



Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers
autorisés de l'Ontario



Position Statement

Healthy Energy Solutions for Ontario

September 23, 2011 - Approved by RNAO Board of Directors
March 3, 2012 FINAL - Approved by RNAO Board of Directors

Position

On December 12, 2011, Canada faced international criticism when it walked away from the Kyoto Protocol, becoming the first and only country to totally repudiate the international treaty to reduce greenhouse gases that cause climate change.¹ On January 18, 2012, US President Barack Obama reaffirmed his decision not to approve the Keystone XL pipeline that is proposed to carry Alberta tar sands oil to US markets. On the same day, the Gitksan joined 60 other Aboriginal groups across British Columbia that were fighting Enbridge's proposed \$5.5 billion Gateway pipeline designed to carry tar sands oil to be shipped to Chinese markets.² In October, 2011, Canada's Commissioner of the Environment and Sustainable Development revealed that the actual environmental impacts of tar sands development was largely unknown.³ This was the debate raging across international and provincial borders and likely to loom large in elections at every level for years to come.

A similar energy conflict divides communities in Ontario, just as political but not as much in the international eye as in Alberta, BC and the mid-west. Underlying the stated outcomes of energy security, sustainable development and air and water protection are the more pervasive agendas of money, power and not-in-my-backyard "nimby-ism". It is in this context that the RNAO has developed a balanced healthy energy policy for Ontario that recognizes both that electricity generation and transmission are important economic drivers and that the environment is a critical determinant of health.

RNAO strongly supports an electricity system in Ontario that is safe, reliable, equitable and environmentally sustainable; one that supports community-sustaining 'green' jobs, one that does not pollute the air, leave a legacy of toxic waste and bankrupt Ontario residents and businesses. Healthy public policy demands aggressive conservation and energy efficiency targets and phasing out Ontario's dependence on dirty coal and other fossil fuels.

RNAO's vision of a clean, healthy energy future is balanced and comprehensive and includes the following recommended elements:

1. Reduced consumption through conservation and energy efficiency;
2. Increased reliance on renewable energy such as community-based, appropriately located and scaled water, wind, solar and bioenergy. Provided new developments are subject to robust environmental assessments, including assurances of appropriate siting, setbacks,

scale and community involvement, a moratorium on renewable energy is not supported on the current evidence;

3. Strategic use of natural gas to meet peak needs until renewable power is on-line and ensure all new natural gas-supplied electricity is highly efficient combined heat and power (CHP);
4. Cancellation of plans for construction of new risky and expensive nuclear power plants; and,
5. Immediate closure of all remaining coal plants, keeping them on emergency standby until permanent closure in 2014 and only operating them if there is no other option to keep the lights on.

Background

Like all Ontarians, registered nurses have become increasingly concerned about the impact of poor air quality and toxins in our environment on conditions such as asthma, lung cancer, cardiovascular disease, allergies and many other health problems.⁴ Ontario's coal-fired electricity generators are among the largest emitters of pollutants in the province⁵ and alone contributed to over 300 deaths in 2010 and about 158,000 minor conditions, such as asthma attacks.^{6 7} In addition to the health costs, the coal plants constitute one of the largest sources of greenhouse gas emissions.⁸ It is crucial that clean, green energy solutions be found – starting with conservation and energy efficiency - to end Ontario's dependence on dirty coal.

In *Creating Vibrant Communities: RNAO's Challenge to Ontario's Political Parties, 2011 Provincial Election*, the RNAO strongly urged political parties to commit to closing all the remaining coal plants by 2012, keeping them on emergency standby until the 2014 date to which the government has committed for final closure.⁹ This continues to be the RNAO position. In addition, the RNAO called for the cancellation of plans to construct new nuclear plants in the province.¹⁰

RNAO welcomed the *Green Energy and Green Economy Act, 2009* and the government's commitment to creating new jobs by expanding clean, green sources of energy such as wind, water, solar, biomass and biogas. These, combined with

significant investments in conservation programs would go far in cutting the province's dependence on dirty coal, improving air quality and reducing the greenhouse gases that are a major cause of dangerous climate change. Wind, in particular, when properly sited and scaled, has huge potential to deliver clean, plentiful and affordable power. It is estimated that wind will meet at least 20 per cent of Canada's power needs by 2025, up from the current one per cent. With this rapid growth, however, comes controversy. Forceful claims of adverse health effects of wind turbines are met by equally forceful arguments of their safety. Community control and ownership of wind turbine developments have done much in other jurisdictions to encourage their spread and acceptance by the public. Ontario would do well to consider the lessons learned in those other jurisdictions.^{11 12}

Health, Environment and Equity

Evidence of the connection between the environment and health is well established. The World Health Organization (WHO) estimates that environmental factors account for 24 per cent of the world's burden of disease and 23 per cent of all deaths.¹³ Environment is estimated to play a larger part in some conditions, such as asthma (44 per cent).¹⁴ Climate change itself affects human health, by contributing to extreme weather events, killer heat waves, poor air quality, and vector-, rodent-, food- and water -borne diseases. By fighting global warming, we are not merely

protecting the environment – we are protecting the health of Ontarians. *Creating vibrant communities* means building healthier environments through cleaner air and water; creating good green jobs on a base of equity and environmental sustainability; getting serious about climate change; and reducing toxic substances and other pollutants in the environment, in our workplaces, in our consumer products, and in our food and water.

