

Questions Arising from the
Auditor General's 2011 Report on
Renewable Energy Initiatives

(Chapter 3 Ministry of Energy: Electricity Sector—Renewable Energy Initiatives)

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Summary:

With comprehensive and detailed evidence gathered independently from inside the Ministry of Energy-- much of it previously unavailable to the public-- the Auditor General's Report unambiguously challenges both the rationale and implementation of the Green Energy Act.

The Act has been promoted as a mechanism for cutting greenhouse gas emissions, increasing job opportunities, and creating a competitive business environment. However the Auditor General's investigators found little evidence that these objectives have been or would be realized. Instead it suggests that the escalating electricity costs resulting from the addition of solar and wind power to the grid with their extravagant feed-in-tariffs are having the opposite effect.

The report emphasizes "that wind and solar renewable power will add significant additional costs to ratepayers' electricity bills". (89)¹ However there will be additional costs because "wind and solar are not as reliable and require backup from alternative energy-supply methods such as gas-fired generation". (89) Nevertheless, the public was led to believe increased costs would be minimal (1%). Surveys indicated that people were willing to pay only up to 5% more for renewable electricity.

¹ The number in brackets following a quotation indicates the page number in the report. Quotations from the report are printed in serif font. The report can be found at: http://www.auditor.on.ca/en/reports_en/en11/2011ar_en.pdf

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The report indicates that the escalating increase of electricity prices will continue to gain momentum as rising costs for backup, connection of renewable energy projects, spilling hydro and nuclear, and payments to renewable energy producers *not to produce electricity* increase. The negative implications of increased electricity costs on employment and the economy in general further challenge the practicality of the Green Energy Act. The Auditor questions whether the estimate of the number of jobs that the government claims have been created by the Act is accurate and asks why those that are being lost are not being accounted for.

However the report goes beyond assessing the financial liability of imprudent expenses and overly generous feed-in-tariffs offered to energy producers. “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”. (89) Alarming, decisions continue to be made piecemeal without overall cost and effectiveness evaluation. The investigators found that “the ministry’s internal audit service team . . . had not recently conducted any audit work on renewable energy initiatives”. (88)

The government’s adamant contention that there are no adverse health effects from industrial wind turbines is also questioned by the Auditor General who notes that the report by Ontario’s Chief Medical Officer of Health “was questioned by environmental groups, physicians, engineers, and other professionals, who noted that it was merely a literature review that presented no original research and did not reflect the situation in Ontario”. (119-120)

Even more worrying, is the lack of appropriate oversight and transparency. Decisions have been made by ministerial directive and directions, relying largely on the opinion of a single inexperienced minister, while circumventing both the recommendations regarding feasibility by expert energy professionals in the Ontario Power Authority (OPA) and frustrating the responsibility for oversight by the Ontario Energy Board (OEB) to ensure that renewable energy resources are obtained in a cost-effective manner.

Detailed findings of the Auditor General's investigations

1. Wind and solar will add significant additional costs to electricity bills

“Wind and solar renewable power will add significant additional costs to ratepayers’ electricity bills. Renewable energy sources such as wind and solar are also not as reliable and require backup from alternative energy-supply methods such as gas-fired generation”. (89)

“The government was well aware that its renewable energy initiatives meant higher costs”. (89) However, the government assumed “that this was a more-than-acceptable trade-off given the environmental and health benefits, as well as the anticipated job-creation benefits”. (89) Nonetheless, the government failed to assess “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”. (89)

QUESTION: Why is the government continuing its massive investment in renewable energy without a responsible business practice assessment of costs and benefits?

2. The government claim of 1% rise in electricity costs for renewable energy was inaccurate

“In May 2009, when the *Green Energy and Green Economy Act* (Act) was passed, the Ministry said the Act would lead to modest incremental increases in electricity bills of about 1% annually—the result of adding 1,500 MW of renewable energy under a renewable procurement program called the Feed-in Tariff program and implementing conservation initiatives. In November 2010, the Ministry forecast that a typical residential electricity bill would rise about 7.9% annually over the next five years, with 56% of the increase due to investments in renewable energy that would increase the supply to 10,700 MW by 2018, as well as the associated capital investments to connect all the renewable power sources to the electricity transmission grid”. (89)

QUESTION: Was it willful blindness or incompetence on the part of Former Energy and Infrastructure Minister George Smitherman when he told the CTV on April 6, 2009: “Any additional costs to consumers will be minimal. *Residents can expect their electricity bills to increase about one per cent per year*”?

QUESTION: Was Premier McGuinty’s statement to the Legislature on February 26, 2009 that “renewable energy will have only a minimal impact on electricity bills” knowingly incorrect in an attempt to mislead the legislature and the public, or was it based on less than the due diligence expected of the leader of the province?

3. \$169 million in 2010 and \$296 million in 2011 would need to be recovered from electricity ratepayers for the cost of connecting renewable energy

“Hydro One files applications with the OEB to seek approval to recover the costs of transmission and distribution charges on electricity bills. Its most recent distribution rate application estimated that investments of \$169 million in 2010 and \$296 million in 2011 would need to be recovered from electricity ratepayers for the cost of

connecting renewable energy to the distribution systems and modernizing the electricity grid”. (115)

4. Ontario consumers were not informed of true costs of green energy

“Based on our analysis of OPA data, renewable energy contracts will contribute significantly to increases to the Global Adjustment (GA). . . . The total GA is expected to increase tenfold province-wide, from about \$700 million in 2006 to \$8.1 billion in 2014, when the last coal-fired plants are phased out. Almost one-third of this \$8.1 billion is attributable to renewable energy contracts”. (94)

“The OPA indicated that consumers have to be advised, through appropriate channels, of the expected electricity-price increases arising from a large number of contracts to buy green energy at fixed rates that are significantly higher than market prices. However, a number of consumer surveys conducted by the government in spring and fall 2010 indicated that although consumers generally supported renewable energy, they were for the most part unaware of its impact on prices. Specifically:

- An OPA survey showed that only 14% of respondents thought renewable energy would lead to electricity price increases, while 60% disagreed that “green energy sources like wind and solar are too expensive and unreliable.”
- Ministry surveys found that only a minority of respondents linked recent price increases to the cost of renewable energy, although many respondents did say that they were prepared to pay “modest” increases for renewable electricity”.
- Hydro One surveys found that consumers supported spending to connect renewable energy to the power grid, but were less inclined to support electricity bill increases associated with these investments. About half said they were willing to pay for such

investments, but only 27% would agree to an increase in their electricity bills of more than 5%”. (94)

“In November 2010, the Ministry’s Long-Term Energy Plan (LTEP) included electricity-price forecasts based on the effects of all investments in Ontario’s electricity system. According to the LTEP, a typical residential electricity bill would rise about 7.9% annually over the next five years, with 56% of the increase due to investment in new, cleaner renewable energy that would increase the supply to 10,700 MW by 2018 as well as the associated capital investments to connect renewable power sources to the transmission grids”. (94-95)

“We also noted that although the LTEP and the related pamphlet did inform the public that renewable energy would increase their electricity bills, the cost impact of renewable energy by sector was not disclosed in detail”. (95)

