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SUBMISSION TO EBR
RE: COAL CLOSURE REGULATION

CAE ALLIANCE
COMMENTS REGARDING EBR REGISTRY NUMBER: 010-0945
COAL CLOSURE REGULATION
MINISTRY OF THE ENVIRONMENT
LOADED TO THE REGISTRY: JULY 12, 2007

The CAE (Clean, Affordable Energy) Alliance is a volunteer organization representing the interests of Ontario's energy ratepayers. Our members have followed the evolving energy policy and the significant changes that have taken place in the electricity sector over the past few years. We have spent considerable time researching credible energy and environmental information. The CAE has reviewed and responded to OPA reports and discussion papers; made submissions and presentations to the media, MPPs, the Minstry of Energy, Ministry of the Environment, and Legislative Committees. We continue to participate in energy conferences and public forums.

The CAE Alliance asserts that:

1. The proposed "Coal Closure Regulation" conflicts with, and therefore contravens existing legislation and regulations. Therefore, this Regulation cannot be implemented.

2. There are too many contingencies and uncertainties in respect of electricity supply resources in the next decade. Mandating a coal cessation date has real potential to impact electricity system reliability.

3. The stated reasons for this proposed Regulation do not acurately reflect the health and environmental impacts of coal-fired generation in Ontario. Provincial and federal environmental information demonstrates that the coal-fired facilities do not pose the serious threat suggested by the "Purpose" for this proposed Regulation. It is incumbent on the Ministry of the Environment to show evidence to justify the claims of the "Purpose" and "Regulatory Impact Statement" included in the Regulation Proposal Notice before the proposed Regulation can be implemented.

4. The "cost of action" for this purported climate change iniative, will be more than the Ontario economy can bear. As this has been included as a "Purpose" of the proposed Regulation, a full cost assessment of the coal closure, and all ramifications, must be completed.

5. This proposed Regulation, if passed, will likely result in greater environmental and health damages. A full environmental assessment must be completed with regard to all alternatives and replacement generation, before any such Regulation can be considered.

6. This proposed Regulation will result in significantly higher use of natural gas, contrary to Minister of Energy Directives, and OPA recommendations.

7. The coal closure timeline will be impacted by significant concerns related to supply and cost of natural gas - the slated replacement for coal-fired power - in the next decade.

8. It is more beneficial, environmentally and economically, to retrofit all remaining coal fired units with the best available emissions reduction technology.

The CAE Alliance therefore requests that the Proposed Coal Closure Regulation be rejected. Rather, we propose a Regulation under the Environmental Protection Act, calling for the installation of the best available emissions reduction technology, without further delay, on all remaining coal fired units in Ontario.

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CHARTS

1. Conflict with Existing Legislation and Regulations

The Ontario Power Authority (OPA) has – by Regulation and Ministerial Directive as prescribed by The Electricity Restructuring Act, 2004 - been granted authority and responsibility to determine the **timing** of the coal phase out in Ontario.

♦ According to The Electricity Restructuring Act, 2004, the OPA was established:
- for the purposes of assessing and forecasting electricity demand and the adequacy and reliability of electricity resources for Ontario for the medium and long term;
- to conduct independent planning for the provincial electricity system;
- to secure necessary resources, including conservation/demand management, and;
- to develop integrated power system plans for Ontario.

All OPA activities are to be conducted in support of the goal of ensuring adequate, reliable and secure electricity supply and resources in Ontario. "The OPA has the capacity, rights, power and privileges of a natural person for the purpose of carrying out its objects…" (Sections 25.2 and 25.29)

♦ This legislation charges the OPA with the development of an integrated power system plan (IPSP), to be submitted to the Ontario Energy Board (OEB) for review to ensure that it complies with directives issued by the Minister and is economically prudent and cost effective.

♦ The IPSP must be designed to assist the goals relating to adequacy and reliability of electricity supply, and that emcompasses related matters prescribed by regulations and Ministerial directives. (Section 25.30)

♦ According to the legislation, the Minister of Energy may issue, and the OPA shall follow, directives that set out goals to be achieved by the IPSP, including goals related to "the phasing-out of coal-fired generation facilities".

♦ On June 13, 2006, a Ministerial Directive was issued in respect to the creation of the IPSP, directing the OPA to meet specific goals, including "Plan for coal-fired generation in Ontario to be replaced by cleaner sources in the earliest practical time frames that ensures adequate generating capacity and electricity system reliability in Ontario."

"**The OPA should work closely with the IESO (Independent Electricity System Operator) to propose a schedule for the replacement of coal-fired generation, taking into account feasible in-service dates for replacement generation and necessary transmission infrastructure**."

♦ The IESO is carefully monitoring replacement generation. "As project commitments are made by the OPA … the Ontario Reliability Outlook will monitor and report on infrastructure developments and their impact on future reliability." (IESO, The Ontario Reliability Outlook, March, 2007)
The coal closure is not an isolated aspect of electricity restructuring in Ontario. Removal of these facilities has major impacts on the system as a whole. Unlike wind and solar, they provide 24/7 resource availability. Unlike baseload nuclear, they provide quick dispatch load following capability, vital to system reliability.

♦ "… the IESO continues to identify a need to ensure that the future supply and demand response mix has sufficient generation that can be dispatched up or down to match changes in the level of demand. … critical during early morning hours, when demand climbs quickly and in the evening when demand

begins to decline. Over half of Ontario's installed capacity … are baseload or non-maneuverable generation … This type of capacity is expected to grow over the next few years with the addition of 1,500 MW of Bruce A generation and significant amounts of new wind generation." (IESO, The Ontario Reliability Outlook, March, 2007)

♦ "Coal fired generators are characterized by relatively high ramp rates and low minimum loading points which translates into timely load following capability over a large range of output levels. … The IESO has undertaken a study to establish a quantifiable measure of load following requirement based on historical demand and market data. … The next steps will be to determine how Ontario's existing supply mix satisfies the identified load following requirements; and simulate how well potential supply mixes in the future will meet these requirements. This will likely include a detailed analysis of the amount of load following provided by generation technology type; and will address the potential impact of replacing coal-fired generation with other types of generation." (IESO, The Ontario Reliability Outlook, March, 2007)

♦ The Ministerial Directive states that the IPSP should "comply with Ontario Regulation 424/04 as revised from time to time".

♦ Ontario Regulation 424/04 specifies that, when developing an IPSP, the OPA shall ensure that for each electricity project which requires an assessment under the Environmental Assessment Act, that the Plan "contains a sound rationale including … an analysis of both the impact on the environment of the project, and an analysis of the impact of a reasonable range of alternatives to the electricity project." According to the Environmental Assessment Act, this includes impacts to both the natural environment, and "the social, economic and cultural conditions that influence the life of humans or a community".

A Regulation mandating a coal closure date cannot be passed until the IPSP and all elements of it – including an assessment of the resources proposed to replace coal fired generation - are reviewed and approved by the OEB.

♦ The Ministerial Directive of June 13, 2006 states that coal closure is be a goal of the IPSP. However, the coal closure timetable – assessing when these facilities can be removed from service while ensuring adequate capacity and reliability - forms part of the IPSP process and Plan. This Plan has yet to be finalized and delivered to the Ontario Energy Board for approval.

The coal closure is dependent upon adequate and sufficient replacement generation. Therefore, the OEB must be granted opportunity to review both the coal closure timing and the feasibity of replacement generation. As set out in The Electricity Restructuring Act, 2004, "The Ontario Energy Board "in carrying out its responsibilities under this or any other Act in relation to electricity, shall be guided by the following objectives: (1) To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service. …"

♦ A report recently prepared by CIBC World Markets Inc. estimates that coal closure and subsequent replacement with natural gas fired generation will cause electricity prices to rise to 60%-70% higher than they are now, or roughly 6.5% per year. ("Can Ontario Shutdown Coal and Keep the Lights On?", Benjamin Tal, CIBC World Markets Inc., July 18,2007)

This estimated price increase will impact homeowners' costs for both electricity and home heating; industrial and manufacturing viability in Ontario; all retail and business and farming sectors; institutions, etc. and therefore every aspect of our economy.

The Ontario Power Authority, according to Regulation 424/04, must "consult with consumers … and other persons who have an interest in the electricity industry in order to ensure that their priorities and views are considered in the development of the plan" (IPSP).

Numerous submissions made to the OPA, particularly of large industrial and manufacturing consumers, have voiced opposition to replacement of coal generation by natural gas.

The Ontario Chamber of Commerce, representing 57,000 businesses, has passed a resolution urging the Provincial government to reverse the coal closure decision until reliable, cost effective and cleaner forms of generation are available; to retrofit the existing facilities with emissions control technology; and to provide plans to demonstrate replacement power at equivalent cost.

Public survey consultant Decision Partners has reported to the OPA that, "Most participants … concluded that in the end, the Ontario economy must be the most important priority – the economy is the primary driver of all decisions in the Province."

The cost impacts of coal closure have been very vague, inconclusive, and not disclosed to the public. The Premier himself, in response to the CIBC World Markets report, has admitted that, "It's almost impossible to predict where electricity prices will end up...".

The costs of coal closure are huge and will adversely impact the economy and, by consequence, the environment. It is therefore necessary that the OPA and the OEB conduct a more detailed assessment of these costs and impacts as mandated by the Electricity Restructuring Act.

♦ This significant rise in electricity prices conflicts with government policy, as described by the Ministry of Finance, "Today's increased globalization means that Ontario faces a more challenging and competitive environment than ever before. Ontario's future prosperity depends largely on its ability to continue to adapt, innovate and strengthen its competitive advantage. … Reliable electricity supply and price stability, which keep Ontario's economy competitive and benefit all consumers, are central to the government's plan." (Ministry of Finance, "2006 Ontario Economic Outlook and Fiscal Review")

"An increase in electricity prices may have adverse macroeconomic effects on the provincial economy in terms of employment losses and may hinder the effectiveness of Ontario businesses that compete outside of the province." (OPA – Sustainability Discussion Paper)

"Manufacturing is the single largest sector of the economy (17.5% of GDP) employing over 1,000,000 people directly in this province ... for every dollar invested in the manufacturing sector there is an additional $3.05 in economic activity." (Canadian Manufacturers and Exporters)

♦ The OPA is developing the IPSP "within … policies and guidelines set by the Ontario government", including the "plan to replace coal-fired generation." (Ontario's Integrated Power System Plan: The Road Map for Ontario's Electricity Future, Preliminary, February, 2007) The plan wil be updated every 3 years "to adapt to changing conditions, new information and emerging technologies". The proposed "Coal Closure Regulation" impacts the ability of the OPA to revise the plan to adapt for new and changing conditions, particularly if resource procurements fail to materialize.

♦ The preliminary IPSP allows for coal gasification technology. The proposed Regulation conflicts with the ability to plan for this power generation source at existing coal-fired power plant sites, which are ideal locations for this technology.

♦ There are existing and proposed coal facilities that are "cleaner" than the natural gas generating facilities being built in Ontario. This coal closure Regulation would preclude the use of existing sites for coal fired generation that meets, or exceeds existing environmental standards for power production in Ontario, contrary to the Electricity Restructuring Act.

CONCLUSIONS

The OPA was created to provide independent power planning. This agency has been directed, through existing legislation, to provide a coal reduction timetable in conjuction with the energy experts of the IESO, and within the legislated perameters of electricity reliability, and adequacy. The power grid is based on science and economics, as well as environmental factors. The complexities and realities overrule political will, however good intentioned it may be.