As the principle of environmental justice reminds us, the costs of environmental damage and climate change are disproportionately borne by lower income people.¹⁵ This is particularly true at the global level with climate change; it is the most vulnerable people in developing countries that are at greatest risk of inequity. These are the people who did the least to cause global warming. Human-generated greenhouse gases that further global warming are likely to exacerbate droughts in sub-Saharan Africa and threaten a “catastrophic reversal in human development.”¹⁶ When developing a safe, green, comprehensive long-term energy plan for Ontario it is critical that the solutions include local communities and not negatively impact our most vulnerable populations, particularly Aboriginal people.

Supply – Keeping the Lights On

In *Renewable is Doable: Ontario's Green Energy Plan 2.0*, the Pembina Institute and Greenpeace Canada conclude that we have the opportunity to replace Ontario's aging nuclear plants not with new nuclear stations, but with the range of safe, clean energy options that are increasingly available to us.¹⁷ With demand having fallen each of the last four years (part of which undoubtedly has been due to the recession), coal being phased out by 2014 (if not sooner), renewable energy sources producing more than originally expected, and the natural gas capacity that ensures the lights stay on during the transition already in place, now is the time to develop a 21st century energy

plan, not one that is rooted in the practices of the past century.¹⁸ It is this visionary, yet achievable, approach that the RNAO strongly supports. In fact, failure to move in this direction would make Ontario an outlier jurisdiction. As the United Nations reported in 2008, for the first time global investment in clean, renewable energy exceeded new nuclear, coal and natural gas combined, a trend that was even more pronounced in 2009.¹⁹

Integrated Power Supply Plan

The government's proposed Integrated Power Supply Plan (IPSP) set the course of energy policy in Ontario for the 20- year period 2010 to 2030. Implementing the Minister of Energy's announcement on November 23, 2010 - *Ontario's Long Term Energy Plan: Building Our Clean Energy Future*²⁰ - the IPSP charted a balanced supply mix that aimed to be reliable, modern, clean, cost-effective and building on the gains achieved through the *Green Energy Act and Green Economy Act, 2009*.²¹

Enactment of the *Green Energy and Green Economy Act, 2009* affirmed the government's commitment to creating new jobs by expanding clean, green sources of energy such as wind, water, solar, biomass and biogas. In fact, the government credits the Act for attracting more than \$16 billion in private sector investment to Ontario and creating a projected 50,000 clean energy jobs by the end of 2012.²²

In the draft IPSP, the government articulated the following policy goals:

- produce electricity from particular energy sources and generation technologies;
- increase generation capacity from alternative and renewable energy sources;

- phase out polluting coal-fired generation facilities by 2014; and,
- develop and implement conservation measures.

While the RNAO supports a diverse energy mix, some sources of generation are cleaner and better for the health of Ontarians while others, notably nuclear and coal, pose unacceptable risks.

Underlying the government's long-term energy plan is the assumption that demand for power will grow moderately, about 15 per cent, between 2010 and 2030. This assumption should be questioned.

Energy consumption has been dropping steadily since 2005, before the recession. According to the North American Electric Reliability Corporation (NERC), whose mandate includes system reliability throughout Canada, the U.S. and parts of Mexico, demand for electricity will continue to drop an average 0.7 per cent annually until 2018. This 9.5 per cent reduction in demand would be the equivalent of about three nuclear reactors, thereby questioning whether Ontario needs to build new nuclear power plants in the first place.²³

Given the enormous cost and long-term economic, environmental and safety consequences of nuclear power, the government should revisit its demand assumptions. With strategic investments in conservation programs, expansion of combined heat and power (CHP), modernization of industrial structure and greater energy efficiency, experience so far this century has been a slight decline, not modest increase, in demand for electricity in Ontario.

Aggressive Conservation Targets

Conservation is promoted as a priority by the government as it committed in the Integrated Power Supply Plan to increase the conservation target to 7,100 megawatts

(MW) and reduce overall demand by 28 terawatt-hours (TWh) by 2030. This is in addition to the more than 1,700 MW of reduced demand since 2005²⁴ that represents, according to the Ministry of Energy, the equivalent of taking more than 500,000 homes off the grid.²⁵

Until now, however, it is clear that conservation has not been the priority it should be. In 2010, the Ontario Power Authority (OPA) reported reducing demand by 430 MW, yet contracted for 13,409 MW of electricity supply. Calculations by the Ontario Clean Air Alliance illustrate that the OPA's payments for energy efficiency are 78 to 89 per cent lower than the cost of new nuclear power supply.²⁶ If Ontario is serious about building a "culture of conservation",²⁷ the playing field must be much more level.