“Figure 4: Monthly Electricity Charge Related to Renewable Energy in Different Sectors (Source of data: Ministry of Energy) (95)

Economic Sector	Examples	Assumed Electricity Consumption (kWh/month)	Renewable Energy Related Charge (\$)	
			(Actual)	2018 (Projected)
residential	n/a	800	2	31
small commercial	convenience store, small dry cleaner, restaurant, small retail store	12,000	38	500
large commercial	supermarket, shopping mall, large office building, hotel	130,000	385	5,000
industrial	paper and pulp, automobile,	61,200,000	200,000	2,400,000

mining, cement,
iron and steel
manufacturing,
chemical
products,
petroleum (i.e.,
refineries)

“In addition to the forecasts in the Ministry’s LTEP and contained in Figure 4, in April 2010, the OEB completed an analysis predicting that a typical household’s annual electricity bill will increase by about \$570, or 46%, from about \$1,250 in 2009 to more than \$1,820 by 2014. More than half of this increase would be because of renewable energy contracts”. (95-96)

5. The government was warned in 2007 that new wind power would create higher Green House Gas (GHG) emissions

“The OPA was designated as the province’s energy planner, responsible for submitting long-term plans to the Ontario Energy Board (OEB) for approval. However, the first long-term energy plan put forward by the OPA since its creation in December 2004 has not been approved by the OEB. Although the OPA did spend \$10.7 million to develop its first energy plan, which it submitted to the OEB for review in 2007, the government suspended the OEB’s review of the plan in 2008. In 2010, the Ministry released its own Long-Term Energy Plan to provide the OPA with sufficient context on the government’s policy priorities and targets to guide it in its planning. From the public’s perspective, this could lead to some ambiguity as to which entity is responsible for electricity planning in Ontario”. (89-90)

QUESTION: Why did the government suspend the OEB’s review of the plan in 2008 after spending \$10.7 million for its development? Was it because the OPA warned the government that wind generation would result in higher greenhouse gas emissions?

The OPA *Integrated Power System Plan*, (October, 2007) analyzed a “high wind power” scenario for the province, and concluded:

“Since wind generation has an effective capacity of 20% compared to 73% for hydroelectric generation, additional generation capacity with better load-following characteristics would need to be installed”.

“This needed capacity will likely have to be obtained by installing additional gas-fired generation. Thus, in addition to incurring further capital costs for the gas generation installation, higher gas usage would be expected to make up for the reduced amount of renewable energy from wind compared to that from hydroelectric generation or this alternative. Therefore, this alternative would result in higher greenhouse gas emissions. Wind and solar power will never be more than a niche supplier of power in Ontario.”

6. Minister added \$4.4 billion to FIT contract payments against O.P.A. advice

“Earlier procurement programs for renewable energy included competitive bidding and the Renewable Energy Standard Offer Program (RESOP), which were both very successful and achieved renewable generation targets in record time. In particular, RESOP received overwhelming responses. It was expected to develop 1,000 MW over 10 years, but it exceeded this target in a little more than one year. Although continuing the successful RESOP initiative was one option, the Minister directed the OPA to replace RESOP with a new Feed-in Tariff (FIT) program that was wider in scope, required made-in-Ontario components, and provided renewable energy generators with significantly more attractive contract prices than RESOP. These higher prices added about \$4.4 billion in costs over the 20-year contract terms as compared to what would have been incurred had RESOP prices for wind and solar power been maintained. The Ministry indicated that replacing RESOP with FIT successfully expedited its renewable energy program and promoted Ontario’s domestic industry”. (90)

“Many other jurisdictions set lower FIT prices than Ontario and have mechanisms to limit the total costs arising from FIT programs. The OPA made a number of recommendations to lower Ontario’s pricing structure. We were advised that the

government opted for price stability to maintain the investor confidence required to attract capital investment to Ontario until the planned two-year review of the FIT program could be undertaken”. (90) ²

QUESTION: What could have prompted the Energy Minister to silence his advisors in October 2009 when “in a letter to the OPA, Mr. Smitherman personally seized control of the agency. ‘I write pursuant to my authority as the Minister of Energy and Infrastructure, in order to exercise the statutory powers of ministerial direction which I have in respect of the Ontario Power Authority. . . I direct you to develop a feed-in tariff (FIT) program’”.³ Was this the result of the lobbying by the industry?

QUESTION: Was Mr Smitherman’s use of ministerial direction in the interests of Ontario’s electricity consumers?

² The Auditor’s report adds further examples of proposed changes:

“• In March 2009, before the passage of the *Green Energy and Green Economy Act*, the OPA proposed a reduction of 9% to FIT prices for electricity generated from ground-mounted solar projects, in line with similar practices in some other jurisdictions. This could have reduced the cost of the program by about \$2.6 billion over the 20-year contract terms. The government did not apply this reduction. The Ministry informed us that such a predetermined price reduction ran counter to the government’s goals of maintaining policy and price stability for the initial two-year period”.

“• In February 2010, the OPA recommended cutting the FIT price paid for power from microFIT ground-mounted solar projects after the unexpected popularity of these projects at the price of 80.2¢ per kilowatt hour (kWh), the same price as was being paid for rooftop solar projects, became apparent. This price would provide these ground-mounted solar project developers with a 23% to 24% after-tax return on equity instead of the 11% intended by the OPA. The recommended price cut was not implemented until August 2010. In the five months from the time the OPA recommended the price cut in February 2010 to the actual announcement in July 2010, the OPA received more than 11,000 applications from developers. Because the government decided to grandfather the price in order to maintain investor confidence, all of these applications, if approved, would qualify for the higher price rather than the reduced one. We estimated that, had the revised price been implemented when first recommended by the OPA, the cost of the program could have been reduced by about \$950 million over the 20-year contract terms”. (90)

³ “Ontario’s iron-fisted energy model” Terence Corcoran, *Financial Post*, October 01, 2009.

7. Was the Samsung agreement made without economic or business case analysis and neither OEB nor OPA was consulted?

“The Ministry negotiated a contract with a consortium of Korean companies to build renewable energy projects. The consortium will receive two additional incentives over the life of the contract if it meets its job-creation targets: a payment of \$437 million (*reduced to \$110 million, as announced by the Ministry in July 2011 after the completion of our audit fieldwork*) in addition to the already attractive FIT prices; and priority access to Ontario’s electricity transmission system, whose capacity to connect renewable energy projects is already limited. However, no economic analysis or business case was done to determine whether the agreement with the consortium was economically prudent and cost-effective, and neither the OEB nor the OPA was consulted about the agreement. On September 29, 2009, the ongoing negotiations with the consortium were publicly announced, and Cabinet was briefed on the details of the negotiations and the prospective agreement in October 2009. The formal agreement was signed in January 2010”. (90-91)

QUESTION: Was it determined whether or not Samsung had sufficient experience in building wind turbines, and if not, is the Ontario taxpayer subsidizing the research and development costs of a Korean company?⁴

⁴ “Samsung Heavy industries (SHI) was established in 1974 and has become the second largest ship manufacturer in the world with an exclusive focus on shipbuilding, offshore floaters, digital devices for ships, and construction and engineering concerns. It was reported in March of 2009 that Samsung was *thinking* about moving towards wind turbine production. *With the recent drop in vessel orders, the company needs a new source of work and revenue. SHI is looking for a new plant site, where the company plans to build a production plant for producing 200 wind turbines, with capacities of 2.5 MW and 5 MW. SHI is aiming to build about 500 units by 2015*”. (Renewable Energy News, May 25 2009)
<http://www.renewbl.com/2009/05/25/samsung-heavy-industries-turning-towards-wind-turbine-production.html>

QUESTION: Who signs a contract (after receiving an offer from only one source) that commits Ontario to pay \$20 billion over a 20 year period for an intermittent power source, much of which will have to be sold at cost because it is produced during times of surplus base load generation? ⁵ Can we not expect our government to apply the same diligence to spending our money as we would- and would we not at least get competitive bids?