This proposed Regulation will put unnecessary constraints on the planning process, thus impacting the ability of the OPA to revise and adapt for new and changing conditions. The OPA has already indicated that the government directive "very much shapes the plan … is prescriptive, with the areas where there is OPA discretion being relatively narrow."

This proposed Regulation conflicts with (i) the legislated IPSP process, and (ii) the concept of a healthy provincial economy, "central to the government's plan".

Most importantly, this proposed Regulation conflicts with existing mandates under the Environmental Bill of Rights! Energy planning in Ontario - which encompasses both the inclusion and exclusion of power resources - must be done in conformity to the Ministry of Energy Statement of Environmental Values, under the Environmental Bill of Rights. The mandate is "to ensure that Ontarians have access to safe, reliable and environmentally sustainable energy supplies at competitive prices".

2. Impact of Resource Contingencies and Uncertainties on the Coal Closure Timetable

The Ontario Power Authority has suggested 2014 as a time by which coal closure could be reasonably considered. Less coal use will start "in 2011 as new power sources, such as conservation, renewable resources and new natural gas generation come online". (OPA) However, there are a number of uncertainties and contingencies which will impact the ability to remove 6,500 MW of reliable and affordable power, including:

♦ " … a tight resource balance … successful implementation of a large number of individual projects is essential for adequacy." (OPA – Discussion Paper, Integration, November, 2006)

(i) Conservation/Demand Management

♦ The target Conservation/Demand Management (CDM) is the most ambitious undertaken anywhere, and "…it will be a challenge for Ontario to deliver the near-term amount of CDM included in the plan." (OPA) According to Peter Love, Chief Conservation Officer, the amount of CDM planned is "very aggressive, extremely aggressive, more than what California has been able to achieve". The required amount, 6,300 MW, represents the expected growth in demand during the planning period; ¼ of electricity used on an average day in Ontario (OPA Discussion Papers).

"With our population and economy continuing to grow, the demand for power is steadily increasing – even with our best efforts at conservation and energy efficiency." (OPA, IPSP Roadmap, Feb., 2007)

♦ "There is a risk associated with conservation and demand management in both the timing and the levels they represent. Failure to meet the targeted levels at the prescribed time would lead to higher levels of demand than identified …" (IESO – 18 Month Outlook, June 22, 2007)

(ii) Nuclear

♦ Nuclear units will reach end of life between 2013 and 2022. "Availability is lowest between 2016 and 2020 when a number of units are simultaneously on refurbishment outages." … For purposes of overall adequacy, it will be especially critical to manage and maximize nuclear availability during this period." (OPA Discussion Paper - Integration)
"…the availability of skilled labour, long lead time for equipment and critical material resources can adversely impact scheduled completion dates and cost. …" (OPA)

♦ In 2005 11,414 MW of installed nuclear capacity produced 79 TWh of power. During the years 2011-2018, the OPA anticipates 88 TWh, an additional 9 TWh, from 1,000 less MW of installed nuclear capacity, primarily from units that are reaching end of life.

(iii) Renewable Resources

♦ Of the new renewable resources expected, only 6% of the hydroelectric (43 MW), 39% of the wind (955 MW), and 2% of biomass (5 MW) is committed procurement. Wind development between 2015 and 2019 is dependent upon transmission enhancements in the Bruce Peninsula area. "Bioenergy has perhaps the greatest degree of uncertainty as to potential, cost and feasibility." (OPA – Discussion Papers, November, 2006)

♦ Even if all renewable energy hoped for is in place by 2015, it is not possible for these resources to produce the proposed additional 12-15 TWh of power required from them.

(iv) Natural Gas

♦ Natural gas generating facilities are expected to double in installed capacity; almost triple in electricity production, as replacement for the coal fired generating units. (11TWh in 2005 to 30 TWh by 2015) However, the OPA states that natural gas prices are expected to rise by 2017, due to depletion of resources in the Alberta basin, where most of gas consumed in Ontario comes from.

♦ There are serious concerns regarding the cost and availability of natural gas.

"The price of natural gas has increased four-fold in the past five years and is expected to remain high and volatile. Residential and commercial space heating and industrial processes compete for supply and several nearby jurisdictions also rely heavily on gas, all of which puts its availability at a premium or even at risk." (OPA)

"While it is impossible to quantify all of the risks at this point, the price and supply risk around gas as a generation source has grown significantly." (OPA)

♦ "The need for additional gas storage capacity in Southern Ontario close to the new gas-fired generation ... the need for additional upstream gas transmission pipeline and other capacity improvements ... will entail major costs and development times." (OPA Report – Natural Gas Price Context)

♦ Natural gas generation represents the replacement for coal fired power. Information in Sections 5 and 6 of this document highlight and verify the significant concerns associated with a transition to natural gas-fired power.

(v) Transmission

♦ "Without new transmission facilities, the IESO will be forced to operate existing facilities near their maximum capabilities, with little margin for unexpected events and requiring complex arrangements to do routine maintenance on critical facilities. A number of local transmission or generation initiatives are also needed in areas throughout Ontario." (IESO, The Ontario Reliability Outlook, March, 2007)

♦ "The IESO remains concerned about the uncertainty around the length of approvals process affecting generation and transmission projects. … The situation is particularly troublesome in the case of new transmission. … there will continue to be a risk that transmission will not be available when it is required." (IESO, The Ontario Reliability Outlook, March, 2007)

(vi) Other

♦ Many of the non-utility generation contracts will expire in the middle of the next decade.

♦ "Longer-term Ontario may not be able to continue to rely on the same level of support from its interconnected neighbours as it has received in the past. Surrounding jurisdictions … are beginning to face the prospect of declining supply margins. … Although the benefits of being interconnected continue to exist, this decline will serve to reduce Ontario's confidence in imports." (IESO, The Ontario Reliability Outlook, March, 2007)

♦ Environmental assessment and approvals processes have slowed some projects, halted others.

Implications

♦ The OPA acknowledges risks and concerns associated with near and mid term planning, including "… less than anticipated success … in capturing conservation potential, … harvesting domestic renewable resource potential, less than expected nuclear performance, higher than anticipated load growth and the potential retirement of existing non-utility generation resources." The "**risk around the implementation and performance of new resources is managed by the timing of coal replacement** and by imports." (OPA)

♦ "The analysis assumes that coal-fired generation will be needed to address potential shortfalls in other supply and demand-side resources. … the required coal-fired production is estimated to be 25 (TWh) in 2010, 23 TWh in 2011, 15 TWh in 2012, 2013 and 2014. … However, it is important to recognize the uncertainty in forecasting coal-fired electricity production."

".. projections of future coal-fired electricity production are subject to a variety of uncertainties." (OPA - Emission Control Alternatives for Ontario Coal Generators, April, 2007)

CONCLUSION

"Ontario's electricity sector is in the early stages of the biggest infrastructure change in its history." (IESO, The Ontario Reliability Outlook, March, 2007) The OPA and the IESO, tasked with the determination of the coal closure timeline, note significant challenges and uncertainties in the decade ahead, and continue to express caution regarding a specific date by which this can be achieved. Although a 2014 time frame has been proposed for coal phase out, "The period to the end of 2014-2015 sees a dramatic transformation."; and "…the 2016-2017 timeframe clearly will be affected by events that happen or begin to happen in the near and medium terms". (OPA)

With this degree of uncertainty, it is vital that the coal closure date be left open ended in order to maintain grid stability and reliability. Affordable and valuable as a market price setter, coal resources will be necessary to ensure supply adequacy.

3. Health and Environmental Impacts of Ontario's Coal-Fired Power Plants

The purported purposes for this proposed Regulation include:

"Coal-fired electricity generating facilities are major sources of air pollution. Emissions include: oxides of nitrogen (NOx); sulphur oxides (SOx); particulate matter (PM); and a variety of toxic pollutants (e.g., mercury). These emissions are associated with major health impacts (e.g., premature death, increased hospital emissions *[we assume the Ministry meant to indicate "admissions"]* for patients with asthma and chronic lung disease) as well as environmental impacts (e.g., buildings, crops and ecosystems).

Coal-fired electricity generating facilities are also major emitters of greenhouse gases (GHG) and therefore are contributors to global climate change."

The CAE Alliance asserts that this:

(i) represents an exaggeration of both health and environmental impacts of coal-fired generation in Ontario;

(ii) fails to acknowledge the degree to which emissions could economically and readily be reduced;

(iii) fails to take into consideration a comparison of replacement generation and the resultant net impact of transitioning to an alternative fossil fuel.

(i) Exaggeration of Health and Environmental Impacts of Coal Fired Generation

Coal-fired generation in Ontario is responsible for less than 7% of air quality concerns. The health and environmental impacts stated are not in proportion to the emissions released. The coal plants meet or exceed all laws and regulations presently in place to protect the environment.

♦ The Ontario Medical Association indicates that health issues associated with pollution are attributable to **chronic** and **acute** exposure to **5** common pollutants, namely:

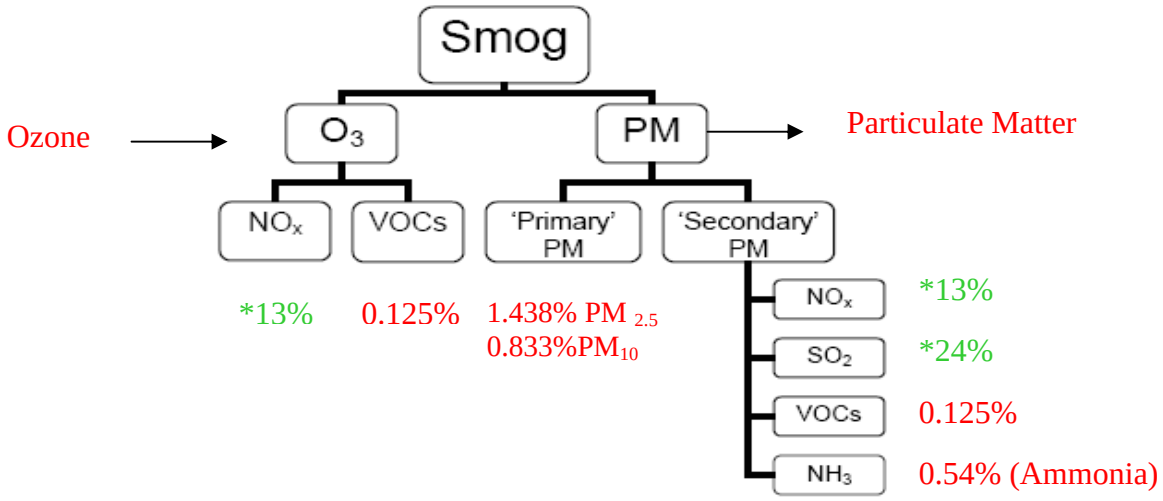
Ozone (O3) which is comprised of NOx (nitrogen oxides) + VOCs (volatile organic compounds); $PM_{2.5}$ (particulate matter); CO (carbon monoxide); and SO_2 (sulphur dioxide). (Ministry of the Environment)

♦ Ozone and fine particulate matter ($PM_{2.5}$), the major components of smog, continue to exceed the ambient air quality criteria and remain the pollutants of most concern. Emissions of NO_x, SO_2 and CO have decreased significantly over the past 35 years and do not exceed government criteria standards. (Ontario Ministry of The Environment, Air Quality in Ontario, 2005)

♦ Coal's contribution to the provincial emissions of the smog precursors, VOCs, and CO are less than 1%. Transportation is by far the greatest contributor.