As the Ontario Clean Air Alliance points out, Ontario's demand for electricity has dropped by seven per cent since 2006, but our usage of electricity per person continues to be 35 per cent higher than our neighbours in New York State.²⁸ Clearly there is much room for improvement. Rather than basing its electricity plan on massive increases to supply (63 per cent higher generation in 2030 than in 2010), the government must focus on greatly enhancing conservation efforts to cut waste and improve energy efficiency.

Commit to Phase Out Coal NOW

In 2007, the Ontario government enacted a regulation requiring all remaining coal-fired electricity generation in the province to end by December 31, 2014.²⁹ During the 2011 provincial election, all the major political parties agreed that the time has come to phase out coal-fired electricity generation.³⁰

Many groups, including the RNAO, the Canadian Association of Physicians for the Environment (CAPE), the Lung Association, Asthma Society and the Ontario Clean Air Alliance (OCAA) are advocating to end the burning of coal immediately and not wait

until 2014. Coal plants can be placed on standby reserve and only operated when there is no other option to keep the lights on.³¹

Coal plants release harmful particulate matter, lead and mercury into the air we breathe and are responsible for thousands of tonnes of climate change-causing greenhouse gases. Pollution from generating electricity using coal is considered to have contributed to over 300 deaths in Ontario in 2010, 440 hospital admissions, 522 emergency room visits and 158,000 minor illnesses such as asthma attacks.³² In fact, the end of coal would represent the equivalent of taking seven million cars off the road.^{33 34}

While evidence of the health dangers of coal is overwhelming, the economic costs, particularly in times of austerity, are unsustainable. Ministry of Energy numbers put Ontario's health and environmental costs of coal at three billion dollars annually.³⁵ According to the Ontario Clean Air Alliance, the Ontario Electricity Financial Corporation, an agency of the provincial government, has paid \$865 million to Ontario Power Generation since January 2009 to compensate for the operating losses of its four coal plants.³⁶

With the closure of two coal units at Nanticoke in December, 2011, a total of ten coal units have already closed in Ontario, representing a reduction of coal-fired generation by more than 70 per cent from 2003 levels.³⁷ Two additional units in Thunder Bay will be converted to gas and potentially biomass, the Atikokan unit will be converted to biomass by 2013 and, finally, the remaining units at Nanticoke and Lambton will be permanently closed by the end of 2014 according to the government's plan. A decision is expected to be made in 2012 as to whether some or all of the remaining coal units at Nanticoke and Lambton will be converted to natural gas during a transitional period. That would help save jobs in those communities and also

reduce reliance on such risky sources of generation as nuclear in ensuring overall system reliability while waiting for cleaner, renewable energy sources to come on-line.³⁸

As for whether some coal-generated electricity is needed between now and the end of 2014 to prepare for the peak periods in winter and summer, an analysis by the Ontario Clean Air Alliance, finds that Ontario's coal-free generation capacity is currently about 29 per cent higher than the forecasted peak demand during the summer of 2012 and 35 per cent greater than the peak demand that is forecast in 2014.³⁹ Even if it is found necessary to keep some of the coal capacity on "standby reserve" until the permanent closure of the coal plants in 2014, the OCAA argues that there is no reason for the coal plants to be operated at even a minimal level in the interim pending an emergency or a need to support grid stability.⁴⁰

Ontarians understand and support the need to phase out Ontario's reliance on coal-fired electricity. According to a poll conducted by Strategic Communications Inc. in November, 2010, two-thirds of Ontarians support closing the province's coal plants and 75 per cent recognize that coal is more harmful than wind power as a source of electricity.⁴¹

New Nuclear Too Risky and Expensive

Nuclear power may not emit air pollutants during "production"⁴² of electricity, but in fact nuclear power is neither emissions-free nor clean. As a recent study points out, there is no safe level of radiation exposure – any amount of exposure to ionizing radiation is too much and is harmful.⁴³

Further, the health risks associated with nuclear power arise at all stages of the nuclear fuel chain, from uranium mining and refining, to the fission process in nuclear reactors and radioactive releases into the air and water, to the legacy of radioactive

waste that we leave for our grandchildren and future generations.⁴⁴

As RNAO noted in a submission on the acceptable level of the radionuclide tritium in Ontario's drinking water, "Ontario's and Canada's heavy water nuclear reactors have been known to release large amounts of tritium due to their design. Depending upon the comparator, heavy water reactors have been estimated to release from over 20 times to over 100 times as much tritium per unit of energy produced (compared to pressurized water reactors and boiling water reactors respectively).⁴⁵ By one estimate, major Canadian nuclear facilities release amounts of tritium equaling about ten per cent of natural production of tritium in the Northern hemisphere.⁴⁶ The majority of the releases come from Ontario reactors, and the impact is greatest near nuclear facilities."