8. Normal due diligence process not followed; no formal Cabinet approval

“However, we noted that the normal due diligence process for an expenditure of this magnitude had not been followed. For large projects such as the consortium agreement, we expected but did not find that a comprehensive and detailed economic analysis or business case had been prepared. According to the Ministry, the decision to enter into the agreement with the consortium was made by the government. Although the Cabinet was briefed about the agreement, the Ministry indicated that there had been no formal Cabinet approval because it was not required”. (108)

QUESTION: Why was no economic or business case analysis done to determine whether the agreement with the Korean consortium was economically prudent and cost-effective, and why was neither the OEB nor the OPA consulted about the agreement?

9. Electricity ratepayers may have to pay \$150 to \$225 million a year to renewable energy generators *not to produce electricity*

“Given that demand growth for electricity is expected to remain modest at the same time as more renewable energy is being added to the system, electricity ratepayers may have to pay renewable energy generators under the FIT program between \$150 million and \$225 million a year not to generate electricity”. (91)⁶

⁵ 2000 MW Wind x 20 years x 8760 hrs/yr x \$140 per MWh x 28% CF = \$13.7 billion
500 MW solar x 20 years x 8760 hrs/yr x \$469 per MWh x 15% CF = \$6.2 billion

⁶ Compare this with another which makes the IESO calculation appear to be very low: \$225 Million for 2500 hours a year of non production corresponds only to 666 MW of wind generation. We are headed to over 7000 MW of wind, and it will mostly be

QUESTION: Does the government not have a responsibility to exercise economic prudence on behalf of electricity consumers? Why have contracts not stipulated that electricity be paid for only when it is needed?

10. Backup: “Consumers have to pay twice for intermittent renewable energy”

“Renewable energy sources such as wind and solar provide intermittent energy and require backup power from coal- or gas-fired generators to maintain a steady, reliable output. According to the study used by the Ministry and the OPA, 10,000 MW of electricity from wind would require an additional 47% of non-wind power, typically produced by natural-gas-fired generation plants, to ensure continuous supply”. (91)

“Operational Challenge: Backup Power Requirement”

“To maintain reliability, there is always a need for backup power generation in the event that a generator must shut down unexpectedly. However, intermittent renewable energy sources such as wind and solar require fast-responding backup power and/or storage capacity to keep the supply of electricity steady when the skies are cloudy or the wind dies down. The OPA informed us that because viable large-scale energy storage is not available in Ontario, wind and solar power must be backed up by other forms of generation. This backup power is generated mainly from natural gas, because coal will be phased out by the end of 2014”. (113)

“The IESO confirmed that *consumers have to pay twice for intermittent renewable energy—once for the cost of constructing renewable energy generators and again for the cost of constructing backup generation facilities, which usually have to keep running at all times to be able to quickly ramp up in cases of sudden declines in*

produced during times of surplus. The cost will be well over 225 million per year, and will be more likely 10 times higher each year.

sunlight levels or in wind speed. The IESO confirmed that such backups add to ongoing operational costs, although no cost analysis has been done”. (113)

QUESTION: Why has the government not carried out any cost analysis of the ongoing operational costs for back up of wind and solar energy?

QUESTION: Are consumers not paying three times: once to the wind generators either to produce or not produce; once to the other generators such as nuclear or hydro that "spill"; and potentially a third time to sell the surplus at a negative price; i.e. we pay others to take the surplus off our hands?

11. Cost and environmental impact of backup not analyzed

“The backup requirements have cost and environmental implications”. (113)

“The use of gas-fired backup generation will reduce the net contribution of renewable energy to environmental protection, as indicated by studies from other jurisdictions (see the “Environmental and Health Impacts” section later in this report)”. (113)

“Despite these concerns, the cost and environmental impacts of such backup generation capacity were not formally analyzed to ensure that this information would be available to policy decision-makers”. (113)

QUESTION: Why has the government not investigated the negative environmental footprint of gas fired backup generation?

A succession of energy ministers through Mr Duncan, Mr Phillips, Mr Smitherman, Mr Phillips again (after Mr Smitherman left abruptly), Mr Duguid and now Mr Bentley keep telling us we need wind to shut down dirty coal to protect the health of Ontarians. The main reason that "coal generation is "dirty" is that the government has resisted installing filters that would remove particulate and SO₂ ... at much lower cost than building the new system and shutting down coal. However more polluting open-cycle gas plants running less efficiently on standby⁷ are needed

⁷ “There are two classes of gas turbine: Open Cycle Gas Turbine (OCGT) and Combined Cycle Gas Turbine (CCGT). OCGT has lower capital cost, higher operating costs, uses more gas and produces more greenhouse emissions than CCGT per MWh of electricity

to back up the wind turbines. They cause more health problems than the coal units when outfitted with modern pollution control. According to the Suzuki Foundation:

“Possibly more troubling are the emissions of fine particulates from gas-fired power plants. Though particulate emissions are about one-tenth what they are for coal power, the U.S. Environmental Protection Agency estimates that 77% of particulates from a natural gas plant are dangerously small. These fine particulates have the greatest impact on human health because they bypass our bodies’ natural respiratory filters and end up deep in the lungs. In fact, many studies have found no safe limit for exposure to these substances”.⁸

QUESTION: Was the following information which appeared on the Ontario Ministry of Energy and Infrastructure web site intentionally designed to confuse the public or did it represent the failure of the minister to understand his portfolio:

**“There are a number of unique advantages to wind power: Electricity generation from wind farms reduces the emission of carbon dioxide by 99 per cent over coal-fired electricity plants and by 98 percent over natural gas”.
“Wind and solar projects will displace 40 megatonnes of carbon dioxide compared to what would be emitted by equivalent gas-fired generation.
That's equivalent to removing every single car off Ontario roads for one year”.**

generated. OCGT follows load changes better than CCGT. CCGT has higher capital cost and needs to run at higher power and run for longer to be economic. CCGT is more efficient so it uses less gas and produces less greenhouse emissions. CCGT produces electricity at less cost than OCGT for capacity factors above about 15%”.