♦ Coal fired generation in Ontario is responsible for 1.438% of provincial $PM_{2.5}$ and 0.833% of PM_{10} emissions. (Environment Canada)

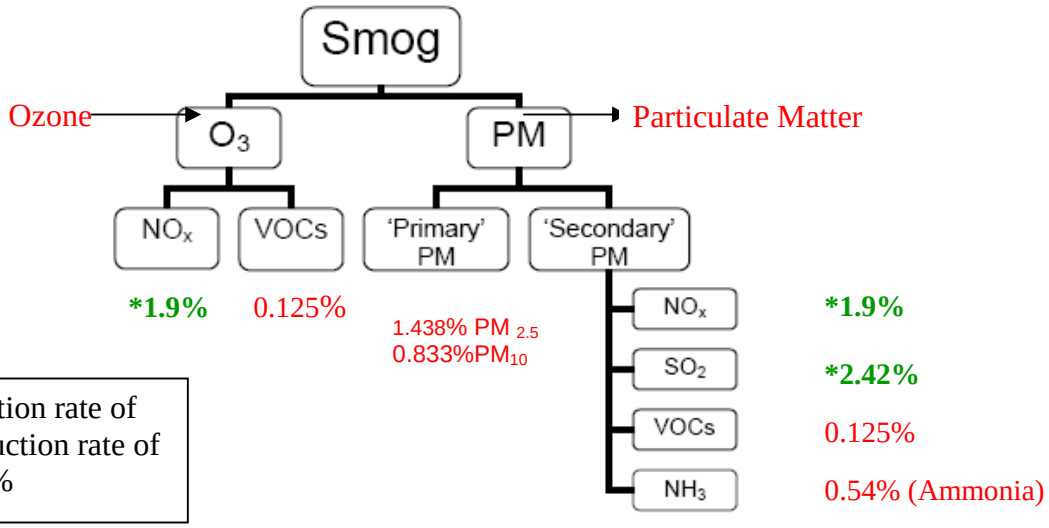
CONTRIBUTION OF COAL FIRED POWER GENERATION TO ONTARIO'S PORTION OF SMOG PRECURSORS



Environment Canada Air Contaminant Emissions tracking also includes CO (carbon monoxide). Coal-fired generation in Ontario contributes 0.49% to Ontario's portion of CO emissions

(These figures include Lakeview GS, now closed.)

CONTRIBUTION OF EMISSIONS FROM COAL-FIRED POWER PLANTS – **WITH POLLUTION ABATEMENT TECHNOLOGY**



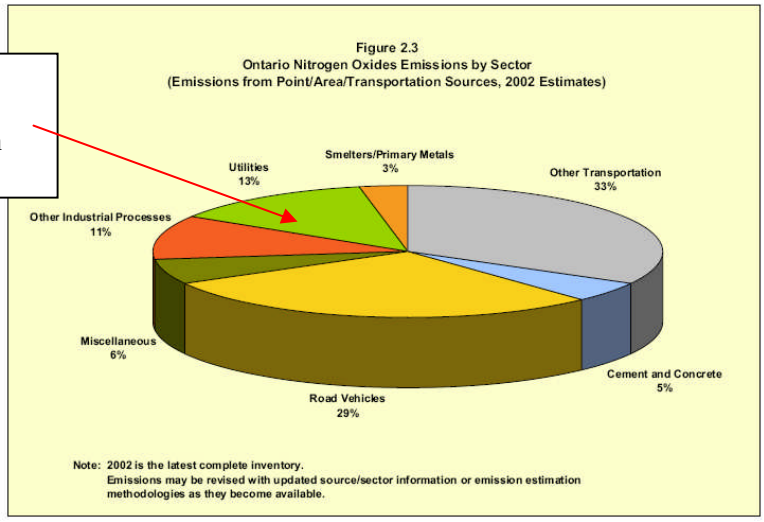
***** NOx reduction rate of 85%; SO2 reduction rate of 90%

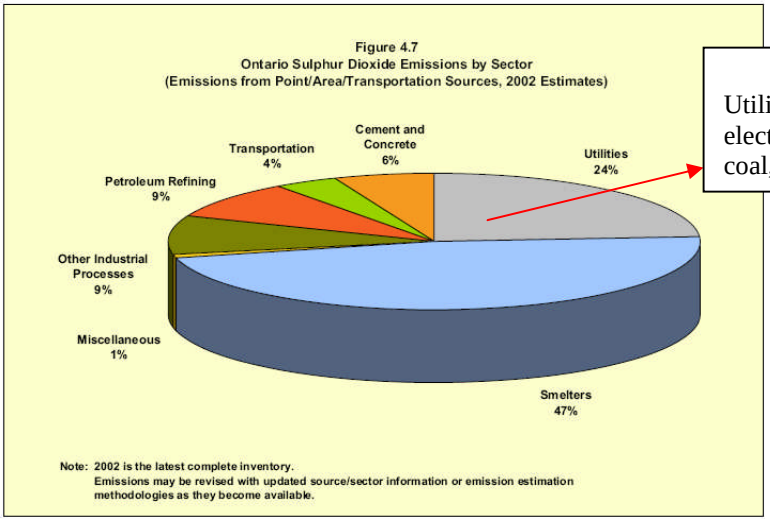
Particulate Matter can be reduced 99%; Mercury and other heavy metals can likewise be reduced 60%-90% (95% Mercury capture at Lambton GS Units 3 & 4)

(Sources: Ontario Ministry of the Environment – Ontario's Clean Air Action Plan: Protecting Environmental and Human Health in Ontario; Environment Canada – Criteria Air Contaminants Emission Summaries)

CONTRIBUTION OF ELECTRICITY GENERATION TO AIR QUALITY EMISSIONS IN ONTARIO

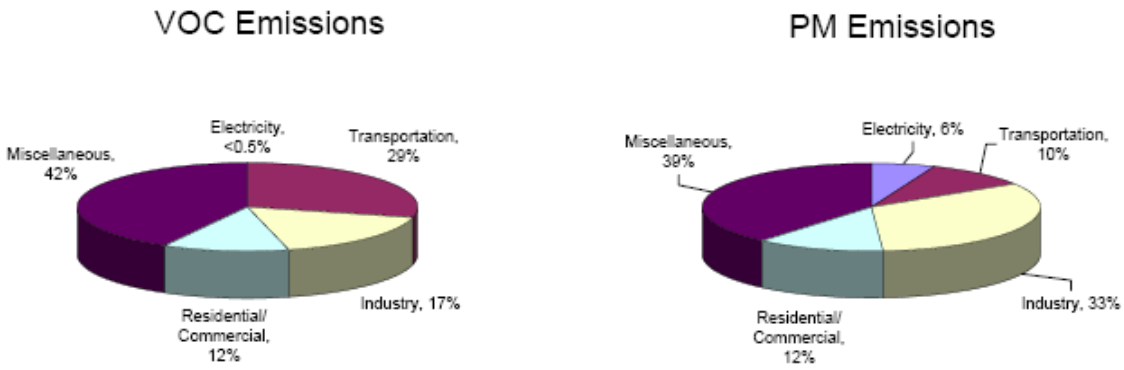
NOx
Utilities - 13% - Includes electricity generation from coal, natural gas and oil





SO2
Utilities - 24% - Includes electricity generation from coal, natural gas and oil

(Ministry of the Environment, Air Quality in Ontario, 2005)



("Ontario's Clean Air Action Plan: Protecting Environmental and Human Health in Ontario", June 21, 2004 – Ontario Ministry of the Environment)

♦ Natural gas fired generation, which is being procured to replace coal fired power in Ontario, will be more harmful with regard to particulate matter. "Scientists point to the smaller particulates — those that measure less than 10 microns - and the smallest particulates - those that measure less than 2.5 microns - as being particularly of concern. These particulates can reach deep within the lung or can enter the bloodstream and cause damage throughout the body." (Ontario Clean Air Alliance)

A report prepared for the Ministry of Energy states that "The scientific evidence demonstrating that the $PM_{2.5}$ fraction accounts for many health damages has increased substantially over the last five years. Accordingly, health damages were forecast largely based on $PM_{2.5}$ concentrations."
This report also states that "All particulate from gas turbines is on the order of 1 micron, hence all PM is assumed to be $PM_{2.5}$." (natural gas combined cycle facilities)
(Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation, prepared for the Ministry of Energy, April 2005)

♦ Ozone concentrations in urban areas (i.e. GTA) are expected to worsen with the use of natural gas generation. (Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation) This is confirmed by the OPA.

♦ Coal fired generation contributes more significantly to SO_2 and NO_x emissions (24% and 13% respectively). However, when transborder air pollution, and background emissions are taken into consideration, the coal fired contribution is minimal.

♦ According to the Ministry of the Environment, 55% of Ontario's air contaminant emissions originate in the U.S. "Background" emissions, described as "natural and human sources from outside of North America, together with natural sources within North America", also contribute significantly to Ontario air quality.

For example, Ministry of the Environment information indicates that "Ontario's NOx emissions in the regional air shed … are about 6 % of the total NO_x emitted."
Canadian sources in the region "emit less than 10% of total sulphur dioxide (SO_2) and NO_x emissions." and
"Ontario's SO_2 emissions account for approximately 6% of the combined total in the Ontario and neighbouring U.S. airshed."
(Transboundary, Air Pollution in Ontario, June 2005, Ministry of the Environment)

Coal fired generation therefore accounts for a net 2.4% and 1.3% respectively of total SO_2 and NO_x in the Ontario air shed. (24% and 13% of the Ontario portion which accounts for 10% of the total)

♦ This is confirmed by reports and studies, including a regional modeling study of the effects on air quality of electric power generation, conducted by the University of Waterloo Department of Chemistry, which concluded that **Ontario's 4 coal generation facilities contribute "about 3-4% of the total SO_2 and about 1-2% of the total NO_x in southern Ontario.** The contributions rise to about 10% and 8% respectively within 20 km of the largest facility." (ie Nanticoke). ("A Regional Modeling Study of the Effects on Air Quality of Electric Power Generation by Fossil Fuels" Waterloo Centre for Atmospheric Sciences, May 26, 2006)