While there are relatively few Canadian studies on the deleterious effects of low levels of radiation on health, there is evidence linking increased prevalence of leukemia in children and living near nuclear facilities. Higher rates of congenital abnormalities have also been documented. A 2008 German study showed a statistically significant relationship between risk of leukemia and living within ten kilometres of a nuclear plant with consistent results across all 16 nuclear power plants in Germany.⁴⁷

Ontario now has safe and clean alternatives to the unacceptable health risks of nuclear power. It is time to invoke the precautionary principle and reject plans to build new nuclear power plants in the province..

There are other reasons to end new nuclear construction projects in Ontario. Nuclear power is prohibitively expensive. This is crucially important in an era when the government is scrambling to cut its huge deficit, and when its own Drummond Commission called for real per capita cuts in

spending amounting to a massive 16.2 per cent of program spending.⁴⁸

While the government itself is budgeting \$33 billion for its nuclear plans, which alone would elbow out other more cost-efficient investments, the track record of nuclear projects is not impressive. Every nuclear project in Ontario has gone considerably over-budget, on average about 2.5 times.⁴⁹ Ontarians concerned about their rising hydro bills are still paying for the huge cost overruns from reactors built decades ago. Compare nuclear plants, where there is no protection for consumers, with renewable energy where Ontario's feed-in tariff guarantees that only the cost of electricity generated is passed along to Ontarians and the cost of overruns and unforeseen liabilities is borne by the developer.⁵⁰

Natural Gas

Natural gas plays a strategic role in the Ministry's draft long-term energy plan largely thanks to its ability to supply local and reliable electricity quickly. While the government envisions natural gas bridging until nuclear generators have been modernized as well as until energy from renewable sources is on-line, natural gas would also allow coal to be phased out more quickly and energy needs to be met without building expensive and unnecessary new nuclear power plants. Natural gas is a fossil fuel and not a long-term solution, but it remains more flexible, adaptable to changing energy needs, and better able to meet peak needs in these days of unpredictable winters and summers.

It also offers considerable health advantages over coal. According to the US EPA, "Compared to the average air emissions from coal-fired generation, natural gas produces half as much carbon dioxide, less than a third as much nitrogen oxides, and one percent as much sulfur oxides at the power plant."⁵¹

Nuclear power, on the other hand, with its long term planning cycle and enormous costs is woefully incapable of adapting to changing demands and is ill-suited to be the cornerstone of the overall system as is currently envisioned in the plan.

The 2007 IPSP had originally forecast the need for three new natural gas plants in Ontario, including ones in the Kitchener/Waterloo/Cambridge area and one in the southwest GTA. However, the current draft plan revises this forecast to one plant, using transmission improvements to meet power needs in the southwest GTA.

Combined Heat and Power

Aggressive targets must be adopted for energy efficient supply such as combined heat and power (CHP).⁵²By simultaneously producing heat and electricity from the same molecules of natural gas, CHP provides energy efficiency of 80 to 90 per cent. Many hospitals (for example London Health Sciences Centre, Sudbury Regional Hospital, Kingston General Hospital) and other facilities, such as the University of Toronto and Pearson International Airport already employ combined heat and power.⁵³

Under the government's long-term plan, it is recognized that combined heat and power is an energy-efficient source of power and the Ontario Power Authority is directed to develop a standard offer program for projects under 20 MW. Combined heat and power costs less than one third the cost of new nuclear and the potential supply of CHP is greater than 11,000 MW.⁵⁴

Combined heat and power is cleaner and safer than most other sources and should play a more prominent role in the overall diversity of power sources in Ontario.

Clean Renewable Energy Solutions

Ontario is proposing a target of 10,700 MW by 2018 from wind, solar and bio renewable energy. This would include continuing such

clean energy programs as the Feed-In Tariff (FIT) and microFIT that encourage businesses to build and supply clean energy and homeowners to produce clean energy and connect to the grid. Under the long-term energy plan, renewable sources would provide Ontario with 15 per cent of its electricity supply by 2030, compared to about three per cent today.⁵⁵

Following the 2011 provincial election when green energy and the Feed-In Tariff in particular were major political issues, the newly appointed Minister of Energy, Chris Bentley, announced a review of the FIT program. While the Feed-In Tariff was intended to be reviewed every two years in any event, the announcement triggered uncertainty in the sector and it remains to be seen whether rapid growth in renewable energy in Ontario will continue at the same pace.⁵⁶

Thanks largely to the *Green Energy and Green Economy Act*, Ontario is acknowledged to be a leader in North America in development of renewable energy, with actual production of electricity from wind, solar and biomass significantly exceeding what was projected in the 2007 Integrated Power Supply Plan.⁵⁷

Wind Energy

Of the renewable options, wind is touted as having huge potential to deliver clean, plentiful and affordable power. In Canada, it is estimated that wind will meet at least 20 per cent of the country's power needs by 2025, up from the current 1.1 per cent.^{58 59} As of late 2010, there were a total of 690 wind turbines in Ontario.⁶⁰ Both wind and solar energy developments can be expected to come under greater public scrutiny to ensure they are properly sited and scaled as the industry continues to grow.