- “If wind generation is available the power produced is highly variable and unscheduled so it needs to be backed up by OCGT. Although OCGT is called up to back up for wind, the energy produced by wind actually displaces CCGT generation mostly”.

- “Because wind energy is variable, unreliable and cannot be called up on demand, especially at the time of peak demand, wind power has low value”. – Peter Lang. *Cost and Quantity of Greenhouse Gas Emissions Avoided by Wind Generation*.
<http://www.windaction.org/documents/20052>

Combined cycle gas plants (efficiency around 70%) need to be operating at a power over about 50% to be able to vary their load up the last 50%, while simple cycle (open cycle) gas turbines (efficiency about 35%) can run from low load to high load, but use twice as much gas to do so. Thus, if combined cycle generators are needed to back up 7000 MW of wind, you would need them already running at 7000 MW to be able to load the top 7000 MW. Thus wind plus gas = 14,000 MW, and make up all of the Ontario base load, leaving no room for nuclear.

⁸ From the Suzuki Foundation web site:

http://www.davidsuzuki.org/Climate_Change/Energy/Fossilfuels/naturalgas.asp

—Ontario Ministry of Energy and Infrastructure web site.

QUESTION: Why does the government continue to mislead the public regarding the real environmental footprint of wind energy?

12. The extent of the backup requirement has been underestimated

“The only analysis on backup power that the Ministry cited was a study done by a third party engaged by the OPA as part of its 2007 IPSP development. The study noted that 10,000 MW of wind would require an extra 47% of non-wind sources to handle extreme drops in wind. We noted that the third party who carried out this study also operated an Ontario wind farm, raising questions about the study’s objectivity”. (113-114)

QUESTION: Why did the government claim that 10,000 MW of wind would require only an extra 47% of non-wind sources as backup relying only on the opinion of an Ontario wind development operator *when it had already been informed of the German electricity distributor E-on Netz “Wind report 2005” which stressed in its introductory summary:*

“Wind energy is only able to replace traditional power stations to a limited extent. Their dependence on the prevailing wind conditions means that wind power has a limited load factor even when technically available. It is not possible to guarantee its use for the continual cover of electricity consumption. Consequently, traditional power stations with capacities equal to 90% of the installed wind power capacity must be permanently online in order to guarantee power supply at all times”.

(More recently, some experts have indicated that wind must be backed up 100%).

“We noted that: Prior to the passage of the *Green Energy and Green Economy Act* in 2009, the Ministry did not quantify how much backup power would be required. It was not until February 2011 that the Minister issued a new supply-mix directive that asked the OPA to consider backup options, such as converting coal-fired plants to gas-fired operation, importing power from other jurisdictions, and developing

storage systems. The OPA has not yet made any recommendations to the Ministry”.

(113)

QUESTION: When will those recommendations be available to the public?

13. Closing coal plants will require an increase of 5,000 MW of gas-fired generation

“The government has committed to closing all coal-fired plants by the end of 2014. Ontario is on track to meet this commitment. Of the 19 units operated at five coal-fired plants across Ontario in 2003, the Ministry indicated that eight units had been closed since that year and two more were to be shut down later in 2011. As a result of these closures, the installed capacity of coal-fired generation in Ontario has been decreasing. It is anticipated that more than 7,500 MW of coal-fired installed capacity in 2003 will be replaced by nuclear power from refurbished plants and *an increase of about 5,000 MW of gas-fired generation*, with the balance coming from new renewable energy sources”. (92-93)

QUESTION: Why does the government continue to mislead the public by saying that wind is shutting down coal? Wind is *not* shutting down coal because wind can fall to 0 when the system is at peak.

14. Minister suspended independent assessment that would ensure decisions were economically prudent and cost-effective

“The OEB’s review and approval process of the OPA’s first IPSP, submitted in August 2007, was suspended the following year at the direction of the Minister, who asked the OPA to revise the IPSP. The suspension of the independent regulator’s review

meant that there would be no independent assessment to ensure that decisions were made in an economically prudent and cost-effective manner”. (96)

QUESTION: Why did the government assume there was no need for independent assessment to ensure that decisions were made in an economically prudent and cost-effective manner?

15. Billions committed to renewable energy without evaluating impact

“Although the Ministry consulted with stakeholders in developing the supply-mix directives, the LTEP, and the *Green Energy and Green Economy Act*, 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”. (97)

QUESTION: Why has no independent, objective, expert investigation been done to examine the potential effects of renewable-energy policies on prices, job creation, and greenhouse gas emissions?

QUESTION: Why has no thorough and professional cost/benefit analysis been conducted to identify potentially cleaner, more economically productive, and cost-effective alternatives to renewable energy, such as energy imports and increased conservation?

QUESTION: Why did the ministry ignore comments received which identified concerns with their path?

16. Despite anticipated surpluses, renewable energy generators will get paid even though Ontario does not need their electricity

“According to the OPA, Ontario’s electricity generation capacity has been much higher than demand in recent years. Electricity demand has declined since 2005 due to the economic downturn, conservation, and declines in the auto, pulp, and paper industries, while supply increased mainly because of the addition of renewable energy and gas-fired resources. The OPA noted that demand is expected to remain flat or decline due to continued conservation efforts and uncertain or slow economic recovery, while supply is expected to increase as a result of significantly more renewable energy coming on-line”. (98)

“Our analysis of actual and projected data from the IESO and the OPA shows that from 2005 to 2025, installed and effective capacity will continue to exceed both average demand and peak demand”. (99)

“The OPA did advise us that Ontario will face significant energy uncertainty beyond 2015 as a result of the increasing supply of renewable energy, the phasing out of coal by the end of 2014, and the refurbishment of nuclear units. Ontario will experience a temporary supply reduction from 2016 to 2020, when all coal-fired plants will be closed and some nuclear units will be taken out of service for refurbishment. The expected increase in renewable energy sources such as wind and solar will not effectively address the temporary supply reduction. According to the OPA, renewable energy sources are not always available during peak demand periods due to their intermittency and low effective capacity”. (99)

QUESTION: Are we at risk of blackouts for four years? Actually it is worse than that. The "plan" replaces coal with gas, and shuts down the coal. The "plan" refuses to refurbish Pickering Nuclear Generating Station, and commits instead to build new nuclear, but the Minister then refused the bid made and did not direct the OPA

to pursue further bids. We are going to be very short on days the wind does not blow.