IMPACT OF TRANSBORDER AIR FLOW ON ONTARIO AIR QUALITY

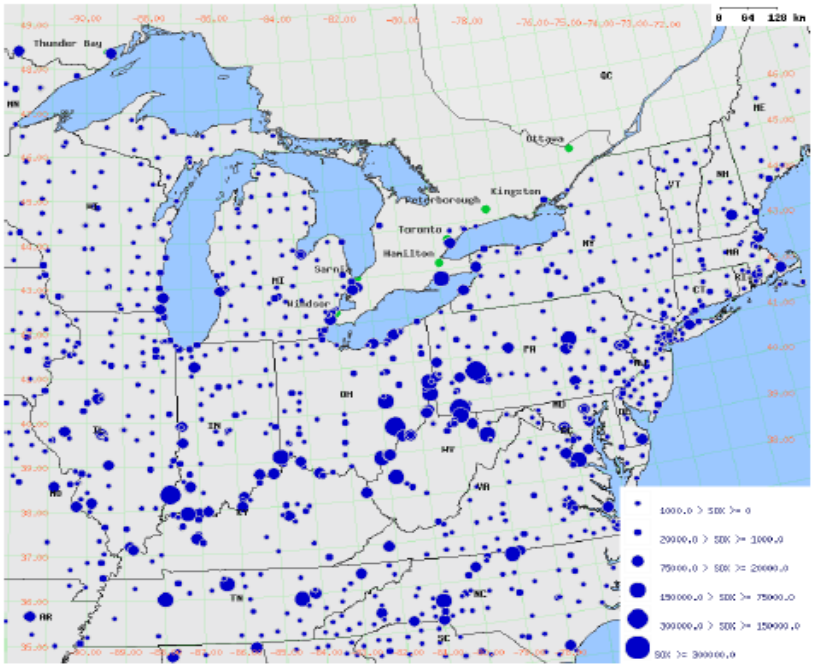
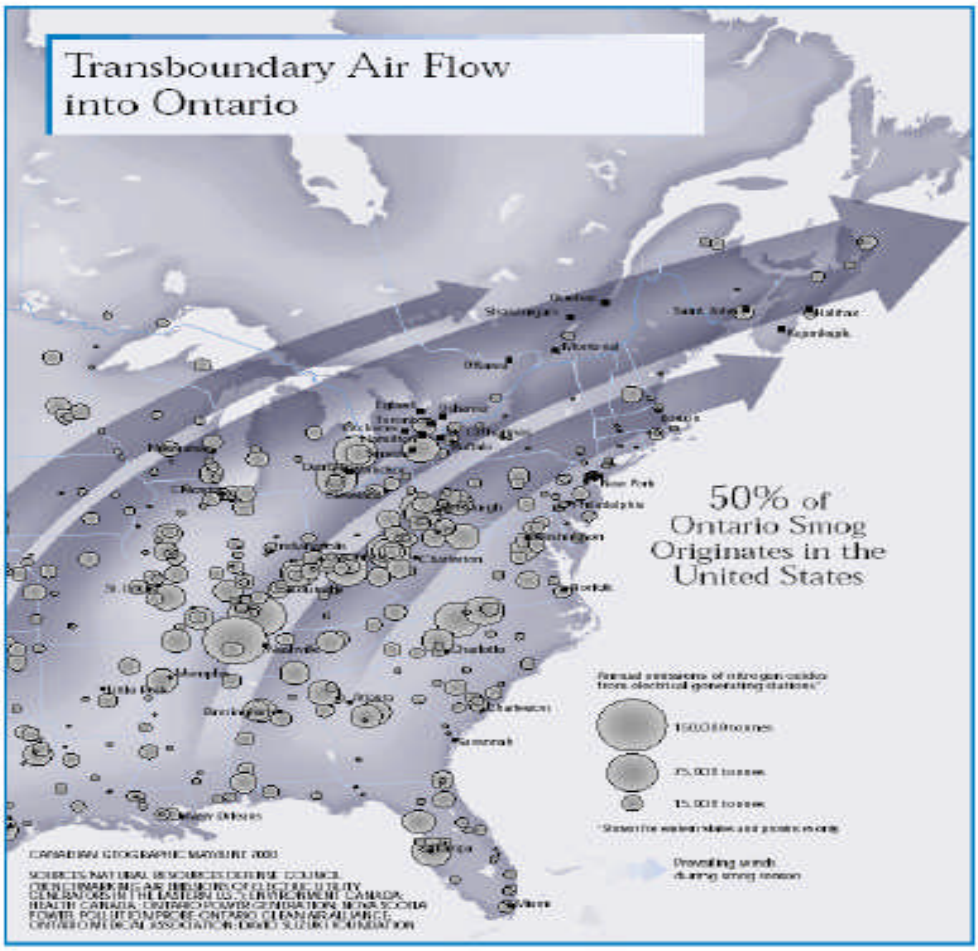


Figure A-4: Sulphur dioxide emissions from power plants shown as dots that vary in size according to their emission inventories
U.S. 1995 (with 2001 updates) and Canada 1999 Emission Inventories
(source: Ontario Ministry of the Environment)



TRANSBOUNDARY EMISSIONS vs ONTARIO CONTRIBUTIONS

● ONTARIO SOURCES ● US CONTRIBUTION

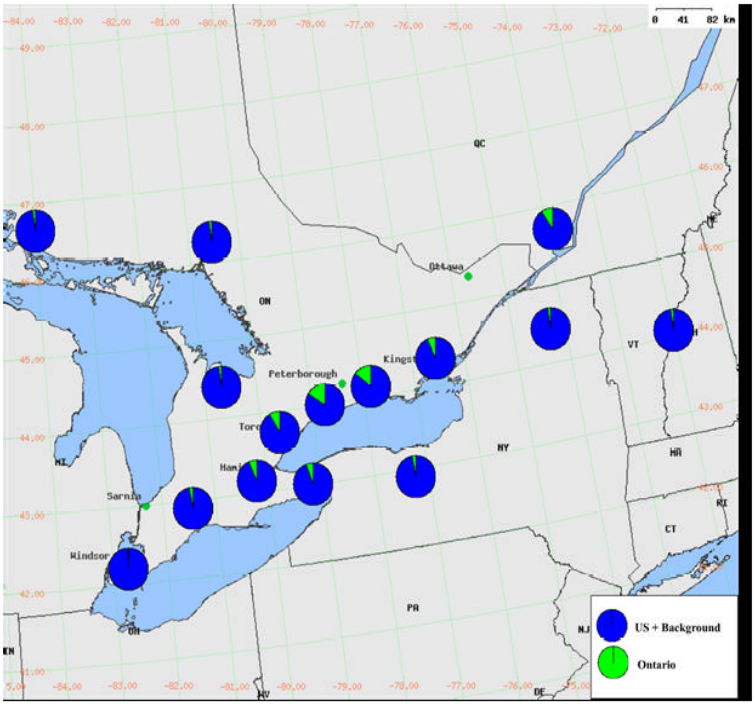


Figure 3.4: Graphic of Transboundary vs. Ontario Contribution for Ozone on High Concentration Days during 1998 Spring/Summer Season.

OZONE

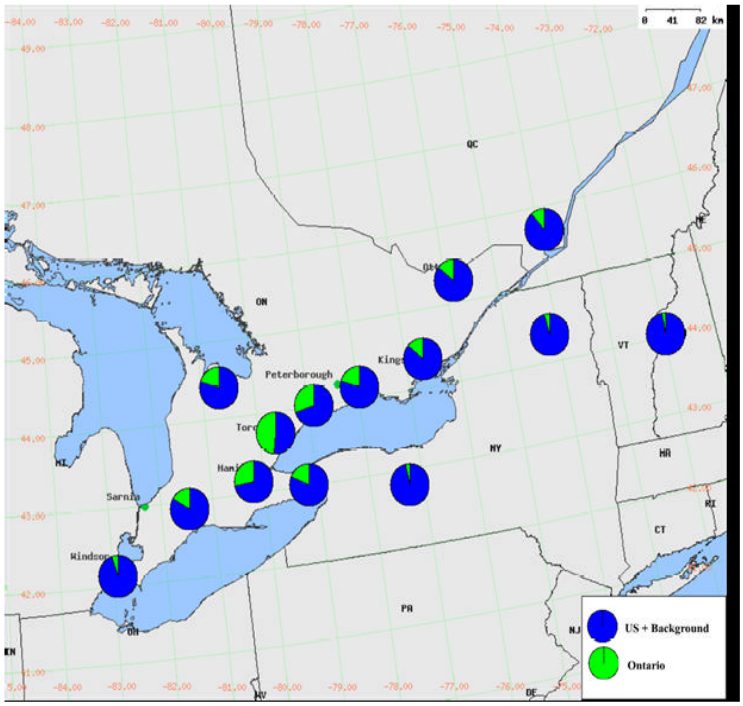


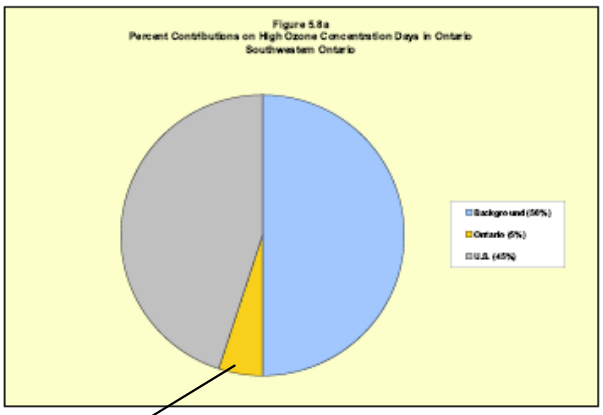
Figure 3.5: Graphic of Transboundary vs. Ontario Contribution for $PM_{2.5}$ on High Concentration Days during 1998 Spring/Summer Season.
(source: Ontario Ministry of the Environment)

$PM_{2.5}$

(Air Quality in Ontario, 2005 - Ontario Ministry of the Environment)

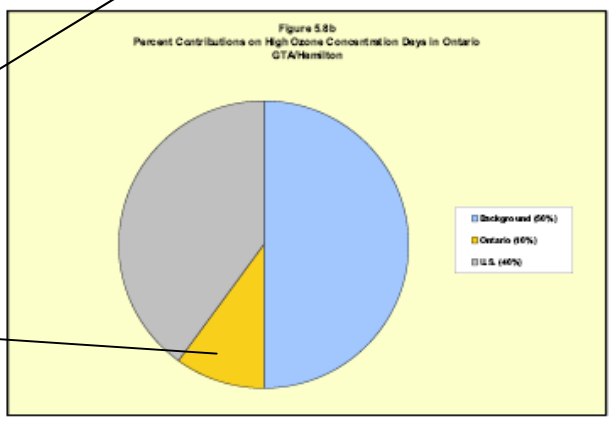
PM 2.5 originates from particles emitted directly from sources and from particles formed in the atmosphere. The precursor gases SO2, NOx, ammonia and certain VOCs react in the atmosphere to form ammonium sulphates, ammonium nitrate and organic particles. Air quality models include all of these components.