A wind farm is a collection of wind turbines, each a large tower with rotating blades that uses wind to generate electricity. Turbines are separated from each other by several

hundred metres, meaning that a large wind farm can cover an area of tens of square kilometres.⁶¹

Noise from wind turbines consists of the aerodynamic noise or swishing sound caused by blades passing through the air, and mechanical noise created by the operation of mechanical elements of the drive-train. Impact of this noise reduces as distance from the turbines increases, hence the importance of appropriate siting. Noise from the blades also increases with wind speed.⁶²

Opponents of wind turbines are demanding a moratorium on all further development pending a full health study of their health impacts, and to restore community control over local wind initiatives.⁶³

Complaints attributed to proximity to turbines include chronic sleeplessness and sleep disturbance, dizziness, headaches, stress, hypertension, concentration problems, annoyance, tinnitus and reduced quality of life,⁶⁴ particularly among residents living within two kilometres.⁶⁵

At this time, the predominance of expert opinion, though, is that a general moratorium or “time out” is not necessary or supported by the evidence. Ontario’s Chief Medical Officer of Health acknowledges that some people living near wind turbines may report symptoms such as headaches and sleep disturbance, but in a comprehensive review of existing scientific evidence, Dr. Arlene King found no causal link between wind turbine noise and adverse health effects at common residential setbacks.⁶⁶

The Chatham-Kent public health unit concludes that as long as the Ministry of Environment guidelines for location criteria of wind turbines are followed, the impacts on local residents are “negligible”: “Although opposition to wind farms on aesthetic grounds is a legitimate point of view, opposition to wind farms on the basis of

potential adverse health consequences is not justified by the evidence.”⁶⁷

That is not to say that changes are unnecessary. Government and renewable energy companies must do more to fully engage communities as partners in future developments.^{68 69} As with any development project that potentially impacts communities and the environment, environmental assessments must be robust with timely and proper consultation with local communities. Communities must be full partners in ensuring siting and setback decisions meet local needs.⁷⁰ Dr. Arlene King, Ontario Chief Medical Officer of Health suggests that community engagement at the very outset of planning for wind turbines and indeed any renewable energy development is important and may help address health concerns.⁷¹ Such a process will help to mitigate potential risks to health such as sound, low frequency sound, ice formation and shadow flicker.

The health effects of wind turbines have been extensively studied, and further studies are ongoing. The RNAO looks forward to reviewing and evaluating new information on both wind and other energy sources such as solar as it becomes available.

Equity

In her review of the health impacts of wind turbines, the Chief Medical Officer of Health suggested that fairness and equity concerns may influence attitudes towards wind farms and allegations about effects on health. There is a danger that wind energy becomes perceived as an elitist, urban concern that is trampling rural communities, including Aboriginal communities, and the rural way of life. This becomes manifest in the feeling of loss of control and local democracy and resentment of wind turbines being imposed on them without adequate consultation. As Dr. King recommends, equity and fairness need to be considered

as the government moves ahead with renewable energy developments.⁷²

Conclusion

The RNAO will continue to work with the government to build an electricity system in Ontario that is safe, reliable, equitable and

environmentally sustainable; one that does due diligence when evaluating different energy mix, respects local decision-making, and does not pollute the air and leave a legacy of toxic waste. Not only is such a system possible, it is necessary and is the only option for a clean, healthy, environmentally sustainable future.