“An OEB analysis completed in April 2010 also concluded that, by 2016, electricity supply will far exceed demand. Despite these anticipated surpluses, renewable energy generators who have contracts with the OPA will get paid even though Ontario does not need their electricity”. (99-100)

Loss of oversight and transparency in decision making

17. Ministerial directives bypassing OPA and OEB lead to loss of transparency, economic prudence and cost effectiveness

“Even after the breakup of the former Ontario Hydro, Ontario’s electricity sector continued to have a system of checks and balances in place with two expert agencies playing key roles—the OPA as energy planner and the OEB as regulator. This arrangement was intended to ensure that decisions are made transparently and objectively; that consumers get reliable, affordable, and sustainable power; and that any energy plan is economically prudent and cost-effective. With the *Green Energy and Green Economy Act, 2009* (Act) giving the Minister the authority to direct certain aspects of planning and procurement of electricity supply through ministerial “directives” and “directions,” the frequent exercise of this authority has created some ambiguity regarding the original mandates of the OPA and the OEB from the planning and oversight perspective”. (100)

18. Many directions related to the procurement and pricing of renewable energy have been issued since 2008 in the absence of an approved IPSP, and the OEB has had no oversight role

“The OEB is an independent regulatory agency mandated to protect the interests of consumers with respect to the price, adequacy, reliability, and quality of electricity service. It is also responsible for promoting economic efficiency and cost-effectiveness in the generation, transmission, and distribution of electricity. Under the *Green Energy and Green Economy Act, 2009* (Act), the OEB was also given a new objective: the promotion of renewable energy, including the timely connection of renewable energy projects to transmission and distribution systems”.

The ministerial direction-making authority has limited the OEB’s ability to carry out its regulatory and oversight role on behalf of consumers with respect to renewable energy. The OEB advised us that other than the review of the IPSP, it has no oversight responsibility over any procurement of renewable energy, which has become an increasingly important part of Ontario’s electricity-supply mix. Because the OEB has not yet approved any IPSP, it has had no oversight role with respect to renewable energy since the creation of the OPA in 2004. Had the OEB’s review and approval responsibilities with respect to the OPA’s first IPSP not been suspended, the impact of any ministerial directions would have been analyzed as part of the OEB’s review of the IPSP. Many directions related to the procurement and pricing of renewable energy have been issued since 2008 in the absence of an approved IPSP, and the OEB has had no oversight role whatsoever. A report in 2009 by the Environmental Commissioner of Ontario raised concerns that the OEB will not be able to examine the economic prudence and cost-effectiveness of any electricity-related initiatives introduced through ministerial directions in the absence of an approved IPSP”. (101)

QUESTION: When will oversight on behalf of consumers be returned to the OEB and the OPA?

“Although the OEB has played an oversight role in the connection of renewable energy to the grid by evaluating construction, expansion, and reinforcement projects of transmission and distribution systems, its limited involvement in reviewing the procurement and pricing of renewable energy has limited the effectiveness of its normal role in protecting the interests of consumers with respect to prices and overall cost-effectiveness in the electricity sector. For example, in December 2007 the Minister directed the OPA to enter into contracts for certain hydro projects that would have the “potential to add a new supply of clean, renewable power at an acceptable price to Ontario ratepayers.” In January 2010, the OPA was advised that the estimated cost for one of these projects had increased substantially, from \$1.5 billion to \$2.6 billion, and there was no guarantee that the cost would not continue to rise. Given the estimated \$1.1-billion cost increase, the OPA expressed concerns about whether the project would provide value for ratepayers. In February 2010, at the OPA’s request, a direction was issued by the Minister, who acknowledged the cost overrun but instructed the OPA to proceed anyway. The direction noted that the Minister was satisfied that the project remained consistent with government priorities. The Ministry informed us that under the existing regulatory and legislative framework, the OEB would not have had any oversight role with respect to this particular project”. (101)

“RECOMMENDATION 2

“To ensure that senior policy decision-makers are provided with sound information on which to base their decisions on renewable energy policy, the Ministry of Energy and the Ontario Power Authority should work collaboratively to conduct adequate analyses of the various renewable energy implementation alternatives so that

decision-makers are able to give due consideration to cost, reliability, and sustainability”. (102)

QUESTION: When does the government intend to implement this recommendation?

19. There has been a lack of independent oversight on the reasonableness of FIT prices

“In recent years, renewable energy has often been procured through standard-offer and non-competitive processes in response to ministerial directions. Prices for renewable energy, especially under the FIT program, have been between two and 10 times higher than those of conventional energy sources, such as nuclear, natural gas, and coal. Generators of renewable energy will be paid guaranteed prices over the contract terms, which range from 20 years for electricity from wind, solar, and bioenergy, to 40 years for hydroelectricity”. (102)

“The OPA indicated that the competitive process usually provides the best value and is the preferred option, barring other policy priorities, to ensure that contracted prices are cost-effective and reflect current market costs”. (102)

“• There was minimal documentation to support how FIT prices were calculated to achieve the targeted return on equity, because of the numerous changes to the financial model and assumptions used by the OPA”. (104)

“• There has been a lack of independent oversight on the reasonableness of FIT prices. Although the OEB has historically been mandated to oversee and approve electricity prices, it has no role or legislative responsibility to review or approve FIT prices”. (104)

“Revision of FIT Prices

“By July 2010, less than a year after the launch of FIT, the OPA had received more than 16,000 applications, about 13,500 of which were for ground-mounted solar projects. According to the OPA, this overwhelming response highlighted the unexpected popularity of microFIT ground-mounted solar projects at the price of 80.2¢/kWh, the same price that was being paid for rooftop solar projects. The original FIT price of 80.2¢/kWh would provide developers of these ground-mounted solar projects with a 23% to 24% after-tax return on equity instead of the 11% intended by the OPA. Therefore, in July 2010 OPA proposed cutting the price by about 27%, from 80.2¢/kWh to 58.8¢/kWh”. (105)

“The proposed price cut brought a strong response during a 30-day round of consultations. Many developers objected to the proposed 58.8¢/kWh price and demanded that the OPA grandfather the 80.2¢/kWh price for those applications already filed. In August 2010, the OPA issued a more modest price cut of about 20%—to 64.2¢/kWh instead of 58.8¢/kWh—and agreed to pay 80.2¢/kWh for all applications received by the OPA up to then, including those still awaiting approval.

“The OPA applied the price cut only to new applications in order to ensure price and policy stability and prevent any potential lawsuits. We also noted that the price cut had limited impact because it was not done in a timely way. Specifically:

- The OPA had proposed since February 2010 that immediate action be taken to reduce the FIT price for ground-mounted solar projects. The OPA informed us that the price cut was not announced until July 2010, five months later, because the government needed time to analyze the situation. Due to this delay, the OPA received more than 11,000 applications from February to June 2010, all of which qualified for the full price rather than the reduced one because of the decision to grandfather the price in order to maintain investor confidence”. (105)

QUESTION: Is this an example of developers making energy policy in the absence of OPA’s ability to ensure that contracted prices are cost-effective and reflect current market costs?

“In addition, we noted that the revised price of 58.8¢/kWh originally proposed by the OPA would have provided developers with an 11% after-tax return on equity intended for all renewable energy projects. However, the revised price went from 58.8¢/kWh to 64.2¢/kWh without adequate documentation to support how the OPA arrived at the higher price. The OPA indicated that 64.2¢/kWh was a reasonable price based on justifications provided by developers and other stakeholders. We estimated that, had the OPA been successful in making the price cut to 58.8¢/kWh when it was initially recommended, electricity ratepayers would have saved about \$950 million over the 20-year contract terms, while developers would still have received their 11% after-tax return”. (105)

QUESTION: Why did the Minister defer to developers and other stakeholders demanding more than a generous and reasonable 11% after-tax return which would have saved electricity ratepayers \$950 million?