% CONTRIBUTION ON HIGH OZONE DAYS IN ONTARIO



Southwestern Ontario

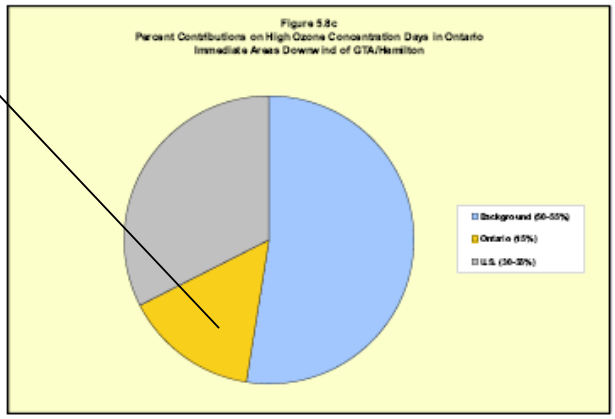
*** Background - 50%**
US Sources - 45%
All Ontario Sources – 5%



GTA/Hamilton

*** Background - 50%**
US Sources - 40%
All Ontario Sources – 10%

Coal emissions represent a small portion of this amount



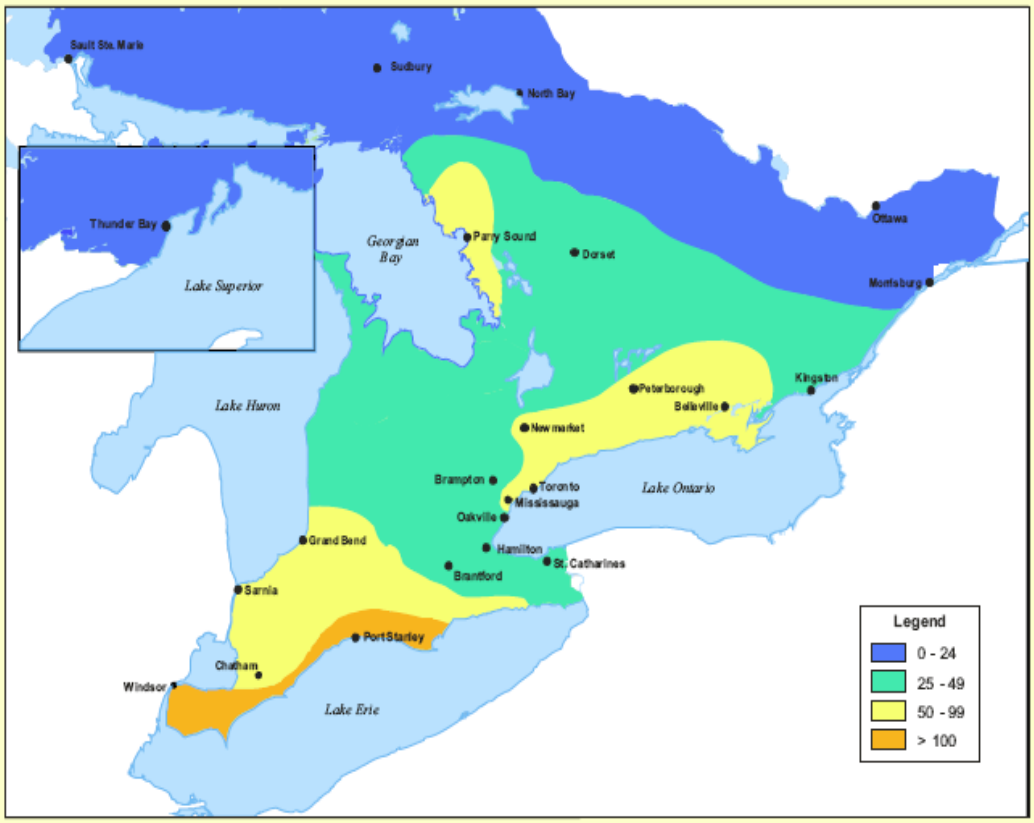
Downwind of the GTA/Hamilton

*** Background - 50%-55%**
US Sources - 30-35%
All Ontario Sources – 15%

*Background ozone concentrations refer to the contributions at a given location in Ontario that are primarily the result of manmade and natural emissions from outside North America and natural sources within North America.
(Air Quality in Ontario, 2005 - Ontario Ministry of the Environment)

On days of low ozone, background ozone concentrations are expected to dominate, and **manmade sources would not contribute as much**. Background contributions were estimated to be about 75-80% for the GTA/Hamilton and 80-85% downwind of GTA/Hamilton. (Ministry of the Environment)

Figure 2.5
Geographical Distribution of Number of One-Hour Ozone Exceedances Across Ontario
(2005)



Higher ozone excedences were recorded on the northern shores of Lakes Erie and Ontario and the southeastern shores of Lake Huron and Georgian Bay. This is attributed to the long range transport of pollutants from the U.S. ("Transboundary Air Pollution in Ontario", Ministry of the Environment)

"The increases in summer and winter ozone means appear to be largely related to rising global background ozone concentrations throughout Ontario. … Potential contributions to the increases in the summer composite means may be related to meteorological factors and long range transport of ozone and its precursors from the U.S." (Air Quality in Ontario, 2005)

♦ The government report, prepared to justify the coal closure mandate, did not include either the Thunder Bay or Atikokan coal facilities in their environmental assessment, indicating that they "emit a small fraction of the total provincial coal fired generation emissions (i.e. <5%) and are outside the main airshed in which southern Ontario coal fired generation emissions interact". (Ontario's Cost-Benefit Analysis - Replacing Ontario's Coal-Fired Electricity Generation, prepared for the Ontario Ministry of Energy, April, 2005)

♦ Of the 38 Air Quality monitoring sites in Ontario, Thunder Bay was the only site that did not record any hours of ozone above the one hour ambient air quality criteria. The designated Canada wide Standard reporting sites were all above the 2010 CWS … for ozone in 2005 with the exception of Thunder Bay …" (Ministry of the Environment, Air Quality in Ontario, 2005)

♦ As part of the government initiatives to lessen the impact of air contaminants, "The province has in place a regulation (O. Reg. 397/01) that establishes annual caps with respect to NO_x and SO_2 emissions from Ontario Power Generation's (OPG) fossil fuel power plants and the electricity sector." (Ministry of the Environment) OPG fossil fuel facilities meet these established criteria.

♦ Air quality monitoring equipment was dismantled in Atitkokan because there was nothing of significance worth monitoring.

Net Impact of Coal-Fired Power Plants on Ontario's Air Quality

♦ Small (less than 7% overall); negligible from Thunder Bay and Atikokan sites

♦ An assessment of contribution of harmful emissions to air quality from Ontario's coal fired power plants was completed as part of the government's Cost-Benefit Analysis. This report demonstrates that coal fired power in Ontario contributes **less than 1% to ozone in southern Ontario; less than 5% to PM_{10}** ("Primary PM_{10}, particulate nitrate, and particulate sulphate concentrations were summed to arrive at total PM_{10} concentrations." (Ontario's Cost-Benefit Analysis - Replacing Ontario's Coal-Fired Electricity Generation, prepared for the Ontario Ministry of Energy, April, 2005)

♦ The role of Ontario's power plants in forming ground-level ozone in Ontario was studied in a report by RWDI consultants, 2004. The results indicated that had the power plants been removed, there would have been almost no difference. "The reduction in ozone formation across the region would have been imperceptibly small." (Pain Without Gain, Fraser Institute, January, 2005)

♦ "Overall, closing down the CFG (coal fired generating) facilities is forecast to improve air quality in most parts of southern Ontario. … However, these improvements are small compared to the overall ambient concentrations of these pollutants. The ambient concentrations of these pollutants are influenced by various sources including transboundary air pollution and vehicle emissions." (Ontario's Cost-Benefit Analysis - Replacing Ontario's Coal-Fired Electricity Generation, prepared for the Ministry of Energy, April, 2005)

Affects of Coal-Fired Power Generation on Health and the Environment

The "purpose" for this proposed Regulation includes the statement that, "These emissions are associated with major health impacts (e.g., premature death, increased hospital emissions for patients with asthma and chronic lung disease) as well as environmental impacts (e.g., buildings, crops and ecosystems)."

While "these emissions" may be associated with health and environmental impacts, the degree to which coal fired generation contributes, is very minimal. The wording here is designed to mislead, to insinuate that coal fired generation is a significant cause and contributor to these concerns.

Note the following:

♦ The Ministry of the Environment operates an extensive network of air quality monitoring sites - 38 locations - across the province. An AQI (Air Quality Index) is based on recordings from these sites, of pollutants that have adverse effects on human health and the environment.

♦ The data collected is summarized and included in the Ministry's Air Quality report. The most recent is the data from 2005. Most sites showed good or very good air quality 85% of the time; moderate 13%-15%; poor on average, less than 1.5% of the time. (. In spite of the fact that the summer of 2005 was particularly hot and smoggy. Due to decreased availability of hydroelectric power and increased air conditioning use, coal fired power was required more frequently. Lakeview GS was in service for the first quarter of that year.)

♦ The following chart shows the impact of emissions on health and the environment. This chart is from the 2005 Air Quality report. We have included coal fired contribution at the bottom.

Table 5.1: Air Quality Index Pollutants and Their Impacts*

Index	Category	Ozone (O_3)	Fine Particulate Matter ($PM_{2.5}$)	Nitrogen Dioxide (NO_2)	Carbon Monoxide (CO)	Sulphur Dioxide (SO_2)	Total Reduced Sulphur (TRS) Compounds
0-15	Very good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people
16-31	Good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	Slight odour	No health effects are expected in healthy people	Damages some vegetation in combination with ozone	Slight odour
32-49	Moderate	Respiratory irritation in sensitive people during vigorous exercise; people with heart/lung disorders at some risk; damages very sensitive plants	People with respiratory disease at some risk	Odour	Blood chemistry changes, but no noticeable impairment	Damages some vegetation	Odour
50-99	Poor	Sensitive people may experience irritation when breathing and possible lung damage when physically active; people with heart/lung disorders at greater risk; damages some plants	People with respiratory disease should limit prolonged exertion; general population at some risk	Air smells and looks brown; some increase in bronchial reactivity in asthmatics	Increased symptoms in smokers with heart disease	Odour; increasing vegetation damage	Strong odour

Coal contribution ^ ^ ^ ^ ^

VOCs 0.125% 1.438% 13% 0.49% 24%

\+ NOx 13%

♦ There were no impacts for healthy people 85% of the time. For 15% of the time, odour and **potential** "respiratory irritation" in **sensitive people during vigorous exercise;** those with heart/lung disorders potentially at some risk. (Noted elsewhere, "moderate" air quality days, according to the Ministry of the Environment, "may have some adverse effects for very sensitive people".)

♦ Environmental impacts include a "potential damage to very sensitive plants; damages some vegetation". Again, however, this is a result of all contributors of NO_x and SO_2, of which coal fired generation is only a smaller portion.

♦ Asthma is most commonly triggered by pollens, dust, pet dander, mould, stress, as well as outdoor air pollution; respiratory viral infection is one of the most common causes. (Canadian Lung Association) Indoor air pollution is 2-5 times higher, occasionally 100 times higher, than outdoor levels. On average, we spend more than 90% of our days indoors. Coal fired generation therefore contributes an insignificant amount to hospital admissions related to asthma.

Greenhouse Gas Emissions

♦ Reducing CO_2 will not improve smog in our province. CO_2 is not a pollutant or a toxic. (It is an essential component of sustaining life on earth.)

