing a slight deviation from the curvature condition. In the other two sectors, the eigenvalues were all zero or negative. Since imposing a curvature condition on the translog removes its flexibility as an elasticity estimator, the slight indication of nonconcavity in the mining sector model was ignored. No correction was applied for autocorrelation in (2.3), so the resulting standard errors were likely biased upwards. However, the model was used for parameter estimation rather than hypothesis testing, and the least squares coefficients are unbiased even in the presence of serially correlated errors, so there was no need to address this.

The data were obtained from the CANSIM Input-Output accounts (CANSIM table 381-0014). Total spending in current dollars in each sector on all inputs, energy (natural gas, motor fuels, and electricity), and labour (wages, salaries, and supplementary income) were aggregated into the categories labour, energy, and other. Input shares were obtained by dividing each input category into the total nominal inputs. To obtain price indexes, real input quantity series (including capital services) for the same categories were obtained for each industry from the Statistics Canada multifactor productivity accounts (CANSIM table 383-0022). These were turned into index form by dividing through by the 1961 value, then the nominal input series were divided by the quantity index. This series in turn was normalized so the 1961 value equals 1, and this was used as the price index. The technology index t was defined as the year. Real output series were also obtained from the multifactor productivity accounts. This yielded a complete set of data for estimating the system (A.3).

Because (A.3) is in log-log form, the coefficients in A, denoted a_{ij}, are the elasticities relating, respectively, labour, energy and other inputs per unit of output to the respective prices. These estimates are listed in table 4.2. I denote the input-per unit output term using capital letters (e.g., $L = l/y$). The unit cost function can be written as the sum of prices times optimized input levels:

$$c(p, t) = p_l L^* + p_e E^* + p_o O^*$$

where * denotes the local optimum value. Differentiating this expression with respect to p_e gives

$$\frac{\partial c}{\partial p_e} = \frac{a_{12}p_l L^* + a_{22}p_e E^* + a_{23}p_o O^*}{p_e} + E^* \quad \text{(A.4)}$$

Equation (A.4) can be converted into elasticity form σ_{cpe} by multiplying by $p_e \div c$, yielding for each sector a measure of the percent change in unit costs resulting from a 1% increase in the price of energy. This is converted into an estimate of the variable d^j_{50}, which is the percentage increase in unit costs of production in sector j resulting from a 50% increase in the price of electricity, by multiplying σ_{cpe} by the nominal share of electricity in energy expenditures (denoted w_{el}), times 50:

$$d^j_{50} = 50 \times w^j_{el} \times \sigma^j_{cpe} \quad \text{(A.5)}$$

where we have added the superscript j to each term to emphasize that this is a sector-specific estimate.

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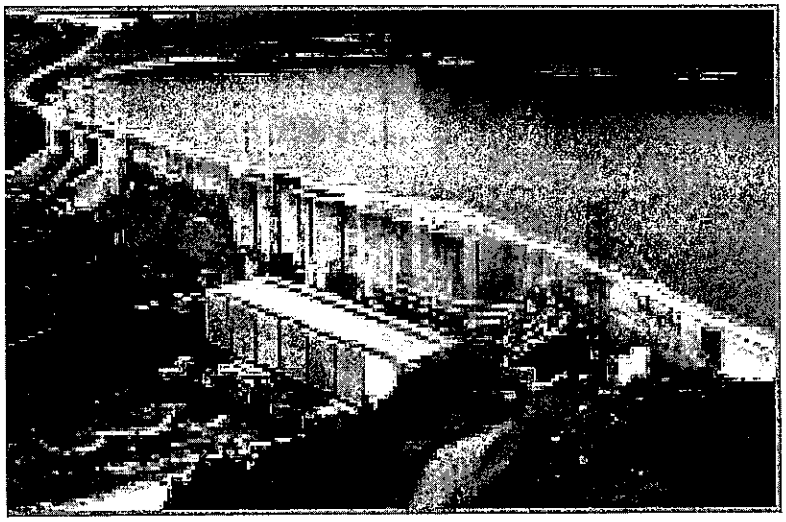
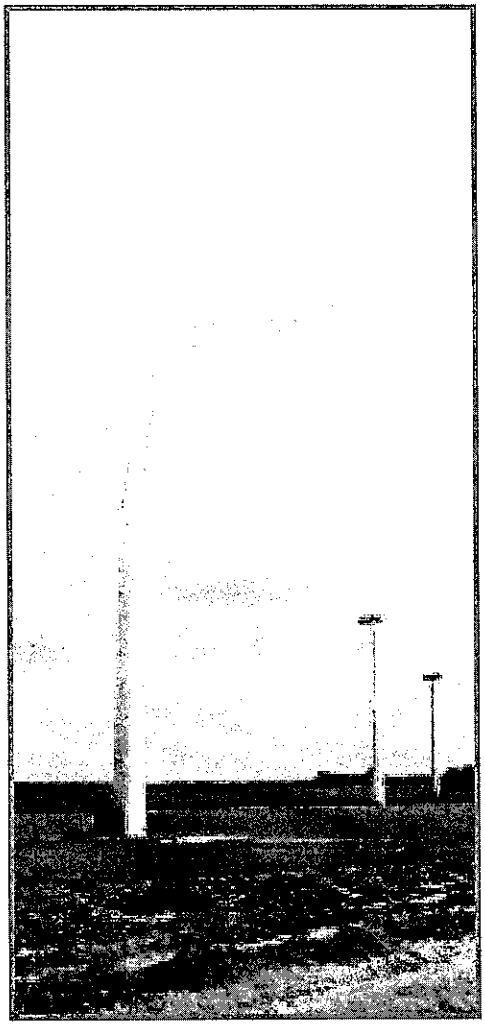
Appendix B Ontario's Long-Term Energy Plan: Building Our Clean Energy Future

Ontario's Long-Term Energy Plan





Building Our Clean Energy Future

Ontario

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foreword

Maintaining a clean, modern and reliable electricity system for all Ontarians is this government's number one energy priority. Ontario families, businesses and the economy rely on the efficiency, dependability and environmental sustainability of electric power. We have to keep the lights on in Ontario homes, schools, hospitals and businesses and power everything from the coffee-maker to the CT scanner. We also need a clean system that won't threaten the health of current and future generations.

Ontarians deserve balanced, responsible long-term energy planning for electricity to ensure that Ontario has clean air, reliable energy and a strong economy for our children and grandchildren. This report represents an update to the McGuinty government's long-term energy plan and outlines how we are helping families and businesses with increasing electricity costs.

Prior to 2003, Ontario's electricity system was weakening and unreliable. Our reliance on coal meant that our electricity sources were polluting and dirty. Between 1995 and 2003, the electricity system lost 1,800 megawatts (MW) of power — the equivalent of Niagara Falls running dry. A brief deregulated pricing experiment in 2002 resulted in sharply increased prices, prompting the government of the time to freeze consumer prices. Energy infrastructure was crumbling, a shortage of supply caused risks of brownouts.

Worst of all, Ontario relied heavily on five air-polluting coal plants. This wasn't just polluting our air, it was polluting our lungs. Doctors, nurses and researchers stated categorically that coal generation was having an impact on health increasing the incidence of various respiratory illnesses. A 2005 study prepared for the government found that the average annual health-related damages due to coal could top $3 billion. For the sake of our well-being, and our children's well-being, we had to put a stop to coal.

Over the past seven years, the McGuinty government has made tremendous progress after inheriting a system with reduced supply and little planning for the future. Today, our system is cleaner, more modern, more reliable and we plan ahead.

The McGuinty government has made electricity cleaner: we are on track to eliminate coal by 2014, the single largest climate change initiative in North America in that timeframe. We have already reduced the use of coal by 70 per cent. Last year our greenhouse gas emissions from the electricity sector reached the lowest they have been in 45 years. In 2009, more than 80 per cent of our generation came from emissions-free sources like wind, water, solar, biogas and nuclear.

Conservation efforts have been working — many Ontario families and businesses are becoming very active energy conservers. Through various programs, Ontarians have conserved more than 1,700 MW of electricity since 2005 — the equivalent of more than half a million homes being taken off the grid.

Today we have enough electricity to power our homes, businesses, schools and hospitals. Our government has increased Ontario's energy capacity by adding over 20 per cent (more than 8,000 MW) of new supply to the system – enough to power two million homes. Investments in Ontario are transforming the electricity system and have helped to make Ontario a leading jurisdiction in North America for renewable and reliable energy. And since 2007, we've used a formal 20-year planning process to help us forecast and meet the province's electricity needs.

Ontario's electricity system is more reliable. Investments in new generation and upgrades to 5,000 kilometres of our transmission and distribution lines — about the width of Canada from coast to coast — have ensured that our electricity system is able to manage peak and sudden swings in demand and supply availability.

We are moving toward a modern, smart electricity system that will help consumers have greater control over their energy usage — even when they're not at home. A smart grid can isolate outages allowing for faster or even automated repair. This will improve overall reliability for all electricity consumers and make it easier for consumers to produce their own power.

As part of the Open Ontario plan, the McGuinty government is moving Ontario from dirty coal dependency to a clean, modern and reliable energy economy that creates jobs. Energy is one of the engines of our economy and employs more than 95,000 Ontarians. Recent investments to modernize the system are helping to create and support jobs and opportunities for people and communities across the province. Ontario's landmark Green Energy and Green Economy Act, 2009 is projected over three years to support over 50,000 direct and indirect jobs in smart grid and transmission and distribution upgrades, renewable energy and conservation.

We've accomplished a great deal in the past seven years, but there is more to do. Ontario has sufficient electricity supply — but we will require more clean power for the future. As Ontario's energy infrastructure ages, we will need to rebuild or create another 15,000 MW of generating capacity over the next 20 years. We will also need to continue to upgrade and update transmission and distribution lines.

While we are proud of our collective efforts so far, we must continue to develop cleaner forms of electricity and foster a conservation-oriented culture. We need to have a balanced low-carbon supply mix to meet energy needs cleanly and reliably — Ontario will be ready for when North America moves to greenhouse gas regulation. We also need to maximize the electricity assets we have and ensure that those assets continue to provide clean, reliable supply.

The necessary, unavoidable investments that Ontario has been making in our electricity system are paid by ratepayers. The cost to bring our system back up to date and build a clean energy economy is having an impact on household and business bills.

We are all paying for previous decades of neglect. In Ontario, in order to have clean air, reliable generation and modernized transmission, residential prices over the next 20 years are expected to increase by about 3.5 per cent per year.

Increases to electricity bills are not easy for Ontario families and businesses. Even though Ontarians are committed to clean air, every increase takes a bite out of take-home income, and that is difficult for families during lean times. To help with rising costs, the McGuinty government has created a number of tax credits for families and seniors to help manage electricity increases. But we need to do more.

In this Plan, and the government's 2010 Economic Outlook and Fiscal Review we have taken steps to ensure that we help families and businesses with electricity costs while investment in clean energy continues. On November 18, 2010, the McGuinty government introduced the Ontario Clean Energy Benefit.

If passed, the Ontario Clean Energy Benefit will give Ontario families, farms and small businesses a 10 per cent benefit on their bills for five years. That would be 10 per cent off your electricity bill every month, effective January 1, 2011.

The proposed Clean Energy Benefit will help families, hard-working small business owners and Ontario farms. The McGuinty government is doing this to help those who are feeling the pinch of the rising cost of living and especially, rising electricity prices. Every little bit helps during lean economic times.

This balanced and responsible Plan sets out Ontario's expected electricity needs and the most efficient ways to meet them.

The Honourable Brad Duguid
Minister of Energy

overview

Ontario Electricity
1906-2003

On October 11, 1910, when Adam Beck lit up a Kitchener street sign that read "For the People," the town went wild, and the electrification of Ontario began. It was the first major project of the Hydro-Electric Power Commission of Ontario, created in 1906 as the world's first publicly owned electric utility. Beck, a municipal and provincial politician, believed that it was essential to the province's economic development that electricity be available to every Ontarian.

The Queenston-Chippawa power station at Niagara (renamed Sir Adam Beck I in 1950) helped Ontario meet the growing demand for electricity during the postwar economic boom. But despite continued expansion, it had become increasingly clear that hydropower alone would not be able to keep up with the province's demand.

As a result, Ontario began to diversify its supply mix in the 1950s, adding new sources of power, including six coal-fired generating stations built near areas where demand was highest. Between the early 1970s and the early 1990s, nuclear power was also added at three generating facilities. In the meantime, in 1974, the Hydro-Electric Power Commission was recognized as a crown corporation and renamed Ontario Hydro.

This trio of electricity sources — hydro, coal and nuclear — would support Ontario's economic prosperity into the 1990s. By then, much of the province's electricity infrastructure was aging and in need of replacement or refurbishment. The system had become unreliable, and there was widespread concern about whether supply would be able to meet projected demand.

Between 1996 and 2003, Ontario's generation capacity fell by six per cent — the equivalent of Niagara Falls running dry, while electricity demand grew by 8.5 per cent. Investments to build new supply and the upkeep of lines were modest. Investments in upgrades to transmission and distribution were less than half of current levels. There were no provincially funded conservation programs.

In 1998, Ontario passed legislation that authorized the establishment of a market in electricity. In April 1999, Ontario Hydro was re-organized into five successor entities. The move to break up Ontario Hydro and partially privatize the electricity system saddled Ontario with a stranded debt of over $20 billion.

A brief market-deregulation scheme saw electricity prices spike an average of over 30 per cent in just seven months. The government of the day was forced to cap prices for residential and small business owners — an unsustainable policy. The cap just masked the underlying problem of rising cost pressures in an electricity system in need of renewal and additional supply.

Ontario was also heavily reliant on coal-fired generation. About 25 per cent of electricity generation came from polluting coal-fired plants. In addition, Ontario imported coal power from neighbouring American states. Ontario, a province with ample power resources, had become a net importer of power.

Ontario Electricity Accomplishments 2003-2010

After taking office in 2003, the Ontario government faced a number of challenges including: a shortfall in supply, a system reliant on dirty coal-fired generation, a lack of conservation programs, an unsustainable pricing regime and little long-term planning.

The shortfall in supply was restored with investments of over $10 billion to keep the lights on in the province's homes and businesses. Since 2003, about 8,400 megawatts (MW) of new cleaner power have come on line — over 20 per cent of current capacity. That's enough electricity to power cities the size of Ottawa and Toronto. Ontario completed the return to service of Pickering A Unit 1 and enabled hydro and other renewable projects. The province also invested $7 billion to improve some 5,000 kilometres of transmission and distribution lines — the equivalent of the distance between Toronto and Whitehorse, Yukon.

Ontario's power has become cleaner by shutting down coal-fired generation and investing in renewables. In 2005, the government permanently shut-down the Lakeview coal-fired plant in Mississauga — the equivalent of taking 500,000 cars off the road. The province is on track to phase out coal-fired electricity by 2014, the largest climate change initiative of its kind in North America.

Currently, Ontario is Canada's solar and wind power leader, and home to the four largest operating wind and solar farms in the country. The province is developing a smart electricity grid that will help integrate the thousands of megawatts of new renewable power from these projects and others.

Public conservation programs were reintroduced to Ontario in 2005 to encourage and provide incentives for families, businesses and industry to consume less energy. Conservation is now a cornerstone of long-term electricity planning, recognizing that all Ontarians — for generations to come — will benefit from cleaner air and a lower carbon footprint.

In 2004, the government introduced a stable pricing regime that better reflected the true cost of electricity in Ontario. As a result, in 2005 the Ontario Energy Board (OEB) released a Regulated Price Plan, which brought predictability to electricity prices for residential and small business consumers. The OEB updates rates and adjusts prices every six months to reflect the costs of supply for that period.

Ontario has also taken steps to lower the stranded debt left by the previous government. Since 2003, Ontario has decreased the stranded debt by $5.7 billion.

In 2004, the government established the Ontario Power Authority (OPA) as the province's long-term energy planner. That set into motion a planning process that would ensure that Ontario's energy infrastructure would continue to be modernized. In 2007, the OPA prepared a 20-year energy plan (formally known as the Integrated Power System Plan or IPSP). The 2007 Plan focused on creating a sustainable energy supply, targeted to improving current natural gas and renewable assets at a sustainable and realistic cost. The government has made significant progress on the items outlined in the 2007 Plan.

2007 Plan Goal / Target	Accomplishments
Ensure adequate supply	Invested over $10-billion to bring about 8,400 MW of new supply online — enough capacity to meet the annual requirements of 2 million households.
Double the amount of renewable supply (to 15,700 MW by 2025)	More than 1,500 MW of clean, renewable energy online since 2003, enough power for more than 400,000 homes.
Reduce demand by 6,300 MW by 2025.	More than 1,700 MW of conservation (reduction in demand) since 2005, equivalent to more than 500,000 homes being taken off the grid.
Replace coal in the earliest practical time frame	Phasing out coal-fired generation by 2014 Four units closed in 2010, ahead of schedule.
Strengthen the transmission system	Over $7 billion in investments since 2003 — upgrades to more than 5,000 kilometres of wires Moved forward on transmission projects to enable additional renewables; import potential; and refurbished nuclear generation
Ensure stable energy prices for Ontarians	The Regulated Price Plan introduced in 2005 has provided predictability Electricity prices have increased on average by about 4.5 percent per year over the past seven years Introduced energy tax credits to help residential and small business consumers with electricity costs

In 2009, the government introduced the groundbreaking Green Energy and Green Economy Act, 2009 (GEA). The GEA is sparking growth in clean and renewable sources of energy such as wind, solar, hydro, and bioenergy. A series of conservation measures in the GEA are providing incentives to lower energy use. In its first three years, the GEA will help create 50,000 clean energy jobs across the province. A clean-energy manufacturing base has been growing in the province and creating jobs for Ontarians.

Ontario's Energy Future 2010-2030

The priorities that the government sets and the investments the government makes today are laying the groundwork for an Ontario of tomorrow that will feature a modern, clean and globally competitive economy; healthy, vibrant and liveable communities; and an exceptional quality of life for all Ontarians. The government has a responsibility to ensure a clean, modern and reliable system for the health and well-being of Ontario families and businesses.

By 2030, Ontario's population is expected to rise about 28 per cent — a gain of almost 3.7 million people. Ontario's population will become more urbanized with population growth taking place in primarily urban areas. The Greater Toronto Area (GTA) population will increase by almost 38 per cent over the same period.

The overall composition of the economy will evolve as high-tech and service industries grow and manufacturers change how they do business to keep pace with technological advances and global competition. The output of large industrial customers, which accounts for about 20 per cent of electricity demand, is expected to grow moderately.

Getting around will be easier for all Ontarians. Improved regional and local transit systems that form integrated transportation networks will make it easy to travel, both within and between urban centres. There will be more electric cars on the road — Ontario's goal is that by 2020, about one in every 20 vehicles on the road will be electric.

All of this means that Ontario needs a more modern energy system and a diverse supply mix. Clean, reliable energy is the fuel that will power Ontario's future economic prosperity. Ontario must take steps today to ensure that the right kind of energy will continue to be there for us tomorrow.

Ontario is building a culture of conservation and as a result, it is expected that the province's demand for energy will grow only moderately over the next 20 years. Increased demand in the long term will be due to the rising population, industrial growth and increased use of electrical appliances and vehicles.

The Smart House of the Future

A smarter electricity grid will enable Smart Houses in the future by using technologies that have built-in intelligence. With Smart Grid infrastructure, homes will be able to use power when it is least expensive, charge electric vehicles, generate their own power via solar panels or other generation – and all of this can be controlled by the owner online, or by smart phone.

The Plan

Since the 2007 Plan, developments in technology, trends in demographics, changes in the economy and the advancements of the renewable energy sector (the success of the Feed-in-Tariff program) mean that Ontario needs an updated plan. This updated long-term energy plan will help to ensure that Ontario can meet the needs of an evolving economy and shifting electricity demands, while providing affordable electricity.

Currently, Ontario's electricity system has a capacity of approximately 35,000 MW of power. The OPA forecasts that more than 15,000 MW will need to be renewed, replaced or added by 2030. Because of capacity brought online in recent years, Ontario has some flexibility moving forward. The challenge is in choosing the right mix of generation sources and the necessary level of investment to modernize Ontario's energy infrastructure to meet future needs.

Through initiatives already underway, the province will be able to reliably meet electricity demand through 2015. Ontario needs to plan now for improving the power supply capacity to meet the province's electricity needs beyond 2015. Ontario must plan in advance because:

- Insufficient investment between 1995 and 2003 left an aging supply network and little new generation
- Additional clean generation will be needed to ensure a coal-free supply mix after 2014
- Nuclear generators will need to go offline while they are being modernized
- The population is projected to grow.

To meet these needs Ontario will need a diverse supply mix. Each type of generation has a role in meeting overall system needs. Ontario requires the right combination of assets to ensure a balanced supply mix that is reliable, modern, clean and cost-effective. Ontario will also, first and foremost, make the best use of its existing assets to upgrade, expand or convert facilities.

As part of a reliable network, the system needs both small and large generators. Nuclear power will continue to reliably supply about 50 per cent of the province's electricity needs. It does not emit air pollutants or emissions during production. Hydroelectric power is expanding to include increased capacity from the Niagara Tunnel project and the Lower Mattagami project — producing clean energy by tapping into a renewable and free fuel source. Natural gas-fired plants have the flexibility to respond when demand is high — acting as peak source or cushion for the electricity system. Natural gas is the cleanest of the fossil fuels, emitting less than half of the carbon dioxide emitted by coal.

Ontario is also planning for future energy generation that will focus on efficient, localized generation from smaller, cleaner sources of electricity rather than exclusively from large, centralized power plants transmitting power over long distances. This strategy is known as "distributed generation". Distributed generation also opens up opportunities for smaller power producers, allowing individuals, Aboriginal communities and small co-operatives or partnerships to become generators.

Renewable energy—wind, solar, hydro, and bioenergy — is an important part of the supply mix. Once the initial investment is made in equipment and infrastructure, fuel cost and greenhouse gas emissions are zero or very low. Renewable energy makes it possible to generate electricity in urban and rural areas where it was not feasible before.

In developing this report, the government heard from over 2,500 Ontarians (individuals, energy organizations, community representatives, and First Nation and Métis leaders and groups). Their views have helped to inform this report. In addition, the Ontario Power Authority (OPA), Hydro One, Ontario Power Generation (OPG), the Ontario Energy Board (OEB) and the Independent Electricity System Operator (IESO) contributed information and advice.

Ontario's Long-Term Energy Plan will help guide the province as it continues to build a clean, modern, and reliable electricity system for Ontario families now and well into the future. It will ensure Ontario continues to be a North American leader for clean energy jobs and technology and becomes coal-free by 2014. Key features of the plan include:

- Demand will grow moderately (about 15 per cent) between 2010 and 2030.
- Ontario will be coal-free by 2014. Eliminating coal-fired generation from Ontario's supply mix will account for the majority of the government's greenhouse gas reduction target by 2014. Two units at the Thunder Bay coal plant will be converted to gas and Atikokan will be converted to biomass. Two additional units at Nanticoke will be shut down in 2011.
- The government is committed to clean, reliable nuclear power remaining at approximately 50 per cent of the province's electricity supply. To do so, units at the Darlington and Bruce sites will need to be modernized and the province will need two new nuclear units at Darlington. Investing in refurbishment and extending the life of the Pickering B station until 2020 will provide good value for Ontarians.
- Ontario will continue to grow its hydroelectric capacity with a target of 9,000 MW. This will be achieved through new facilities and through significant investments to maximize the use of Ontario's existing facilities.
- Ontario's target for clean, renewable energy from wind, solar and bioenergy is 10,700 MW by 2018 (excluding hydroelectric) – accommodated through transmission expansion and maximizing the use of the existing system. Ontario will continue to grow the clean energy economy through the continuation of FIT and microFIT programs.
- Natural gas generation for peak needs will be of value where it can address local and system reliability issues. Natural gas will support the increase in renewable sources over time and supplement the modernization of nuclear generators.
- Combined Heat and Power is an energy-efficient source of power and the OPA will develop a standard offer program for projects under 20 MW.
- Ontario will proceed with five priority transmission projects needed immediately for reliability, renewable energy growth, and changing demand. Future Plans will identify more projects as they are needed.
- Ontario is a leader in conservation and the government will continue to increase and broaden its targets to 7,100 MW and reduce overall demand by 28 terawatt-hours (TWh) by 2030.
- Over the next 20 years, estimated capital investments totalling $87 billion will help ensure that Ontario has a clean, modern and reliable electricity system.
- Measures outlined in this Plan will help create and sustain jobs and investments in Ontario's growing clean energy economy.
- Residential bills are expected to rise by 3.5 per cent per year over the next 20 years. Industrial prices are expected to rise by 2.7 per cent per year over the next 20 years.
- The government is proposing an Ontario Clean Energy Benefit to give Ontario families, farms and small businesses a 10 per cent benefit on their electricity bills for five years.

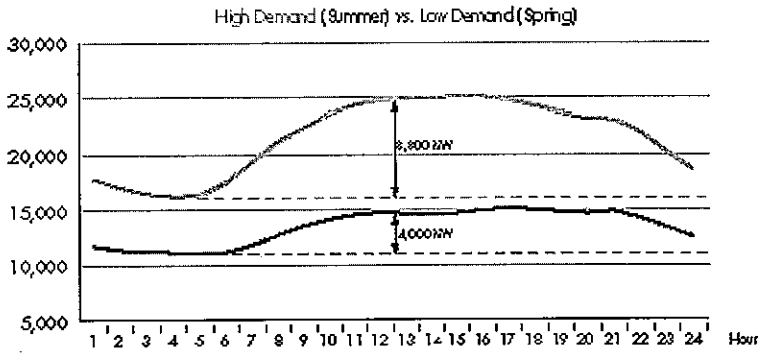
This plan will help ensure that Ontario is able to meet its electricity needs until 2030 and build a modern, clean, reliable system that will provide energy to Ontario homes and businesses for generations to come.

1 demand – an updated forecast

A forecast of the demand for electricity establishes the context for long-term planning — it predicts the amount of electricity Ontario will need.