References

- ¹ The Guardian. (2011 Dec. 13). Retrieved February 18, 2012 from: <http://www.guardian.co.uk/environment/2011/dec/13/canada-pulls-out-kyoto-protocol?intcmp=239>.
- ² Toronto Star, Pipeline politics in Canada and US a peril for Stephen Harper. (2012, January 19). Retrieved February 18, 2012 from: <http://www.thestar.com/news/canada/politics/article/1118348--tim-harper-pipeline-politics-in-canada-and-u-s-a-peril-for-stephen-harper>.
- ³ CTV.ca. (2011 October 4). Watchdog says major questions hang over oil sands. Retrieved November 14, 2011 from: <http://www.ctv.ca/CTVNews/TopStories/20111004/canada-federal-government-environment-audit-scott-vaughan-111004/>.
- ⁴ Registered Nurses' Association of Ontario (2010). *Creating Vibrant Communities: RNAO's Challenge to Ontario's Political Parties 2011 Provincial Election Technical Backgrounder*. Toronto: Author. 18. Retrieved October 17, 2011 from http://www.rnao.org/Storage/65/5964_Backgrounder.pdf.
- ⁴ Registered Nurses' Association of Ontario (2010). *Op. cit.* 18.
- ⁵ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan*. Author. 19. Retrieved February 18, 2012 from http://www.mei.gov.on.ca/en/pdf/MEI_LTEP_en.pdf.
- ⁶ Each billion kWh of coal-fired electricity generation in Ontario: a) kills 25.1 people in Ontario; b) causes 34.9 hospital admissions in Ontario; c) causes 41.4 emergency room visits in Ontario; and d) causes 12,543.6 minor illnesses in Ontario. See DSS Management Consultants Inc. & RWDI Air Inc., *Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation*, Prepared for Ontario Ministry of Energy, (April, 2005) 4, 5..In 2010, Ontario's coal-fired electricity generation equalled 12.6 billion kWh. See IESO, *News Release*, "Diverse Supply Mix Provides Flexibility in Operating Ontario's Power System – Integration of Renewable Resources Well Underway", (January 7, 2011). Retrieved February 18, 2011 from: <http://www.mei.gov.on.ca/en/pdf/electricity/Cost%20Benefit%20Analysis%20DSS%20Report%20-%20Executive%20Summary.pdf>;
- ⁷ Ontario Clean Air Alliance (2011). *Finishing the coal phase out: An historic opportunity for climate leadership*. Author. 1. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/active/0/coalphaseout2011.pdf>.
- ⁸ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan*. Author. 19.
- ⁹ Registered Nurses' Association of Ontario (2010). *Op. Cit.* 23.
- ¹⁰ Ibid, 23.
- ¹¹ Anderson, K., Jungjohann, A., and Weis, T. (2011). *Harvesting Clean Energy on Ontario Farms: A Transatlantic Comparison*. Heinrich Böll Stiftung, Washington DC. Retrieved February 18, 2012 from <http://www.pembina.org/pub/2230>.
- ¹² Warren, R.M. (2011). *Renewing Renewable Energy*. *Toronto Star*. Retrieved February 18, 2012 from <http://www.thestar.com/opinion/editorialopinion/article/1033766--renewing-renewable-energy>.
- ¹³ Prüss-Üstün, A. & Corvalán, C. (2006). *Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease*. Geneva: World Health Organization, 9. Retrieved February 18, 2012 from http://www.who.int/quantifying_ehimpacts/publications/preventingdisease/en/index.html
- ¹⁴ Prüss-Üstün & Corvalán, *Op. cit.* 78.
- ¹⁵ Filcak, R. (2009). *On the Distribution of the Environmental Benefits and Adverse Impacts: The Environmental Justice and Vulnerability of People*, 1-2. from ESEE 2009 8th International Conference of

the European Society for Ecological Economics held 29 June to July 2, 2009 in Slovenia. Retrieved February 18, 2012 from www.esee2009.si/papers/Filcak-On_the_distribution.pdf .

¹⁶ Kevin Watkins, director of the office of Human Development Reports of the United Nations has said: “Many of the 390 million people in Africa living on less than \$1.25 a day are smallholder farmers that depend on two things: rain and land. Even small climate blips such as a delay in rains, a modest shortening of the drought cycle, can have catastrophic effects.” Revkin, A. (2009, April 7). Study finds Pattern of Severe Drought in Africa. *New York Times*, A13. Retrieved February 18, 2012 from Study finds Pattern of Severe Drought in Africa. *New York Times*.

¹⁷ Weis, T., Stensil, S., and Stewart, K. (2010), *Renewable is Doable: Ontario's Green Energy Plan 2.0*. Pembina Institute and Greenpeace Canada. Retrieved February 18, 2012 from <http://pubs.pembina.org/reports/ontario-green-energy-report-august-web.pdf>.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ontario Ministry of Energy and Infrastructure, (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan*. Author.

²¹ *Green Energy and Green Economy Act, 2009*, S.O. 2009, c.12.

²² Ontario Ministry of Energy and Infrastructure. (2010). Op. cit. 7.

²³ Weis, T, Stensil, S. and Stewart, K. (2010), *op cit*.

²⁴ Ontario Ministry of Energy and Infrastructure. (2010). *Backgrounder: Results – Ontario's Energy Sector*. November 23, 2010. Author. Retrieved February 18, 2012 from <http://news.ontario.ca/mei/en/2010/11/energy-backgrounder-2-november-23-2010.html>.

²⁵ Ontario Clean Air Alliance. (2011). *Ontario burned more coal to generate electricity last year as demand went up*

Press Release, February 18, 2012, retrieved October 17, 2011 from <http://www.cleanairalliance.org/node/920>.

²⁶ Ontario Clean Air Alliance. (2010) *Factsheet: Conservation vs. Electricity Supply*. Author. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/active/0/fs26-july19.pdf>.

²⁷ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan*. Author.8.

²⁸ Ontario Clean Air Alliance (2011). *Nuclear heavy energy plan will double residential electricity bills* Press Release, November 23, 2010, retrieved February 18, 2012 from <http://cleanairalliance.org/node/902>.

²⁹ Environmental Protection Act, Ontario Regulation 496/07.