♦ Human contributions represent less than 4% of all greenhouse gas releases. This amount however is increasing and causing concerns regarding climate change potential.
Canadian emissions account for about 1.8% of this 4%, or 0.072% of these global man made emissions. ((Natural Resources Canada - Global Emission Outlook)

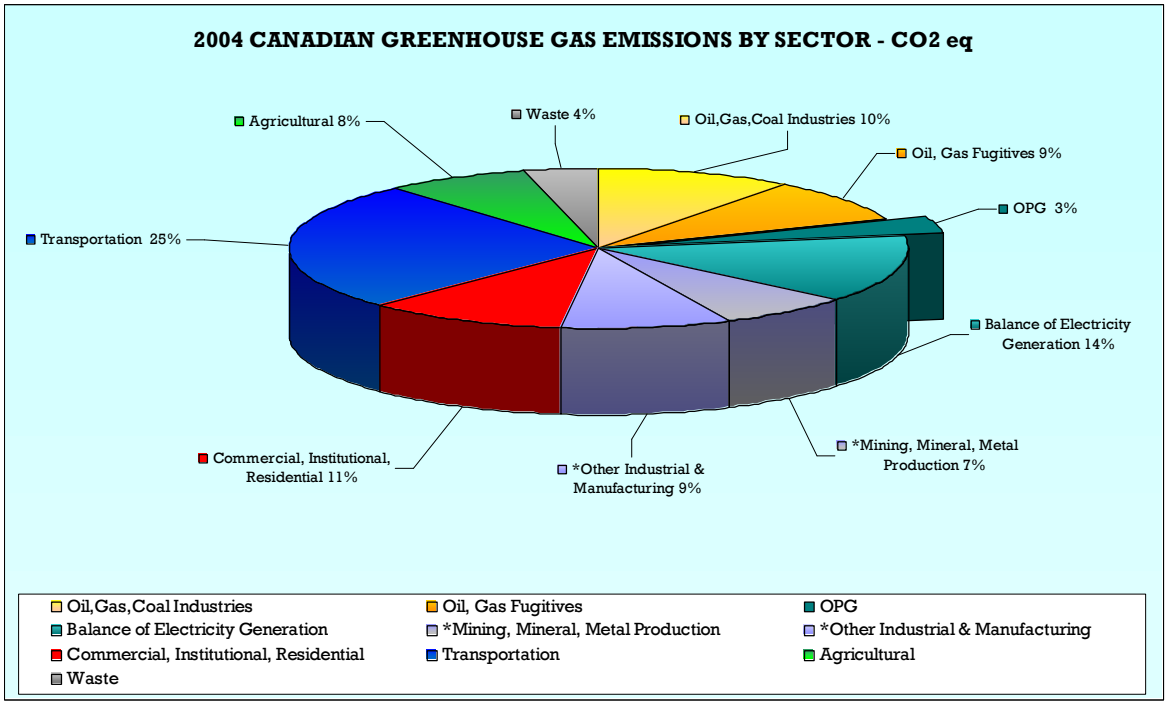
♦ According to Environment Canada statistics for 2004, OPG coal plants contribute about 3% to the national total; 0.054% globally (manmade emissions); 13% to Ontario greenhouse gas emissions.
(see Charts, following)

♦ Emissions impacting climate change will not be reduced significantly with the closure of Ontario's coal-fired power plants. Replacement generation is slated to come from natural gas-fired power. Although natural gas emits about 55% the CO_2 of coal generation at point of combustion, there are significant emissions associated with production, flaring, processing and transport of natural gas. There is marginal net benefit of using natural gas in place of coal.
(For comparison, and statistics, see section (iii), Net Impact of Transitioning to an Alternative Fossil Fuel")

Conclusion

The coal fired power plants are large facilities, single source emitters of pollutants of some concern. However, they do not constitute a major portion of air quality concerns in Ontario.

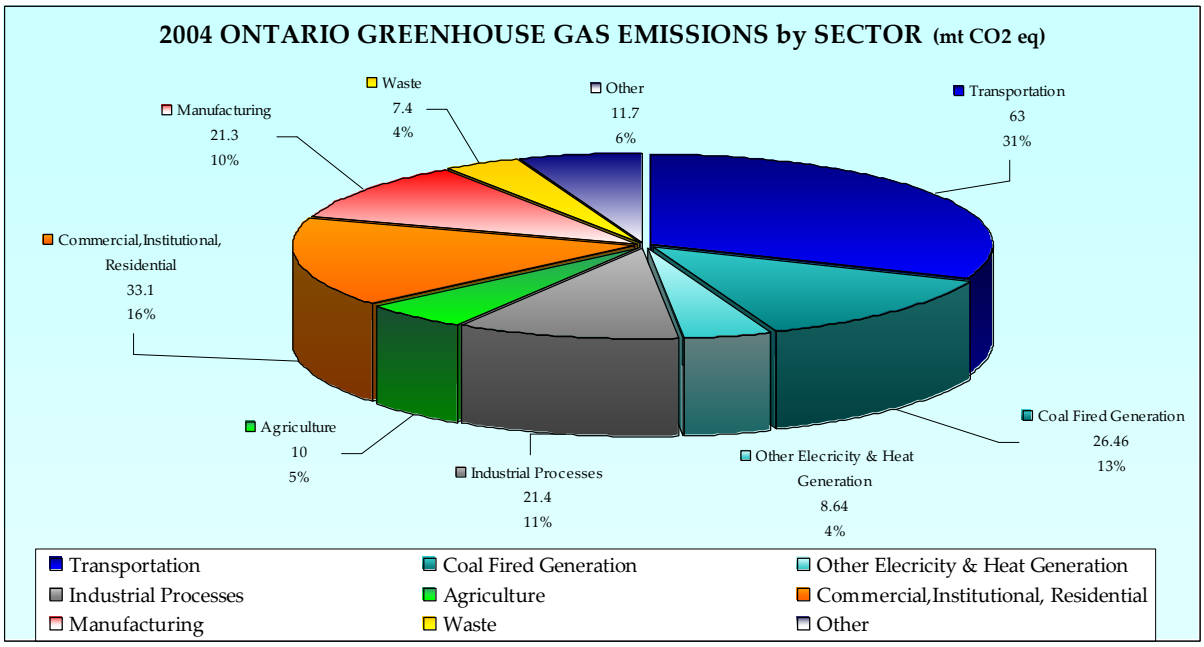
To conclude, as noted in the "Regulatory Impact Statement" (as part of the EBR Regulation Proposal Notice) that "removing coal as an electricity generation fuel will provide significant human health and wider environmental benefits" is a gross overstatement.



"Environment Canada, Summary of Canada's 2004 Greenhouse Gas Inventory"
*Includes both combustion emissions and process emissions

- Total Canadian Greenhouse Gases 758.0 MT
- OPG (coal) Greenhouse Gas Emissions 26.5 MT
- % OPG (coal) of all Canadian GHG emissions approx. 3%

(includes Lakeview Generating Station, since removed from service)



Environment Canada, National Inventory Report, 1990-2004 – Greenhouse Gas Sources and Sinks in Canada – Annex 12: Provincial/Territorial Greenhouse Gas Emission Tables, 1990-2004" and
Ontario Power Generation, 2005 Sustainability Development Report, Appendix B, www.opg.com

(ii) Emissions Can be Economically and Successfully Reduced

The pollutants of greatest concern in relation to coal fired power generation, are the emissions that can be most affordably and successfully reduced. This success is evidenced in reports generated by and for the Ministry of Energy, including the Cost Benefit Analysis Report and the OPA's IPSP Discussion Paper Emission Control Alternatives for Ontario Coal Generators, 1 April 2007. These reports show that the emissions from Lambton Generating Station Units 3 and 4 are approximately 75%-85% less for NO_x and SO_2; 95% less for mercury emissions, as a result of emissions abatement technology installed on these units. Subsequently, they are ranked 4th and 9th cleanest of the 500 coal fired plants in North America. Greater reductions can be obtained, as noted below.

♦ "Proven and cost-effective emission control technologies are available that can be added to existing coal stations to achieve significant reductions. Selective Catalytic Reduction (SCR) can reduce NOx emissions by up to 80%, while de-sulphurization scrubbers can reduce SO_2 emissions by 90+ percent. …" (Ontario Ministry of the Environment, "Coal-Fired Electricity Generation in Ontario")

♦ The Ministry encourages other industries to employ the same emissions reduction technology that is readily available for coal powered plants, to reduce industrial emissions. The Ministry recognizes the benefit of NO_X abatement technology reduces emissions by "80-95%", and technology for SO_2 reduction including Dry Flue Gas De-Desulphurization reduce emissions "55-95%", as well as Wet Flue Gas Desulphurization systems which reduce emissions "90-98%". ("Appendix II - Ontario's Industry Emissions Reduction Plan: Proposal for a Nitrogen Oxides (NO_X) and Sulphur Dioxide (SO2) Regulation", June, 2004)

♦ The Ministry has joined with other agencies to encourage the adoption of technologies that would reduce emissions from U.S. coal fired power plants by up to 90% into the regional air shed.

♦ "... if currently existing remediation technology were used, the air quality effects from coal fired power plants are comparable to those from natural gas plants and neither could be distinguished from the regional background at distances more than a few km from the source."
("A Regional Modeling Study of the Effects on Air Quality of Electric Power Generation by Fossil Fuels" Waterloo Centre for Atmospheric Sciences, May 26, 2006)

♦ This study, funded in part by the Ontario Ministry of the Environment, reports that "currently existing remediation technology on the coal plant reduces both the SO_2 and NO_X contributions to about 0.3% when averaged across southern Ontario and about 1% within 20 km of the largest plant".

♦ Electrostatic precipitators (dry ESP) installed at coal fired power plants, including Lambton Generating Station, reduce approximately 99% of particulate matter. A wet ESP would remove over 95% of the remaining 1%. (This represents superior reduction of PM than natural gas use.)

With regard to mercury and other toxic pollutants:

♦ The US Department of Energy indicates that mercury can be reduced 80%-90%+ using combined scrubber/SCR technology.

♦ "Essentially all coal-fired power boilers in Germany are equipped with both SCR systems and limestone based wet scrubbers. Total mercury capture in these systems exceeds 80% system-wide."

("How Low Can We Go?" Babcock & Wilcox) Germany uses coal fired generation for 50% of its power needs.

♦ According to Environment Canada, "capture of mercury from ... coal-fired power plants ... on the order of 60-90% is achievable. ..." This report lists both current and emerging technologies, with removal rates for each, affirming the conclusion that mercury emissions reductions of 60-90% are achievable by 2010. (Submission filed by Environment Canada to U.S. EPA, March 30, 2004)

♦ Nanticoke Generating Station "is achieving more than 60% capture of mercury in coal burned through existing pollution control equipment and fuel blending". Nanticoke has not yet been outfitted with scrubbers, as has Lambton Generating Station. (Presentation by the Ministry of the Environment to the Great Lakes Bi-national Toxics Strategy Mercury Work Group on May 17, 2005)

♦ Mercury removal of at least 90% can be achieved by methods developed by Babcock, Wilcox which involves low cost and collection of mercury that ensures that it will not be re-emitted to the environment. ("How Low Can We Go?") Other mercury emissions reduction technologies (Eco System – Power Span Corp.) are in process, or development.

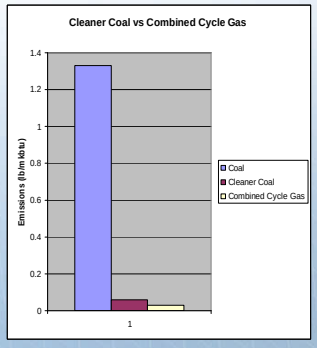
♦ Example:

Coal fired Generation can be one of the cleanest power generation alternatives

Smog causing emissions reduction:

- Cleaner Coal - 96.4%
- Replacement with Natural Gas Combined Cycle – 97.3%

Item	Emissions g/MWh	
	Gas	Coal
NOx	26	163
CO	104	49
VOC	16	0
PM2.5	29	8
PM10	0	0
SO_2	2	82
NH_3	42	0
Total	**224**	**302**



Many people are unaware that current technology can be applied to existing coal power plants to make them very nearly as clean as modern, efficient Natural gas turbine combined cycle power plants. Application of these technologies in Ontario would reduce smog and acid rain causing emissions by more than 96%. BABCOCK & WILCOX (with permission)

♦ See Charts, page 11, comparing air contaminant emissions with and without reduction technology

(iii) Net Environmental Impact of Transitioning to an Alternative Fossil Fuel

The proposed coal closure cannot be viewed in isolation of the replacement generation for these resources. The Ontario Power Authority, at the direction of the Ministry of Energy, is in process of procuring 7,000 MW of natural gas fired generation (in addition to the existing 5,000 MW of gas fired power) as replacement for coal fired facilities. Natural gas generation produces emissions, including greenhouse gas emissions that must be taken into consideration when assessing the **net benefit** of ceasing to utilize coal for electricity generation.