System planning requires a complex forecast of the total amount of electricity that will be used over the course of a year, as well as the amount required to meet peak demand. The next step is to match these requirements with available generation and transmission capacity. Demand fluctuates with the time of day, weather, time of year and the structure of the economy. Ontario's demand can fluctuate between 11,000 MW on an early Sunday morning in spring to 25,000 MW on a hot Thursday afternoon in summer.

FIGURE 1: ONTARIO ELECTRICITY DEMAND COMPARISON



Unlike other forms of energy, electricity cannot be easily stored. Ontario's electricity system must be able to produce and move enough electricity to meet the changing demand for it instantaneously — all day and all night, every day and every night.

Ontario is part of an interconnected grid consisting of thousands of generators linked by tens of thousands of kilometres of transmission lines, crossing international, provincial and regional borders. The interconnected nature of the grid, supported by mandatory reliability standards, helps to ensure a stable power supply even when major components fail or when demand exceeds what can be met with domestic resources. Trade in electricity takes place over this interconnected system — for instance, between Ontario, Quebec and the U.S. — on a daily basis. In 2003, Ontario was a net importer and much of this imported supply came from U.S. coal power, which increased prices and reduced Ontario's air quality. Ontario is now a net exporter of electricity.

Electricity demand in Ontario has declined since reaching a peak in 2005. For the next 10 years, demand is expected to recover from the recent recession and then stay relatively flat as conservation efforts and an evolving economy change Ontario's energy needs.

Accomplishments

Ontario families and businesses have participated in conserving energy through various government conservation programs and shifting the demand away from peak hours.

- Ontario's conservation initiatives have been successful. Since 2005, Ontarians have saved enough energy to meet the combined electricity demand of Mississauga and Windsor.
- peaksaver®, a residential and small business electricity demand reduction program that temporarily powers down central air conditioning systems, has conserved enough to power a community the size of Thunder Bay.

Future Needs

Demand is recovering slowly in 2010 after the global economic recession. Future demand will depend on a number of factors including: the speed of Ontario's economic recovery, population and household growth, greater use of electronics in appliances and home entertainment systems, the pace of the recovery of large, energy-intensive industry and the composition of the economy (e.g. a shift to more high-tech and service jobs). Demand will also be impacted by the success of conservation efforts, as well as the potential electrification of public transit and the number of electric vehicles on the road. Weather can also have a pronounced effect.

To account for generation maintenance, extreme weather or significant changes in the amount of electricity the province needs, it is important to have electricity capacity in reserve.

The Plan

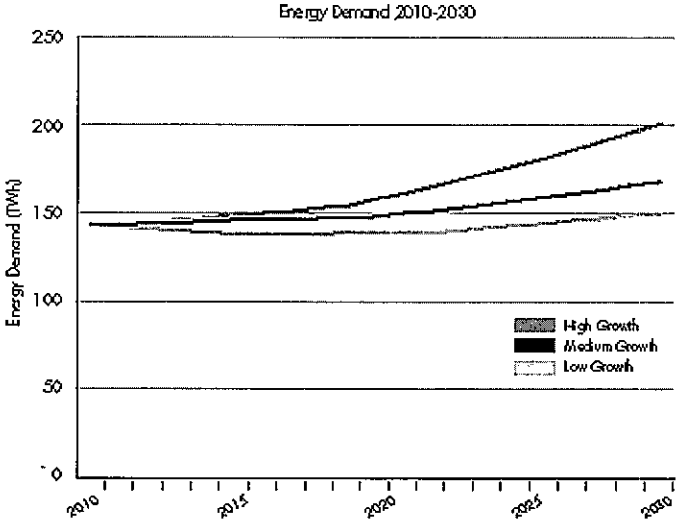
Based on OPA analysis, this Plan outlines three potential scenarios (net of conservation) for electricity demand:

1. Low growth (yellow) assumes that Ontario's manufacturing and industrial sectors continue to grow modestly in accordance with the current trend. Some of the recent decline in consumption is due to conservation, some to restructuring in the various industrial sectors, and some due to the recession. This forecast assumes a lower rate of population growth than in the other two scenarios. It further assumes that only 13 per cent of people use electricity for heating and that small appliance use accounts for 30 per cent of growth.

2. Medium growth (brown) represents moderate growth in the industrial sector and in population. This scenario assumes continued growth in the residential, commercial and transportation sectors. This forecast assumes that there is a consistent move towards high-tech and service industries and somewhat higher provincial population growth than the low growth scenario. This scenario is consistent with the current government goal for electric vehicles: five per cent by 2020.

3. High growth (orange), or aggressive electrification, assumes that there is a significant increase in electric transportation — both public and private. It assumes that there is aggressive North American greenhouse gas regulation, faster population growth than the low growth scenario, significant industrial change and that by 2030 about 12 per cent of vehicles on the road are electric.

FIGURE 2: RANGE OF ENERGY DEMAND FORECAST



The three scenarios do not differ significantly until 2018, allowing time to adjust as the Long-Term Energy Plan will be updated every three years. For planning purposes, the government is using the medium growth line to predict future electricity needs. The medium growth scenario balances the expected growth in residential and commercial sectors, with modest, post-recession growth in the industrial sector. The addition of 1.1 million households and the expected increase in the use of entertainment electronics, and small appliances will increase residential electricity demand. The addition of 132 million square metres of commercial space and the associated use of air-conditioning, lighting and ventilation will increase electricity demand in the commercial sector.

Based on the medium growth scenario, Ontario's demand will grow moderately (15 per cent) between 2010 and 2030, based on the projected increase in population and conservation as well as shifts in industrial and commercial needs. As a result, for planning purposes, the system should be prepared to provide 146 TWh of generation in 2015 rising to 165 TWh in 2030.

Ontario is also planning to create sufficient flexibility in the system to accommodate the higher growth scenario.

2 supply

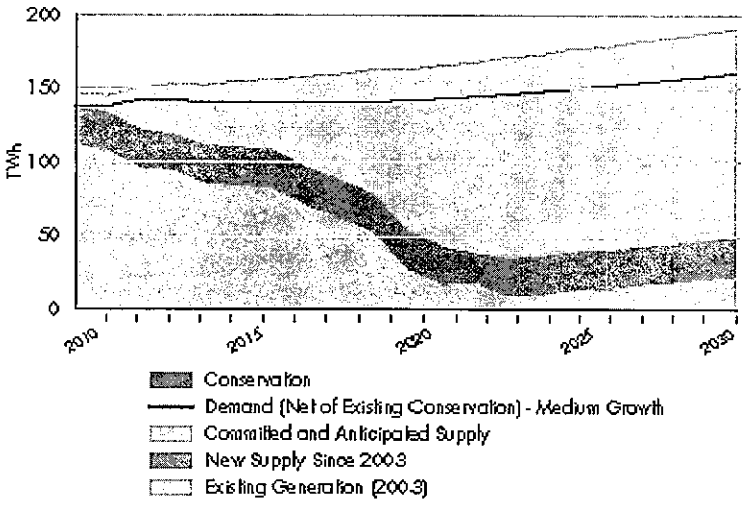
With a long-term demand forecast in place, Ontario must determine the most effective way to meet that demand so that there is no gap in supply. Ontario needs a balanced, cost-effective supply mix that supports the economy, is modern, can adapt to future changes and provides clean, reliable electricity to Ontario families and businesses for generations to come.

A clean, reliable energy system relies on a balance of resources. Good system planning includes a sustainable supply mix that meets the demands of the public. It also means continually looking for efficiencies and emphasizing the best use of current resources. Ontario's supply mix includes:

- Conservation: As the best and first resource, it reduces consumption and therefore demand on the system. By avoiding the need to build new generation, all consumers benefit through cost savings.
- Baseload power: Generation sources, such as nuclear and hydro stations, designed to continuously operate (Niagara Falls, for example). Baseload power is the foundation of a stable, secure supply mix.
- Variable or intermittent power: Generation sources that produce power only during certain times such as wind and solar projects. These are important contributors to a cleaner supply mix.
- Intermediate and peak power: Generation sources designed to ramp up and down as demand changes throughout the day such as natural gas and hydro generation with some storage capability. These function as a cushion to the system to ensure reliability when demand is highest.

This supply mix balances reliability, cost and environmental performance.

FIGURE 3: FORECAST SUPPLY AND DEMAND (2010-2030)

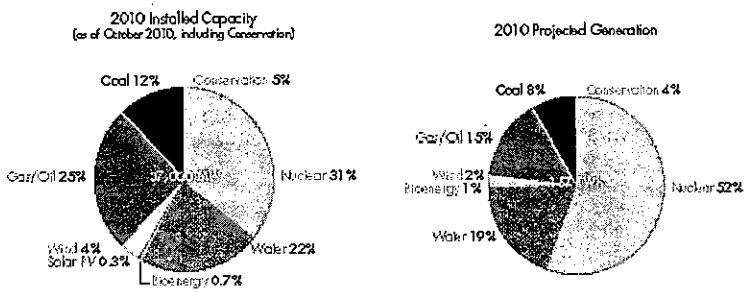


Energy Storage can help to balance the electricity grid by storing off-peak generation and using it during peak hours. This helps to reliably incorporate more renewable generation into the grid. Energy storage is an important part of the move to a Smart Grid. Ontario will continue to investigate the potential for new storage technologies. There are a number of issues that impact the development of energy storage:

- The capital costs for large-scale electricity storage are high largely due to high engineering and construction costs.
- Research is underway on flywheel storage, plug-in vehicle storage, various forms of thermal storage as well as other storage options.
- There are growing opportunities for small storage projects, particularly as battery technology improves.
- Ontario has a pumped storage facility in the Sir Adam Beck Pumping Generating Station at Niagara Falls. OPG is currently studying the possible expansion of the reservoir to allow for further storage at the station.

The capacity of the system is necessarily larger than what is actually generated. It is critical to have more capacity than generation to be able to manage normal equipment maintenance and shutdowns, unprecedented peak demands or an unexpected shutdown of an electricity generator. Generation, or the amount of electricity Ontario produces, is measured in terawatt hours (TWh or billion kWh). The capacity of the system, or what it is able to generate, is measured in megawatts (MW).

FIGURE 4:
CONTRAST BETWEEN GENERATION AND INSTALLED CAPACITY



Selecting a supply mix and investment in supply is a matter of choices and trade-offs. A variety of power supply sources — some designed for baseload requirements, some designed for meeting peak requirements — is superior to relying heavily on only one source. For this long-term plan the government has considered environmental, economic, health, social and cost implications to come up with the best possible supply mix.

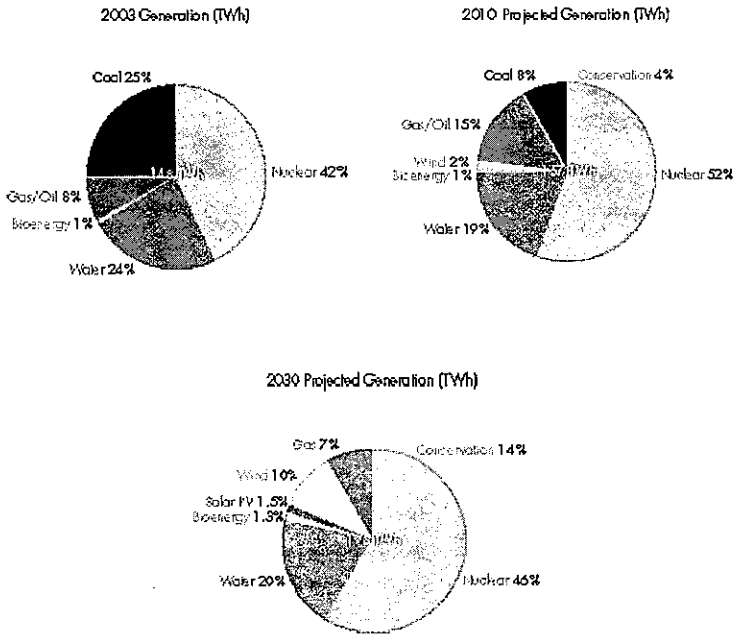
This improved supply mix will be cleaner, sustainable, modern and reliable. It phases out coal-fired generation at a faster pace, it modernizes Ontario's nuclear fleet, it includes more renewables, it maximizes hydroelectric power over the near term, and it advances Ontario's conservation goals.

By 2030, Ontario will have completely eliminated coal as a generation source and will have also increased wind, solar and bioenergy from less than one per cent of generation capacity in 2003 to almost 13 per cent. To ensure reliability, the strategic use of natural gas will be required to complement renewable generation. Nuclear will continue to supply about 50 per cent of Ontario's electricity needs.

The following chapter will include a review of the various components of Ontario's electricity supply:

- Coal
- Nuclear
- Renewables: Hydroelectric
- Renewables: Wind, Solar and Bioenergy
- Natural gas
- Combined Heat and Power (CHP)

FIGURE 5: BUILDING A CLEANER ELECTRICITY SYSTEM



Coal Free

The Ontario government is committed to improving the health of Ontarians and fighting climate change. Coal-fired plants have been the single largest source of greenhouse gas emissions in the province and among the largest emitters of smog-causing pollutants. Ontario's reliance on coal-fired generation shot up 127 per cent from 1995-2003, significantly polluting the province's air. During that period Ontario also relied on importing coal-fired power from the United States. An Ontario study found the health and environmental costs of coal at $3 billion annually ("Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation," April 2005).

Since 2003, the government has reduced the use of dirty coal-fired plants by 70 per cent. Eliminating coal-fired electricity generation will account for the majority of Ontario's greenhouse gas reduction target by 2014 — the equivalent of taking 7 million cars off the road.

In addition, Ontario Power Generation (OPG) is required to meet strict government-mandated greenhouse gas emission targets, including ensuring that between 2011 and 2014 annual emissions are two-thirds lower than 2003 levels.

Ontario is the only jurisdiction in North America that is phasing out coal-fired generation. The government has committed to eliminating coal-fired generation by 2014 and is introducing clean and reliable sources of energy in its place. Until then, coal and natural gas plants will continue to provide power in peak-demand periods to maintain the reliability of the system.

Accomplishments

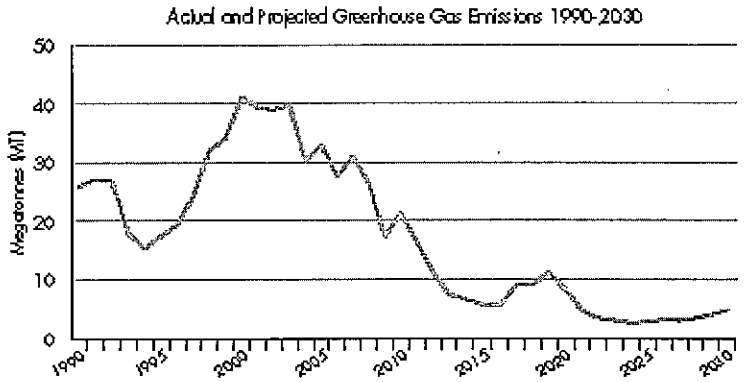
The government of Ontario has shut down eight coal units since 2003 (3,000 MW) and will close the remaining units by 2014 or earlier.

- Lakeview (Mississauga) – four units closed April, 2005
- Nanticoke – two units closed October, 2010
- Lambton – two units closed October, 2010

After the closure of four coal units on October 1, 2010, coal-fired generation makes up only 13 per cent of Ontario's electricity capacity.

Ontario's electricity sector emissions will decrease dramatically to only five megatonnes post-2020 as a result of becoming coal-free. Between 2015 and 2019, extensive nuclear refurbishments will take place and Ontario will rely on its natural gas-fired stations to maintain reliable electricity supply.

FIGURE 6:
REDUCING EMISSIONS IN ONTARIO'S ELECTRICITY SECTOR



The Plan

Coal-fired plants will cease to burn coal in 2014. Ontario will shut down two additional units at Nanticoke Generating Station before the end of 2011.

The government recognizes the potential benefits of continuing to use Ontario's existing electricity-generating assets and sites. Coal-fired plants could be converted to use alternative fuels, such as natural gas. Similar to coal, biomass and/or natural gas can provide electricity on demand for peak periods.

In line with the Growth Plan for Northern Ontario and future needs of the Ring of Fire, the province is replacing coal at Atikokan and Thunder Bay and re-powering these facilities with cleaner fuel sources.

Converting the Atikokan Generating Station to biomass by 2013 will create up to 200 construction jobs and help protect jobs at the plant. It will also support jobs in Ontario related to the production of wood pellets and sustain other jobs in the forestry sector. The project is expected to take up to three years to complete. Once converted, the plant is expected to generate 150 million kilowatt-hours of renewable power, enough to power 15,000 homes each year.

At the Thunder Bay Generating Station, two units will be converted to natural gas in a similar timeframe. The Thunder Bay plant is needed not only for local supply to the city of Thunder Bay, but for system reliability in northwestern Ontario, particularly during periods of low hydroelectric generation and until the proposed enhancement to the East-West tie enters operation. The government will work with suppliers on the planning process to convert the Thunder Bay units.

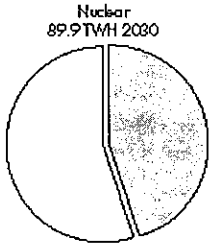
Ontario will continue to explore accelerating the closure of the remaining six units (four at Nanticoke and two at Lambton), taking into consideration the impact of the closures on system reliability.

Ontario will monitor the progress of the continued operation of nuclear units at Pickering. The government expects in 2012 to have an update on the progress of extending the life of these units. At this time, Ontario will consider the possible conversion of some of the units at Nanticoke and Lambton to natural gas, if necessary for system reliability. Due to the lead times involved, planning and approval work for the natural gas pipeline infrastructure required to Nanticoke will begin soon.

Ontario will continue to explore opportunities for co-firing of biomass with natural gas for any units converted to natural gas. Decisions on other biomass opportunities will have to carefully take into account the ability to bring in fuel supply and the cost of conversion.

Nuclear – New/Modernized

Nuclear power is a reliable, safe supplier of the province's baseload generation needs — accounting for about 36 per cent of the province's installed electricity capacity. Nuclear operates 24 hours a day, seven days a week and it produces about 50 per cent of the electricity generated in Ontario. Nuclear power does not produce any primary air pollution or release greenhouse gases into the atmosphere.



Nuclear power plants are able to operate steadily, providing a plentiful, consistent supply of energy for decades at stable prices. In addition, the fuel cost for a nuclear power plant is a small portion of its total costs, so nuclear power is generally not impacted by fuel price escalation or fluctuations.

- Ontario has used nuclear power for more than 40 years.
- In 2009, more than half of the province's electricity came from nuclear energy.
- Ontario's nuclear power stations and waste storage facilities have an excellent safety record. OPG won the Zeroquest Platinum (Sustainability) Award from the Infrastructure Health and Safety Association (IHSA) in June 2010.
- Over 70,000 jobs in Canada are directly or indirectly related to the nuclear power industry.

Accomplishments

A number of nuclear power producing units have been modernized and returned to service since 2003 including:

- Pickering A Unit 1, in November 2005, providing 515 MW (or about 6 per cent of new supply)
- Bruce Unit 3, in March 2004, providing 770 MW (or about 9 per cent of new supply)
- Bruce Unit 4, in November 2003, providing 770 MW (or about 9 per cent of new supply)

Future Needs

Nuclear power is crucial to providing reliable electricity to the province. Units at Bruce B and Darlington are expected to reach the end of their service lives over the next decade. To extend the life of these units, each would have to be shut down for about three years while being modernized.

At the time of the 2007 Plan, there was a need for new nuclear planning to begin immediately. Since then, demand has declined and renewable generation has become a bigger contributor to the system. Investment in renewables, the reduction in demand and the availability of natural gas have all reduced the immediate need for new nuclear. However, to preserve the long-term reliability of the system, particularly for baseload generation, additional investment in nuclear generation will be required.

Ontario will continue to rely on nuclear power – at its current level of contribution to the supply. Nuclear generation is ideally suited for providing baseload generation because of its unique economic and operating characteristics. Nuclear plant operational design and economics depend on the plants being able to operate steadily throughout the year. A generation mix of 50 per cent nuclear combined with baseload hydroelectric generation is sufficient to meet most of Ontario's baseload requirements.

If nuclear capacity beyond this were added, the hours in the year in which nuclear capability exceeded Ontario demand could substantially increase. Under such surplus conditions, some nuclear units might need to be shut down or operate differently than intended. This could lead to significant system and operating challenges and so therefore, generating too much nuclear is undesirable.

The Plan

Over the first 10 to 15 years of this Plan, 10,000 MW of existing nuclear capacity will be refurbished. Investment should focus first and foremost on the improvement of existing assets so that those facilities can continue to provide reliable, affordable electricity. A coordinated refurbishment schedule was agreed to in 2009 by a working group including OPG, Bruce Power, the OPA and the Ministry of Energy. This schedule will be regularly reviewed and updated to reflect current information on resources and plant performance and conditions.

The government is committed to continuing to use nuclear for about 50 per cent of Ontario's energy supply — a capacity of 12,000 MW will produce that amount of energy. The remaining nuclear capacity of 10,000 MW at Darlington and Bruce will need to be refurbished and modernized.

The remainder of the nuclear capacity that Ontario will need for its projected demand (about 2,000 MW) will be made up of new nuclear at Darlington.

The construction of new nuclear infrastructure requires a significant lead time (approximately 8 to 10 years to commercial operation) and while new nuclear supply will be needed in Ontario, it must be provided at a fair price to ratepayers. Both refurbishment and new build will have significant positive impacts on local economies – and considerable employment opportunities.

In February 2008, the government of Ontario launched a process to procure two new units at the Darlington site. Atomic Energy of Canada Limited (AECL) was one of three vendors who met the February 2009 bid submission deadline. AECL emerged as the only compliant bidder in the process; however the AECL bid price exceeded the province's target. Ontario then sought to finalize a deal with the company to procure the units at an acceptable price.

During the discussions between the Ontario government and the federal government, the federal government announced its intention to sell AECL in May 2009. The news cast a great deal of uncertainty over Ontario's procurement process. The position of uncertainty that the federal government placed AECL in, together with a much higher than anticipated price, made it very difficult for Ontario to finalize a procurement that was in the best interest of ratepayers. As a result, Ontario suspended the RFP process in June 2009.

The Province continued to engage AECL, as the only compliant bidder, in discussions with the hope that a deal could still be finalized. The talks did not lead to any demonstrable progress. Consequently, the Premier of Ontario wrote to the Prime Minister requesting that the process to sell AECL be halted. It was Ontario's position that both levels of government should try to complete the procurement with AECL before the company was sold so that Ontario's need for significant nuclear refurbishment and new nuclear generation could be met while simultaneously protecting jobs and preserving the industry in Canada. This proposal was not pursued by the federal government and their process is continuing without a deal with Ontario being completed.

It is anticipated that the federal government will identify a preferred vendor by the end of this year. Ontario is expecting that the federal government will restructure AECL in a manner that will allow Ontario to be able to complete a deal with the new owner at a price that is in the best interest of ratepayers.

The decrease in demand together with the new supply added in recent years, means that Ontario is well-positioned to examine a number of options for negotiating new nuclear production at the right time and at a cost-effective price.

In the meantime, OPG is continuing with two initiatives that were underway prior to the suspension of the new build procurement process: the environmental assessment and obtaining a site preparation licence at Darlington. It is essential that the province stay ready to construct new nuclear plants as part of the government's ongoing commitment to modernize Ontario's nuclear fleet.

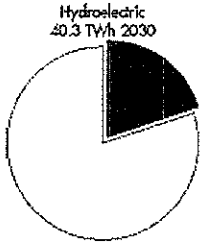
OPG will invest $300 million to ensure the continued safe and reliable performance of its Pickering B station for approximately 10 years, to 2020. Following this, OPG will begin the longer term decommissioning process and will work with the community of Pickering and the advisory committee to explore future opportunities for the site.

A 2010 report by the Canadian Manufacturers and Exporters estimates the employment and economic benefits from refurbishing and operating the Bruce and Darlington reactors will be substantial: almost 25,000 jobs and annual economic activity of $5 billion.

In developing a new-build procurement and modernization strategy Ontario will:

- Secure an acceptably priced contract for construction of nuclear new build under specified timeframes.
- Pursue project terms that are in the best interest of ratepayers.
- Retain the maximum number of high-quality, high-paying nuclear industry jobs in the province while providing opportunities for long-term growth of the nuclear industry.

Renewables: Hydroelectric

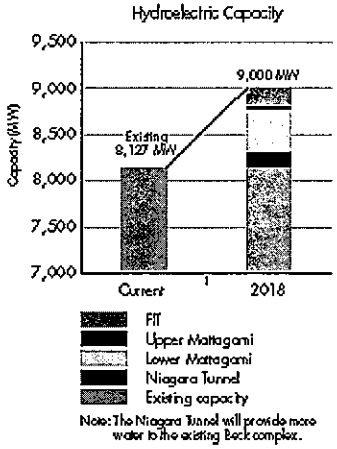


Ontario has been generating renewable power from water — hydroelectric power — for over 100 years. Hydroelectric power is clean, renewable, cost-effective and helps to contribute to clean air quality. Hydro currently makes up the vast bulk — about 90 per cent — of Ontario's total renewable energy supply, representing 8,127 MW of capacity. It is a reliable source of electricity that can continue to provide clean energy for generations to come.

Accomplishments

The 2007 Plan projected a total of 7,708 MW of hydroelectric capacity by 2010. The government has exceeded this goal. Ontario has also launched significant hydroelectric projects — the first major investments in 40 years. Since October 2003, 317 MW of new hydro projects have been brought online.

FIGURE 8: HYDROELECTRIC CAPACITY



Some of the larger completed and ongoing hydro projects to meet Ontario's future needs include:

- Niagara Tunnel project, which will increase the amount of water available for power generation at the Sir Adam Beck Generating Station
- The Lower Mattagami project expansion – the largest hydroelectric project undertaken in Ontario in 40 years. This project will add about 440 MW of clean electricity generating capacity to Ontario's energy grid, while providing $2.6 billion of investment in the North
- Healey Falls, a 15.7 MW facility near Campbellford, east of Peterborough
- Lac Seul Generating Station, a 12.5 MW facility near Ear Falls
- Trent Rapid Hydroelectric Station, an 8 MW facility near Peterborough
- Sandy Falls, a 5.5 MW facility on the Mattagami River, near Timmins.