“• The initial FIT prices proposed by the OPA in March 2009, prior to the passage of the *Green Energy and Green Economy Act*, included an automatic 9% drop in the contract price for every 100 MW of power contracted from ground-mounted solar projects. However, the OPA informed us that the Minister removed this adjustment, fearing that it would discourage manufacturing investments and hamper the development of renewable energy. We estimated that if this adjustment had been implemented as first proposed, the cost of the FIT program could have been reduced by about \$2.6 billion over the 20-year contract terms”. (106)

QUESTION: Can the Minister explain why he felt electricity ratepayers could afford to pay an extra \$2.6 billion given the already deteriorating economic climate?

“• The absence of caps or limits to the number of contracts signed under Ontario’s FIT program led to the current oversubscription. The OPA informed us that it

designed the FIT program at a time when no long-term energy plan was in place and it was unsure about the quantities”. (106)

QUESTION: Is there a long-term energy plan now?

“One of the top-priority issues identified by the OPA was the significant reduction in the cost of solar technologies—about 50% since 2009—as the technology matured and improved. The OPA specifically recommended reducing FIT prices for solar projects to reflect current market conditions and introducing a plan to signal further price reductions in future. However, the OPA informed us that no decision had been forthcoming regarding its concern about the very generous prices being offered to investors in renewable energy projects”. (107)

QUESTION: Why has the Ministry failed to take into account the fact that the cost of solar technologies has been reduced by 50% since 2009 even though the OPA has expressed concerns about the very generous terms being offered to investors in renewable energy projects?

20. If the IESO instructs wind generators to shut down under a surplus-power situation, the generators still get paid

“Reducing renewable power can be an efficient way to reduce supply. Wind generators can be brought on-line or off-line quickly—an ideal characteristic to address surpluses. Although this helps to address the degree to which the electricity system is overloaded, it may not result in cost savings because if the IESO instructs wind generators to shut down under a surplus-power situation, the generators still get paid under the FIT program”. (113)

“According to the OPA, a new IPSP will assess the operational challenges of surplus power and backup requirements. At the time of our audit, the new IPSP was still under development”. (114)

QUESTION: Will the Ministry be deleting this provision in its review of the FIT contracts in order to save electricity ratepayers well over \$225 million a year? (See below)

21. There has been inadequate assessment of the potential costs of curtailing renewable energy

“A situation called curtailment occurs when the Independent Electricity System Operator (IESO) instructs generators to reduce all or part of their output in order to mitigate an oversupply of electricity. Compared to other renewable energy contracts such as RES and RESOP, the FIT contract has a unique feature that offers renewable energy generators an “Additional Contract Payment” to compensate them for any revenue lost as a result of curtailment instruction. Accordingly, electricity ratepayers still have to pay renewable energy developers even when those generators are not producing electricity during periods of curtailment”. (107)

“The IESO has not yet curtailed renewable energy generators under the FIT program because no FIT projects have been on-line, and therefore no “Additional Contract Payment” has been triggered or included in electricity bills to date. However, the OPA and the IESO acknowledged that when more renewable energy projects under the FIT program are added to the grid, the power surplus will grow and such curtailments will be likely (see “Operational Challenge: Surplus Power” later in this report)”. (107)

“There has been inadequate assessment of the potential costs of curtailing renewable energy, even though there is a strong likelihood of curtailment in the future for these energy sources. For example, the OPA has performed several scenario analyses, but

none included the impact of curtailing renewable energy. The OPA indicated that its plans are based on situations where supply equals demand, but not where there are surpluses and where the curtailment of renewable energy may be required”. (107)

QUESTION: Why have the costs of curtailment not been estimated in the cost of renewable energy? Why have electricity consumers been burdened with this unique feature of the FIT contract?

22. Adding more renewable energy would result in curtailment cost of paying renewable generators for not producing electricity from \$150 million to \$225 million a year

“The OPA also noted that the calculation of curtailment costs depends on a number of factors and assumptions that could be very volatile. The only analysis on curtailment we found was done by the IESO in 2009. It estimated that the substantial addition of renewable energy would result in curtailment of between 2,000 and 2,500 hours per year and that the cost of paying renewable generators for not producing electricity could range from \$150 million to \$225 million a year. However, these projections were based on 2008 data and we were advised that no updated projections had been done since then”. (107)

QUESTION: Since this estimate refers to an excess of only 666MW, and in reality the excess will be well over that, when can we expect updated projections?

23. The lack of correlation between electricity demand and intermittent renewable energy has created operational challenges, including power surpluses and the need for backup power

“We analyzed the performance of all wind farms in Ontario in 2010 based on IESO data. Although the average capacity factor of wind throughout the year was 28%, it

fluctuated seasonally, from 17% in the summer to 32% in the winter. It also fluctuated daily, from 0% on summer days, when electricity demand was high, to 94% on winter days, when demand was lower”. (111)

“Our analysis also indicated that wind output was out of phase with electricity demand during certain times of day. For example, during the morning hours, around 6:00 a.m., wind output usually decreased just as demand was ramping up. Throughout the day, demand remained high but wind output typically dropped to its lowest level for the day. During the evening hours, around 8:00 p.m., when demand was ramping down, wind output was rising, and it remained high overnight until early morning. This somewhat inverse relationship between daily average wind output and daily average demand was particularly pronounced in the summer and winter months”. (111)

“The OPA has recognized that the lack of correlation between electricity demand and intermittent renewable energy has created operational challenges, including power surpluses and the need for backup power generated from other energy sources. The IESO has been working through its Renewable Integration Project to mitigate these challenges by engaging stakeholders and establishing technical working groups to discuss design principles, forecasting, and future markets for renewable energy”. (111)

QUESTION: Figure 10, on page 111 of the Auditor General’s report indicates that the OPA and IESO show that wind has a "capacity contribution" of only 11% during system peak, and actual experience shows it is often well less than that, as low as 0 MW from all Ontario wind generators during system peak some days. At what point does this lack of correlation between availability and demand make wind energy economically unviable? Is it not imprudent to carry on adding wind energy to the grid before such analysis has been completed?

24. Surplus base load generation caused by renewable energy will add more costs for electricity ratepayers

“The IESO informed us that increasing the proportion of renewable energy in the supply mix has exacerbated a challenge called surplus base-load generation (SBG), a power oversupply that occurs when the quantity of electricity from base-load generators is greater than demand for electricity. Base-load generators are designed to run at a steady output 24 hours a day to meet the constant need or minimum demand for electricity. Ontario’s base-load fleet includes nuclear units, certain hydro stations, and intermittent renewable energy sources such as wind. The IESO informed us that Ontario did not have any SBG days from 2005 to 2007, but experienced four such days in 2008, 115 days in 2009, and 55 days in 2010. The jump in SBG days was attributed to several factors, including an increase in wind power and a drop in electricity demand”. (111-112)

“Given that electricity demand is expected to remain relatively flat for at least the next few years as more renewable energy comes on-line, there will almost certainly be more SBG days in the years to come, creating operational challenges and costs that will ultimately be borne by electricity ratepayers”. (112)

QUESTION: How many surplus base-load days were experienced in 2011?

