Beyond Coal:

Power, Public Health and the Environment

Ontario Public Health Association

November 2002

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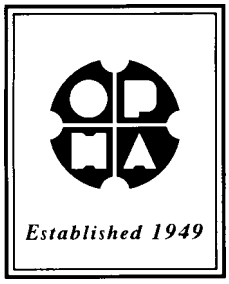

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Distribution:

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Executive Summary

Concerns Related To Ontario's Electrical Sector

This report has been prepared by the Ontario Public Health Association (OPHA), a non-profit organization that represents the staff and professionals who work in public health units and community health centres throughout Ontario. It focuses on Ontario's electrical sector, its impact on air quality, human health and the environment, because this sector is currently undergoing huge changes. In May of this year, Ontario's electrical market was opened to competition, a change that presents both risks and opportunities.

With a visionary regulatory framework, a competitive electrical sector could actually encourage the development of alternative energy sources, co-generation, and energy efficiency measures that would be beneficial to air quality, human health and the environment. However, without the proper regulatory framework, competition could lead to increased use of electricity and greater reliance on coal-fired power plants, which could result in further degradation of air quality and the environment, and greater harm to human health.

The increased use of coal-fired power plants is a concern because they are significant contributors of the air emissions that lead to: 1) global climate change, 2) smog, 3) acid rain and 4) mercury contamination of the aquatic food chain.

Global Climate Change

Scientists worldwide have documented a shift in the global climate over the last century that is unprecedented for its pace of change. Most believe that this change is due, in most part, to human activities. Of particular concern is the release of carbon dioxide (CO_2) that results from the burning of fossil fuels such as gasoline, oil, coal and natural gas. Consequently, global climate change is inextricably linked to the energy policies of nations around the world, as well as to their economic growth and population size.

Global climate change could have profound impacts on the health of whole populations in regions spanning the globe. The direct health impacts expected include those associated with increases in heat waves, air pollution, and extreme weather events such hurricanes and floods. The indirect health impacts expected include those associated with increases in drought, loss of water supplies, shifts in food supplies, and changes in the range of insect-borne and infectious diseases.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that greenhouse gas emissions will have to be reduced to a small fraction of their current levels in order to stabilize atmospheric concentrations of CO_2 and retard global climate change. Under the Kyoto Protocol, Canada is committed to reducing greenhouse gas emissions to 6% below 1990 levels between 2008 and 2012. While this reduction represents a small percentage of the reductions that will ultimately be needed, ratification and implementation of the Kyoto Protocol is an essential first step in the international process required to properly address global climate change.

In Ontario, coal-fired power plants were responsible for 20% of greenhouse gas emissions in 2001, while in the United States, they were responsible for 33% of total greenhouse gas emissions.

Smog

Ontario's coal-fired power plants were responsible for about 23% of the sulphur dioxide (SO_2) and 14% of the nitrogen oxides (NOx) emitted in the province in 2001. Both air pollutants can harm human health when present in their gaseous form (e.g. as sulphur dioxide and nitrogen dioxide) and when converted to acid aerosols such as sulphates and nitrates that make up a significant percentage of the fine particulate matter in Ontario's air. NOx are also precursors for ground-level ozone, the air pollutant that triggers most of the smog alerts in Ontario.

The Ontario Medical Association (OMA) has estimated that the fine particulate matter in Ontario's air contributes to approximately 1,900 premature deaths each year, while researchers at Health Canada have demonstrated that the gaseous air pollutants such as nitrogen dioxide and ozone, are responsible for, on average, 7.7% of premature deaths each year in cities such as Toronto, Hamilton, London, Ottawa and Windsor.

Acid Rain

While huge improvements have been made on air emissions of SO_2 in both Canada and the United States since the 1970s, acid rain remains a serious environmental problem today. In 1997, a multi-stakeholder task group struck by the federal government concluded that SO_2 caps in Ontario, Quebec, and the mid-western and eastern States, would have to be reduced by an additional 75%, if most of eastern Canada were to be protected from acid rain. The task group has also called for reductions in NOx because of their contribution to acid rain.