Future need

More hydroelectric power will be added to Ontario's electricity system in the next eight years than over the previous 40 years. Unlike Quebec, Ontario does not have the geography to support massive reliance on hydroelectric power. (Quebec has almost four times the hydro capacity of Ontario.) New hydroelectric generation will continue to be an important part of a clean, reliable system over the next 20 years. The government is also reviewing how crown land is made available for waterpower projects, particularly for smaller Feed-InTariff (FIT) Program projects.

The Plan

Ontario will continue to develop the province's hydroelectric potential and is planning for 9,000 MW of hydroelectric capacity by 2018.

Once the Niagara Tunnel expansion is complete, it will provide enough electricity to power 160,000 homes. When the capacity expansion at Lower Mattagami is complete, the project will provide enough electricity to power over 300,000 homes. These projects will help to maximize Ontario's existing hydro projects.

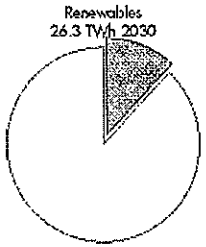
Existing hydro is the cheapest form of generation in Ontario and in many cases, it can help to meet peak power demand. There are a number of projects that are currently under consideration, such as:

- Two hydroelectric generating stations on the Little Jackfish River (north of Lake Nipigon) that could add 100 MW of capacity
- New Post Creek, a 25 MW project in the development stage
- Mattagami Lake Dam, a 3-6 MW development at Kenogamissi Falls on the Mattagami River.

Ontario will plan for future hydroelectric development where it is cost-effective to build. This will mean FIT-level hydro projects (less than 50 MW) will also be considered.

New hydro projects complement other renewable initiatives and help to eliminate coal by 2014. Some additional projects will be considered, but large-scale projects, usually in remote locations, are not economically feasible at this time due to high capital and construction costs. Transmission, engineering and environmental factors are also challenges. However, due the importance of hydroelectric generation, Ontario will continue to study Northern hydro options over the period of the Plan.

Renewables: Wind, Solar and Bio-energy



Ontario has become a North American leader in producing energy from sources that are continually renewed by nature such as wind, sun and bioenergy. Renewables do not produce harmful emissions, which contribute to smog, pollution and climate change. Increasing Ontario's renewable energy supply helps reduce the province's reliance on fossil fuels. Greater investments and reliance on renewable energy help to ensure that Ontario has a clean and reliable electricity system for generations to come.

Accomplishments

Ontario is now Canada's leading province for wind and solar capacity and home to the country's four largest wind and solar farms. The world's largest photovoltaic solar farm is in Sarnia (Enbridge's 80 MW Sarnia Solar) and Canada's largest wind farm is near Shelburne (the 199.5 MW Melancthon EcoPower Centre). In 2003, Ontario had 10 wind turbines; today, the Province has more than 700.

Since October 2003, the government has signed more than 16,000 renewable energy supply contracts from wind, water, solar and bio-energy sources. This includes almost 2,400 MW of small and large renewable power projects under North America's first comprehensive Feed-in Tariff (FIT) Program, introduced in 2009. These FIT contracts represent a private sector investment of $9 billion and are projected to create approximately 20,000 direct and indirect clean energy jobs.

The success of the FIT Program has also attracted the notice of global investors, including a consortium of companies led by Samsung C&T Corporation, laying the foundation for Ontario to become a global clean energy production and manufacturing hub.

Ontario's Feed-in Tariff (FIT) Program combines stable, attractive prices and long-term contracts for energy generated using renewable resources.

Homeowners, business owners and developers may apply to the FIT Program if they use one or more forms of renewable energy, including wind, waterpower, solar photovoltaic (PV) power and bioenergy.

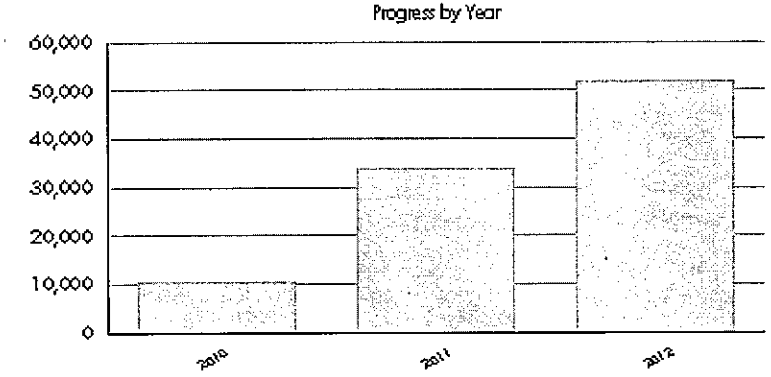
The Program is the first comprehensive FIT program in North America. It was launched through the Green Energy and Green Economy Act, 2009.

Over 1,000 FIT contracts are currently in place for clean energy projects.

Some 51 community projects will provide renewable electricity supply to the grid through the Ontario FIT program. From these projects, more than 200MW of clean electricity will be generated by communities engaging in, solar, wind and bio-energy projects across Ontario.

Thousands of Ontarians are also participating in the microFIT Program. Homeowners, farmers or small business owners, are able to develop a very small or "micro" renewable electricity generation project (10 kilowatts or less in size) on their properties. Under the microFIT program, they are paid a guaranteed price for all the electricity they produce for 20 years.

FIGURE 9: PROGRESS ON 50,000 PROJECTED GREEN ENERGY ACT JOBS



Major Private-Sector Renewable Investments in Ontario

The $7-billion Green Energy Investment Agreement with Samsung C&T Corporation and Korea Electric Power Corporation (Consortium), is the single largest investment in renewable energy in provincial history. It will:

- Build 2,500 MW of wind and solar power.
- Deliver an estimated 110 million megawatt-hours of emissions-free electricity over the 25-year lifetime of the project — enough to supply every Ontario home for nearly three years.
- Create more than 16,000 new clean energy jobs to supply, build, install and operate the renewable generation projects.
- Lay the groundwork with major partners to attract four manufacturing plants.

Out of the 16,000 new clean energy jobs, this investment is expected to create or sustain 1,440 manufacturing and related jobs, building wind and solar technology for use in Ontario and export across North America.

As part of the Green Energy Investment Agreement, Samsung and Siemens have announced plans to build Ontario's first wind turbine blade manufacturing plant, which will create up to 900 direct and indirect jobs. The Consortium will negotiate with manufacturing partners to locate three other plants in Ontario for wind turbine towers, solar inverters and solar module assembly.

Under the agreement, three of the four manufacturing facilities are scheduled to be ready in 2013, while the fourth is scheduled to be in operation by the end of 2015. The Consortium also intends to use Ontario-made steel and other Ontario content in its renewable energy projects for items such as wind turbine towers.

More than 20 companies have publicly announced plans to participate in Ontario's clean energy economy, in the last year. These companies are currently operating or plan to set up solar and wind manufacturing facilities in Ontario in the following categories: solar PV modules, mounting systems, inverters, wind turbine blades and wind turbine towers. Some recent examples include:

- Heliene Inc., producing modules in Sault Ste. Marie;
- Canadian Solar, will manufacture modules in Guelph;
- Photowatt, producing modules in Cambridge;
- Samco, an auto parts manufacturer now also producing solar mounting systems in Scarborough;
- Schletter, producing solar mounting systems in Windsor;
- Sustainable Energy Technologies partnering with Melitron to produce inverters in Guelph;
- Satcon, producing inverters in Burlington;
- Siemens will be producing wind turbine blades; and,
- DMI Industries is producing wind turbine towers in Fort Erie.

Future Needs

Ontario will continue to be a leader in renewable energy development and generation. The growth of the renewable energy sector will be influenced by electricity demand, the ability of the system to accommodate additions to the grid, continued innovation in the renewable technology sector and global demand for renewable energy production. Expansions and upgrades to the transmission and distribution system will be necessary to increase the capacity for renewable energy in Ontario.

As more and more of Ontario's electricity comes from renewable energy sources and research and innovation of Smart Grid technologies continues, there will be increased opportunities for renewable energy projects, both large and small to be established in Ontario.

There will also be greater opportunity for employment in this field. Renewable energy projects require skilled labour, such as engineers as well as construction and maintenance labour across the province. As renewable energy projects are established, the need for skilled and general labour will continue to provide jobs for thousands of Ontarians over the next decade. Innovation in new technology also contributes high skilled jobs and economic opportunities for Ontario.

Biomass is dispatchable and can be used as a peaking resource. This attribute allows it to complement increased wind and solar generation. The conversion of Atikokan Generating Station to run on biomass will contribute to long-term system reliability, especially during low water conditions in the region. The conversion from coal to biomass at Atikokan by 2013 will create up to 200 construction jobs and help protect jobs at the plant. It will also support jobs in Ontario related to the production of wood pellets and sustain other jobs in the forestry sector. Ontario will continue to monitor the conversion of Atikokan and consider future potential of biomass generation.

The Plan

Ontario will continue to develop its renewable energy potential over the next decade. Based on the medium growth electricity demand outlook, a forecast of 10,700 MW of renewable capacity (wind, solar, and bioenergy) as part the supply mix by 2018 is anticipated. This forecast is based on planned transmission expansion, overall demand for electricity and the ability to integrate renewables into the system. This target will be equivalent to meeting the annual electricity requirements of two million homes.

The province's renewable energy capacity target will be met with the development of renewable energy projects from wind, solar, biogas, landfill gas and biomass projects across Ontario.

Future rounds of FIT projects will be connected to the Bruce to Milton transmission line and the priority transmission projects identified as part of this Long-Term Energy Plan. This will enable 4,000 MW of new renewable energy projects to be connected.

In the near term, the OPA will be releasing information regarding the status of all FIT applications not offered contracts as of June 4, 2010. These applications will be subject to the first Economic Connection Test (ECT) under the FIT program. The ECT process, to be conducted on a regular basis and in alignment with major planning or system development milestones, will help to determine whether the costs of grid upgrades to allow a FIT project to connect to the grid are economically viable.

For the period after 2018, depending on changes in demand, Ontario will look for opportunities to increase the development of renewable energy projects and expand renewable energy capacity in the Province. Ontario will review the electricity demand outlook in the next Long-Term Energy Plan to explore whether a higher renewables capacity forecast is required.

FIT contract prices were set following extensive consultations and are designed to ensure a reasonable rate of return for investors while providing good value for clean, renewable energy for Ontario ratepayers.

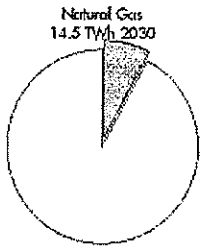
As part of the scheduled two-year review of the FIT Program in 2011, the FIT price of renewables in Ontario will be re-examined. Successful and sustainable FIT programs in a number of international jurisdictions (such as Germany, France and Denmark) have decreased price incentives. Advances in technology and economies of scale reduce the cost of production. A new price schedule will be carefully developed to achieve a balance between the interests of ratepayer and the encouragement of investment in new clean energy in Ontario.

The response to the microFIT and FIT programs has been a tremendous. Thousands of Ontarians are participating in the program to feed clean energy into the grid.

Given the popularity of Ontario's growing clean energy economy, applications to the microFIT and Capacity Allocation Exempt (CAE FIT) program are outpacing needed upgrades to the grid. To continue to ensure the growth of small clean energy projects, Ontario will continue to invest in upgrades to the transmission and distribution systems to accommodate renewable supply.

In areas where there are technical challenges, the OPA, Hydro One and Local Distribution Companies will continue to work with proponents that have already applied to the CAE FIT or microFIT program.

Natural Gas



Natural gas plants have the flexibility to respond well to changes in demand, making them an important cushion for Ontario's electricity system — particularly for peak periods.

Natural gas produces electricity either by burning to directly power a gas turbine or by producing steam to drive a steam turbine. A combined cycle gas plant combines these two technologies. Natural gas can supplement baseload power supply and, because it responds quickly to increases in demand, it can also complement the intermittent nature of wind and solar electricity generation.

Natural gas is much cleaner than coal. Some air emissions — particularly mercury and sulphur dioxide — are totally eliminated when natural gas replaces coal. Carbon dioxide emissions are reduced by between 40 and 60 per cent. Currently, Ontario's electricity generation capacity from natural gas is over 9,500 MW.

By replacing coal with natural gas and renewable energy sources, Ontario has greatly reduced greenhouse gas emissions from its electricity supply mix. This policy has prepared Ontario for the possibility of greenhouse gas regulation in the North American market.

Accomplishments

The Ontario government and the OPA have launched a number of clean natural gas and cogeneration projects since 2003 to help with local reliability and peak demand.

The 2007 Plan projected that some 12,000 MW of natural gas would be needed by 2015. Since then, changes in demand and supply — including about 8,400 MW of new, cleaner power across the system and successful conservation efforts — means that less capacity will be required.

Future Needs

In 2009, about 10 per cent of Ontario's electricity generation came from natural gas. In the coming years, the government anticipates that it will be necessary to maintain the amount of natural gas supply at its current level in the supply mix.

The Plan

Natural gas will continue to play a strategic role in Ontario's supply mix as it helps to:

- Support the intermittent supply from renewables like wind and solar
- Meet local and system reliability requirements
- Ensure adequate capacity is available as nuclear plants are being modernized

The 2007 Plan outlined a forecast need for an additional three gas plants in the Province, including one in the Kitchener-Waterloo-Cambridge and one in the southwest GTA.

Because of changes in demand along with the addition of approximately 8,400 MW of new supply since 2003, the outlook has changed and two of the three plants — including the proposed plant in Oakville — are no longer required. However, a transmission solution to maintain reliable supply in the southwest GTA will be required.

As indicated in 2007 Plan, the procurement of a peaking natural gas-fired plant in the Kitchener-Waterloo-Cambridge area is still necessary. In that region, demand is growing at more than twice the provincial rate.

Ontario is taking advantage of its existing assets with the conversion of two coal-fired units in Thunder Bay to natural gas. (See page 21 on Coal.)

Over the next few years, non-utility generation contracts, which were entered into between the private sector and the former Ontario Hydro in the early 1990s, will begin to expire. Many of these are natural gas-fired. These non-utility generators — or NUGs as they are known — have been part of Ontario's overall supply mix for 20 years. They can contribute up to 1,550 MW of clean power to the system. The contracts with NUGs are currently held by the Ontario Electricity Financial Corporation, an agency of the Ministry of Finance.

As non-utility generator contracts expire, the IESO and the OPA will determine if the generation is still required to help ensure reliability. The government will direct the OPA to design contracts that will encourage NUGs to operate during periods when it would most benefit the electricity system. The OPA will be authorized to enter into new contracts where this generation is needed and will negotiate to get the best value for consumers.

CHP (Combined Heat and Power/Cogeneration)

Combined Heat and Power is the simultaneous production of electricity and heat using a single fuel such as natural gas. The heat produced from the electricity generation process is captured and used to produce steam or hot water that can then be used for industrial and commercial heating or cooling purposes, such as district energy systems.

CHP can make more efficient use of fuel and therefore reduce greenhouse gas emissions. CHP overall efficiency can exceed 80 per cent — which means that 80 per cent of the energy can be captured as electricity or usable heat.

Accomplishments

Currently, the total industrial CHP capacity in Ontario is estimated to be about 2,000 MW, or about 6 per cent of Ontario's installed generation capacity.

In October 2006, the OPA awarded seven contracts with a total capacity of 414 MW — enough to provide the power for 400,000 Ontario homes. Much of this new capacity (395 MW) will be coming from industrial projects. These facilities are in communities across the province including: Windsor, Kingsville, London, Oshawa, Markham, Sault Ste. Marie and Thorold.

Algoma Energy Cogeneration Facility

The 63 MW Algoma Energy Cogeneration Facility is located in Sault Ste. Marie, Ontario. The facility uses the by-product fuels from cokemaking and ironmaking (blast furnace and coke oven gas) to generate electricity and steam used for steel manufacturing operations.

The facility reduces Essar Steel Algoma's reliance on the provincial power grid by 50 per cent on average, freeing up this capacity for the rest of the province. This cogeneration facility helps to reduce Essar Steel Algoma's nitrous oxide emissions by 15 per cent (approximately 400 metric tonnes a year).

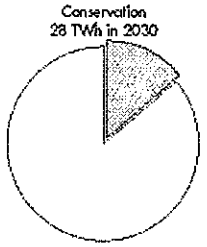
The Plan

Ontario will target a total of 1,000 MW of CHP. It will be procured through the OPA and will include existing contracts, individual negotiations for large projects and a new standard offer program for smaller projects in key strategic locations.

The government will encourage new local CHP generation projects, where price, size and location make sense. The government will work with the OPA to develop options for small, targeted programs. Over the next 20 years, Ontario will see more community-scale CHP projects. The OPA will create a new standard offer program for CHP projects under 20 MW in specific locations.

The OPA will continue to negotiate larger CHP projects on an individual basis. For example, the OPA and St. Marys Paper Corporation recently signed a 10-year contract for the company to generate clean electricity at a new 30 MW biomass-fuelled plant to be built next to St. Marys existing mill in Sault Ste. Marie. The plan is expected to reach commercial operation by early 2014 and will support 550 direct and indirect jobs.

3 conservation



Conservation is Ontario's most environmentally friendly and cost-effective resource. Conservation initiatives save money and reduce greenhouse gas emissions. Reducing consumption reduces bills for consumers and reduces demand on the system, avoiding the need to build new generation. For every dollar that is invested in conservation, two to three dollars of net savings are realized over the life of the investment. Conservation can also create local jobs in energy audits and energy services.

Accomplishments

From 1995 to 2003, there were no provincial conservation programs — it was not a priority. Since 2003, Ontario has had goals for conservation and as a result, this province has become a North American leader. The goal to reduce peak demand by 6,300 MW by 2025 was included in the 2007 Plan. Ontario is on target to meet this goal.

Ontario's A+ 2009 National Energy Efficiency Report Card from the Canadian Energy Efficiency Alliance

The province raised its grade from a "C-" in 2004 to an A+ in 2009 with its strong commitment to energy efficiency and conservation as cornerstones of its energy plan. In addition to the Green Energy and Green Economy Act, 2009, the report lauds Ontario's energy conservation programs, improved energy efficiency in building codes and product standards, as well as other initiatives supporting energy efficiency.

To improve the quality of the province's air and the efficiency of the system, Ontario invested about $1.7 billion in conservation programs from 2006 to 2010. This will save ratepayers $3.8 billion in avoided costs.

Conservation programs also give customers the tools to help them manage costs, and balance demand in peak periods in winter and summer. Conservation programs also create jobs in the clean energy sector.

Ontario has helped to create a culture of conservation since 2003 by:

- Updating Ontario's building code to make energy efficiency a core purpose.
- Delivering the Home Energy Savings Program which has helped over 393,000 homeowners with energy audits and helped nearly 250,000 homeowners with energy savings and retrofits. Despite the federal government's early withdrawal from funding this conservation program in March 2010, Ontario will continue to support the Home Energy Savings Program until March 31, 2011. This program helped save annual greenhouse gas emissions equivalent to taking over 83,000 cars off the road.
- Initiating the OPA's Great Refrigerator Round Up which has removed more than 230,000 old appliances since 2007. It will result in lifetime savings of more than one million megawatt hours over the life of the program.
- Providing $550 million over two years for energy retrofits in schools.
- Launching the Ontario Solar Thermal Heating Initiative for solar water and air heating projects for institutional, commercial or industrial organizations. The program continues until March 31, 2011. Almost 600 projects have been launched or completed to date.
- Moving forward with Smart Meters and Time of Use billing to encourage consumers to shift electricity consumption away from peak periods of demand; Avoided system expenditures help keep costs down for Ontarians.
- Reducing electricity consumption in government buildings through initiatives such as deep lake water cooling — a reliable, efficient and sustainable way to cool buildings while reducing demand on the grid.

Over the past five years, Ontario's conservation programs have generated over 1,700 MW of peak demand savings — the equivalent of over 500,000 homes being taken off the grid. Local Distribution Companies have been partners in helping Ontario achieve its conservation targets.

Conservation efforts are measured by looking at the results of conservation programs. The impacts of the global economic recession are not counted as part of conservation efforts, although they did result in a significant reduction in electricity demand. The recession also affected the level of participation in conservation programs which, although successful, are not expected to allow Ontario to meets its 2010 interim target. Confirmation of this will occur late in 2011, after program results undergo rigorous verification by independent third-parties. Had the global recession not had a significant impact on Ontario's economy, 2010 conservation achievements would have been significantly higher.

The Plan

Working together to reduce electricity use at peak times makes sound economic and environmental sense. Providing consumers with the benefit of up-to-date and accurate electricity consumption readings is also critical to the creation of a culture of conservation. The government is committed to moving forward with implementation of a Time-of-Use pricing structure that balances benefits for both the consumer and the electricity system as a whole.

To help families, Ontario will move the off-peak period for electricity users to 7 p.m. which will provide customers with an additional two hours in the lowest cost period. This change will be in effect for the May 2011 Regulated Price Plan update.

Time-of-Use

"On average, most farmers will pay slightly less on time-of-use billing than they currently pay. Advantages for farmers will be modest with a savings in the range of one to five per cent. However, the advantages for the power supply system will be substantial..."

- Don McCabe, Ontario Federation of Agriculture

Ontario is already a North American leader in conservation (the province conserved over 1,700 MW since 2005). The government's target is 7,100 MW and 28 TWh by 2030. This would mean the equivalent of taking 2.4 million homes off the grid. This level of conservation will reduce Ontario's greenhouse gas emissions by up to 11 megatonnes annually by 2030. These targets are among the most aggressive in North America.

As part of the Green Energy and Green Economy Act, 2009, Local Distribution Companies (LDCs) will become a more recognizable "face of conservation" and have been assigned conservation targets which they must meet as a condition of their licence. LDCs will meet their targets through a combination of province-wide and local conservation programs.

Ontario proposes to provide support for homeowners to have energy audits to become better informed of the opportunities to improve the energy efficiency of their homes.

Conservation targets

Date	2015	2020	2025	2030
Capacity	4,550 MW	5,840 MW	6,700 MW	7,100 MW
Generation	13 TWh	21 TWh	25 TWh	28 TWh

These targets will be met through a combination of programs and initiatives:

- Innovative energy efficiency programs for residential, commercial and industrial sectors
- Next-generation building code updates and standards for appliances and products
- Demand response programs to help reduce peak demand
- Time-Of-Use rates

The government anticipates that the commercial sector will contribute 50 per cent of the conservation target; residential sector will contribute 30 per cent; and industrial sector 20 per cent.

Over the next 20 years, Ontario's conservation targets and initiatives are projected to save about $27 billion in ratepayer costs on the basis of a $12 billion investment. Conservation will also do more than that by helping to ensure that Ontario's air is cleaner and the electricity sector reduces its impact on the environment.

Ontario will continue to provide broad support for achieving these targets through policy initiatives such as bringing forward a proposed regulation to require the broader public sector (municipalities, universities, schools and hospitals) to develop energy conservation plans.

In early 2011, together with LDCs, Ontario will launch a number of new programs, which will allow the province to meet its conservation targets over the next few years and make up for the slower period between 2009 and 2010. The programs will target all sectors, be better coordinated and have greater customer focus than previous programs.

Ontario is designing, implementing and funding a province-wide electricity conservation and demand management program for low-income residential consumers . Ontario is also developing a low-income energy program comprised of natural gas conservation, customer service standards and emergency financial assistance.

These new conservation programs, together with programs for very large industrial customers, will require an investment of about $3 billion over the next five years. The results will be significant: an avoided lifetime supply cost of $10 billion and a net benefit to Ontario ratepayers of about $7 billion over the life of the conservation measures.

4 reliable transmission/ modern distribution

Reliable transmission and modern delivery is the backbone of Ontario's electricity system. It is crucial for supporting Ontario's evolving supply mix, including the closing of coal-fired plants by 2014 and the further expansion of Ontario's clean energy resources. Reliable, safe transmission brings electricity from large generators to Ontario's largest industries and local distribution companies who in turn, deliver to homes and businesses. A modern distribution system, utilizing new technology, allows for greater customer control, incorporates renewable energy, enhances reliability, and supports new technology like electric vehicles.

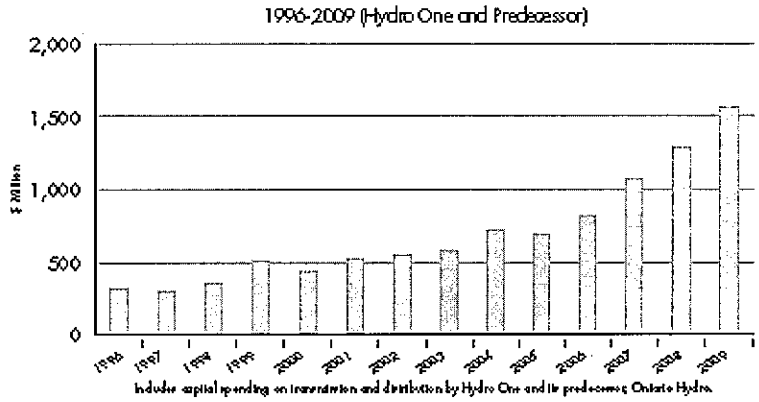
Transmission

Ontario must take the transmission system that's been built over the past century and continue to renew and update it to meet Ontario's growing population, evolving supply mix, and enable more distributed generation.

The Ontario government has taken early and decisive steps to enhance existing electricity infrastructure. It is important to ensure that Ontario can efficiently upgrade the grid to carry additional renewable generation to homes, businesses and industries.

Since 2003, Hydro One has invested more than $7 billion in its transmission and distribution systems. The average annual investment has been double what it was from 1996-2003.