♦ As noted in the previous section, air contaminant emissions of concern from coal fired power plants can be reduced to a level comparable with natural gas.

♦ Natural gas "production has significant environmental consequences in the form of wilderness and habitat destruction…. Contrary to its clean image, natural gas contributes to climate change. Although burning natural gas produces fewer greenhouse gas emissions than coal or oil (25–40% lower, per unit of generated electricity), natural gas still creates emissions when it is produced, processed, and transported…" (Suzuki Foundation submission to the Ontario Power Authority, Fall, 2005)

♦ Regarding greenhouse gas emissions, note:

(a) Natural gas emits about 55% - 63% the CO_2 of coal generation at point of combustion. (63.06% the CO2 of coal at point of combustion. - Carbon Dioxide Emissions from the Generation of Electric Power in the United States, July 2000, staff of the U.S. Department of Energy and the U.S. Environmental Protection Agency; Natural Resources Canada, 56.67%).

However, there are significant emissions associated with production, flaring, processing and transport of natural gas.

(b) "Burning gas instead of coal also sounds good and green since it cuts CO_2 emissions in half. In practice it may be the most dangerous energy source of all, because natural gas is 23 times as potent a greenhouse gas as CO_2. … even a 2 percent leak of the natural gas from the production sites to the power stations makes it as bad as burning coal. In practice, the leak rate is 4 percent, so it may be more than twice as bad as burning coal or oil."
(Mr. James Lovelock - address to the Canadian Nuclear Association Annual Seminar, March 10, 2005)

(c) "the contribution of natural gas generation to climate change is only slightly less than coal (on an energy basis). ... Even using the best-case scenario shows that natural gas is a deficient strategy to address climate change." (David Suzuki Foundation – Submission to the Ontario Power Authority, fall, 2005)

(d) Natural gas GHG emissions are about 25% less than coal, on a lifecycle basis. (IAEA Spadaro et al. 2000). This gap could be closed by burning biomass with coal.

(e) TransCanada Pipelines Ltd. reported more than twice the emissions at the Kenora Compressor Station from the compression/recompression of natural gas coming into the Province, than from Atikokan and Thunder Bay coal fired stations combined.

(f) "If life cycle analysis was used and other greenhouse gases were taken into account, electricity generation from fuels other than coal would show similar or even higher GHG emissions …" (World Energy Council)

(g) "In Canada … natural gas is a larger source of carbon dioxide emissions than coal. Natural gas 29.0%; Coal 19.2% (Carbon Dioxide Fact Sheet, 2004)

(h) Considering the significant amount of new gas fired generation proposed for Ontario, and the future supply concerns, "…liquefied Natural Gas (LNG) is expected to play a critical role in addressing the forecast supply gap." (Navigant Consulting Report to OPA) There are greenhouse gas implications of using LNG. LNG entails an energy loss of 15% - 30% in the transport, liquefaction and regasification processes.

(i) Greenhouse gas emissions have increased in Canada from 1990 to 2003. …42% of the increase is as a result of "fugitive releases (e.g. methane leaks from pipelines)... most of this increase is the result of greater traffic through energy pipelines..." (Environment Canada – Summary of Canada's Greenhouse Gas Inventory)

(j) CO_2 emissions from coal plants can be reduced by:

Co-firing with biomass, as is successfully done in Europe and in preliminary stages at Nanticoke – resulting in up to 30% reduction in CO_2 ;

Implementing emissions control technology and other equipment upgrades to increase unit efficiency;

Re-establishing emissions trading (A practice of OPG prior to coal closure mandate) ;

Using fly ash from coal combustion in cement production. Each tonne of ash used in place of shale avoids a tonne of carbon dioxide being released into the atmosphere. Nanticoke diverts 300,000 – 400,000 tons of fly ash from land fill to cement companies, offsetting one ton of CO_2 for each ton of fly ash used;

Carbon capture and sequestration, a process that, although still in the developmental stage, is progressing rapidly for market use.

CONCLUSION

Coal fired power generation does not produce a "major" portion of Ontario's air contaminant emissions. The emissions impact from Atikokan and Thunder Bay Generating Stations are minute. Therefore, the health and environmental benefits have been greatly exaggerated. The emissions that do pose concerns can be readily, affordably, and successfully reduced to near par with natural gas fired generation. Switching to natural gas fired generation will not lessen global greenhouse gas emissions from power generation in Ontario.

Replacement generation will come at great cost to the Ontario economy, and to the average ratepayer, at very minimal environmental benefit.

4. Cost Implications

Included in the "Purpose" for this proposed Regualtion is the statement that, "Coal-fired electricity generating facilities are also major emitters of greenhouse gases (GHG) and therefore are contributors to global climate change. In 2006, the 'Stern Review on the Economics of Climate Change' identified the global cost of climate change to be as high as 20% of global GDP. In the same report, the cost of action was found to be as low as 1% of global GDP."

Inclusion of this as justification for the "Coal Closure Regulation" necessitates the assessment of:

(i) the impact of Ontario's coal-fired power plants on global climate change;

(ii) the impact of replacement generation on global climate change, and;

(iii) the "cost of action", namely the removal of coal-fired generation.

Consider:

(i)

♦ As noted in Section 3 (i) of this document, Ontario's coal-fired power plants represent less than **0.06% of global manmade greenhouse gas emissions** (GHG). Antropogenic emissions of CO_2 account for approximately 4% of all GHG. Therefore, closure of Ontario's coal-fired power plants will impact the global total by **0.0024%.**

♦ According to 2004 statistics, the latest available for the Ontario sector summary, coal-fired generation (including Lakeview GS) contributes 13% to Ontario GHG, 3% to Canadian GHG.

(ii)

♦ The closure of Ontario's coal-fired power plants **will not** reduce these factors to zero. It is acknowledged by the OPA and the Ministry of Energy that natural gas-fired generation will replace coal-fired power. (Renewable generation can displace the amount of fossil fuels used, but due to generating characteristics, cannot replace them.) Natural gas generation in the province is slated to almost triple in terms of TWhs of power production, double in installed capacity. The volume of natural gas required for the province will increase by 37%.

♦ At point of combustion, natural gas produces 35%-45% less greenhouse gas emissions. However, as noted in Section 3 (iii) of this document, when lifecycle emissions of natural gas for production, refining and transport are considered, natural gas has little benefit and may actually be worse for the environment in terms of climate change. As noted, the Kenora Natural Gas Compression Station alone reported higher GHG than Atikokan and Thunder Bay coal-fired stations, combined.

♦ Methane (primary constituent of natural gas) is 23 times more potent a greenhouse gas than CO_2.

(iii)

The cost impacts of the coal closure are huge, and will most definitely impact provincial GDP more than 1%.

♦ Refer to pages 4, 5 of Section 1, in which we highlighted some of the concerns associated with the economic impacts of closing the coal-fired power plants.

♦ Every product and service utilizes electricity, so the impact of higher energy costs has a compound and domino effect. "The export-oriented manufacturing sector represents about one-fifth of overall real GDP in the two largest provincial economies of the country,… both employment and output in that sector have been declining for quite awhile. There is always the risk that this weakness could deteriorate households' confidence and spread to the rest of the economy, notably consumer spending and housing demand." (Toronto Star – Dec 28/06)

♦ The slowing of the Ontario ecomony is due in part to "higher energy costs", according to Finance Minister Greg Sorbara, December 13, 2006. Likewise, higher energy costs are deemed a risk to any hoped for turn around in the economic outlook.

♦ "In 2003 to 2005, as energy and other commodity prices began to increase, the stimulus for national growth shifted west. ... Ontario ... export driven economy felt the ... impact of higher fuel costs. ... Manufacturing fell in 2003 and 2005 in Ontario ... lagged behind the national average for the last three years..." (Statistics Canada - Provincial and Territorial Economic Accounts, summary, Nov. 8, 2006)

♦ Higher energy rates not only impact corporate return, they also discourage new investment in the Province.

♦ The Finance Ministry also notes that "Ontario has the largest agriculture sector of any province, with sales of $8.2 billion in 2005. The government recognizes that Ontario farmers face challenges from a variety of external factors." According to The Ontario Federation of Agriculture, "Without reasonably priced power the production and processing of food in Ontario would be uncompetitive and likely extinct. Agriculture is Ontario's second largest industry. Reliable and reasonably priced power is essential to its sustainability."

♦ Ontario is bleeding manufacturing jobs. Much of the goods we use now come from China and India, both of which are exempt from Kyoto complaince due to their status as "developing countries". A closure of Ontario's 6,434 MW of coal fired generation will cause electricity costs to escalate, eroding the competitiveness and viabiltiy of the primary employers in Ontario. China, which currently has 650,000 MW of installed coalfired generation capacity, is building the equivalent of 2 - 500 MW coal plants per week. China, which is expected to surpass the U.S. in GHG by 2009 - 10 years earlier than anticipated - will be the beneficiary of lost manufacturing in Ontario.

♦ There have been constant complaints and concerns expressed by energy stakeholders regarding the lack of transparency and full cost analysis of energy restructuring in Ontario. Attempting to assess costs to the public is complicated by lack of disclosure regarding contracts with private power producers, conflicting and incomplete information provided by the OPA and Ministry of Energy.

♦ The basic cost increase for electricity is estimated at 60%-70% by CIBC World Markets Inc.. The following are some statements from the business, the industrial and manufacturing sectors, and the farming community - the economic drivers of this province - from submissions made to the Ontario Power Authority.

(a) AMPCO (Association of Major Power Consumers of Ontario), represents the mining, refining, cement, steel, forest products, petrochemical, automotive and general manufacturing sectors, employing over 100,000 people, and indirect employment for an additional 300,000. Comments include:

"... member companies have a strong stake in the long-term security and cost of electricity in Ontario and Ontario in turn depends on the health of the industries ..."

"... members face intense global competition and the low electricity cost advantage they once had has vanished. ... Recent announcements of plant and mill closures are a direct result of high and rising energy prices. Our concern is clear and urgent"

"We are very concerned that current electricity polices are moving Ontario towards greatly increased reliance on natural gas for its electricity supply ... this is a dangerous direction for Ontario"

"The current policy to retire from service the existing coal-fired stations ... is the biggest factor causing upward pressure on rates and increasing risks in Ontario's electricity market. ... Our analysis suggests that the environmental performance of these facilities can be dramatically improved for a relatively modest investment."

(b) The Ontario Mining Association, a vital contributor to the provincial economy reports that "The studies show that current technology can be applied to existing coal plants to make them very nearly as clean as modern, efficient gas turbine combined cycle power plants ... in the 1-2% range ..."

"...experts are telling us demand for natural gas in North America exceeds supply. ... Ontario must decide whether it wants to rely upon an energy source for its future electric power generation that is bound to generate extensive periods of tight supplies with high prices and the potential for extreme volatility. If it does, the result will be reduced industrial activity in the Province."

"... a large spike in energy pricing greatly changes the feasibility of an Ontario operation."

(c) Industrial Gas Users Association, with 45 members from the pulp & paper, metals, mining & smelting, and chemical industries, warns that "Ontario must decide whether it wants to rely upon an energy source for its future electric power generation requirements that is bound to feature extensive periods of tight supplies with high prices and the potential for extreme volatility. If it does, the result will be reduced industrial activity in the Province."