25. In 2010, 86% of wind power was produced on days when Ontario was already in a net export position.

“In 2008, the IESO forecast that, because most generators cannot ramp wind power up or down in response to demand, SBG hours will increase significantly over the next decade. The vast majority of new renewable energy in the next few years is expected to come from wind generators, which typically have their highest output overnight and early morning, when SBG events are more prevalent.

Since the prevalence of SBG events could threaten the reliability of the electricity system, the IESO has been taking action to ease the power surplus. However, there are technical difficulties and cost implications of these actions. Among them:

- Storing surplus power is difficult because of the seasonal nature of renewable energy and the need for unrealistically large storage capacity.
- Exporting surplus power is, according to the OPA and the IESO, a common and preferred way to mitigate power surpluses. Since 2006, Ontario has been a net exporter. The IESO indicated that although it is difficult to quantify, the increase in renewable energy has led to an increase in exports and put downward pressure on export prices. We noted that:
 - In 2010, 86% of wind power was produced on days when Ontario was already in a net export position”. (112)

QUESTION: If in 2010 only 14% of the wind energy that was produced was available when it was needed, why were electricity ratepayers burdened with the obligation to pay for production of wind energy so that it can be exported at below cost and sometimes it actually costs to export it? (See below)

QUESTION: What percent of wind energy was produced in 2011 when Ontario was already in a net export position?

26. Export customers paid only about 3¢/kWh to 4¢/kWh for Ontario power; electricity ratepayers of Ontario paid more than 8¢/kWh for this power to be generated

“The price Ontarians pay for electricity and the price Ontario charges its export customers—which are determined by the interaction of supply and demand in the electricity market—have in recent years been moving in opposite directions.

Although export customers paid only about 3¢/kWh to 4¢/kWh for Ontario power, electricity ratepayers of Ontario paid more than 8¢/kWh for this power to be generated. . . .” (112)

27. From 2005 to the end of our audit in 2011, Ontario received \$1.8 billion less for its electricity exports than what it actually cost electricity ratepayers of Ontario

“• Based on our analysis of net exports and pricing data from the IESO, we estimated that from 2005 to the end of our audit in 2011, Ontario received \$1.8 billion less for its electricity exports than what it actually cost electricity ratepayers of Ontario”.

(112)

QUESTION: What actually *did* it cost us considering that sometimes we had to pay to export electricity?

“• A study in September 2009 also noted that Denmark, which relies heavily on wind power, has been faced with a similar situation and exported large amounts of surplus power to Norway and Sweden in order to balance domestic supply with demand”.

(112)

QUESTION: The government was warned of the situation in Denmark where electricity consumers end up subsidizing the electricity exported to adjacent jurisdictions in the CEPOS Report (see below) which was brought to the Minister’s attention in 2009. Is it the government’s policy to subsidize American energy consumers at the cost of Ontario residents?

QUESTION: Although government ministers have claimed that export and import rates balance out, the Auditor General’s observation that supply and demand in the electricity market have in recent years been moving in opposite directions, appears to contradict these claims. Will the Ministry be investigating this issue and when will a realistic cost accounting be available to the public?

“• Reducing hydro power can be done by diverting, or spilling, water from hydro generators. The IESO informed us that although the magnitude and timing of spill activities have not been well documented, Ontario spilled water to reduce electricity supply on 96 days in 2009 and 10 days in 2010. Because the overall cost to produce

hydro power is often lower than that of all other types of power, reducing hydro power to “make room” for wind and solar power is an expensive mitigation strategy to reduce surplus power, particularly as hydro, wind, and solar power are all considered renewable energy sources”. (112-113)

QUESTION: What is the magnitude of the spill activities in 2011? When will this information be available to the public?

28. The IESO requested that nuclear generators shut down or reduce electricity supply 205 times in 2009 and 13 times in 2010

“Reducing nuclear power is viewed as a last resort because nuclear units are designed to run constantly and produce at maximum capacity. Ramping nuclear units up and down involves significant costs and can lead to equipment damage. If a nuclear unit is shut down, it typically takes 48 to 72 hours to restart it. With nuclear energy accounting for the majority of Ontario’s electricity, such downtime is risky and costly. The IESO requested that nuclear generators shut down or reduce electricity supply 205 times in 2009 and 13 times in 2010”. (113)

QUESTION: How many times were nuclear reactors shut down in 2011?

QUESTION: Why is government policy jeopardizing the reliability and efficiency of our nuclear fleet when wind production could easily be terminated?

29. Recommendation 5: Assess the operational challenges and the feasibility of adding more intermittent renewable energy into the system

“RECOMMENDATION 5

“To ensure that the stability and reliability of Ontario’s electricity system is not significantly affected by the substantial increase in renewable energy generation over

the next few years, the Ontario Power Authority should continue to work with the Independent Electricity System Operator to assess the operational challenges and the feasibility of adding more intermittent renewable energy into the system, and advise the government to adjust the supply mix and energy plan accordingly”. (114)

QUESTION: When can the public expect to see an accurate assessment of this issue?

Socio-economic Impacts

“The *Green Energy and Green Economy Act, 2009* (Act) was intended to support new investment and economic growth in Ontario through the creation of a strong and viable renewable energy sector”. (117)

“The Ministry said the Act is expected to support over 50,000 direct and indirect jobs over three years in transmission and distribution upgrades, renewable energy, and conservation. We questioned whether the job projection information was presented as transparently as possible”. (117)

30. Promised “green” jobs have not been produced and existing jobs may be lost because of higher electricity prices

“Recent public announcements stated that the *Green Energy and Green Economy Act, 2009* was expected to support over 50,000 jobs, about 40,000 of which would be related to renewable energy. However, about 30,000, or 75%, of these jobs were expected to be construction jobs lasting only from one to three years. We also noted that studies in other jurisdictions have shown that for each job created through renewable energy programs, about two to four jobs are often lost in other sectors of the economy because of higher electricity prices”. (91)

31. A majority of the jobs will be temporary

“We questioned whether the job projection information was presented as transparently as possible. For example:

- A majority of the jobs will be temporary. The Ministry projected that of the 50,000 jobs, about 40,000 would be related to renewable energy. Our review of this projection suggests that 30,000, or 75%, of these jobs would be construction jobs and would last only from one to three years, while the remaining 10,000 would be long-term jobs in manufacturing, operations, maintenance, and engineering. However, the high proportion of short-term jobs was not apparent from the Ministry’s public announcement”. (117)

32. Analysis should consider both job-creation and job-loss impacts, and experiences of other jurisdictions with similar renewable energy initiatives

“• The 50,000-job projection included new jobs but not those jobs that would be lost as a result of promoting renewable energy. Experience in other jurisdictions suggests that jobs created in the renewable energy sector are often offset by jobs lost as a result of the impact of higher renewable energy electricity prices on business, industry, and consumers. . . . In addition, the closure of Ontario’s coal-fired plants by the end of 2014 will lead to job losses, but these were not factored into the Ministry’s job projections. Ontario Power Generation, which operates the coal-fired plants, informed us that the extent of job losses depended on the Ministry’s plan: about 2,300 jobs would be lost if the Ministry closed all coal-fired plants, but 600 of these could be saved if certain coal-fired plants are converted to biomass or gas-fired operation”. (117-118)