FIGURE 10: GRID INVESTMENTS



Some of Ontario's recent investments include:

- The launch of the Bruce to Milton transmission expansion project — the largest electricity transmission investment in Ontario in the last 20 years, which will connect refurbished nuclear units and additional renewable energy to the grid.
- Ongoing work to reinforce the power transfer capability between northern and southern Ontario including additional 750 MW of planned clean northern generation (Lower Mattagami and some northern FIT Program projects).
- The new Ontario-Québec Interconnection Project (2010), which increased access to 1,250 MW of hydroelectric power and enhanced system reliability in eastern Ontario.
- Additional transmission projects that will facilitate the retirement of coal-fired generation, including transmission reinforcement in the Sarnia area, the installation of new transformers in the northern GTA, and voltage support facilities in the Niagara, London and Kitchener areas. These projects represent an investment of over $400 million.
- Over 15 per cent of transformer stations across Ontario have received overhauls in the past five years, amounting to a total investment of $850 million.
- Installation of almost 4.3 million smart meters across the province, which are already helping with outage management and remote meter reading and reducing the number of estimates for consumers.
- Early investments in Smart Grid infrastructure and technologies, including pilots and demonstration projects. These projects will help Ontario move toward a Smart Grid system that can integrate energy monitors, home automation systems, in-home renewable generation and electric cars.
- Hydro One's $125-million Grid Control Centre opened in 2004 and uses some of the most sophisticated technology in the world to efficiently manage the bulk of Ontario's electricity network.

Reliability has also been improved since 2003 due to a combination of new generation, transmission upgrades, reduced load growth and successful conservation programs. For example, Toronto's reliability was enhanced with the installation of two new underground cables between downtown transfer stations and will be further assisted by reinforcement and upgrade projects worth about $360 million. Annual capital investments by Ontario's Local Distribution Companies, including Hydro One, have averaged $1.1 billion between 2004 and 2009, maintaining reliable and high quality power for Ontario's electricity customers. These investments have made the operation of the system more cost-effective, which will have an impact on Ontarians' bills over the long term.

Modern Distribution

Local distribution systems are an important link in how electricity moves from generators to homes and businesses. In 2003, Ontario's distribution systems often relied on older technology. The government's move towards a Smart Grid was driven by the need to replace aging infrastructure, introduce customer control, incorporate more renewable energy and accommodate new adaptive technology such as electric vehicle charging. Over time, LDCs will have to replace old mechanical infrastructure with newer automated infrastructure that meets Ontario's future needs.

A modern distribution system must be able to accommodate new energy supply from a variety of sources and deliver it reliably to consumers. It must take advantage of Smart Grid technologies to enable efficient and cost-effective delivery of electricity, helping customers to better manage their electricity use, and integrate more renewable energy.

Building a Smart Grid that can coordinate the production of power from large numbers of small power producers and allow utilities to more efficiently manage their grid infrastructure is another essential element of Ontario's clean energy future. Other jurisdictions (Australia, Great Britain and California) are moving toward a smarter grid, but Ontario is leading the way in many areas. By leveraging existing communications technology, a Smart Grid will enable the two-way power flow of electricity across the grid. The Smart Grid will help incorporate distributed generation. It will also improve grid automation with real-time information that will help save energy, reduce the cost of supply over time and increase reliability.

A Smart Grid is a more intelligent grid infrastructure, incorporating communications technology and automation to:

- Maximize existing infrastructure
  - Rather than building out more traditional grid infrastructure (poles, wires, etc), a Smart Grid will use Information Technology solutions to improve and automate distribution.
- Modernize the grid
  - The current distribution system in some places is decades old. A modernized grid is critical for improving reliability, home automation and adapting to evolving transportation needs.
- Lay the foundation for Smart Homes
  - A Smart Grid will put in place the intelligent infrastructure required to support applications for home automation, conservation and smart charging for electric vehicles.

The Green Energy and Green Economy Act, 2009 identified three main areas of focus for Ontario's Smart Grid:

- Helping consumers become active participants in conservation.
- Connecting new and renewable sources of energy to the overall system (consumers and businesses produce energy that can be connected to the local system) to help address power demands.

- Creating a flexible, adaptive grid that can accommodate the use of emerging, innovative energy-saving technologies and control systems.

Smart meters provide a foundation for the Smart Grid and provide customers with timely and accurate information about their electricity use. Smart meters also provide utilities with automatic notification of outages, save on in-person meter-reading costs and enable Time-of-Use pricing.

Smart meters also help avoid system costs that in turn save money for ratepayers: Hydro Ottawa saved $200,000 in meter reading in 2008 and Toronto Hydro estimates that smart meters will cut meter-reading costs by $2.5 million by 2010.

Future Needs

The Ontario government, working with its agencies, will move forward responsibly on a number of new and modernizing transmission projects as well as on improving and maintaining the province's existing infrastructure across all regions in Ontario. These improvements will also balance environmental concerns and the cost to ratepayers. In addition to evaluating the province's need for transmission to integrate renewables, meet provincial demand growth and ensure reliable service, system planning will address community needs. For example, a transmission solution to maintain reliable supply in the southwest GTA will be required.

The Plan

In 2009, the government asked Hydro One to start planning and developing a series of new transmission and distribution projects. Since that time, there have been a number of developments, such as the substantial interest in the Green Energy and Green Economy Act, 2009 to develop renewable energy projects.

Based on the advice of the OPA, the government will prudently move forward with cost-effective priority transmission projects that meet current and future demand and also:

- Accommodate renewable projects;
- Serve new load; and
- Support reliability.

Ontario will proceed first with an investment of approximately $2 billion in five priority projects to be completed in the next seven years, which will ensure a growing mix of renewable sources can be reliably transmitted across the province. These priority projects together with the Bruce to Milton line, in addition to various other station and circuit upgrades, will enable approximately 4,000 MW of additional renewable energy.

FIGURE 11: TRANSMISSION INVESTMENTS: COMPLETE, UNDERWAY AND PROPOSED

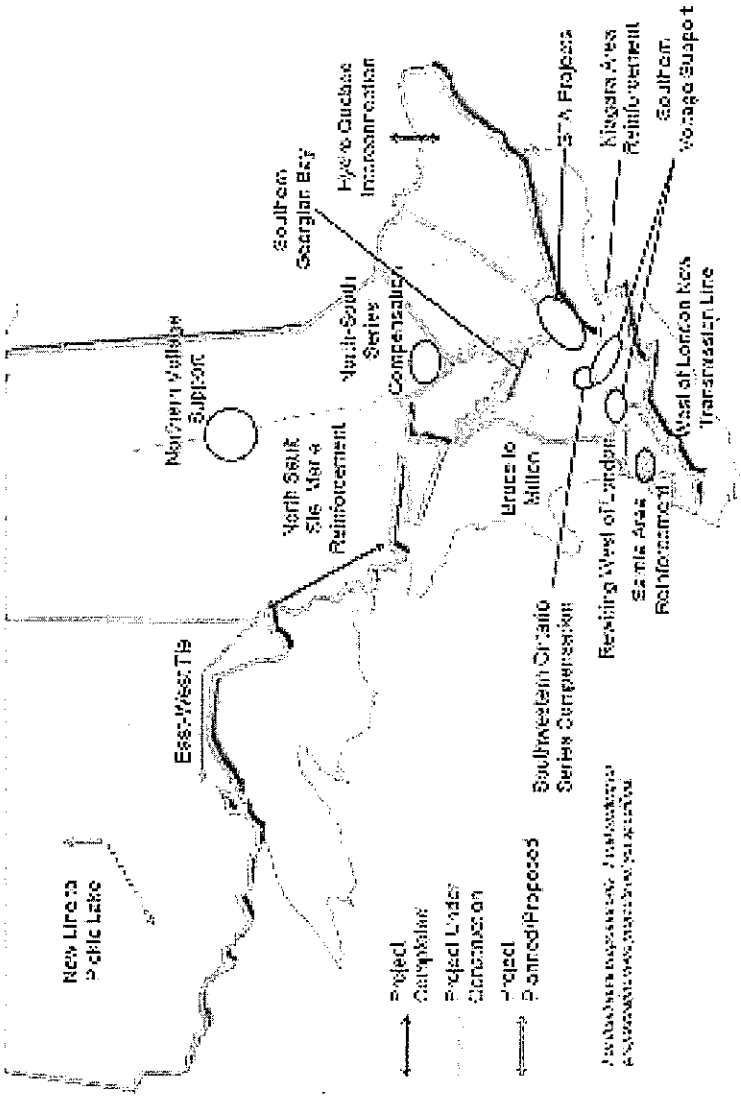


FIGURE 12: PRIORITY TRANSMISSION PROJECTS

Project	Type	Need	Target Completion Date
Series compensation in Southwestern Ontario	Upgrade	Add renewables to grid	2014
Rewiring west of London	Upgrade	Add renewables to grid	2014
West of London	New Line	Add renewables to grid	2017
East-West Tie	New Line	Maintain system reliability, allow more renewables, accommodate electricity requirements of new mineral processing projects.	2016-17
Line to Pickle Lake	New line	Serve industry needs and help future remote community connection	Pending consultation

Given the nature of the transmission upgrades in southwestern Ontario, including series compensation, rewiring and a new line west of London, the government intends to direct Hydro One to carry out these projects immediately.

The East-West tie will be submitted to the OEB to carry out a designation process to select the most qualified and cost-effective transmission company to develop the line.

To ensure successful and timely implementation of the line to Pickle Lake, the government will work with its agencies and the multiple parties involved, including the Federal government, local industries, and First Nation communities that stand to benefit from the project to establish an implementation schedule and a proponent for the line.

Transmission planning will also continue at the regional level, using an approach that considers conservation, demand management, distributed generation and transmission. Regional plans will assess needs based on a region's unique resource mixes and community priorities. Load growth and system reliability are also factors in determining system planning and transmission solutions. Ontario will continue to plan and study additional transmission projects as demand and changes to supply require.

To build a modern system, the government will issue a set of Smart Grid principles and objectives to the Ontario Energy Board. These will provide guidance to LDCs in modernizing their distribution systems and enable the smart home of the future. LDCs will develop smart grid plans and ensure that these are coordinated across the Province. The government will also establish a Smart Grid Fund in 2011 which will provide assistance to Smart Grid companies with a strong Ontario presence. This will lead to new economic development opportunities and bolster Ontario's position as a leader in the Smart Grid.

5 aboriginal communities

Accomplishments

The Ontario government is committed to encouraging opportunities for Aboriginal participation in the energy sector and has launched several initiatives to support participation by First Nation and Métis communities in energy projects, including:

- The Aboriginal Energy Partnerships Program
- The FIT Program: 17 aboriginal-led or partnered projects have secured contract offers
- The $250-million Aboriginal Loan Guarantee Program

Ontario also has a significant partnership at the $2.6 billion Lower Mattagami hydroelectric project, which will see Moose Cree First Nation have up to a 25 per cent equity position with OPG.

Future Needs

First Nation and Métis communities have diverse energy needs and interests. Ontario will work to ensure there is a wide range of options for Aboriginal participation in Ontario's energy future.

Conservation

Conservation priorities and the applicability of programs will vary between First Nation and Métis communities. Community education and youth engagement are also critical for conservation success. Ontario will launch programs to support participation in conservation initiatives, including Aboriginal Community Energy Plans and targeted conservation programs.

Renewable Energy

Future opportunities for First Nation and Métis communities include:

- Partnerships with private developers on confirmed FIT projects under development,
- Development of smaller renewable microFIT projects, like small wind or solar, to build community capacity in energy and generate income.

Existing Green Energy and Green Economy Act, 2009 support programs will be adjusted to ensure that aboriginal communities can take advantage of these opportunities. Aboriginal participation levels will also be reviewed during the regular FIT program review to determine whether adjustments are needed to the rules and incentives.

Transmission

Where new transmission lines are proposed, Ontario is committed to meeting its duty to consult First Nation and Métis communities in respect of their aboriginal and treaty rights and accommodate where those rights have the potential to be adversely impacted. Ontario also recognizes that Aboriginal communities have an interest in economic benefits from future transmission projects crossing through their traditional territories and that the nature of this interest may vary between communities.

There are a number of ways in which First Nation and Métis communities could participate in transmission projects. Where a new transmission line crosses the traditional territories of aboriginal communities, Ontario will expect opportunities be explored to:

- Provide job training and skills upgrading to encourage employment on the transmission project development and construction.
- Further Aboriginal employment on the project.
- Enable Aboriginal participation in the procurement of supplies and contractor services.

Ontario will encourage transmission companies to enter into partnerships with aboriginal communities, where commercially feasible and where those communities have expressed interest. The government will also work with the OPA to adjust the Aboriginal Energy Partnerships Program — currently focussed on renewable energy projects — to provide capacity funding for aboriginal communities that are discussing partnerships on future transmission projects.

The Plan

Ontario recognizes that successful participation by First Nation and Métis communities will be important to advance many key energy projects identified under a Long-Term Energy Plan. The path forward needs to be informed by regular dialogue with First Nation and Métis leadership through distinct processes. Working with First Nation and Métis leadership, Ontario will look for opportunities to promote on-going discussion of these issues.

Ontario's remote First Nation communities currently rely on diesel generation for their electricity supply — but diesel fuel is expensive, difficult to transport, and poses environmental and health risks. According to analysis done so far, transmission connection would be less expensive over the long term than continued diesel use for many remote communities.

New transmission supply to Pickle Lake is a crucial first step to enable the connection of remote communities in northwestern Ontario. A new transmission line to Pickle Lake — one of this plan's five priority projects — will help to service the new mining load and help to enable future connections north of Pickle Lake. Subject to cost contributions from benefiting parties, Ontario will focus on supplying Pickle Lake from the Ignace/ Dryden area immediately. A line to serve the Nipigon area specifically will continue to be considered as the need for it evolves.

As part of this project, the government will also ask the OPA to develop a plan for remote community connections beyond Pickle Lake, including consideration of the relevant cost contributions from benefiting parties, including the federal government. This plan may also consider the possibility of onsite generation such as small wind and water to reduce communities' diesel use.

6 energy in Ontario's economy — capital investments

Energy has a significant impact on Ontario's economy. Ontario businesses rely on electricity to produce goods and services and it is essential to our quality of life.

- Ontario's electricity sector is a $15 billion annual industry.
- Energy accounts for eight per cent of Canada's GDP.
- Some 95,000 Ontarians are currently directly and indirectly employed in the energy sector.
- More than $10 billion has been invested in Ontario in new clean energy projects that are online or under construction.
- Ontario has attracted more than $16 billion in private sector investments in the energy sector in the past year.

Ontario's progress in modernizing and upgrading electricity has not only benefited electricity users, it has strengthened the economy by attracting investment and creating jobs. Large infrastructure projects typically have high GDP and employment impacts, and this is also true of the ongoing and planned investments in Ontario's electricity sector.

Hydroelectric investment

Waterpower has been helping to fuel Ontario's economic growth for more than 100 years and is the backbone of renewable supply.

Ontario hydroelectric producers spend $250 million annually in operating and maintenance costs and in the past decade alone have made additional capital investments of $400 million to bring new waterpower online. Today, Ontario's hydroelectric producers directly employ more than 1,600 people and support an additional 2,000 jobs.

Hydroelectric has an even greater impact in Ontario's north, where it accounts for more than 80 per cent of the electricity generated. Twenty-four of 65 generating stations run by OPG are located in Ontario's north, representing close to 2,000 MW.

Many older hydroelectric facilities date to Ontario's early industrial mining and forestry activities and some of these sites are being rebuilt at higher capacity. Recent substantial investments are playing an important economic role in the north. The Lower Mattagami River Hydroelectric Project, Ontario's largest hydroelectric project in 40 years, will bring a $2.6-billion investment into northeastern Ontario and create up to 800 construction jobs.

In southwestern Ontario, work is underway on the Niagara Tunnel project, the single biggest construction project for the Niagara region since the Beck 2 Generating Station was built 55 years ago. The project means that region will benefit from over 230 construction jobs.

Wind, Solar and Bio-Energy investment

Ontario is creating a new sector for investment and is becoming a global destination of choice for clean energy developers and suppliers. Ontario's Green Energy and Green Economy Act, 2009 has laid the foundation for economic opportunities throughout the province. In the coming years, over 20,000 people will be employed in renewable energy and development activities including manufacturing triggered by North America's most comprehensive FIT program.

Ontario has already attracted more than $16 billion of private sector investment and over 20 companies have announced plans to set up or expand operations in Ontario. This activity will create or support indirect jobs in areas such as finance, consulting and other manufacturing, service, and development industries.

Many communities that were hard-hit during the recent economic downturn are reaping benefits of Ontario's growing clean energy economy. According to the Windsor Essex Economic Development Commission, of the 6,000 new jobs created in Windsor in the past 10 months, five to 10 per cent are tied to renewable energy.

The Green Energy and Green Economy Act, 2009 has already attracted the single-largest investment in renewable energy in provincial history. The Consortium, led by Samsung C&T Corporation, is investing $7 billion to create 2,500 MW of new wind and solar power in Ontario. The investment will lead to more than 16,000 new clean energy jobs to build, install and operate the renewable generation projects and associated manufacturing. The consortium is also working with major partners to secure four manufacturing plants in the province. This will lead to the creation of 1,440 manufacturing and related jobs to build wind and solar technology for use in Ontario and export across North America.

Plans for the first of the four plants have already been announced. Samsung and Siemens have said they intend to build Ontario's first wind turbine blade manufacturing plant, creating up to 900 direct and indirect jobs. The supply-chain of Ontario's new clean energy economy is providing benefits to other sectors of the economy. For example, the Consortium intends to use Ontario steel in its projects, subject to necessary quality standards.

The clean energy sector is also providing new opportunities to people in rural Ontario. Farmers are leasing portions of their land for wind turbines, allowing them to generate income while continuing to farm. For example, in Port Alma, local farmers and landowners are leasing their land to the 44-turbine Kruger Energy wind power project, which produces enough clean electricity to power 30,000 households.

Province-wide, farmers and agri-food businesses received a total of $11.2 million to develop and build generating systems that produce clean energy, reduce electricity costs and contribute to local economies through OMAFRA's Biogas Systems Financial Assistance Program, which ran from September 2008 to March 2010.

"Building a clean energy economy is not an issue that splits left from right. It's about past and future. People of all political stripes who are entrusted in building a modern economy can – and do – look ahead."

- Rick Smith, founding partner of Blue Green Canada

Modernization of nuclear fleet

The nuclear sector has contributed a great deal to Ontario's economy over the past forty years. According to the Canadian Nuclear Association, the sector supports over 70,000 jobs across Canada and injects some $6 billion into the national economy every year. The Organization of CANDU Industries estimates that its 165 members employ over 30,000 people, many of them here in Ontario. Its members supply goods and services for nuclear reactors in domestic and export markets.

Plans to upgrade and refurbish Ontario's nuclear plants are expected to create and support thousands of jobs and inject billions of dollars into this sector over the next decade. A report by the Canadian Manufactures and Exporters estimates that the refurbishment and operation of the Bruce and Darlington units will create or sustain 25,000 jobs and provide $5 billion in annual economic activity.

The design and construction of two new nuclear units at Darlington will employ up to 3,500 people and support many thousands more indirect jobs. Ongoing operation at the plant will require a further 1,400 tradespeople, nuclear operators, and engineering and technical support staff for the duration of the plant's life.

Transmission upgrades

Thousands of Ontarians are employed in the province's electricity transmission sector and billions of dollars in planned upgrades to and expansion of the system are expected to support and create thousands more jobs in the future.

Fully owned by the Province of Ontario, Hydro One is the province's largest electricity transmission and distribution company. It owns 97 per cent of the transmission facilities in the province and employs approximately 5,400 workers, many of them highly skilled technicians, in communities throughout Ontario.

This Plan includes a commitment to develop five priority transmission projects. Employment on the five priority projects alone will peak at over 5,000 in 2013. This new transmission capacity will enable further generation development, including many new private-sector renewable projects.

The rollout of new transmission projects will also allow communities, including Aboriginal communities, to develop more small-scale renewable generation and, in certain cases, reduce their dependence on polluting forms of electricity generation.

Coal plant conversion

Converting Ontario's existing coal-fired generating stations to new fuels will create new constructions jobs and support clean energy jobs in operations and maintenance.

For example, the Atikokan biomass conversion project will create up to 200 construction jobs and help protect jobs at the plant. It will also support an estimated 20 to 25 jobs in Ontario related to the production of wood pellets and sustain other jobs in the forestry sector. The project will provide engineering and construction jobs during the conversion as well as ongoing employment in the forestry and transportation sectors to keep the station supplied with fuel. Natural gas conversion at Thunder Bay will provide additional jobs in pipeline construction and ongoing operations.

Conservation

Conservation programs contribute to local and regional jobs, creating employment and new business opportunities in a number of areas, including technology and product development, manufacturing, distribution, marketing, sales, installation and maintenance. For example, Ontario's $3-billion investment in conservation programs over the next five years is expected to create or sustain about 5,000 jobs annually.

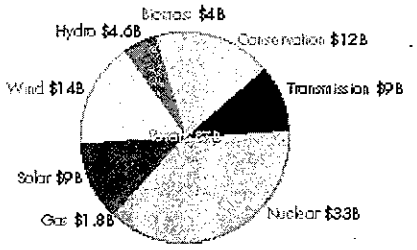
Capital Investments

Ontario's electricity sector is a $15-billion annual industry. Investments in the electricity system are helping to clean Ontario's air, improve the reliability of the energy supply and create jobs and economic opportunities in communities across the province. Since 2003, over $10 billion has been invested to bring new supply on line, and over $7 billion has been spent to strengthen the transmission system. Ontario has also attracted more than $16 billion in private sector investment through the FIT program.

Investments over the past seven years to build new cleaner generation and modernize electricity infrastructure has increased significantly to make up for years of underinvestment. Needed capital investments in Ontario's energy system over the next 20 years will be significant, and are in line with the government's efforts to upgrade and replace aging infrastructure. For example, the ReNew Ontario Infrastructure plan invested $30 billion over four years in capital projects across the province.

This Plan outlines essential capital expenditures to continue building a clean and modern electricity system and to keep the lights on for Ontario families and businesses. The total capital cost in 2010 dollars is estimated to be $87 billion over the life of the Plan. This accounts for new and refurbished energy supply, transmission and distribution infrastructure and conservation investments. This Plan provides more investments over the 2007 Plan due to increased investments in renewables, updated capital cost assumptions, and more certainty on the costs of nuclear refurbishments and new build. These cost estimates will be further refined by the OPA in the coming months and then submitted to the OEB.

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



The capital investments outlined are through both the private and public sector, and the majority will be paid for by electricity consumers spread over many years, depending on the cost recovery mechanism. (For example, electricity generators typically recover their investment over 20 years, whereas transmission investments may take up to 40 years to be fully repaid). This ensures that the annual costs to consumers, as reflected on electricity bills are spread over a longer period of time.

Conservation expenditures in this Plan include direct program costs and additional capital expenditures driven by higher appliance energy efficiency standards and higher building code efficiency standards.

Overall, renewables account for one third of total expenditures, nuclear just over one third, and natural gas, conservation and transmission the remainder. The breakdown is reflective of the Plan's objective to deliver a balanced and diverse supply mix that is cost effective, clean and helps create clean energy jobs.

7 electricity prices

Over the past 20 years, the price of water, fuel oil and cable TV have outpaced the price of electricity. Over the next 20 years, Ontario can expect stable prices that also reflect the true cost of electricity. The government will need to take a balanced and prudent approach to investment and pricing that ensures that Ontario's children and grandchildren have a clean, reliable system.

Ontarians now pay the true cost of electricity to ensure that essential investments are made in clean energy and modern transmission. About 40 per cent of Ontario's electricity generation is subject to price regulation, contributing significantly to predictable prices for Ontario consumers. Regulated Price Plan (RPP) rates (adjusted every six months) ensure pricing reflects the true cost of generating electricity. This helps to provide stable and predictable electricity prices for consumers.

Accomplishments

In 2003, the electricity system was in significant decline but Ontario families and businesses have invested in the creation of cleaner sources and the restoration of reliability. The cost of energy has increased in order to provide cleaner, more reliable energy for generations to come.

The government has also taken several steps to keep the cost of electricity down for Ontario families and businesses. Actions taken to prudently manage expenditures total over $1 billion, including:

- Freezing the compensation structures of all non-bargained public sector employees for two years – which include the five energy agencies.
- Limiting travel costs and other expenses for public sector workers.
- Requesting that Hydro One and Ontario Power Generation revise down their 2010 rate applications to find savings and efficiencies.
- The IESO has reduced costs by $23 million over the past seven years.
- For 2011, the OPA has reduced its overall operating budget by 4.1 per cent.
- Hydro One will reduce operations costs by $170 million in 2010 and 2011. Information technology upgrades will save $235 million over the next four years.
- OPG is reducing operations costs by more than $600M over the next four years.

Ontario has taken steps to lower the hydro debt left by the previous government. In 1999, the restructuring of Ontario Hydro and the attempt to sell-off Hydro left electricity consumers with a debt of $20.9 billion. Since 2003, Ontario has decreased that stranded debt by $5.7 billion. Payments toward the debt are made through Payments in Lieu of Taxes, dedicated income from government energy enterprises, and by ratepayers through the Debt Retirement Charge.

The government has also launched a number of initiatives to help Ontario families and businesses manage electricity bill increases. Some of these include:

- The Northern Ontario Energy Credit, a new, permanent annual credit to help families and individuals in the North who face high energy costs. The yearly credit of up to $130 for a single person and up to $200 for a family would be available to over half of all northern Ontario households.
- Ontario Energy and Property Tax Credit, starting with the 2010 tax year, to low-income Ontarians who own or rent a home would receive up to $900 in tax relief, with seniors able to claim up to $1,025 in tax relief to help with both their energy costs and property tax. Overall, the proposed Ontario Energy and Property Tax Credit would provide a total of about $1.3 billion annually to 2.8 million Ontarians.