As indicated above, Ontario's coal-fired power plants were responsible for about 23% of the SO_2 and 14% of the NOx emitted in the province in 2001, while the electrical sector in the United States was responsible for about 70% of the SO_2 and 25% of the NOx emitted in that country.

Mercury Contamination Of The Aquatic Food Chain

Mercury is a highly toxic element that is capable of accumulating in the aquatic food chain. In recent years, negative health impacts have been documented among children whose mothers ate fish during pregnancy. The National Academy of Science (NAS) has estimated that over 60,000 children per year in the United States are born at risk from adverse neuro-developmental effects due to prenatal exposure to mercury.

In 1994, under the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem*, mercury was targeted for a 90% reduction by the year 2000. While other sectors in Ontario have made significant progress towards this goal, Ontario's electrical sector has increased emissions of mercury. In 1999, coal-fired plants were responsible for about 23% of mercury emissions from human activities in the province.

Actions Needed

In order to ensure that a competitive electrical sector produces results that are beneficial to human health and the environment, regulations and policies must be developed that: 1) Encourage energy efficiency; 2) Promote renewable technologies; and 3) Phase-out the use of coal-fired power plants.

Encouraging Energy Efficiency

Ontario's Select Committee on Alternative Fuel Sources has concluded that energy efficiency measures are actually more important to meeting Ontario's future energy needs than are new energy supplies. In the 1990s, electricity demand in Ontario was reduced by 25,000 Gigawatt-hours (GWh) annually from the figure expected through increases in energy efficiency. This represents almost 17% of the total electricity generated for Ontario in 2001. The energy experts, Torrie Smith Associates, have estimated that electricity demand in Ontario could be reduced by up to an additional 35,000 GWh annually by 2012 with systematic efforts to increase energy efficiency in this province. In addition, they have estimated that another 10,000 GWh per year of electricity could be generated by industrial and commercial "co-generators". These estimates indicate that energy efficiency and co-generation combined, could displace about 30% of all the electricity generated in Ontario in 2001,

which is more electricity than was generated with coal-fired power plants in 2001 (i.e. 37,185 GWh).

The Commission for Environmental Cooperation (CEC), established under the North American Free Trade Agreement, has identified changes in building codes as the area with the greatest potential for energy efficiency in Canada and the United States. In 1999, the residential, commercial and institutional sectors in Canada were responsible for nearly 30% of secondary energy use and 28% of greenhouse gas emissions in the country. Changes in Ontario's Building Code are recommended to encourage energy efficiency, renewables and co-generation in new building stock, while a "shared savings mechanism" that rewards electrical utilities that effectively encourage reductions in energy consumption among their consumers, is recommended to increase energy efficiency in existing buildings.

Promoting Renewable Technologies

The CEC, Ontario's Select Committee on Alternative Fuel Sources, and the Federal Liberal Caucus Working Group on Environmental Technologies have all concluded that renewable energies have huge potential, from both technological and economic perspectives, to provide a significant share of clean and secure energy in North America. Torrie Smith Associates have estimated that new and renewable electricity, generated with wind, small hydro, and biogas, has the potential to provide 20,000 GWh of electricity per year in Ontario; 5,000 GWh of which could be developed by 2012.

Many believe that the introduction of renewable technologies has been hampered by government policies that are biased towards existing, conventional technologies. For example, the Federal Liberal Caucus Working Group on Environmental Technologies reported that, between 1970 and 1999, direct federal spending on fossil fuel based energy was $40.4 billion, while federal support for Canada's nuclear industry exceeded $16.6 billion over the last five decades. In countries that have revamped their public policies to support the development of renewable energies, the results have been impressive. For example, Germany, which began to invest in wind power in 1990, has developed 8,000 MW of wind-generated electrical capacity, and is also on track to meet its target of 22,000 MW of wind-powered electrical capacity by 2010. Germany's 2010 target is only 2,700 MW less electrical capacity than Ontario Power Generation currently has with its nuclear, hydro, coal-fired and oil-fired facilities combined (i.e. 24,700 MW).