³⁰ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan*. Author.; Ontario Progressive Conservative Party. (2011) *changebook*. Author: Retrieved February 18, 2012 from <http://www.ontariopc.com/changebook/>.

Ontario New Democratic Party. (2011). *Change that Puts People First: Ontario's New Democrats Plan for Affordable Change*. Author. Retrieved February 18, 2012 from <http://ontariodp.com/en/wp-content/uploads/2011/06/NDP-Platform-2011-OUTLINE-small.pdf>.

³¹ Ontario Clean Air Alliance. (Revised October 2011). *Finishing the coal phase out: An historic opportunity for climate leadership*. 2. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/phaseout2011.pdf>

³² Each billion kWh of coal-fired electricity generation in Ontario: a) kills 25.1 people in Ontario; b) causes 34.9 hospital admissions in Ontario; c) causes 41.4 emergency room visits in Ontario; and d) causes 12,543.6 minor illnesses in Ontario. See DSS Management Consultants Inc. & RWDI Air Inc., *Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation*, Prepared for Ontario Ministry of Energy, (April, 2005) 4, 5..In 2010, Ontario's coal-fired electricity generation equaled 12.6 billion kWh. See IESO, *News Release*, “Diverse Supply Mix Provides Flexibility in Operating Ontario's Power System – Integration of Renewable Resources Well Underway”, (January 7, 2011). Retrieved February 18, 2012 from: <http://www.mei.gov.on.ca/en/pdf/electricity/Cost%20Benefit%20Analysis%20DSS%20Report%20-%20Executive%20Summary.pdf>.; referenced in Ontario Clean Air Alliance (2011). *Finishing the coal phase out: An historic opportunity for climate leadership*. Author. 1.

³³ Independent Electricity System Operator (IESO), *The Ontario Reliability Outlook*, (December 2008), p. 5. Retrieved February 18, 2012 from http://www.ieso.ca/imoweb/pubs/marketReports/ORO_Report-Dec2008.pdf.

- ³⁴ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan.* 19.
- ³⁵ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan.* Op. cit. 19.
- ³⁶ Ontario Clean Air Alliance. (October 2011). *Lower Energy Bills and a Strong Economy: A Six Point Plan.* 1. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/6pointplan.pdf>.
- ³⁷ Ontario Ministry of Energy and Infrastructure. (2010). Backgrounder: Results – Ontario's Energy Sector. November 23, 2010.
- ³⁸ Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan.* 21.
- ³⁹ Ontario Clean Air Alliance. (Revised October 2011). *Finishing the coal phase out: An historic opportunity for climate leadership.* 1. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/phaseout2011.pdf>.
- ⁴⁰ *Ibid.* 2..
- ⁴¹ Ottawa Citizen. (2010). *Phasing Out Coal a Positive Move.* November 27.
- ⁴² Ontario Ministry of Energy and Infrastructure. (2010). *Building Our Clean Energy Future: Ontario's Long-Term Energy Plan.* (2010). Op. cit.9.
- ⁴³ Vakil, C. and Harvey L. (2009) *Human Health Implications of the Nuclear Energy Industry.* Retrieved February 18, 2012 from: [http://www.cape.ca/res_cardfile.shtml?cmd\[227\]=i-227-7b058e61798aba73c3b5247c1a196e81&cmd\[252\]=i-252-7b058e61798aba73c3b5247c1a196e81](http://www.cape.ca/res_cardfile.shtml?cmd[227]=i-227-7b058e61798aba73c3b5247c1a196e81&cmd[252]=i-252-7b058e61798aba73c3b5247c1a196e81).
- ⁴⁴ Vakil, C. and Harvey L. (2009). Op. cit.
- ⁴⁵ Nuclear Energy Agency of OECD. (1980). *Radiological Significance and Management of Tritium, Carbon-14, Krypton-85, and Iodine-129 Arising from the Nuclear Fuel Cycle*, Paris; United Nations Scientific Committee on the Effects of Atomic Radiation. (2000). *Sources and Effects of Ionizing Radiation*, New York.; European Commission. (2000). *Radioactive effluents from nuclear power stations and nuclear fuel reprocessing plants in the European Union, 1995-1999. Report – Radiation Protection*; all cited in Fairlie, I. (June 2007). *Tritium Hazard Report: Pollution and Radiation Risk from Canadian Nuclear Facilities.* Greenpeace, 10. Retrieved February 28, 2008 from <http://www.greenpeace.org/canada/Global/canada/report/2007/6/tritium-hazard-report-pollu.pdf>
- ⁴⁶ Fairlie, I. (June 2007). *Tritium Hazard Report: Pollution and Radiation Risk from Canadian Nuclear Facilities.* Greenpeace, 9-10.
- ⁴⁷ Vakil, C. and Harvey L. (2009). Op.cit.
- ⁴⁸“ If we factor in both population growth and inflation, we find that real program spending for every man, woman and child in Ontario must fall by 16.2 per cent, an average annual decline of 2.5 per cent from 2010–11 through 2017–18, a drop that is almost certainly unprecedented.” Commission on the Reform of Ontario's Public Services. (2012). <http://www.fin.gov.on.ca/en/reformcommission/chapters/report.pdf>
- ⁴⁹ Weis, T., Stensil, S. and Stewart, K. (2010), Op. cit.
- ⁵⁰ Weis, T., Stensil, S and Stewart, K. (2010). Op. cit.
- ⁵¹ US Environmental Protection Agency. (2007). *Natural Gas.* Retrieved February 18, 2012 from <http://epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html#footnotes>.
- ⁵² Green Energy Act Alliance. (2009). *Analysis of Bill 150 – The Green Energy and Green Economy Act, 2009.* Toronto: Author, 3. Retrieved February 18, 2012 from http://www.greenenergyact.ca/Storage/25/1680_GEAAEBRFinalWord.pdf.
- ⁵³ Ontario Clean Air Alliance. (October 2011). *Lower Energy Bills and a Strong Economy: A Six Point Plan.* 2. Retrieved February 18, 2012 from <http://www.cleanairalliance.org/files/6pointplan.pdf>.
- ⁵⁴ Ontario Clean Air Alliance. (2011). *Nuclear heavy energy plan will double residential electricity bills,* November 23, 2010, retrieved October 17, 2011 from <http://cleanairalliance.org/node/902>.
- ⁵⁵ *Ibid.*
- ⁵⁶ Ontario Ministry of Energy and Infrastructure. (2011). *McGuinty Government Continues To Build Ontario's Clean Energy Economy* October 31, 2011. Retrieved February 18, 2012, from <http://news.ontario.ca/mei/en/2011/10/moving-renewable-energy-forward.html>.
- ⁵⁷ Weis, T., Stensil, S., and Stewart, K. (2010). Op. cit.