Energy Consumer Protection Act, 2010:

On January 1, 2011, new rules will take effect under the Energy Consumer Protection Act, 2010 that will help protect electricity and natural gas consumers by putting an end to unfair practices by energy retailers. The rules will ensure that consumers receive accurate price disclosure from all energy retailers before they sign contracts, helping to protect Ontario families and seniors.

Ontario is helping low-income Ontarians with their energy costs through a province-wide strategy to help consumers better manage their energy consumption and costs, including:

- Establishing a new emergency energy financial assistance fund.
- Implementing enhanced customer service rules that will assist all customers, particularly low-income Ontarians.

Ontario is also developing a comprehensive electricity conservation program for low-income households in coordination with the natural gas utilities. Through the conservation measures, customers will be better able to manage their energy bills.

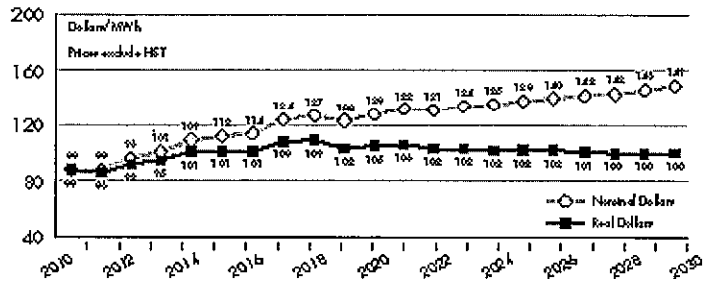
The Plan

Industrial Users

Due to investments to make the electricity system cleaner and more reliable for industry, the government projects that the industrial rate will increase by about 2.7 per cent annually over the next 20 years. The Ontario government has introduced initiatives to enhance the efficiency and competitiveness of large industrial consumers as well as protect jobs and local economies. These include:

- The Industrial Conservation Initiative will help the province's largest industrial and manufacturers to conserve energy, save on costs and increase their competitiveness. By changing the Global Adjustment Mechanism, large industrial users can shift their usage off peak times and save on electricity costs.
- The OPA's Industrial Accelerator Program has been launched to assist transmission-connected industrial electricity users to fast-track capital investment in major energy-efficiency projects.
- The Northern Industrial Energy Rate Program provides electricity price rebates for qualifying northern industrial consumers who commit to an energy efficiency and sustainability plan. On average, the program reduces prices by about 25 per cent for large facilities.

FIGURE 14: INDUSTRIAL PRICE PROJECTIONS (2010-2030)



Helping Ontario Small Businesses and Families

In order to ensure that Ontario has a clean, modern system that increases renewables, ensures reliability and creates jobs, continued investments in the electricity system are essential.

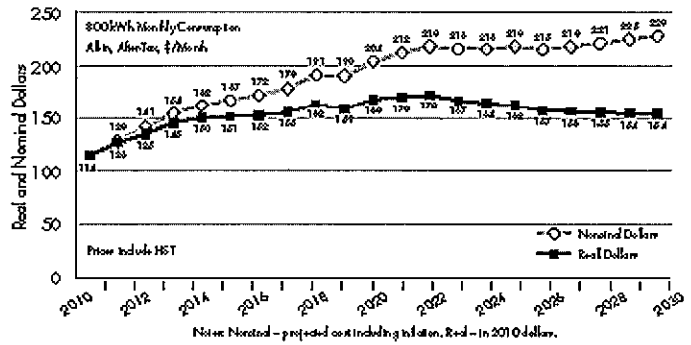
Based on the significant investments in clean, modern energy outlined in this plan, the government projects, based on current forecasts, that electricity prices will increase. Over the next 20 years, prices for Ontario families and small businesses will be relatively predictable. The consumer rate will increase by about 3.5 per cent annually over the length of the long-term plan.

Over the next five years, however, residential electricity prices are expected to rise by about 7.9 per cent annually (or 46 per cent over five years). This increase will help pay for critical improvements to the electricity capacity in nuclear and gas, transmission and distribution (accounting for about 44 per cent of the price increase) and investment in new, clean renewable energy generation (56 per cent of the increase).

Continued investments in transmission, conservation and supply are needed for a system that provides more efficient and reliable electricity to consumers whenever they need it and does not pollute Ontario's air or negatively affect the health of citizens and future generations.

After five years, Ontario will have largely completed the transition to a cleaner more reliable system due to the replacement of coal-fired generation and new renewable generation under the GEA. Once these investments have been made, price increases are expected to level off. The investments that the entire province is making in the future of electricity will help to ensure that Ontario never finds itself in the dire straits it was in just seven years ago.

FIGURE 15: RESIDENTIAL PRICE PROJECTIONS (2010-2030)



However, in the next five years, the government recognizes that the increases will have an impact on Ontario families and businesses.

The government's 2010 Ontario Economic Outlook and Fiscal Review took action to help Ontarians who are feeling the pinch of rising costs and electricity prices. The Ontario government proposed direct relief through a new Ontario Clean Energy Benefit (OCEB).

For eligible consumers, the proposed OCEB would provide a benefit equal to 10 per cent of the total cost of electricity on their bills including tax, effective January 1, 2011. Due to the length of time required to amend bills, the price adjustments would appear on electricity bills no later than May 2011, and would be retroactive to January 1, 2011.

Every little bit of assistance helps during lean times. The proposed OCEB together with the Northern Ontario Energy Credit and the Ontario Energy and Property Tax Credit will all help mitigate electricity costs for families.

Eligible consumers would include residential, farm, small business and other small users. The proposed OCEB would help over four million residential consumers and over 400,000 small businesses, farms and other consumers with the transition to an even more reliable and cleaner system.

Benefits for Eligible Consumers

Customer Monthly Consumption	Current Estimated Monthly Bill	Estimated Bill after Ontario Clean Energy Benefit	Monthly Benefit (10%)	Yearly Benefit (10%)
Typical Residential 800kWh	$128	$115.20	$12.80	$153.60
Small Business 10,000kWh	$1,430	$1,287	$143	$1,716
Farm 12,000kWh	$1,710	$1,539	$171	$2,052
*Typical 2011 monthly benefit for a consumer. Benefit amount will vary based on actual price, consumption and location				

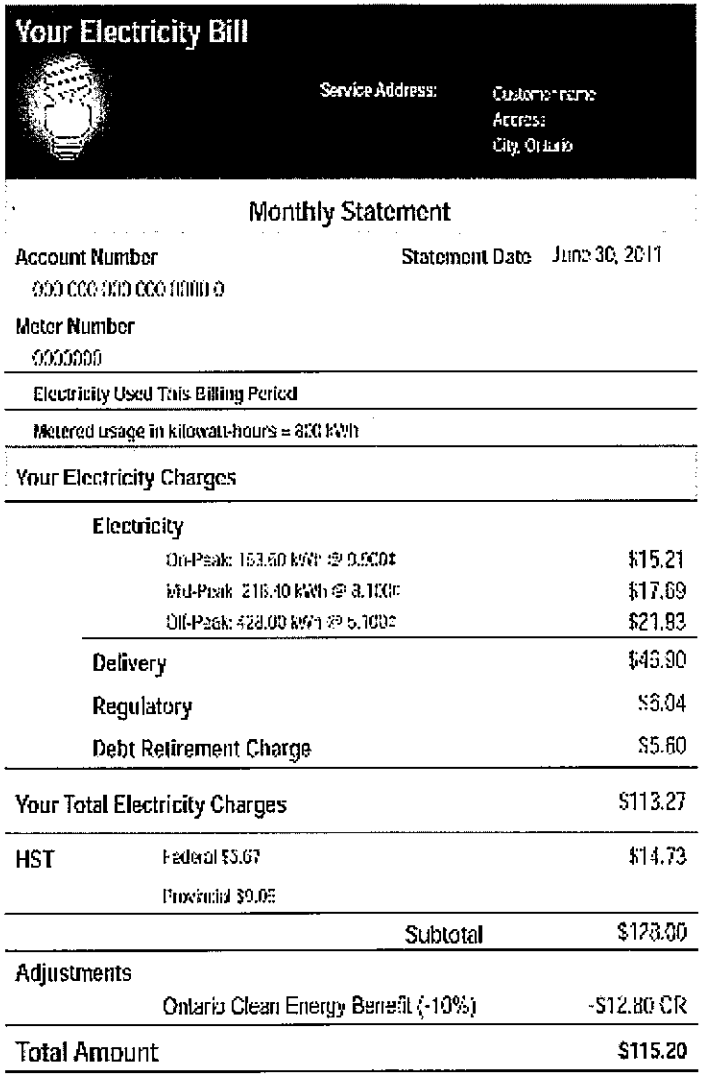
Providing the 10 per cent OCEB to Ontarians is a responsible way of helping Ontario families and businesses through the transition to a cleaner electricity system. The OCEB would help residential and small business consumers over the next five years as the grid is modernized. The government has introduced legislation to implement the proposed OCEB.

Working together to reduce electricity use at peak times makes sound economic and environmental sense. Providing consumers with the benefit of up-to-date and accurate electricity consumption readings is also critical to the creation of a culture of conservation. The government is committed to moving forward with implementation of a Time-of-Use pricing structure that balances benefits for both the consumer and the electricity system as a whole.

To help families, Ontario will move the off-peak period for electricity users to 7 p.m. which will provide customers with an additional two hours in the lowest cost period. This change will be in effect for the May 2011 Regulated Price Plan update.

This plan has outlined a new clean, modern and reliable electricity system for the people of Ontario. Instead of a system that was polluting, unreliable and in decline with unstable pricing, Ontarians will have a North American-leading clean energy system that keeps the lights on for generations to come, creates jobs for Ontario families and ensures that the air they breathe is cleaner.

FIGURE 16: SAMPLE BILL



Your Electricity Bill

Service Address: Customer name
Address
City, Ontario

Monthly Statement

Account Number 000 000 000 000 0000 0	**Statement Date** June 30, 2011
Meter Number 0000000	
Electricity Used This Billing Period	
Metered usage in kilowatt-hours = 800 kWh	
Your Electricity Charges	
Electricity	
On-Peak: 153.60 kWh @ 9.50¢	$15.21
Mid-Peak: 216.40 kWh @ 8.10¢	$17.69
Off-Peak: 428.00 kWh @ 5.10¢	$21.83
Delivery	$46.90
Regulatory	$6.04
Debt Retirement Charge	$5.60
Your Total Electricity Charges	$113.27
HST Federal $5.67	$14.73
Provincial $9.06	
Subtotal	$128.00
Adjustments	
Ontario Clean Energy Benefit (-10%)	-$12.80 CR
Total Amount	**$115.20**

Sample Bill for illustrative purposes only. Other adjustments may apply.

Appendix One:
who does what

Ontario Power Generation: **Generates 60 per cent of Ontario's electricity.**

Hydro One: **Operates 97 per cent of Ontario's transmission network.**

Independent Electricity System Operator: **Ensures reliability, forecasts short-term demand and supply, monitors supply, and manages the Ontario wholesale market.**

Ontario Power Authority: **Responsible for system planning (generation, transmission, demand and conservation), contracts for new generation and conservation, and manages contracts for about 40 per cent of Ontario's generation.**

Ontario Energy Board: **Independent, quasi-judicial regulator of Ontario's energy sector**

Licensed Transmission System Operators: **Transmit electricity (There are five; Hydro One Networks is the largest).**

Local Distribution Companies: **More than 80, mostly owned by municipalities, deliver electricity and serve customers in a given area.**

Electricity Retailers: **Seventy-seven private-sector companies that sell contracts to businesses and consumers**

Privately-owned generators: **Facilities that produce energy (Bruce Power, wind and solar energy companies)**

Appendix Two:

consultations and next steps

Ontario's Long-Term Energy Plan was informed by public and stakeholder consultations as well as advice from the OPA. In addition to issuing this plan, the government is posting a proposed supply mix Directive on the Environmental Registry for a 45 day public comment period. Following this posting, the directive will be finalized and sent to the OPA. The OPA will consult publicly during the development the Integrated Power System Plan (IPSP) and submit the plan to the OEB. The OEB will conduct a review of the IPSP including public hearings. The final IPSP will constitute the detailed long-term energy plan for the next 20 years. It will be updated every three years as required by regulation.

Public and Stakeholder and Online Consultations
September 21st – November 18, 2010
More than 40 stakeholder sessions and over 2,500 online response

↓

Ontario's Long-Term Energy Plan
November 23, 2010

↓

45-Day Posting on Environmental Registry
of Proposed Supply Mix Directive
www.ebr.gov.on.ca
November 23, 2010-January 7, 2011

↓

OPA prepares detailed IPSP, holds consultations and submits it to the OEB
Mid-2011

↓

OEB Review
2011-2012

Appendix Three:

installed capacity (MW)

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

glossary – of energy terms

Baseload Power: Generation sources designed to operate more or less continuously through the day and night and across the seasons of the year. Nuclear and generally large hydro generating stations are examples of generators that operate as baseload generation.

Biomass: Energy resources derived from organic matter, including wood, agricultural waste and other living cell material that can be burned to produce heat energy or electricity.

Demand Response (DR): Programs designed to reduce the amount of electricity drawn by customers from the grid, in response to changes in the price of electricity during the day, incentive payments and/or other mechanisms. In Ontario, both the OPA and the IESO run demand response programs.

Dispatchable Generation: Sources of electricity such as natural gas that can be dispatched at the request of power grid operators; that is, output can be increased or decreased as demand or availability of other supply sources changes.

Distribution: A distribution system carries electricity from the transmission system and delivers it to consumers. Typically, the network would include medium-voltage power lines, substations and pole-mounted transformers, low-voltage distribution wiring and electricity meters

Feed-in Tariff (FIT): A guaranteed rate program that provides stable prices through long-term contracts for energy generated using renewable resources

Greenhouse Gas (GHG): Gases that contribute to the capture of heat in the Earth's atmosphere. Carbon dioxide is the most prominent GHG, in addition to natural sources it is released into the Earth's atmosphere as a result of the burning of fossil fuels such as coal, oil or natural gas. Widely acknowledged as contributing to climate change.

Intermittent Power Generation: Sources of electricity that produce power only during certain times such as wind and solar generators whose output depends on wind speed and solar intensity.

Kilowatt (kW): A standard quantity of power in a residential-size electricity system, equal to 1,000 watts (W). Ten 100-watt light bulbs operated together consume one kW of power.

Kilowatt-hour (kWh): A standard unit of electrical energy in a residential-size system. One kWh (1,000 watt-hours) is the amount of electrical energy produced or consumed by a one-kilowatt unit during one hour. Ten 100-watt light bulbs, operated together for one hour, consume one kWh of energy.

Load or Demand Management: Measures undertaken to control the level of energy usage at a given time, by increasing or decreasing consumption or shifting consumption to some other time period.

Local Distribution Company (LDC): An entity that owns a distribution system for the local delivery of energy (gas or electricity) to consumers.

Megawatt (MW): A unit of power equal to 1,000 kilowatts (kW) or one million watts (W).

Megawatt-hour (MWh): A measure of the energy produced by a generating station over time: a one MW generator, operating for 24 hours, generates 24 MWh of energy (as does a 24 MW generator, operating for one hour).

MicroFIT: Ontario residents are able to develop a very small or "micro" renewable electricity generation project (10 kilowatts or less in size) on their properties. Under the microFIT Program, they are paid a guaranteed price for all the electricity they produce for at least 20 years.

Peaking Capacity: Generating capacity typically used only to meet the peak demand (highest demand) for electricity during the day; typically provided by hydro, coal or natural gas generators.

Peak Demand: Peak demand, peak load or on-peak are terms describing a period in which electricity is expected to be provided for a sustained period at a significantly higher than average supply level.

Photovoltaic: A technology for converting solar energy into electrical energy (typically by way of photovoltaic cells or panels comprising a number of cells).

Regulated Price Plan (RPP): Rates (adjusted every six months) to ensure electricity pricing reflect the true cost of generating electricity. They provide stable and predictable electricity prices for consumers.

Smart Grid: A Smart Grid delivers electricity from suppliers to consumers using digital technology with two-way communications to control appliances at consumers' homes to save energy, reduce costs and increase reliability and transparency.

Supply Mix: The different types of fuel that are used to produce electricity in a particular jurisdiction. Normally the mix is expressed in terms of the proportion of each type within the overall amount of energy produced.

Terawatt-hour (TWh): A unit of power equal to a billion kilowatt-hours. Ontario's annual electricity consumption is around 140 TWh.

Transmission: The movement or transfer of electricity over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other, separate electric transmission systems. Transmission of electricity is done at high voltages (50kV or higher in Ontario); the energy is transformed to lower voltages for distribution over local distribution systems.

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Appendix C Correspondence from Davis LLP to Ministry of the Environment

DAVIS LLP | LEGAL ADVISORS SINCE 1892

FROM THE OFFICE OF Laura K. Bisset
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DIRECT FAX 416.777.7432
E-MAIL lbisset@davis.ca

FILE NUMBER: 81310-00002

February 7, 2013

DELIVERED BY COURIER & FAX

Sarah Raetsen
Senior Program Support Coordinator
Ministry of the Environment
Operations Division
Environmental Approvals Branch
2 St. Clair Avenue West
Floor 12A
Toronto ON M4V 1L5

Dear Ms. Raetsen:

Re: EBR Registry Number 011-7852
Dufferin Wind Power Inc. - Instrument Proposal - Approval for a renewable energy project pursuant to s. 47.3(1) of the *Environmental Protection Act*

We are counsel for Conserve Our Rural Environment ("**CORE**"), an incorporated residents' group in the Township of Mulmur who have an interest in the wind farm proposed (the "**Proposed Wind Farm**") by Dufferin Wind Power Inc. ("**DWPI**"), and whose members can be impacted by it. On behalf of CORE, we write to provide comments on the above-noted Instrument Proposal and reports submitted in support of its approval.

CORE's position is that the reports submitted in support of the Proposed Wind Farm fail to demonstrate that it is in the public interest to grant the requested approval. Although CORE does not accept the adequacy of any of the reports, it comments herein focus on the following key areas of concern:

1. Natural Heritage
2. Noise
3. Cultural Heritage
4. Geotechnical
5. Air Quality
6. Visual Impact
7. Rail Line Easement

8. Human Health

It is CORE's position that the REA cannot be approved as long as these key concerns remain outstanding. A substantial amount of work would be required to demonstrate that the Proposed Wind Farm meets the requirements of the *Environmental Protection Act* and O. Reg 359/09. The reports simply do not support the approval of the REA.

Natural Heritage

The proponent's natural heritage assessment work does not meet the requirements of O. Reg. 359/09 (the "**Regulation**"), nor does it demonstrate that the Proposed Wind Farm will have acceptable impacts on the natural environment.

These comments on natural heritage assessment will focus on bats, as an example of the inadequacy of DWPI's analysis of natural heritage features. Eighteen species of conservation concern were identified during site investigation with the potential to occur within 120 metres of the project location (see Evaluation of Significance Report). Even though these comments relate to bats, CORE's position is that the adequacy and completeness of the analysis performed with respect to the other species of conservation concern are also unsatisfactory, as is the analysis completed with respect to wetlands, woodlands, areas of natural and scientific interest and wildlife habitat.

The Records Review Report identifies three species of bat, classified as endangered by COSEWIC, as potentially occurring in the general area of the project location: the Little Brown Bat, the Northern Long-eared Bat, and the Eastern Pipistrelle (see Appendix C). The Natural Heritage Assessment Site Investigation Report identifies five bat maternal roost colonies habitat, all of which were suitable roosting habitat for the Little Brown Bat, and the Northern Long-eared Bat. Two of these habitats (BMA 1 and BMA 4) are considered significant habitat, and BMA 2 is being treated as significant. Within 5 metres of BMA 1, DWPI proposes the following project components: underground collector circuit, alternative underground collector circuit, horizontal directional drilling, Turbine 3, access road, and crane path. Within 20 metres of BMA 2, DWPI proposes the following project components: Turbine 15, access road, underground collector circuit, and crane path. Within 5 metres of BMA 4, DWPI proposes the following project components: underground collector circuit, horizontal directional drilling, Turbine 34, access road, and crane path (see Environmental Impact Study Report).

The Environmental Impact Study Report says that studies to confirm the significance of wildlife habitats treated as significant will be completed prior to construction, which would include BMA 2. Mitigation measures will only be applicable if wildlife habitats are confirmed to be significant. In that same report, DWPI advises that pre-construction surveys will not be conducted within BMA 2. In other words, DWP proposes to construct Turbine 15 and determine later whether it poses a mortality threat to two species of endangered bat, and because it will not be confirming that BMA 2 is actually significant habitat, no mitigation measures will be applicable. This approach is plainly unacceptable.

In the same vein, and equally unacceptable is the description of the proposed contingency measure in the Environmental Effects Monitoring Plan for significant natural features in and within 120 metres of the Proposed Wind Farm where an operational impact has the potential to occur. DWPI proposes the following contingency measure with respect to bats: "upon submission of annual post-construction monitoring reports to Ministry of Natural Resources ("the "**MNR**") it will be determined in consultation with MNR whether contingency measures are required and the contingency measures to be undertaken." In other words, DWPI suggests that the Proposed Wind Farm be permitted to operate, potentially causing endangered bat mortality, before contingency measures to avoid that outcome are developed.

DWPI states that discussions regarding species at risk are outlined in a separate report (see Environmental Impact Study Report), but this report has not been made available. Bat mortality is a significant concern arising from the operation of wind farms. The MNR reports in *Bats and Bat Habitats: Guidelines for Wind Power Projects* that bat mortality has been documented at wind power projects in a variety of habitats across North America, and in Ontario, annual mortality estimates at wind power projects range from 4 to 14 bat mortalities/turbine/year. It is not acceptable that analysis of a virtually guaranteed impact to three endangered species of bats is not available for public review and comment prior to the potential approval of the requested REA. This approach fails to address the regulatory requirement to describe all potential negative environmental effects related to natural heritage resources and indicate where additional approvals will address specific potential effects.

These comments were provided to DWPI in July. None of the Draft Records Review Report, Draft Evaluation of Significance Report, or Draft Environmental Impact Study Report were modified in any way to address the comments before the reports were finalized.

DWPI has also failed to meet the procedural requirements of the Regulation, in relation to natural heritage. Subsection 28(3) of the Regulation requires the proponent to submit three things: (a) a natural heritage assessment; (b) a copy of any confirmation or comment it is required to obtain from MNR; and (c) *any additional written comments provided by MNR in respect of the natural heritage assessment.* At the time that DWPI's draft reports were made available for public comment in May, 2012, DWPI did not make available any correspondence from MNR suggesting that it had obtained the required confirmations to proceed with the Proposed Wind Farm. The final reports, however, make reference to correspondence from MNR dated May 9, 2012, without including a copy of it. DWPI did not comply with the regulation in not making that correspondence available with the draft reports, and it continues to fail to meet its obligations pursuant to paragraph 28(3)(c) of the Regulation by failing to produce a copy of the May 9, 2012 MNR correspondence. DWPI's REA application should not have been deemed complete in the absence of this correspondence; and MOE should not consider approving the REA until the correspondence has been produced, and it has received public comment on it.

Finally, MNR's October 21, 2012 correspondence indicates that MNR does not "support or confirm that any part of the Northern Route has satisfied the requirements of Ontario Regulation 359/09." It is unclear to CORE what is meant by the "Northern Route" or whether DWP is seeking the MOE's approval of it notwithstanding MNR's failure to provide the confirmation required by the Regulation.

DWPI's natural heritage work is inadequate and fails to meet the regulatory requirements that would allow for the approval of the REA.

Noise

DWPI's Noise Study Report concludes:

> The modelling was completed for a worst-case noise impact scenario with a conservative assumption of applying the maximum turbine noise level for all wind speeds and comparing the results against the most stringent limit (i.e., 40 dBA) which applies to wind speed of 6m/s at 10m height. The noise modelling results, as assessed in this study indicated that receptor noise levels for non-participating receptors (including vacant lots) comply with the most stringent guideline limit of 40 dBA.

The concept of applying the maximum turbine noise level against the most stringent criteria is a reasonable approach that avoids having to consider the wind speed profile. However, the implementation of this approach in the report is questionable.

Specifically, referring to Table 5(c) on page 19 of the report as an example, the analysis undertaken has used the Manufacturer's Emission Level at the highest wind speed (10m/s) as the Adjusted Emission Level for all integer wind speed between 6 and 10m/s. However, the total sound power is not the highest at a wind speed of 10m/s; it is 0.1 dB higher at a wind speed of 8m/s and 0.2 dB at 9m/s. Similar discrepancies occur in the emission levels assumed for four of the seven different wind turbine generation capacities.

Increments of 0.1 or 0.2 dB in the sound power levels would seem to be trivial were it not for the fact that in Table 8(a) the predicted impact at seven non-participating receptors (NP15, NP43, NP56, NP83, NP133, NP250, and NP255) is identically at the criteria of 40.0 dBA. Assessed properly, and depending on site specific wind shear values and the frequency spectrum of the sound emissions, the sound levels at these receptors may be out of compliance with MOE guidelines.

In addition, several other potential concerns should be clarified or addressed:

- The MOE guidelines require that: "the acoustic emissions of the wind turbine must be specified by the manufacturer for the full range of rated operation and wind speeds. As a minimum, the information must include the sound power levels, frequency spectra in octave bands (633 to 8000 HZ), and tonality at integer wind speeds from 6 to 10 m/s. The acoustic emission information must be determined and reported in accordance with the international standard. CAN/CSA-C61400-11-07."

  The report refers to some of the above sound power and tonality levels in text and tables, and directs the reader to the detailed data in Appendix A. Appendix A presents no information related to wind turbines making it difficult to validate the values used in the analysis.

- The cumulative impact of adjacent wind farms does not appear to have been properly assessed in the report. For example, Table 8(a) claims it summarizes the combined noise impact, and for non-participating receptor 258 (NP258) shows an impact of 37.5 dBA. However, the concordance table (Table 8(b)) shows an impact of 37.5 dBA from the Dufferin Wind Farm and 38.0 dBA from the neighbouring Plateau Wind Farm. Summing these two impacts results in a combined impact of 40.8 dBA which is not in compliance with MOE guidelines. Also, on Table 8(b), the report is not necessarily correct in stating that the conservative location for vacant lots is a point closer to the Dufferin Wind Farm; this depends on the relative impact from the two wind farms.