The OPHA is recommending that the Ontario government establish a schedule of ambitious Renewable Portfolio Standards (RPS) to promote the development of renewable energies within Ontario, and that the Federal government provide financial support to renewable technologies that is equal to that provided to conventional energy sources.

Phasing Out Coal-Fired Power Plants

Ontario's Select Committee on Alternative Fuel Sources has recommended that Ontario eliminate its reliance on oil- and coal-fired power plants by 2015. Many organizations support the phase-out of coal-fired power plants because, while they are one of the most significant sources of greenhouse gases, there is currently no commercially available control technology that can be used to reduce their CO_2 emissions.

In Ontario, the greenhouse gases emitted from Ontario's five coal-fired power plants each year (i.e. about 35,000 kilotonnes in 2001) represent about 78% of the greenhouse gas emissions that Ontario would need to cut in order to achieve the 6% reduction envisioned by the Kyoto Protocol. A phase-out of coal-fired power plants, driven by the need to reduce greenhouse gases, would simultaneously produce a number of other public health and environmental benefits. It would reduce SO_2 emissions in Ontario by 23%, mercury emissions by 23%, and NOx emissions by up to 14%.

Recommendations:

At The Federal Level

The OPHA recommends that the Federal government:

- Ratify and implement the Kyoto Protocol as currently written, recognizing that it is only the first step towards the 60 to 80% reduction in greenhouse gases that will be required to retard global climate change;

- Provide municipalities with stable funding, that is not dependent upon participation by the province, with which to promote energy efficiency projects within their communities;

- Establish a schedule of ambitious and increasing renewable energy targets to guide the development of energy policies, environmental regulations, and budgetary commitments at the federal level for the coming years;

- Provide financial support to renewable technologies that is equal to that traditionally provided to conventional energy sources; and

- Establish regulations under the Canadian Environmental Protection Act (CEPA) that encourage the phase-out of coal-fired power plants by 2010.

At The Provincial Level

The OPHA believes that the Ontario government should move quickly on the recommendations of Ontario's Select Committee for Alternative Fuel Sources, and recommends that the Ontario government:

- Instruct the Ontario Energy Board (OEB) to establish a shared savings mechanism that rewards utilities for investing in energy efficiency programs that effectively reduce electricity consumption and their customers' bills;

- Move immediately to revise the Ontario Building Code to incorporate the most advanced science with respect to renewable energies, co-generation, and energy efficiency;

- Establish a schedule of increasing Renewable Portfolio Standards (RPS) that meets or exceeds the most ambitious program established in North America; and

- Ensure that the emission trading scheme developed for Ontario:

  - Is a cap and trade model consistent with that proven effective in the United States;
  - Significantly improves air quality and protects public health across the regional air shed on both sides of the border;
  - Is supported by air emission caps for the electrical sector that will result in the phase-out of coal-fired power plants by 2010;
  - Includes a hard cap of 25 kilotonnes (kt) for nitrogen oxide emissions from fossil-fuelled power plants in southern and central Ontario to be achieved by 2007; and
  - Limits imports and exports of electricity to generators that achieve emission performance rates for mercury, nitrogen oxides, sulphur dioxide, and carbon dioxide that are as good as, or better than, those achieved by high efficiency natural gas generators.

At The Municipal Level

The OPHA recommends that municipalities:

- Establish ambitious energy efficiency programs that include specific targets and timelines for their corporate operations and ensure that financial savings are re-invested in energy efficiency projects and/or used to support purchasing policies that favour renewable energies and low emission generators of electricity;

- Develop and implement corporate purchasing policies that favour renewable energies and low-emission generators of electricity;

- Establish programs to encourage large organizations within their communities to establish ambitious energy efficiency programs;

- Encourage large organizations within their communities to adopt purchasing policies that favour renewable energies and low emission generators of electricity; and

- Establish social marketing programs to encourage energy conservation efforts among individuals in their communities.