-
- ⁵⁸ Rideout, K., Copes, R., Bos, C. (2010). *Wind Turbines and Health*. National Collaborating Centre for Environmental Health. 1. Retrieved February 18, 2012 from http://www.nccch.ca/sites/default/files/Wind_Turbines_January_2010.pdf
- ⁵⁹ Pembina Institute. (2010). Op. cit. 1.
- ⁶⁰ Ontario Ministry of Health and Long-Term Care (2011). *New Report From Ontario's Chief Medical Officer Of Health Says There Is No Direct Causal Link Between Wind Turbines And Adverse Health Effects* Retrieved February 18, 2012 from <http://news.ontario.ca/mohlhc/en/2010/05/new-report-from-ontarios-chief-medical-officer-of-health-says-there-is-no-direct-causal-link-between.html>.
- ⁶¹ Ontario Ministry of the Environment (2008). *Noise guidelines for wind farms: Interpretation for applying MOE NPC Publication to wind power generation facilities*. Author. 5. Retrieved February 18, 2012 from: http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079435.pdf.
- ⁶² Ontario Ministry of the Environment (2008). Op. cit. 5.
- ⁶³ Hamilton Community News. (2012, January 23). OFA calls a halt to wind turbines. Retrieved February 18, 2012 from http://www.hamiltonnews.com/news/ofa-calls-a-halt-to-wind-turbines/?utm_source=rss&utm_medium=rss&utm_campaign=ofa-calls-a-halt-to-wind-turbines.
- ⁶⁴ Registered Nurses' Association of Ontario. (2011). Personal correspondence from RNAO members August 2010 to June 2011.
- ⁶⁵ Toronto Star. (2011, Jan. 15). Wind turbines feeding political storm. A7.
- ⁶⁶ Chief Medical Officer of Health of Ontario. (May 2010) *The Potential Health Impact of Wind Turbines*. Toronto: Author. 10. Retrieved February 18, 2012 from http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf.
- ⁶⁷ Chatham-Kent Public Health Unit. (June 2008). *The Health Impact of Wind Turbines: A Review of the Current White, Grey and Published Literature*. Chatham: Author. 17. Retrieved February 18, 2012 from <http://www.wind-works.org/LargeTurbines/Health%20and%20Wind%20by%20C-K%20Health%20Unit.pdf>.
- ⁶⁸ Environmental Defence and the Ontario Sustainable Energy Association. (2011). *Blowing Smoke: correcting Anti-Wind Myths in Ontario*. Author. 2. Retrieved February 18, 2012 from http://environmentaldefence.ca/sites/default/files/report_files/BlowingSmokeReport_FINAL2.pdf.
- ⁶⁹ Pembina Institute. (2010). *Wind Power Realities: Putting Wind Power Myths into Perspective*. Author. 4. Retrieved February 18, 2012 from <http://www.greenenergyact.ca/Page.asp?PageID=122&ContentID=1370&SiteNodeID=201>.
- ⁷⁰ Environmental Defence and the Ontario Sustainable Energy Association. (2011). Op. cit. 2.
- ⁷¹ Chief Medical Officer of Health of Ontario. (May 2010). Op. cit.10