- The report considers wind turbines of seven different generation capacities. In Table 2 the model names are not listed *per se*, only the name plate capacity. Based on the parameters listed it is suspected that there are only two models, GE Energy 1.6-100 and GE Energy 2.75-103, with the remaining five "models" likely to be de-rated versions of these two. De-rated turbines cause a concern from a compliance perspective because it is difficult to ensure that the adjustments are working as intended.

- In the MOE guideline, "Participating Receptor" is defined as a property that is associated with the Wind Farm by means of a legal agreement with the property owner for the installation and operation of wind turbines or related equipment located on that property. The report identifies 44 participating residences, with 20 of those predicted to have sound levels exceeding the MOE criteria, which is allowed under the guideline. From Figure 3 in the report, the relationship between participating receptors and the wind turbine equipment is clear, except in the vicinity of wind turbines T22, T48 and T49 where there are four participating receptors associated with the three turbines.

- The acoustic impact of the substation transformer options has been assessed in a reasonable fashion, and while the report shows both options comply with the MOE guidelines, the option of having the transformer at the point of interconnect in the Town of Mono impacts a significant number of receptors with at least 10 dB higher sound levels than the option of locating the transformer within the project site. Levels on the order of 37 dBA are expected at non-participating receptors in Mono, and it should be considered that persistent complaints arose at a similar transformer in Amaranth that produced noise impacts on the order of 30 dBA. It appears from a note on DWPI's website that this option has not been selected, however, this should be clarified.

DWPI's noise impact analysis is inadequate and fails to meet the regulatory requirements that would allow for the approval of the REA.

Geotechnical

DWPI proposes to construct the wind turbines on large spread footings. It is essential that the turbines' foundations be adequate for their purpose, and solidly grounded, because the consequence of failure is that the turbines will fall over. DWPI has not demonstrated that the turbine foundations are capable of being constructed in a way that will allow them to be adequate for their purpose.

First, the Geotechnical Report is based on preliminary information only. For instance, the author of the report is not certain about the bearing pressure of the turbines. The report says that based on preliminary information provided, two types of turbines will be used on this project: (1) 1.6MW turbine which is typically founded on a 14m diameter spread footing foundation with a bearing pressure of 160 kPa to 215 kPa; and (2) 275 MW turbine which is typically founded on a 16m diameter spread footing foundation with a bearing pressure of 215 kPA to 290 kPa. The report then says that it is not clear at the time of the draft report if the above values represent ultimate or serviceability (working load) conditions and if they are factored or not. The bearing pressure is the maximum pressure which can be supported without failure. Without properly understanding these conditions, it is impossible to conclude that geotechnical conditions are such that the turbines can be constructed.

Second, the reported groundwater elevation is not based on sufficient information, and has likely underestimated the depth of the water table. The report relies on groundwater measurements obtained in December 2011 and February 2012. The report finds that groundwater levels were found to be relatively deep except at 14 locations where the groundwater table was found to be less than 4 metres below the ground surface. The report then adds the important qualification that groundwater levels can vary and are subject to seasonal fluctuations as well as fluctuations in response to major weather events. Higher groundwater levels should be expected during wetter period of the year, for example spring run-off and during periods of extended rainfall.

Given that the groundwater level measurements were taken (a) during the winter; and (b) during one of the driest winters on record in southern Ontario, it is quite likely that the assessment of the elevation of the water table is low, probably lower than it would be were four-season measurements to have been taken and averaged. Moreover, if there are seasonal fluctuations in the groundwater level, as suggested, the levels presented in the report will be higher at different parts of the year.

The report assumes that excavations will be large diameter relatively shallow excavations to facilitate construction of the turbine bases. It also assumes that the depth of excavation will be at least 1.5 metres or more to provide adequate frost protection. The thickness of the turbine bases, as well as the depth of the excavation required for the foundations was not known at the time of preparing the report.

Based on the low estimate of the groundwater elevation, there are a significant number of turbine sites where excavating to a minimum of 1.5 metres below the surface to construct the turbine foundations will pose a problem. In particular, the groundwater depth at T01 is 1.5 metres; at T26 it is 0.8 metres; at T32, it is 1.6 metres; at T34, it is 1.4 metres; at T36 it is 1.7 metres; at T39 it is 1.3 metres, and at T48 it is 1.4 metres. As previously stated, the elevation of the water table could even increase given seasonal fluctuations. The Geotechnical Report suggests that where the excavations extend a significant depth below the water table then additional dewatering such as temporary cut-off walls, well points, etc. may be required due to the sandy nature of the till soils. The report provides no analysis as to whether these mitigation measures are feasible in the conditions. The conclusion in Geotechnical Report, and adopted in the Construction Plan Report that generally these conditions are considered favourable from a geotechnical perspective for supporting wind turbines on the typical large spread footings is questionable in light of the data and DWPI's failure to analyse the feasibility of mitigation measures.

DWPI's geotechnical analysis is inadequate and fails to meet the regulatory requirements that would allow for the approval of the REA.

Cultural Heritage

The proponent's Construction Plan Report does not implement the findings of the Archaeological Assessment which is appended thereto.

First, turbine sites T31 and T32 have not been adequately assessed. The Archaeological Assessment, states that assessment of the T31 and T32 turbine sites, as well as their associated access road yielded evidence of a historic scatter in the south-eastern corner of the T31 turbine pad. The Archaeological Assessment concludes that if the site is to be impacted by development, Stage 3 Testing and Controlled Surface Pick-up are warranted. It is further concluded that Stage 4 archaeological investigation may be required for areas of the site as well, depending on the results of the Stage 3 archaeological assessment. DWPI's response to this analysis, documented in the Construction Plan Report, was that because a Stage 3 was recommended, the location of the buildable area for T30 (formerly T31) would be moved. DWPI has provided no analysis of the archaeological resources that may be located at the new T30 turbine site.

Second, turbine sites T43 and T44 have not been adequately assessed. The Archaeological Assessment states that assessment of the T43 and T44 turbine sites, as well as their associated access road yielded evidence of a historic scatter on turbine site T43, located in the north-eastern corner of the turbine pad. The report concludes that if the site is to be impacted by development, Stage 3 Testing and Controlled Surface Pick-up are warranted. It is further concluded that Stage 4 archaeological investigation may be required for areas of the site as well, depending on the results of the Stage 3 archaeological assessment. DWPI's response to this recommendation is completely inadequate. T42 (formerly T43) is not being relocated, nor are Stage 3 Testing or Controlled Surface Pick-up proposed to be undertaken.

Nevertheless, with respect to both of these areas, DWPI states that it has determined that there will be sufficient area outside of the area of archaeological concern to lay down turbine components in the construction stage of the project, such that this archaeological resource will not be affected. DWPI proposes to erect temporary fencing along the outer limits of the monitoring zone to prevent any accidental impacts. Temporary fencing might be an adequate mitigation measure once assessment has been completed. Not having completed the assessment, though, DWPI cannot know that its construction activities will not impact sensitive archaeological resources. DWPI must undertake the Stage 3 assessment and Controlled Surface Pick-up that its consultants have recommended to it.

DWPI has not completed the archaeological assessment required by the Ministry of Culture, Tourism and Sport ("**MCTS**") for the private easement lands. All ploughed fields remain to be reploughed, allowed to

weather, and resurveyed for a second field assessment. The REA should not be considered until this assessment is completed and the results made available to the public for comment.

DWPI's analysis of archaeological and cultural heritage resources on and around the project site is incomplete. DWPI should not be permitted to proceed until the analysis is complete.

DWPI's cultural heritage work is inadequate and fails to meet the regulatory requirements that would allow for the approval of the REA.

Air Quality

The Construction Plan Report states that there will be project-related air quality effects during the construction phase. Although DWPI states that the effects are "expected to be minimal and temporary," DWPI has not provided any air quality analysis for public or MOE review, such that DWPI's expectations can be assessed. Air quality analysis is required before the REA can be approved.

Visual Impact

CORE is concerned about the impacts of the project on the scenic resources of the Township and on its rural character. CORE does not accept that the visual impact of any of the turbines on the rural landscape of the Township is acceptable. In addition, the Niagara Escarpment Commission (the "**NEC**") considers the impacts of some of the turbines close to the Niagara Escarpment Plan boundary to be unacceptable. The NEC has requested that some of the turbines be relocated, which request has gone unanswered by DWPI. Visual impacts must be properly assessed before the REA can be approved.

Rail Line Easement

DWPI has decided to seek approval for the 230 kV power line option, which is proposed to run along the former railroad right-of-way. DWPI has not secured the property rights it requires from the County of Dufferin (the "**County**") to construct the power line along the former right-of-way. County Council has directed staff to commence a review of DWPI's proposal to enter into an easement agreement and to engage in public consultation. CORE has engaged in the public consultation process by providing comments to the County in opposition to the grant of the easement. In CORE's view, the County has not satisfied itself that, if it grants the easement, and the transmission line is constructed, no unacceptable land use conflicts will arise. It does not appear to the members of CORE that the transmission lines can co-exist with current and planned uses of abutting land. Three areas of particular concern are in the populated residential areas in Shelburne and Corbetton, and the locations along the corridor that are used and planned for recreational purposes. The Construction Plan Report indicates that some guyed poles will be required where the power line shifts to either side of the easement or transitions through curves or difficult terrain. Guy wires are a particular safety concern for snowmobilers who use the rail lands.

The County will take these and other comments into consideration in determining whether to grant the easement. This public process has not yet run its course.

DWPI has also applied to the Ontario Energy Board (the "**OEB**") for leave to construct the 230 kV power line. CORE has been involved in the OEB process, and it, along with other parties, oppose the grant of leave to construct by the OEB. The OEB process has not concluded yet.

It is premature for MOE to consider the REA before it is known whether the 230 kV power line can be constructed in the location DWPI proposes. It is a waste of the MOE's resources to review a proposal

that may never be implemented; or that may need to be so substantially altered so as to require that a new application be filed.

Human Health

DWPI has done no analysis of the potential impacts on human health of the Proposed Wind Farm. CORE is concerned about the impacts of the Proposed Wind Farm operations on its members' health, in particular the effects of shadow flicker, ice throw hazards and noise.

There are studies that show that the shadow flicker effect caused by the operation of wind turbines can, in the long term, cause significant nuisance. In particular, shadow flicker causes stress to human beings and can cause headaches.

Health Canada has announced that it will be working with Statistics Canada and other external experts possessing expertise in areas including noise, health assessment, clinical medicine and epidemiology, to design a research study that will explore the relationship between wind turbine noise and the extent of health effects on those living near wind power developments. In Health Canada's view, currently there is insufficient evidence to conclude whether or not there is a relationship between exposure to the noise from wind turbines and adverse human health effects, although community annoyance and other concerns have been reported in the scientific literature.

It is CORE's position that the approval process related to the Proposed Wind Farm should await the outcome of Health Canada's study, given the import of protecting human health, and given how close to its members' homes some of the turbines are proposed to be located. MOE should not countenance DWPI's ostensible lack of concern for the health impacts that can be caused by the Proposed Wind Farm.

Conclusion

In CORE's view, approval of the Proposed Wind Farm has not been justified by the Reports. Substantial further work is required to bring the Reports into compliance with the requirements of the Regulation. As it has been presented, the REA has the potential to cause significant adverse impacts to natural heritage resources, cultural heritage resources, air quality, scenic resources and the rural character of the Township, and human health and safety. It would be a mistake to grant an REA for the Proposed Wind Farm.

Yours truly,
DAVIS LLP
Per:

Laura K. Bisset
LKB/

cc: Jane Pepino
Paul Mills

Davis: 12995241.1
1

DAVIS LLP | LEGAL ADVISORS SINCE 1892

FROM THE OFFICE OF Laura K. Bisset
DIRECT LINE 416.941.5400
DIRECT FAX 416.777.7432
E-MAIL lbisset@davis.ca

FILE NUMBER: 81310-00002

February 12, 2013

DELIVERED BY COURIER & FAX

Sarah Raetsen
Senior Program Support Coordinator
Ministry of the Environment
Operations Division
Environmental Approvals Branch
2 St. Clair Avenue West
Floor 12A
Toronto ON M4V 1L5

Dear Ms. Raetsen:

Re: EBR Registry Number 011-7852
Dufferin Wind Power Inc. - Instrument Proposal - Approval for a renewable energy project pursuant to s. 47.3(1) of the *Environmental Protection Act*

As previously advised, we are counsel for Conserve Our Rural Environment ("**CORE**"). We write to provide comments supplementary to the comments submitted on February 7, 2013, with respect to the above-noted Proposed Wind Farm. We write in particular to supplement our comments about:

1. matters arising in the context of the application to the Ontario Energy Board (the "**OEB**") by Dufferin Wind Power Inc. ("**DWPI**") for Leave to Construct transmission facilities;

2. confirmation of DWPI's failure to secure municipal support for the Proposed Wind Farm; and

3. noise impacts.

Leave To Construct Application

On February 5th, the OEB issued Procedural Order No. 3 in the Leave to Construct matter. In that procedural order, the OEB has required disclosure of certain information by DWPI, by February 15th, 2013, including:

- corporate organizational abilities, including, but not limited to background information on key personnel, relevant financial information, and information about experience with respect to the management of similar projects;

- a copy of its FIT contract, including a copy of all amendments to date; and

- additional detailed corporate information related to key individuals, financial information, and technical resources.

As set out in our previous correspondence, CORE believes that the impacts of the Proposed Wind Farm will be numerous and significant. Managing a wind farm with adequate regard to the public interest requires an operator to monitor and address impacts to the natural environment and to human health and safety caused by the wind farm. DWPI's corporate and financial ability to monitor, assess and address impacts are therefore directly relevant to whether an REA should be granted in respect of the Proposed Wind Farm.

It is also essential that the public be given the opportunity to review DWPI's FIT contract and any amendments thereto. Amendments to the FIT Rules were finalized in December, 2012, which include consideration of municipal council engagement and support for proposed renewable energy projects. The contents of DWPI's FIT contract will inform the feasibility of the Proposed Wind Farm; and it is possible that amendments to it require consideration of the December 2012 FIT standards related to municipal council support. As will be discussed in greater detail below, there is no municipal support for the Proposed Wind Farm.

As such, MOE should defer consideration of granting any REA to DWPI until the above-noted information has been made public, and the public has had at least thirty (30) days from the date of disclosure to review it and to provide additional comment to the MOE.

Moreover, in further support for CORE's comment that it is premature to consider granting an REA until the Leave to Construct Application has been disposed of by the OEB, the location and feasibility of the transmission lines, which are matters that the OEB will be considering, continue to be moving targets. If the route of the transmission line is altered, it is possible that the generation facilities will also require revision, and that a revised REA application will need to be made. In particular, it is not known whether the present request to the County of Dufferin to use its rail line will be granted, or it so, on what conditions. Some issue, such as financial capacity to provide requested mitigation for the transmission line are relevant to the REA. Some items, such as decommissioning requirements, should be co-ordinated with any REA conditions.

Lack of Municipal Support

On February 7, 2013, the County of Dufferin resolved to bring municipal concerns related to the grant of an REA to DWPI to the MOE's attention. Its concerns relate to a number of matters, including the route for the proposed transmission line, along a former railway corridor which now belongs to the County, and over which DWPI would be required to secure an easement to proceed with construction as proposed; ecological and social effects of the Proposed Wind Farm; and the County's role and the role of local municipalities in monitoring the impacts of the Proposed Wind Farm.

On February 6, 2013, the Township of Mulmur also resolved to bring its concerns to the attention of the MOE through the REA comment process. The comments that the Township of Mulmur resolved to make included that none of the concerns it has raised with DWPI have been resolved to the Township's satisfaction.

The Mayor of the Township of Melancthon has written to the Province on numerous occasions expressing concern with the approval of industrial wind generation facilities in the Township.

It is inappropriate to grant an REA where there is no municipal support for a proposed project. The MOE should not consider granting approval to the Proposed Wind Farm unless the affected municipalities are

satisfied that DWPI has addressed their concerns and that the impacts to their communities will be acceptable.

Noise Impacts

New information about the noise impacts of wind turbines has recently come to CORE's attention. Large wind turbines generate low frequency sound, or infrasound, in turbulent wind conditions. The health impacts of infrasound on the human ear are currently poorly understood and are being studied, but are thought to include tinnitus and vertigo, and other inner ear conditions. The standards by which noise studies in support of REA approvals are assessed for sufficiency by MOE do not include consideration of infrasound. Given potential risk to human health that may be caused by infrasound, DWPI's noise study should not be considered to be complete until DWPI has modelled and assessed infrasound, and the impacts of infrasound on human health are understood.

This information further underscores the need to await further progress on Health Canada's study on the relationship between wind turbine noise and the extent of health effects on those living near wind power developments.

Yours truly,
DAVIS LLP
Per:

Laura K. Bisset
LKB/

cc.: Jane Pepino
Paul Mills

Davis: 13178986.1

Appendix D Correspondence between the Township of Melancthon and the Ministry of Energy

The Corporation of

THE TOWNSHIP OF MELANCTHON

157101 Hwy. 10, R.R. # 6, Shelburne, Ontario, L0N 1S9

Telephone - (519) 925-5525
Fax No. - (519) 925-1110
Website: www.melancthontownship.ca
Email:info@melancthontownship.ca

Denise B. Holmes, AMCT
CAO/Clerk-Treasurer

January 29, 2013

Ministry of Energy
880 Bay Street
2nd Floor
Toronto, Ontario
M7A 2C1

Attention: Mirrun Zaveri, Deputy Director, Renewable Energy Facilitation Office

Dear Sir:

Thank you for your letter dated January 7, 2013.

Respectfully this is simply a political answer. We are aware of the Regulations and the FIT Program Rules.

The fact remains that your Government continues to ignore the wishes of the people in dealing with the concerns that have been expressed about Industrial Wind Farm Projects and the potential health issues relating to them.

The former Minister of Energy, Brad Duguid, made a statement over a year ago about the fact that there were Municipalities lined up to become involved in renewable energy projects. Former Premier McGuinty, in April of 2012, at a news conference in Belleville went further to say he didn't need the headaches from Municipalities that did not want wind turbines.

Although we had requested that list from Minister Duguid, and the current Minister of Energy, Chris Bentley and the former Premier McGuinty, they have all been ignored and instead we received your letter.

Therefore, I will ask you to please provide us with that list that so many senior people in the Liberal Government claim to have access to.

Respectfully,

Bill Hill,
Mayor

(9)

FEB - 7 2013

Ministry of Energy

880 Bay Street
2nd Floor
Toronto ON M7A 2C1
Tel: (416) 212-6582
Fax: (416) 314-2175

Ministère de l'Énergie

880, rue Bay
2e étage
Toronto ON M7A 2C1
Tél: (416) 212-6582
Téléc.: (416) 314-2175

Ontario

RECEIVED
JAN 10 [illegible]

January 7, 2012

His Worship Bill Hill, Mayor
The Township of Melancthon
157101 Highway 10, RR #6
Shelburne, Ontario L0N 1S9

Dear Mayor Hill,

Your letters to the Premier regarding your concerns about wind energy projects in the Township of Melancthon have been forwarded to the Ministry of Energy's Renewable Energy Facilitation Office. I am pleased to respond.

Ontario has stringent noise regulations and setback requirements that wind facilities must meet in order to proceed to construction. When developing the Renewable Energy Approvals (REA) regulation, the Ministry of the Environment (MOE) used existing scientific research from around the world. Reviewing a large body of reports and studies enabled MOE to develop a regulation that was based on the best available science to protect human health and the environment.

Under the REA process, project applicants must engage the public, municipal governments and Aboriginal communities in discussions about their proposed energy projects. If mandatory public, municipal and Aboriginal consultation requirements are not met, a REA will not be issued, and the project will not proceed.

The government's clean energy initiatives, including its successful Feed-in Tariff (FIT) program, are creating economic benefits for Ontario. Many municipalities in Ontario have embraced the FIT program by both participating in and supporting local projects. There is room for municipalities to play a greater role in the development of projects.

Ontario has recently undertaken a review of the Feed-in Tariff (FIT) program, which resulted in the release of the FIT 2-Year Review Report on March 22, 2012. The Report contained recommendations for creating a more sustainable program by reducing prices, encouraging community participation in renewable energy development and improving local consultation.

Under the updated FIT program, new project applicants that work closely with municipalities and have support will receive points during the application process, helping those projects move forward.

(4)

JAN 24 2013

The FIT 2-Year Review also included further recommendations for enhancing municipal engagement in renewable energy, which are currently being implemented:

- The Ministry of the Environment is revising the Municipal Consultation Form in the REA process to better reflect areas of municipal concern, in consultation with AMO.
- The Ministry of Energy's Renewable Energy Facilitation Office (REFO), developers and renewable energy industry associations are working to develop best-practice guidance materials, to help build projects in a sustainable, meaningful and responsible way.
- REFO has updated the Municipal Guide to Renewable Energy Projects, in collaboration with AMO amongst others, and will launch additional outreach initiatives, as appropriate. Please see the updated Guide online at the website link below:

http://www.energy.gov.on.ca/docs/en/RenewableEnergyDevelopment.pdf

We appreciate you taking the time to provide your feedback. If you have any further comments or questions please contact me and I will have a member of my staff assist you.

Sincerely,

Mirrun Zaveri, Deputy Director
Renewable Energy Facilitation Office

Appendix E Dufferin County Corporate Services memo, dated February 13, 2013

DUFFERIN COUNTY

CORPORATE SERVICES

February 13, 2013

TO: Interested Parties regarding the Request For Easement on the Rail Line

RE: Dufferin Wind Power Request for Easement Update No. 3

Further to our letter dated January 7, 2013, I can provide the following update.

A public meeting was held on Tuesday, February 5th in Shelburne to hear a presentation from the MMM Group, Consultants engaged by the Council of Dufferin provide comments on the Dufferin Wind's application to the Ministry of the Environment for approval of a renewable energy project. Approximately 100 people were in attendance to hear the presentation.

Following the public meeting, Council received a report from the Chief Administrative Officer and also a report from MMM Group on February 7, 2013.

The reports are available at: http://www.dufferincounty.ca/government/council-and-committee-meetings/date

Council passed the following motion in response to comments received by residents and also comments made by MMM Group.

> *THAT the report of the Chief Administrative Officer dated February 7, 2013 with respect to the request by Dufferin Wind Power for an easement along the former rail line be received;*
>
> *AND THAT, staff be directed to submit comments, to the Ministry of the Environment through the Renewable Energy Approval process, pertaining to the following:*
>
> - *Additional Studies and Reviews identified by the MMM Group;*
> - *Items for Clarification and additional information identified by the MMM Group;*
> - *Clarification of items raised by staff;*
> - *A summary of general types of comments received from residents;*

- *Copies of all correspondence received from residents on this matter (both negative and positive).*

AND THAT the Provincial approval authorities be advised as follows:

1. *The County of Dufferin requests a moratorium on all wind development until the health studies currently being conducted (Two Year Health Canada Study on Wind Turbine Noise and Health) is completed and shared.*

2. *The County of Dufferin objects to any overhead lines that will connect with any wind development projects in Dufferin County.*

3. *The County of Dufferin requests that any transmissions lines, if approved, be located underground and not located in the Town of Shelburne.*

4. *Concerns and questions from Dufferin County residents and interested parties be responded to by the Ministry of the Environment prior a decision being made on the Dufferin Wind Project.*

Please do not hesitate to contact us with any questions/concerns.

Yours very truly,

Pam Hillock, County Clerk

Appendix F Township of Mulmur Report to Council, dated July 12, 2012

CORPORATION OF THE
township of mulmur

REPORT TO COUNCIL

TO: Mayor Mills and Members of Council
FROM: Ron Mills, Planner
DATE: July 12, 2012

SUBJECT: Mulmur Township comments on Dufferin Wind Power Inc. Proposal

RECOMMENDATION:

That Council receive the report of Planner Ron Mills concerning the Township's comments on the proposed Dufferin Wind Power Inc. wind farm in the Township of Melancthon, and a possible 69 kV transmission line along a portion of the Mulmur-Melancthon Townline and that staff be authorized to forward the report, as amended as directed by Council, to the proponent, the approval authorities, area MP and MPP, adjacent, directly affected municipalities, the County of Dufferin and ratepayers that attended the May 25th meeting as our formal comments and position on the proposal.

BACKGROUND:

A copy of the application and all related submissions prepared in support of an application for approval of the proposed 49 turbine Dufferin Wind Power Inc. wind farm in Melancthon Township, and related transmission and transformer infrastructure in Dufferin County was delivered to the Township in the early spring. Under the Province's Renewable Energy Approval (REA) process, adjacent directly affected municipalities are required to be consulted and a 60 day commenting timeframe is normally provided for submitting comments. Because the information could not be released to the public until the latter part of May, the commenting deadline for this project was extended until July 24, 2012. The proposal requires approval under Ontario Regulation 359/09 under the Ontario Environmental Protection Act.

A meeting was held on May 25th for Township ratepayers with an interest in and/or concerns about the proposal. The meeting was an early opportunity for our ratepayers to share information and concerns about the project and served to help the Township better understanding the concerns of its ratepayers and focus its efforts on identifying key issues. The list of very preliminary issues/concerns attached as ATTACHMENT NO. 1 was prepared for that meeting, for discussion

purposes. It was made clear at that time that the information was preliminary and that no decisions had been made, or positions had yet been taken by Council.

At the meeting, ratepayers and ratepayers groups were urged to keep us informed about their concerns once they had had a better opportunity to review the extensive background material and to provide us with a copy of their comments and submissions. To date, we have received very little such information, but as the deadline approaches we will not doubt be the recipient of such information. Items received before the July 18 Council meeting will be placed on-desk and I will attempt to provide a brief summary of the submissions, recognizing that Council may wish to take a position with respect to those submissions. Comments received after the July 18 Council meeting can be provided as information items at the next Council meeting, if/as directed by Council.