“In particular, Ontario’s FIT program was modeled on the FIT programs in Germany and Spain, and their job-related experiences could well be relevant to Ontario. For example, we noted the following studies conducted over the past three years:”

“• A 2009 study conducted in Germany noted that job projections in the renewable energy sector conveyed impressive prospects of gross job growth but omitted such offsetting impacts as jobs lost in other energy sectors and the drain on economic activity caused by higher electricity prices. The study found that the cost of creating renewable-energy-related jobs was up to US\$240,000 per job per year, far exceeding average wages in other sectors”. (118)

“• A 2009 study conducted in Spain found that for each job created through renewable energy programs, about two jobs were lost in other sectors of the economy”. (118)

“• A 2009 study conducted in Denmark noted that a job created in the renewable sector does not amount to a new job but, rather, usually comes at the expense of a job lost in another sector. The study also found that each job created under renewable energy policies cost between US\$90,000 and US\$140,000 per year in public subsidies—or about 175% to 250% of the average wage paid to manufacturing workers in Denmark”. (118)

“• A 2011 study conducted in the United Kingdom (after the FIT program was launched in Ontario) reported that about four jobs were lost elsewhere in the economy for every one new job in the renewable energy sector, primarily because of higher electricity prices”. (118)

“In November 2010, similar concerns were raised about the Ontario job projections in a report by the Task Force on Competitiveness, Productivity and Economic Progress of the Rotman School of Management at the University of Toronto. The report noted that it is unclear what the jobs estimate includes, because it has offered neither a definition of green jobs nor a transparent calculation of how the 50,000 figure was arrived at. The report also said that it is unclear whether the 50,000

estimate is a gross or net number of jobs. The report further noted that even if 50,000 new jobs were created, the higher energy costs attributable to renewable energy might result in job losses elsewhere in the economy, particularly in industries that use large quantities of energy. Another recent study in Canada estimated that each new job to be created as a result of renewable energy programs would cost \$179,000 per year”. (118)

“RECOMMENDATION 7: To ensure that the provincially reported estimate of jobs created through the implementation of the renewable energy strategy is as objective and transparent as possible, the analysis should give adequate consideration to both job-creation and job-loss impacts, as well as job-related experiences of other jurisdictions that have implemented similar renewable energy initiatives”. (118)

QUESTION: When can the public expect some transparency and objectivity in ministerial announcements on this subject?

Environmental Concerns

33. Estimated reduction in greenhouse gases did not take into account the continuing need to run fossil-fuel backup

“The Ministry indicated that renewable energy will help reduce greenhouse gases by displacing gas-fired generation. However, as noted earlier, any significant increase in intermittent renewable energy requires backup power by either coal- or gas-fired plants because wind and solar power have relatively low reliability and capacity. In Ontario’s case, because coal-fired plants are being phased out by the end of 2014, this backup will need to come from gas-fired plants. Although gas-fired plants emit fewer greenhouse gases than coal-fired plants, they still contribute to greenhouse gas

emissions. Our review of experiences in other jurisdictions showed that the original estimated reduction in greenhouse gases had not been reduced to take into account the continuing need to run fossil-fuel backup power-generating facilities. For instance:

- A 2008 study in the United Kingdom found that power swings from intermittent wind generation need to be compensated for by natural-gas generation, which has meant less of a reduction in greenhouse gases than originally expected.
- A 2009 study in Denmark noted that although the country is the world's biggest user of wind energy, it has had to keep its coal-fired plants running to maintain system stability.⁹
- The German government also had to build new coal-fired plants and refurbish old ones to cover electricity requirements that could not be met through intermittent wind generation". (119)¹⁰

⁹ In September 2009, "Wind Energy, the case of Denmark" was published by the Danish Center for Politiske Studier (CEPOS). The report warned: "The very fact that the wind power system, that has been imposed so expensively upon the consumers, cannot and does not achieve the simple objectives for which it was built, should be warning to the energy establishment, at all levels, of the considerable gap between aspiration and reality".

¹⁰ The October 2009 report of the Rhine-Westphalia Institute for Economic Research (one of Germany's leading economic research institutions), analyzed the German renewable energy technology promotion experience. The report concluded: "Although Germany's promotion of renewable energy is commonly portrayed in the media as setting 'a shining example', we would instead regard the country's experience as a cautionary tale of massively expensive environmental and energy policy that is devoid of economic and environmental benefits". "Wind turbines and solar panels have produced no environmental benefit in Germany in terms of lowering of CO₂ emissions that would not have been produced by other plans already in effect. Frondel, Dr. Manuel; Ritter, Nolan; Vance, Prof. Colin, Ph.D., Scheffer, Fabian; & Schmidt, Prof. Christoph. *Economic impacts from the promotion of renewable energies: The German experience*. Final Report. Rheinisch-Westfälisches Institut für Wirtschaftsforschung (Rhine-Westphalia Institute for Economic Research) October 2009.

http://www.instituteeforenergyresearch.org/germany/Germany_Study_-_FINAL.pdf

“The Ministry has not yet quantified how much backup power will be required from other energy sources to compensate for the intermittent nature of renewable energy, and accordingly has no data on the impact of gas-fired backup power plants on greenhouse gas emissions”. (119)

Health Concerns

34. CMOH report questioned

“In recent years, there have been growing public-health concerns about wind turbines, particularly with regard to the noise experienced by people living near wind farms. In May 2010, Ontario’s Chief Medical Officer of Health issued a report concluding that available scientific evidence to date did not demonstrate a direct causal link between wind turbine noise and adverse health effects. However, the report was questioned by environmental groups, physicians, engineers, and other professionals, who noted that it was merely a literature review that presented no original research and did not reflect the situation in Ontario. We also noted that only a limited number of renewable generators were in operation in Ontario when the report was prepared in spring 2010, a few months after the launch of the FIT program”. (119-120)

35. Academic research chair has produced no report

“One of the provisions of the Act was the establishment of an academic research chair to examine the potential effects of renewable energy generators on public health. In February 2010, an engineering professor from the University of Waterloo was

appointed to this position but, as of July 2011, there had been no report on the results of any research conducted to date”. (120)

QUESTION: When can we expect a report from the academic research chair?

QUESTION: What are the qualifications of an engineering professor specializing in solar energy to assess medical problems?

36. Ministry of Energy should measure impact of backup facilities and provide objective research on potential health effects of wind power

“RECOMMENDATION 8

“To ensure that renewable energy initiatives are effective in protecting the environment while having minimal adverse health effects on individuals, the Ministry of Energy should:

- develop adequate procedures for tracking and measuring the effectiveness of renewable energy initiatives, including the impact of backup generating facilities, in reducing greenhouse gases; and
- provide the public with the results of objective research on the potential health effects of renewable wind power”. (120)

QUESTION: Does the government’s failure to act on the issues detailed in the Auditor General’s report necessitate a full public enquiry?