Since those initial comments were prepared, we have been made aware of concerns for impacts on people along the alternative transmission line alignment through Melancthon/Shelburne/Amaranth, relating primarily to the proposal to install a much higher voltage (230 kV) transmission line along the former railway right-of-way and through a portion of Shelburne (Power line option 2). Since we have not investigated that proposed alternative in any depth, and in the interests of good relations with our neighbouring municipalities, it is probably appropriate that the Township should limit its comments to the concerns and requirements we have with the Townline alternative (Power line option 1) only, which is the only one that has the potential to directly impact on ratepayers of Mulmur Township.

Council supported a recommendation that came out of the May 25th meeting and has urged the Township of Melancthon to peer review the Noise Impact Assessment Report. Melancthon has confirmed that it is conducting a peer review and has offered to make the results available to us. At the time of writing this report, the results were not yet available and will not be available for the July 18 Council meeting. The Township should therefore ensure that it reserves the right to provide additional comments in support of our concerns for noise impacts, should the advice we get from the peer review consultant warrant further action on our part.

Representatives from Dufferin Wind Power Inc. attended the June 20th Council meeting, including two noise experts. Because we had already identified noise as a primary issue and because the proponent had two experts on noise present at the meeting, much of the discussion focused on noise impacts and electromagnetic affects.

Although some information dealing with the electromagnetic impacts and health effects has been provided, no similar information relating to the potential impacts of the turbines has been provided. It is noteworthy that the Canadian government

has very recently announced that it will be doing health related studies on the affects of wind turbines and related infrastructure. In 2010, the Township adopted a resolution imposing a moratorium on wind farm developments in Mulmur Township and calling for such health studies to be completed before any new projects are approved. A copy of that resolution is attached. Although this project is not physically located within the Township, some of the turbines are nearly as close to receptors in Mulmur Township as they would be if the project was located in the Township, so the resolution should apply. This Township has already had experience with a proponent of a wind farm insisting that a 400 m. set-back from receptors was adequate, only to have the Province shortly thereafter impose greater set-back requirement of a minimum of 550 m., with even greater set-backs where the cumulative impacts of several turbines are involved. In some other jurisdictions, set-backs of up to 2 km. are required. In light of this resolution and the concerns of our ratepayers, it should be our position that it would not be appropriate for the approval authorities to approve any new projects until the results of the studies to be undertaken by the Federal government are available and the noise impacts and health effects of such projects are more clearly understood, and avoided and/or mitigated so that they can somehow be deemed to be minimal and acceptable.

The appropriateness of proposed set-backs between the proposed 69 kV line and existing dwellings along the Townline also remains of concern.

At the June 18 Council meeting, we also discussed potential visual impacts of the project to/from vantage points in the Township, including from the Niagara Escarpment and the Bruce Trail in particular. Information that has apparently been submitted to the Niagara Escarpment Commission in that regard has not yet been received by the Township, despite several requests. However, some preliminary depictions were provided to Council at the June 20th Council meeting. The proponents indicated that they did not wish that information released by the Township to our ratepayers, but Dillon Consulting has since offered, and we have arranged to have their visual impact expert, Eha Naylor, attend the July 18th Council meeting to present her findings concerning the visual impacts of the proposed wind farm, from a Mulmur perspective. Although the turbines themselves are within (and beyond) an area that has been classified in the preliminary visual impact assessment information that has been provided to Council as a "low attraction natural area", there are a significant number of turbines that will be located quite close to areas classified as "attractive natural areas" and as "outstanding natural areas". Such large structures will be clearly visible from these areas.

Visual impacts of the proposed 69 kV transmission line along the Mulmur-Melancthon Townline are also of concern. The assertion that the proposed 69 kV line is no more visually intrusive than the existing transmission line requires explanation, especially since a portion of that alignment does not have a transmission line at the present time.

During the discussions at the June 20th Council meeting, it was discovered that the development potential and options for developing vacant parcels for purposes otherwise permitted as of right in municipal Official Plans and Zoning By-laws was, in many cases, being greatly diminished as a consequence of the reciprocal application of required minimum set-backs between turbines (and entire wind farms) and new receptors. Owners of vacant parcels that now have the right to build anywhere on their lands in accordance with property line setbacks (where the lands are zoned for development) could be, and are being severely constrained. Small development envelopes, most often very near to municipal roads and in the opposite corner from proposed wind turbines will be the only option available, once the turbines are built. This could, and very likely will diminish the value of those properties. If the required set-backs are ever increased, which is a distinct possibility, many of those lots could be rendered undevelopable. Development rights must either be respected and any diminution or removal of such rights must be compensated. This should be a primary concern of landowners within, and the Township of Melancthon generally.

Decommissioning of the project remains of concern. The Township of Melancthon and the approval authorities must ensure that decommissioning takes place in an appropriate and timely manner, and at no cost to taxpayers.

We have received comments from the Town of Mono on those aspects of the proposal that are of concern to them. They have pointed out that it appears that the responsibility for constructing/re-constructing the existing transmission facilities involved with power line option 1 have been apportioned between the project proponent and Hydro One in such a way as to seemingly avoid the need for an environmental assessment, and that Hydro One and the taxpayers of Ontario appear to be responsible for a considerable share of the costs. As the up-grading and extending of the transmission lines is substantially, if not entirely for the benefit of this private sector initiative, the costs should be borne by the proponent. The position advanced by the Town of Mono in this regard should be supported.

Recommendations

The following is recommended as the Township of Mulmur's comments and requirements relating to, and current position with respect to the proposal:

1) The project should not be approved until studies to be carried out by the Government of Canada are completed and it has been definitively determined that set-backs between individual turbines (and wind farms generally) and noise receptors are adequate, and that electromagnetic effects of wind farms and transmission facilities are determined to be minimal and acceptable, from a human health and safety perspective.

2) The impact of noise on Mulmur Township residents and, in particular, of the cumulative impacts of noise from the wind farm, have not (yet) been addressed to the satisfaction of the Township. The Township reserves the right to provide further documentation in support of this concern following receipt of the results of a peer review currently being carried out by the Township of Melancthon.

3) Visual impacts of the proposed wind farm on scenic resources and the rural character of Mulmur Township, and on the landscape in the vicinity of power line option 1 have not (yet) been adequately addressed. Council should further clarify its concerns and position on this issue following the presentation by Eha Naylor and, if deemed necessary, reserve the right to provide further documentation in support of any outstanding concern(s).

4) Assurances have not been provided to demonstrate that set-backs from the proposed 69 kV transmission line and adjacent residences are adequate, relative to potential electromagnetic effects on human health and safety.

5) The flight path to/from and existing private airstrip located on the Townline within Mulmur Township must be preserved. The transmission lines must be buried at this location. The burial of such lines is technically feasible. The sole concern appears to be the higher cost. The Township is therefore of the position that the required 69 kV transmission lines should be buried along that portion of power line option 1 within and adjacent to the Township.

6) No cost of the transmission lines necessitated by and serving this private sector development should be borne by Hydro One or the taxpayers of Ontario.

7) The decommissioning plan is not adequate, and adequate funding must be provided at the outset, or some funding mechanism must be put in place to cover the full cost of decommissioning. Agreements must be required to ensure that decommissioning takes place in an appropriate and timely manner, at no cost to the host municipality or the taxpayers.

8) Any diminution of rights to develop and use property as a result of the proposal must be adequately compensated. Buy-out provisions at fair market value should be incorporated into agreements between the host municipality and the proponent in all situations where any increase in the required set-backs between the turbines or wind farm and where owners can build on their lots that would render vacant parcels undevelopable.

If the project is approved.....

9) A road use agreement with Mulmur for any use of Township roads is required. All costs shall be the responsibility of, and shall be fully recovered from the proponent.

FINANCIAL IMPACT:

Full municipal cost recovery for review and consultation, as well as for project related damages and costs (if project approved) is required, pursuant to our recently approved cost recovery by-law. Although assurances have been provided that a deposit to cover the costs incurred by the Township relating to review of the proposal and municipal consultation is forthcoming, no deposit has yet been received.

Respectfully submitted,

_____

Ron Mills, Planner

ATTACHMENTS (3)

ATTACHMENT NO. 1

Dufferin Wind Power Inc. Mulmur Preliminary Comments prepared for the May 25, 2012 Mulmur ratepayers meeting

Wind Farm

- The cost of Mulmur involvement for review and consultation are to be recovered from the proponent. A substantial deposit for this purpose has been requested and is expected to be received shortly.

- A visual impact assessment has not been provided. Views to/from the NE and an analysis of visual impacts from other key locations in Mulmur should be prepared and made available. Information should be prepared in accordance with the Township's requirements, as developed by Eha Naylor, for the Eolectric proposal. Ms. Naylor now works for Dillon, lead consultant for this project, and has apparently been dealing with this issue with the NEC. The Township has insisted, and will continue to insist that this information be released to the Township and the public for review and comment.

- According to the lead consultants for the project, the decommissioning plan is proposed to "evolve over time". The Township (and Melancthon Township) must be assured that proper decommissioning will occur, and that sufficient guarantees and funds are in place from the outset to accomplish this.

- A road use agreement with Mulmur for any use of Township roads is required. Costs are also to be recovered from the proponent.

- Township has pointed out that information distributed by proponent on health effects (Health and Welfare Canada) deals only with power transmission lines, and not the turbines. Similar information should be provided that deals with the health effects (or lack of same) caused by the wind turbines, sufficient to address the concerns (fears) of Mulmur ratepayers.

- The Township does understand that a number of its ratepayers may stand to benefit from this undertaking, and recognizes the importance of this initiative to them, from a financial perspective.

Transmission Lines

- The Township does not support Transmission Line Option One – involving the up-grading of existing and new 69 kV power lines which, in part, will criss-cross the Mulmur-Melancthon Townline between Highway 89 and County Road 17, due to the impacts it will have on existing properties and ratepayers along that

alignment. The Township strongly supports the Dufferin Rail transmission route, despite the existence of some wetlands along that route. People are more important than wetlands, and the Township fails to see how the addition of a transmission line there will negatively impact the landowners along that alignment and the wetlands to anywhere near the extent of the Option One routing.

- If the Option One routing is chosen, the Township will require a road use agreement and the recovery of all of its costs.

ATTACHMENT NO. 2

Issues list from the May 25th meeting prepared to facilitate discussion at the June 20th Council meeting.

- Noise Impacts – concerns with the reliability of the studies and the appropriateness of stated impacts, cumulative impacts not addressed?; very high noise levels for some participating landowners, levels at or very near threshold levels for many non-participating landowners, etc;

- Use of very large turbines in area adjacent to the Township of Mulmur, where visual and noise impacts are greatest for Mulmur residents;

- Visual impacts to/from the Niagara Escarpment and Bruce Trail, and from adjacent properties;

- Most of the wetlands within/adjacent to the wind farm are mapped as "unevaluated wetlands" – adequacy of understanding of impacts??

- Impacts of wind turbines on bird migration, native species at risk and bats;

- The rationale for, and impact on lands and landowners rights in areas where the transmission lines within the wind farm are proposed to be buried;

- affects on human and animal (livestock and wildlife) health and welfare related to electromagnetic and noise impacts;

- Visual Impacts of the proposed 69 kV transmission line along the Townline;

- Electromagnetic effects and the adequacy of set-backs between existing dwellings and the proposed line (what are the minimum acceptable standards?);

- The need for a new line to 'close the existing gap' in the existing pole line along the Townline;

- Impacts on the existing private airstrip and the need to bury the lines in its vicinity;

- Impacts on wetlands and existing forests and treed areas along the Townline transmission route;

- The appropriateness of a 230 kV line (as opposed to a 69 kV line) within the alternative (Dufferin Railway) transmission route and impacts on properties and people along that route;
- Impact on wetlands and forested lands, and wildlife along that route;
- Burial of transmission lines as an option to reduce impacts;
- Impact of the wind farm and transmission facilities on property values;
- The possibility that the project will be expanded to the east into the north-west area of the Township of Mulmur;
- The need for a decommissioning plan and adequate up-front securities;

ATTACHMENT NO. 3

Council resolution calling for a moratorium and health studies

MULMUR TOWNSHIP COUNCIL

Mulmur Township Council met on Wednesday, February 17th, 2010, at 6:00 p.m. with the following present:

Gordon Montgomery – Mayor
Susan Snider – Deputy Mayor
Jeff Sedgwick – Councillor
Earl Hawkins - Councillor
Rhonda Campbell Moon – Councillor

Staff: Terry Horner, CAO/Clerk was present for the entire meeting. John Willmetts, Director of Public Works and Ron Mills, Planner were present for their respective sections.

Motion # 77-10 Hawkins-Snider: THAT WHEREAS Council, at its January 5, 2010 meeting, received a resolution from the County of Grey expressing concern for the public health effects of wind turbines;

AND WHEREAS a further, similar resolution has now also been forwarded from the Municipality of West Grey, calling for a moratorium until the effects of wind turbines are studied and clearly understood and the health, safety and well-being of the public can been assured;

NOW THEREFORE BE IT RESOLVED THAT the Township of Mulmur supports the resolution of the County of Grey calling for the Province to conduct scientific research on the public health and safety aspects of low frequency noise and electrical and electromagnetic disturbances caused by wind turbines, and also calling for the provision of scientifically based standards for wind turbines that will protect the health and ensure the safety of the public,

AND THAT the Township of Mulmur also supports the resolution from the Municipality of West Grey calling for a moratorium on the establishment of any new wind turbines in Ontario until the health, safety and well-being of the public has been thoroughly and scientifically evaluated and assured;

AND THAT the County of Grey and the Municipality of West Grey be advised accordingly, and that a copy of the two resolutions, along with this resolution be forwarded to Premier Dalton McGinty and the Ministers responsible for Energy, the Environment and Health, as well as MPP Sylvia Jones.

Carried.

Appendix G Clarification Request

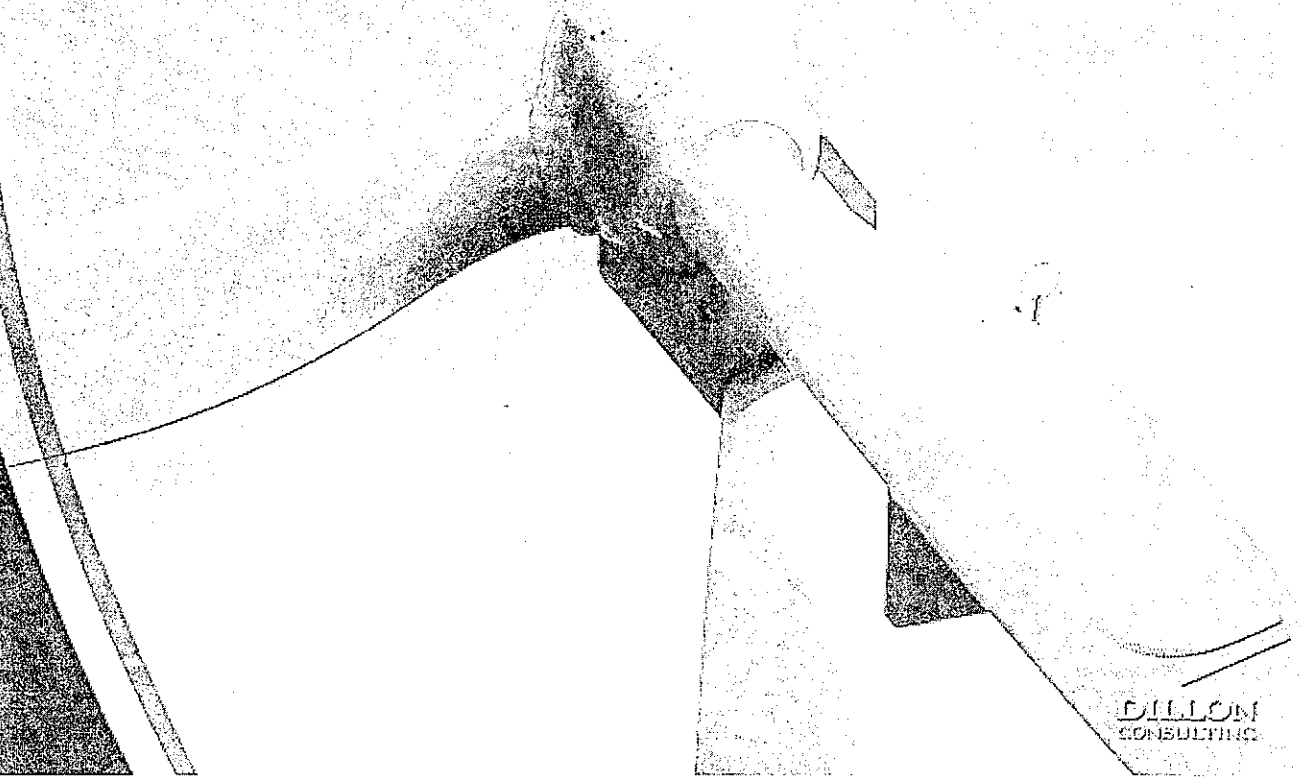
Dufferin Wind Power Inc.

DUFFERIN WIND POWER INC.

Wind Power Project

Renewable Energy Approval Clarification Request

November 2012



DILLON CONSULTING

LONGYUAN POWER

DUFFERIN WIND POWER INC.

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IMPORTANT NOTICE

December 20, 2012

Dear Reader,

On August 13, 2012, Dufferin Wind Power Inc. submitted its Renewable Energy Approval (REA) application to the Ministry of the Environment. The REA application included two possible routes for the power line that will interconnect the project to the provincial grid. The first power line option consisted of a dual-circuit, 69kV line that would have run along the public road right of way under a joint use agreement with Hydro One through the Townships of Melancthon, Mulmur, Amaranth, and the Town of Mono. The second power line option consisted of a single-circuit, 230kV line that would run along a private easement and along the former Toronto Grey and Bruce railroad corridor through the Township of Melancthon, the Town of Shelburne, and the Township of Amaranth.

After substantial public consultation over the past year and half including consultations with provincial and municipal authorities, environmental investigations, technical reviews, and consultations with the local community, we have selected the 230 kV power line option using the private easement and former railroad corridor as it presents the least impact to the community and is the better overall solution.

On December 17, 2012 Dufferin Wind Power Inc. notified the Ministry of the Environment of the selection of the 230kV power line option and withdrew the 69kV power line option from consideration.

While this report, along with the other REA reports, for the Dufferin Wind Power project still include information on both the 69kV and 230kV power line options for your reference, the 69kV option has been withdrawn and will no longer be considered part of Dufferin Wind Power's REA application.

If you have any questions please contact us at 1 (855) 249-1473 or e-mail us at info@dufferinwindpower.ca. You can also visit us and review the project reports and updates at www.dufferinwindpower.ca

Sincerely,
Dufferin Wind Power Inc.

MEMORANDUM

DILLON CONSULTING

TO: Ms. Sarah Raetsen, Senior Program Support Coordinator

cc: Jeff Hammond, Dufferin Wind Power Inc.
Doris Dumais, Director, MOE, EAASIB
Sandra Guido, Senior Program Support Coordinator, Service Integration, EAASIB
Chris Benedetti, Sussex Strategy

FROM: Don McKinnon, Dillon Consulting Limited

DATE: November 2, 2012

SUBJECT: Dufferin Wind Power Inc.
Renewable Energy Approval Clarification Request

PROJECT NO.: 11-5199

PURPOSE OF MEMO

This memo provides clarification to a number of requests made to DWP by the Ministry of the Environment (MOE) in a letter dated October 29, 2012. Additionally, this memo serves to provide an update on project activities since the Renewable Energy Approval (REA) submission to the MOE in August 2012. Topics covered include consultation activities, proposed project changes resulting from further project design activities and REA report alterations.

BACKGROUND

The Dufferin Wind Power Project (the Project) is a wind facility being developed by Dufferin Wind Power Inc. (DWP), an entity owned by Longyuan Canada Renewables Ltd. (Longyuan Canada) and Farm Owned Power (Melancthon) Ltd. (FOPM). The wind farm, located in the County of Dufferin, will consist of 18 General Electric (GE) 2.75 MW and 31 GE 1.6 MW wind turbines for a total of 49 wind turbines with a nameplate capacity of 99.1 MW and expected energy generation of 91.4 MW. The wind turbines will be situated entirely on privately owned land that is currently under agricultural production of row crops, pastureland or land that has been left fallow.

A 100 MW contract from the Ontario Power Authority (OPA) for the sale of electricity from wind power through the Province"s Feed-in-Tariff (FIT) program (enabled by the *Green Energy and Green Economy Act*) has been received for the Project. The Project will require approval under *Ontario Regulation 359/09, Renewable Energy Approval (REA* or *Ontario Regulation 359/09)* under Section V.0.1 of the *Ontario Environmental Protection Act.* Based on the REA Regulations, this project is a „Class 4" wind facility.

In August 2012, DWP filed a REA application for review of completion to the MOE which included the following reports:

- Project Description Report
- Construction Plan Report
- Design and Operations Report
- Consultation Plan Report
- Decommissioning Report
- Property Line Setback Report
- Wind Turbine Specification Report
- Evaluation of Significance Report
- Environmental Impact Statement
- Records Review
- Site Investigation Report
- Water Assessment Report
- Water Body Report.

PROJECT UPDATES

The following outlines the updates to the project since submitting the REA application to the MOE in August 2012.

Archaeological Assessment

i. The August 2012 REA application did not identify a specific route for an approximate 6 km section for the 230 kV transmission line that passed through private property (the REA reports and mapping identified a study area for this route section). The routing was contingent on obtaining easements from property owners. Private land easements for the private land section of the 230 kV transmission line have now been secured and a specific route for the transmission line has been identified (will be forwarded under separate cover). See the attached updated Site Plan in Appendix A. Stage 2 archaeology studies and natural heritage studies for the specific route have been completed. Ministry of Tourism, Culture and Sport (MTCS) "re-confirmation letters" (dated September 10 and 24, 2012) have been received and Ministry of Natural Resources (MNR) "re-confirmation letters" (dated August 16 and October 22, 2012) have been received for this specific route. (See Appendix B). The route was also presented to the public at the October 22, 23 and 24, 2012 PICs.

ii. A switch station near the HONI Substation is required to connect the project to the provincial grid. An agreement with the landowner of Lot 7 Shannon Court (the formerly proposed location) could not be reached. The adjacent Lot (Lot 5) is now proposed. (See detailed Site Plan for the site in Appendix A). A MNR reconfirmation letter for this change has been received. The Archaeological Stage 2 work on Lot 5 has been completed and the Stage 2 report for this site was submitted on October 17, 2012. DWP is waiting MTCS sign-off. We note the site has been subject to past land uses/disturbances. No archaeological features have been identified.

iii. The MTCS confirmation letter dated April 25, 2012, indicated a Stage 1 Archaeological Assessment was revised as of March 2, 2012. A revised copy of the report is included in Appendix B for your reference.

iv. The MTCS confirmation letter dated April 25, 2012, references a Stage 2 Archaeological Assessment report dated December 27, 2011. This report is included in Appendix B for your reference.

Heritage Assessment

i. The September 10, 2012 confirmation from the MTCS for the Heritage Assessment on the proposed 230 kV transmission line through the private easement was included in the August 2012 REA submission. The Heritage Assessment Report document is attached in Appendix C for your reference.

ii. A switch station near the HONI Substation is required to connect the project to the provincial grid. An agreement with the landowner of Lot 7 Shannon Court (the formerly proposed location) could not be reached. The adjacent Lot (Lot 5) is now proposed. (See detailed Site Plan for the site in Appendix A). Lot 5 was previously assessed as part of the Heritage Assessment completed for Lot 7 Shannon Court; therefore no additional study of the area is required. The Heritage Assessment Report did not find any significant heritage concerns.

Construction Plan Report

DWP acknowledges the MOE"s comments regarding a Permit to Take Water (PTTW).

Project Description Report

The project transmission line are included as part of the project location. A map showing the 120 metre buffer requirement is included in Appendix A for your reference.

Noise Assessment Report

A revised Noise Study Report will be submitted to the MOE on Monday November 5, 2012. The Noise Study Report is being revised to include updated coordinates on the as built for the Melancthon Wind Farm. The Noise Study Report will include a new noise model run based on the as-built turbine locations for TransAlta"s Melancthon Wind Farm. Table 1 outlines DWP"s responses to comments received from the MOE.

Table 1: Noise Study Report Responses to MOE Comments

	Comment	Response
i.	Please provide an electronic Excel spreadsheet containing the UTM coordinates of all sources (including adjacent wind facilities) and point of receptions.	See Appendix J
ii.	Please provide a letter and report from the manufacturer indicating that the GE models of the project (seven models, GE2.75MW, GE2.565MW, GE2.47MW, GE 1.6MW, GE1.482MW, GE1.388MW and GE1.336 MW) are not tonal based on ICE 61400-11-ed2.1:2006.	See Appendix J
iii.	Please confirm that the most up-to-date UTM coordinates of the Melancthon Wind Farm wind turbines are considered in the Cadna/A modelling. It seems that the UTM coordinates may not be the most up-to-date.	The UTM coordinates for the neighbouring wind farm (i.e., Melancthon) used in the acoustic assessment were based on their acoustic assessment report. It is noted that based on the information recently provided, the UTM coordinates and turbine IDs for as-built vary slightly from those used in their acoustic assessment report. As such, the modelling and the noise report will be updated with the latest UTM coordinates and turbine IDs for the Melancthon Wind Farm.
iv.	Please confirm if the Melancthon Wind Farm transformer substation was considered in the noise assessment.	The Melancthon Wind Farm transformer is located at: Easting 556527 and Northing 4867543, which is approximately 25 km away from the nearest Dufferin Wind Farm turbine. As such, this transformer was not included in the noise modelling for the Dufferin Wind project.
v.	Please provide sample Cadna/A calculations (octave bands) for NP133, VL62 and VL91. It seems that the levels at those PORs and a few others exceed the noise limit.	See Appendix J
vi.	Please update Table C1 based on the following: a) Clarify A1, A2 and A3 source IDs of the table to indicate which belongs to which project. b) The wind turbine types (description) of the Dufferin Wind Energy Project are not consistent with Cadna/A. c) The Wind turbine UTM coordinates are inconsistent with Cadna/A sample calculations Example: T22 coordinates i. | ii. X | iii. Y iv. Appendix C – Table C1 | v. 560182 | vi. 4897344 vii. Cadna/A | viii. 552717 | ix. 4896359 d) Define acronyms/wind farms Source ID, Melancthon, Plateau and Dufferin Wind Energy Project.	A revised Table C1 with the requested details will be included in the revised Noise Study Report being submitted to the MOE on November 5, 2012.
vii.	Please demonstrate what the maximum noise impact is at 10 m/s wind speed. It seems that 7 m/s and 8 m/s have a greater noise impact.	The noise impact assessment is based on the worst-case noise emission scenario for the turbines, corresponding to wind speeds of 10 to cut-out (at 10 m height). For some turbine models the noise levels remain the same for 8 m/s, 9 m/s and 10 m/s to cut-out. Please note that conservatively, the maximum turbine noise was modelled and compared against 40 dBA limit (i.e., wind-shear coefficient correction, which may result in lower adjusted turbine noise levels was not used).
viii.	Please address all of the above noted comments and provide a revised noise report complete with a signature and a new date.	A revised Noise Study Report will be submitted to the MOE on November 5, 2012.

The need for Fisheries permits from the Department of Fisheries and Oceans (DFO) is contingent on the final design of the project which is not yet completed. Based on the project concept design and the completed REA studies, fish habitat effects are anticipated to be minor. It is expected that a "Letter of Advice" from DFO/Conservation Authority would be sufficient and full authorization under the federal *Fisheries Act* would not be required. We note that project discussions have been held with the Nottawasaga Valley Conservation Authority and the Grand River Conservation Authority.

Consultation Report

The following Aboriginal Communities were identified by the MOE as potentially having an interest in the project:

- Beausoleil Chippewas of Christian Island
- Chippewas of Georgian Island First Nation
- Chippewas of Mnjikaning First Nation
- Saugeen Ojibway First Nation
- Saugeen First Nation
- Chippewas of Nawash Unceded First Nation
- Kawartha Nishnawbe First Nation
- Great Lakes Métis Council
- Métis Nation of Ontario
- The Haldimand Tract and the Six Nations of the Grand.

Throughout the study process, numerous letters were sent to aboriginal communities inviting them to participate in the project. As a result of communications a number of aboriginal communities expressed an interest in consultation and being involved with the project study process.

On September 10, 2012, DWP sent all aboriginal communities listed above a project update letter including an invitation to the additional PICs.

The following sections describe the aboriginal communities, their involvement in the project and any future involvement commitments DWP has made. DWP is committed to ongoing consultation with all aboriginal communities throughout all phases of the project.

- Beausoleil Chippewas of Christian Island

  To date, this community has not expressed interest in the project. On November 2, 2012, Dillon Consulting made a follow-up call and spoke with Mr. James Trimble of the Beausoleil Chippewas of Christian Island. Mr. Trimble noted there was a definite interest in the project and would like additional information by email. On the same date, Dillon Consulting sent Mr. Trimble a digital copy of the final Project Description Report and noted in the email that Dillon would be following up with a telephone call to schedule a meeting to discuss the project.

- Chippewas of Georgian Island First Nation

  To date, this community has not expressed interest in the project. On November 2, 2012, Dillon Consulting made a follow-up call to the Chippewas of Georgian Island First Nation. There was no answer. Dillon will be making more follow-up calls the week of November 5, 2012, until someone can be reached.

- Chippewas of Mnjikaning First Nation

  To date, this community has not expressed interest in the project. On November 2, 2012, Dillon Consulting made a follow-up call and talked with Mr. Dennis Monague. Mr. Monague will forward the message to Mr. Dan Shilling, Band Manager. If no call is received within one week by Dillon Consulting another call will be made.

- Saugeen Ojibway Nation (includes Saugeen First Nation and the Chippewas of Nawash Unceded First Nation)

  DWP has been consulting with the Saugeen Ojibway Nation (SON) through their environmental office. DWP provided funding to SON in 2012 for their on-going participation in the archaeological Stage 2 surveys in 2011 and 2012. This has included their involvement in the archaeology Stage 2 surveys (including most recently for the 230 kV private easement route) and in the review of the natural heritage REA reports. A site visit was conducted in October 2012, with SON's natural heritage consultant. No specific concerns regarding the project have been expressed by SON to date. DWP is expecting to receive comments from SON on the REA reports in regards to cultural heritage and natural heritage considerations. On November 2, 2012, SON indicated comments would be received on the archaeological and natural heritage reports within the next couple of weeks. SON informed DWP on November 2, 2012, that they are near completion of their review of the NHA Reports and have requested a meeting in the near future. DWP expects to meet with SON in November 2012, to review their comments.

- Kawartha Nishnawbe First Nation

  To date, this community has not expressed interest in the project. On November 2, 2012, Dillon Consulting made a follow-up call and left a message. If no reply is received within one week Dillon will attempt another phone call until someone can be reached.

- Great Lakes Métis Council

  In response to project notifications sent to them, DWP has recently received a follow-up reply from the Georgian Bay Métis Council since last meeting with them in late 2011. A meeting is scheduled with the Great Lakes Métis Council for November 27, 2012. No specific concerns have been expressed about the project to date.

- Métis Nation of Ontario (MNO)

  MNO is participating in the meetings with the Great Lakes Métis Council as noted above.

- Six Nations of the Grand River

  DWP met with Six Nations of the Grand River on June 13, 2012. At that meeting while no specific concerns with the project were expressed, Six Nation representatives indicated that their economic development officer wanted to meet with DWP. The action was for Six Nations to get in touch with DWP. No response was ever received by DWP regarding a second meeting. On June 20, 2012, an email was sent by Dillon Consulting to Ms. Joanne Thomas to follow-up and requesting available dates for a second meeting. A response has not yet been received. Six Nations has not expressed any further interest in the project to date. Dillon Consulting left a message for Ms. Thomas on November 2, 2012, to determine the Six Nations" continued interest in the project.

- Haudenosaunee Development Institute (HDI)

  DWP has recently received a reply from HDI in follow-up to project correspondence sent to them. Phone discussions have been held with Ms. Hazel Hill of HDI in October 2012, to provide an update on the project status. Discussions with have been held with HDI to update them on the project status. Discussions are on-going at this time.

i. A sample copy of the letter dated May 28, 2010, as well as a list of aboriginal communities the letter was delivered to, is included in Appendix D for your reference.

ii. A sample copy of the letter dated September, 2010, as well as a list of aboriginal communities the letter was delivered to, is included in Appendix D for your reference.

iii. A sample copy of the letter dated March 12, 2012, as well as a list of aboriginal communities the letter was delivered to, is included in Appendix D for your reference.

iv. A sample copy of the letter dated May 21, 2012, as well as a list of aboriginal communities the letter was delivered to, is included in Appendix D for your reference.

v. No further correspondence has been received from Oneida Nation of the Thames based on additional correspondence material that has been sent to them. DWP will make a follow-up call to this community to determine any interest in the project.

OTHER CORRESPONDENCE

i. DWP is currently coordinating with Transport Canada with regards to turbine lighting.

ii. On June 1, 2012, a letter was received outlining concerns of the Niagara Escarpment Commission with respect to the projects impacts on the local viewshed. As a result of the concerns raised by the NEC, a visual impact assessment report was prepared which outlined potential viewed

impacts and proposed mitigation measures. A draft report will be provided to both the NEC and the Township of Mulmur the week of November 5, 2012 and is included in Appendix E.

iii. The Township of Melancthon submitted a municipal consultation form on July 20, 2012. The form is included in Appendix I for your reference.

iv. At the time of the REA submission to the MOE in August 2012, the Town of Shelburne had not provided a municipal consultation form to the proponent. Since August however, a municipal consultation form has been received from the Town of Shelburne and is included in Appendix F for you reference. The municipal consultation form was received on September 24, 2012.

ADDITIONAL PROJECT UPDATES SINCE REA SUBMISSION

Since the submission of the REA application to the MOE in August 2012, project design and consultation activities have continued. As a result, there are numerous updates the MOE should be aware of as a result of the continued design and planning for the project which extend beyond the scope of the clarification questions discussed above.

Project Alterations and Renewable Energy Approval Changes

Since the submission of the REA application to the MOE in August 2012, there have been some updates and changes to the project design and ongoing project activities as a result of the continued design and planning for the project. The following sub-sections outline the proposed project alterations. Additionally, a summary of the changes and the impacts these changes will have on text submitted with the REA application can be found in Appendix G.

230 kV "Private easement" Routing

The August 2012 REA application did not identify a specific route for an approximate 6 km section for the 230 kV transmission line that passes through private property. The routing was contingent on obtaining easements from property owners. Private land easements for the transmission line have now been secured and a specific route for the transmission line has been identified. See attached updated Site Plan in Appendix A.

Switch Station Relocation

A switch station near the HONI Substation is required to connect the project to the provincial grid. An agreement with the landowner of Lot 7 Shannon Court (the formerly proposed location) could not be reached. The adjacent Lot (Lot 5) is now proposed. (See detailed Site Plan for the site in Appendix A). A MNR reconfirmation letter for this change has been received (Appendix B). We note the site has been subject to past land uses/disturbances.

Project Substation Relocation

The project substation has been relocated from outside a woodlot to a location on the same property (Lot 26, Concession 2, Township of Melancthon) to avoid the removal of trees (this change was made in response to comments received). See Appendix A for a detailed site plan for its location.

The movement of the substation from within the woodlot to outside of the woodlot had not been presented to the public when submitted as part of the REA application. Since August 2012, the revised location (i.e., outside of the woodlot) has since been presented to the public at a Public Information Meeting in October 2012 and MTCS and MNR sign-off letters have been received for the changed location (Appendix B).

Turbine Site #48 Adjustment

Turbine Site #48 has been moved 28 m south to avoid an archaeological find site. The new location is within the buildable area that had received previous sign-off by MTCS and MNR. The new location site meets noise criteria for all receptor locations (as seen in Appendix A).

Species at Risk

An Information Gathering Form (IGF) was completed for the project and comments were received from the MNR on August 19, 2012. The IGF Draft Report was re-submitted on October 24, 2012. The main changes to the document included:

- Updating the project location
- Identifying areas where Butternut trees may be located and presenting the result of Butternut surveys
- Providing clarification on surveys completed for the Eastern Whippoorwill
- Refining the methodology description for Chimney Swift (adding crepuscular bird survey information)
- Identifying and survey for Blandings Turtles
- Further explanation was provided to clarify the proposed projects potential impact on Species at Risk.

PUBLIC CONSULTATION ACTIVITY UPDATES

Project Notices

Notice of Additional Public Meeting – September 2012

The First Notice of Additional Public Meeting was published on September 10, 2012. Subsequently, after consultation with the MOE and further direction being received, the PIC dates where changed and a second First Notice of Additional Public Meeting was published during the week of September 17, 2012. The Second Notice of Additional Public Meeting ads were published during the week of October 8, 2012. All notices were published in the Orangeville Banner, Orangeville Citizen, Dundalk Herald, Creemore Echo and Shelburne Free Press. The notices were made available on the project website and at the Clerk's Office at the County of Dufferin and the five local municipalities.

Radio advertisements were run from October 12, 2012 to October 24, 2012, on Jewel FM, based in Orangeville and on AM 740 News Radio, based out of Toronto.

In addition to the notice, a letter dated September 10, 2012 and a subsequent letter sent September 17, 2012, advising of the date changes, was sent by mail to the County of Dufferin, the Townships of Melancthon, Amaranth, Mulmur and the Towns of Mono and Shelburne, the MOE, Aboriginal Communities and all landowners within 550 m of the project location.

All notifications were made available 30 days prior to the additional PIC, held on October 22, 23 and 24, 2012, as per MOE direction. A copy of the notice and letters are included in Appendix H of this report.

Notice of Application and Hearing Application for Leave to Construct Transmission Facilities For Dufferin Wind Power Inc. – October 2012

A notice of application and hearing application for leave to construct transmission facilities for Dufferin Wind Power Inc. was published in the Orangeville Banner, Orangeville Citizen, Dundalk Herald, Creemore Echo and Shelburne Free Press during the week of October 22, 2012. The notice was made available on the project website and at the Clerk's Office at the County of Dufferin and the five local municipalities and all Ontario Energy Board (OEB) mandated institutions and all affected landowners directed by OEB (Appendix H).

PUBLIC INFORMATION CENTRES

On October 22, 23 and 24, 2012, a series of Public Information Centres (PIC), all presenting the same information, were held to present information on the proposed project alterations, as outlined above. Public meetings were held at the Amaranth Township Banquet Hall in the Township of Amaranth, the Centre Dufferin Recreation Complex in the Town of Shelburne and the Horning's Mills Community Hall in the Township of Melancthon.

The PICs were formatted in the following way, based on a request by local municipalities: the first half hour was a walk through event where the public could view information panels and talk directly to the project proponents and their consultants. The following hour and a half, a formal moderated question and answer period took place, whereby the public wrote their questions on index cards and the proponent or one of their consultants would reply to the questions. In addition to the proponent, the experts on the panel included: noise, public health, REA approvals, construction, operations and engineering design.

Transcripts of the question and answer period are currently posted on the project website.

Amaranth Township Banquet Hall PIC on October 22, 2012

Twenty one people signed in (staff counted 30 attendees) and no comment sheets were received. Please see Appendix H for copies of the sign-in sheets.

In general, public questions and concerns related to:

- Proximity of the power line to specific residences
- Property values
- Financial compensation
- Recreational uses within the rail corridor
- The health impacts of a high voltage power line
- Liability issues of maintaining and decommissioning the power line
- Issues relating to the Green Energy Act and wind energy, in general.

Centre Dufferin Recreation Complex PIC on October 23, 2012

Twenty two people signed in (staff counted 55 attendees) and 2 comment sheets were received. Table 2 summarizes the comments received. Please see Appendix H for copies of the sign-in sheets and comment forms.

Table 2: Summary of Comments – Shelburne Additional PIC October 23, 2012

Received	Comments
Comment Sheet 1	Have the strobing and light interference of turbines been considered for the placement of turbines not to affect residential homes and/or non-participant residences? If not what mitigation has DWP determined to be to eliminate light strobing on residential non participant properties? If any. Light flickering/strobing is a major problem with turbine placement and should be avoided when turbines are located.
Comment Sheet 2	My name is **. I Live at ** 270 Side road. My farm house is located about 50 m to the old rail road/ as far as I understanding the underground wire is passing through the old rail road which would make it impossible to live in that location. I do believe after 5 years of not [actively] living with sound of the windmills now adding another problem for us is fair. I want to inform you I am going to fight in court of justice if you ignore our right. My phone number is XXX-XXX-XXXX.

In general, the concerns were similar to the Amaranth PIC, with the addition of tree clearing activities.

Horning's Mills Community Hall PIC on October 24, 2012

Twenty three people signed in (staff counted 50 attendees) and three comment sheets were received. Table 3 summarizes the comments received. Please see Appendix H for copies of the sign-in sheets and comment forms.

Table 3: Summary of Comments – Melanchthon Additional PIC October 24, 2012

Received	Comments
Comment Sheet 1	Not in favour of them in my neighborhood
Comment Sheet 2	Too, too close to the Melancthon-Nottawasaga Town line and its residents. Move it much, much further away!!! Some of us have serious health issues with the flickering lights and such, because of epilepsy.
Comment Sheet 3	Absolutely opposed. This is a town we are people. Where do you live? What studies have you done? I am sick since I moved here.

In general, the concerns were similar to the previous PICs, with the addition of the following:

- Shadow flicker from wind turbines
- Noise from wind turbines
- Health impacts from wind turbines
- Consultation issues, during land lease stage and post-MOE completeness review
- Compensation
- Property values
- Financial security for decommissioning
- Ontario Energy Board Leave to Construct Application.

Letters of Support

As this project started as ten smaller projects being initiated by the landowners themselves, there is a good foundation of support for this project within the community. Many of these participants have written letters of support for the project. Since August 2012, DWP has received seven letters of support for the project. These letters can be found in Appendix H.

Point of Interconnect Consultation Activities

In August 2012, it was identified that eleven landowners adjacent to the 69 kV point of interconnection substation in the Town of Mono had not been contacted regarding the project. At the time of the REA submission, those landowners were sent a letter regarding this oversight in the project contact list. On September 14, 2012, the MOE was informed of the oversight in the writing and made aware of DWPs efforts to resolve the consultation gap and make contact with these individuals.

Since September 14, 2012, steps have been taken and all of the eleven properties have been consulted. During consultation with the eleven landowners, three requested follow-up items. All three landowners have since been contacted as seen in Table 4.

Table 4: Summary of 69 kV Point of Interconnect Consultation Activities		
Landowner	Comments	DWP Action
Landowner 1	Upset 69 kV power line is being considered. Wishes to talk directly to Dufferin Wind Power	Dillon Consulting and DWP have both made follow up calls to Landowner 1. They understand that the 230 kV power line is the preferred route and they are active in writing to their County council. No further action required, unless they request a meeting.
Landowner 2	Concerned that 230 kV is not preferred route. Told by council that DWP is holding up private easement discussions for 230 kV route.	DWP has both called and met with Landowner 2. Landowner 2 is supportive of DWP's efforts to pursue the 230 kV power line. No further action required, unless Landowner 2 requests a meeting.
Landowner 3	Wishes to receive leave to construct notice in writing.	Dufferin Wind Power contacted Landowner 3 regarding concerns. Letter outlining preference from 230 kV power line forwarded week of September 17, 2012. No further action required, unless Landowner 3 requests a meeting.

DWP will continue to update landowners adjacent to the 69 kV power line option, as required.

230 kV Impacted Properties Consultation Activities

Dillon Consulting and DWP have initiated kitchen table talks with landowners who reside adjacent to the 230 kV power line. These informal meetings commenced Monday, October 29, 2012. Meetings have already been held or will be held the week of November 5, 2012, with interested landowners who reside within 75 m of the proposed power line. Once these meetings are completed, DWP will continue to meet with other interested individuals living along the 230 kV power line route to ensure their concerns are heard and addressed.

Some of the comments heard to date include:

- Health impacts related to high-voltage transmission lines
- Requests for adjustments of pole placements
- Impacts on property values
- Effect of transmission line on honey bees
- Possibility of putting the 230 kV power line underground in more locations
- Noise/humming emanating from power lines
- Possibility of putting orange markers on power line as one resident flies model airplanes.

DWP has also committed to finding information for individuals relating to the questions that were asked and following up with individual landowners.

Other Public Comments

In addition to comments being received during the PIC events, comments were also provided to DWP via other mediums, including emails, letters and meetings. DWP requests that landowners provided comments by October 24, 2012, for comments on the proposed changes to the REA since August 2012. Please note that comments received well in advance of October 24, 2012, were responded to individually. All comments received on or just before the public comment period deadline and those that were received during the PICs have all been read and considered in the proposed changes but have not been responded to individually. DWP has committed to responding to comments where specific questions have been asked. Below outlines a brief summary of the general concerns and comments received from August 2012 to October 24, 2012.

Table 5 lists a summary of public comments received since the Final REA was submitted to the MOE. See Appendix H for copies of all correspondence.

Table 5: Summary of Public Comments – Addressed

Date	Subject	Summary
August 10, 2012	Acoustical Audit	Commitment for Acoustical Audit to be required once project becomes operational despite MOE requirements.
August 24, 2012	Flicker Study	Requests status of Flicker Study
August 24, 2012	Regulations	Review of draft reports does not meet regulations
September 20, 2012	Private Land Easement	Requests information on location of private easement and how transmission line would be installed along private properties
September 25, 2012	Substation Location	New location of substation, sightline impacts and effects on power line locations
September 25, 2012	Land for Additional Wind Turbines	Landowner notifying DWP of land he has available, if needed.
October 3, 2012	Public Information Meetings	Requests information on additional meetings in Mulmur or Mono
October 3, 2012	Natural Heritage Reporting	Request for more information about natural heritage of the rail corridor and what studies have been done.
October 4, 2012	Secondary Power Line	Requests if the power line through Mono is no longer an option
October 9, 2012	Substation	Requests information on plans to block noise and line of sight of substation at new location.
October 9, 2012	PIC Format	Request information on upcoming PIC format.
October 9, 2012	PIC Format	Would like the October 24, 2012 PIC to be in a format similar to the previous meeting.
October 10, 2012	Pictures	Notifies of pictures she has that would look great on advertising or reports and offers them for use.
October 14, 2012	Community Benefit	Requests a cited reference regarding community benefits to creation of wind farms.
October 17, 2012	PIC Times	Requests information on why the PICs are held during the week.

Table 5: Summary of Public Comments – Addressed		
Date	Subject	Summary
October 23, 2012	Green Tags/RECs	Requests information on purchasing Green Tags/RECs from the wind farm.
October 25, 2012	Property	Requests contact from someone on the project in regards to his property. He has land he thinks would be beneficial to the project.
October 27, 2012	Neighbouring Properties	Requests information on what the neighbouring landowners" say is when it comes to placement and involvement.
October 31, 2012	Contact Information Request	Requests contact information to speak to someone rather than emailing.

MUNICIPAL CONSULTATION

Township of Melancthon

On September 10, 2012, Dillon provided the Township of Melancthon with a summary table of all comments received from local municipalities as part of the Municipal Consultation Form collection process which was initiated in February 2012 and continued through the spring and summer of 2012. The package included a table with details of comments received and DWP"s response (see Appendix I).

On September 11, 2012, Dillon met with the Township of Melancthon, to discuss municipal comments received as part of the project and to address outstanding concerns with respect to municipal road crossings.

On October 9, 2012, the Township of Melancthon requested additional information about plans for blocking out sight lines to the project substation as a result of moving its location out of the originally proposed woodlot. DWP addressed this concern at the Public Information Centre in Melancthon on October 24, 2012.

On October 11, 2012, the Township of Melancthon requested DWP format the additional PICs in the same "town hall" style meeting, similar to the July 2012 PICs. The format request included a 30 minute walk through of the PIC display panels and opportunities to discuss project components one on one with project representatives prior to an hour and a half group question and answer period. DWP complied with the request and changed the proposed format of the PICs to suit the Township"s request.

On October 23, 2012, DWP delivered a copy of the Ontario Energy Board Leave to Construct Application to the Township for their review.

Township of Amaranth

On September 10, 2012, Dillon provided the Township of Amaranth with a summary table of all comments received from local municipalities as part of the Municipal Consultation Form collection process which was initiated in February 2012 and continued through the spring and summer of 2012. The package included a table with details of comments received and DWP's response (see Appendix I).

On October 23, 2012, DWP delivered a copy of the Ontario Energy Board Leave to Construct Application to the Township for their review.

Mulmur Township

On September 10, 2012, Dillon provided Mulmur Township with a summary table of all comments received from local municipalities as part of the Municipal Consultation Form collection process which was initiated in February 2012 and continued through the spring and summer of 2012. The package included a table with details of comments received and DWP's response (see Appendix I).

On September 18, 2012, Mulmur Township requested a copy of the Visual Assessment Report and Noise Report completed for the project. An electronic copy of the draft visual assessment report was provided. Access to the noise report has been restricted until the MOE provides notice that the REA application is complete and is posted on the Environmental Bill of Rights website. Once the REA application is complete, the Noise Report will be made available to Mulmur Township for review.

On October 23, 2012, DWP delivered a copy of the Ontario Energy Board Leave to Construct Application to the Township for their review.

Town of Shelburne

On September 10, 2012, Dillon provided the Town of Shelburne with a summary table of all comments received from local municipalities as part of the Municipal Consultation Form collection process which was initiated in February 2012 and continued through the spring and summer of 2012. The package included a table with details of comments received and DWP's response.

On September 24, 2012 the Town of Shelburne provided a completed Municipal Consultation Form outlining the concerns of their township. The completed form included the same comments received on May 15, 2012 and included in the Final REA submission (see Appendix I).

On October 23, 2012 DWP delivered a copy of the Ontario Energy Board Leave to Construct Application to the Town for their review.

Town of Mono

On September 10, 2012, Dillon provided the Town of Mono with a summary table of all comments received from local municipalities as part of the Municipal Consultation Form collection process which was initiated in February 2012 and continued through the spring and summer of 2012. The package included a table with details of comments received and DWP's response (as seen in Appendix I).

On October 23, 2012, DWP delivered a copy of the Ontario Energy Board Leave to Construct Application to the Town for their review.

County of Dufferin

DWP has continued to work with Dufferin County in regard to using the County-owned rail corridor for the project's transmission line.

On September 13, 2012, DWP and Dufferin County entered into a Memorandum of Understanding to ensure that DWP reimburse Dufferin County for the County's existing and future costs associated with reviewing and considering DWP's proposed easement.

On October 23, 2012, DWP delivered a copy of its Leave to Construct application for the proposed transmission line along the rail corridor to Dufferin County for its review and consideration.

On November 2, 2012, DWP delivered a third-party engineering report on the transmission line's ability to coexist with future rail operations along the rail corridor and a draft Traffic Management Plan (TMP) related to operations during construction of the transmission line.

Following the County's review of the documents, the parties will meet to review and discuss the technical, operational and commercial aspects of the transmission line and easement.

Please see Appendix I for related correspondence.

Appendix H Correspondence from Shibley Righton to Davis LLP, May 8, 2012

SHIBLEY RIGHTON LLP
Barristers and Solicitors

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Please reply to the TORONTO OFFICE

May 8, 2012

File No. 2110787

BY E-MAIL

Mr. Chris Barnett
Davis LLP
1 First Canadian Place, Suite 6000
P.O. Box 367
100 King Street West
Toronto, ON M5X 1E2

Dear Mr. Barnett:

Re: Dufferin Wind Power Project (the "Project")

We are in receipt of your letter dated May 8, 2012 and confirm that we do act for Farm Owned Power (Melancthon) Ltd..

Yours truly

Leslie S. Mason
LSM/lcs

cc: Torys LLP – Attn: Krista Hill (w/encl)

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