"If CES contracts are used for future power generation contracts then very large volumes of gas will be purchased at Dawn ... Dawn Index will be pushed higher but there will be significant price volatility... other purchasers, including industrial consumers may be forced out of that market."

(d) The Ontario Federation of Agriculture, representing Ontario's second largest industry, warns that "Reliable and reasonably priced power is essential to its sustainability", without which, "production and processing of food in Ontario would be uncompetitive and likely extinct."

Switching to natural gas fired generation will result in "... increased gas costs for millions of homes and businesses as well as in fertilizer and chemical costs increases for farmers ... increased unemployment, lost investment and lost production ... (OFA) advocates ... cleaner coal, fully scrubbed so that Ontario has power at a cost we can afford with improved air quality."

(e) The Canadian Manufacturers & Exporters, representing 75% of manufactured output in Ontario and 90% of all exports, employs over 1,000,000 people directly. For every $1.00 invested in manufacturing there is an additional $3.05 in economic activity.

"Recent government policy decisions including the decision to phase out coal-fired generation and RFP contracts will virtually guarantee higher prices for electricity. ... Ontario must not become an island of higher priced electricity relative to other jurisdictions that are competing for investment."

"Cost analysis has been seriously lacking ...."

"Rather than picking sources of fuel on an ideological basis, the government should look to set criteria for generation based on desirable health, social and environmental outcomes. ... CME believes strongly that coal has been dismissed as a fuel source without adequate consideration of the potential for environmental and health improvements and the advantages of coal-fired generation from a cost standpoint."

(f) The Canadian Chemical Producers Association advises the OPA that "This emphasis on using increasingly scarce natural gas for power generation has stretched North American natural gas markets and driven up the price of natural gas. The EIA (US Energy Information Administration) believes that the natural gas for additional power generation will be sourced primarily from new and expanded LNG terminals. ... for Ontario, relying on LNG would be even more problematic."

"...excessive demand has made natural gas so expensive, driving electricity prices higher along with it, that it undermines ability to compete internationally."

The President of the CCPA ... urges provincial policy makers... to revisit energy and electricity policies that have largely eliminated coal as a fuel ... in spite of its low costs. We're looking for strong leadership on energy ... not platitudes, wishful thinking and naiveté while industry leaves for lower-priced markets." "Clearly, in order to remain competitive, coal must be part of Ontario's future supply mix."

CONCLUSION

It is disingenuous to claim that the closure of the coal-fired power plants will result in a substantial benefit in terms of global climate change. The Ministry of the Environment must conduct a full assessment of the production and refining impacts of natural gas, the significant GHG associated with the long distance transport of natural gas to Ontario from Alberta. GHG implications of LNG, oil and single cycle gas turbine use must likewise be included in the net benefit of switching to natural gas-fired generation.

The rise in electricity rates will impact provincial GDP. However, other related costs must also be considered in the determination of "worth" in mandating a coal closure time. These include infrastructure costs to accommodate replacement generation - $7-$10 billion; higher institutional costs, i.e. schools and hospitals passed on to the taxpayer; less retail sales and personal tax revenue in the public coffers to finance provincial spending, to name a few.

5. This Regulation Will Result in Greater Health and Environmental Damages

It is likely that the implementation of this proposed Regulation will result in greater harm to health and the environment, and therefore must be rejected. Consider the following:

♦ Significantly more natural gas-fired generation in the GTA and "Golden Horseshoe" will create higher rates of ozone and particulate matter, increasing the health impacts in urban areas. (OPA) With shorter emissions stacks and higher concentrations of smog producing pollutants where pre-ambient conditions for ozone and smog occur, natural gas fired generation may be worse for the environment than the current coal fired generation plants.

♦ An environmental assessment must be done regarding the safety or environmental impacts of siting natural gas facilities in urban areas, such as the transport of ammonia for NO_x abatement equipment, hydrogen for generator cooling, and large volume natural gas pipelines.

♦ The OPA suggests that gas fired power plants may utilize the option for oil fuelled power generation. "to ensure operational capability during winter peak periods when gas demand and electricity demand peak simultaneously." The environmental impacts are greater from oil, than coal-fired generation.

♦ Single cycle natural gas power plants are proposed for peaking periods. The higher emissions associated with these facilities have not been compared to coal-fired generation, for either greenhouse gas, or air contaminant emissions.

♦ The uncertainties and tight resource balance anticipated from 2010 to 2020 will likely force imports of power from coal-fired power plants less environmentally "clean" than existing Ontario coal-fired plants (which are in the top 10% in North America).

♦ The proposed Regulation, if passed, will likely be repealed in future when it is deemed necessary to retain the coal facilities for reliability reasons. (See Section 2). Passing this Regulation at this time will defer the installation of emissions reduction technology, resulting in more time (years) of emissions from coal plants which could otherwise have been avoided.

♦ If system reliability is compromised, power interruptions may occur, thereby impacting the environment as a result of industrial and manufacturing power losses. For example, NOVA Chemicals reported that unexpected power outages introduce problems, including safety and environmental incidents typically associated with crash shutdowns and start-ups. (Letter to Minister of Economic Development and Trade, April 8, 2005)

♦ Natural gas resources in North America are declining, while demand is increasing. The coal closure necessitates significant use of natural gas in Ontario – a 37% increase, more than all residential consumers combined. (Ontario Energy Board) Ontario will inevitably become dependent on LNG imports (National Energy Board) and unconventional gas resources, such as coalbed methane (OPA), resulting in higher emissions and other environmental impacts. (For more impacts and concerns associated with natural gas, see Section 7)

♦ The coal closure regulation will increase electricity costs an anticipated 70%. This will cause significant damage to the Ontario economy. The results and implications are manifold, with far reaching impacts to the health and welfare of Ontarians.

♦ Higher energy costs cause disproportionate harm to those least able to cope - the elderly, the infirm, those on fixed and lower incomes. This will translate into issues such as lack of ability to afford air conditioning, or using wood burning for residential heat.

♦ It is reported that many newly constructed homes have installed natural (wood) burning fireplaces, rather than natural gas, due to the rising cost of gas.
This impacts the environment, as there is more particulate matter (PM) emitted from residential wood combustion (wood stoves and fireplaces) in Ontario, than from all the provincial coal fired power plants combined. (Environment Canada – Criteria Air Contaminants Emission Summaries)

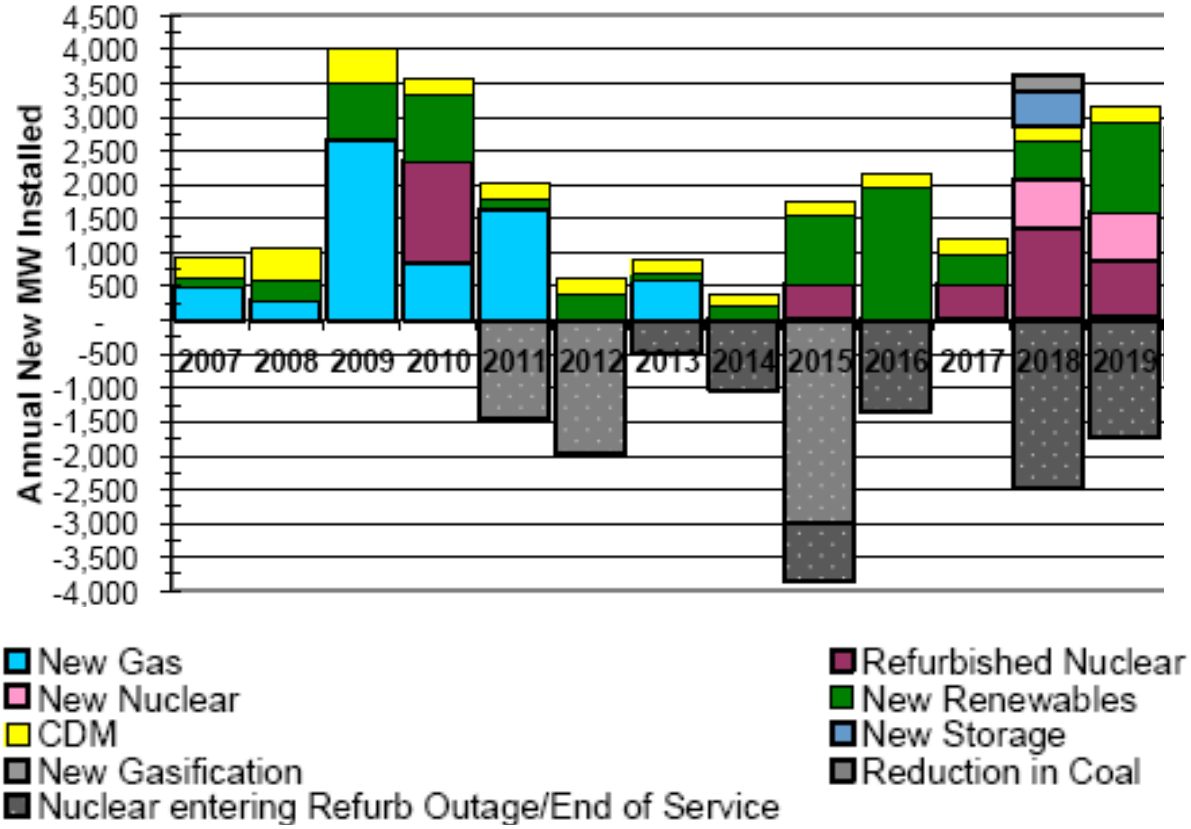
♦ Less funding will be available to address emissions from sectors of greater environmental impact than coal fired generation. (Transportation is one of the largest sources of Canadian carbon dioxide emissions. Roughly half of the carbon dioxide emissions from the transportation sector are created by the cars and light trucks we drive for personal use. The rise in transportation emissions is attributed to growth in use of SUVs and minivans, which almost doubled between 1990 and 2003.)

CONCLUSION

It is imperative, and necessary for compliance with the Environmental Protection Act, (and Regulation 424/04, as noted in Section 1) that a full environmental assessment be conducted to determine the full environmental ramifications of a Regulation mandating the coal closure, including replacement generation. If we waste valuable, limited resources based on inaccurate information, more people will suffer, not fewer.

6. Increased Use of Natural Gas Contrary to Existing Regulations and Directives

As demonstrated on the chart below, 2014-2020 is a critical time with enormous uncertainties regarding proposed new resources, retirement of aging nuclear facilities, and ambitious conservation targets. Insufficient resources will lead to over reliance on gas-fired facilities, contrary to cautions expressed by the OPA, and directives issued by the Ministry of Energy.



(OPA)

♦ In the creation of the IPSP, Regulation 424/04 directs the OPA to "identify opportunities to use natural gas in high efficiency and high value applications in electricity generation."

♦ The Ministerial Directive of June 13, 2006 instructs the OPA to "Maintain the ability to use natural gas capacity at peak times and pursue applications that allow high efficiency and high value use of the fuel."

♦ Using natural gas for base or intermediate generation is arguably outside of the perameters set by the Minister of Energy, in response to OPA cautions regarding supply and cost concerns regarding natural gas-fired generation.

♦ Any shortfall of resources (existing nuclear units reach end of life sooner than anticipated; conservation/demand management initiatives are not successful in achieving reductions in power demand; and/or new renewable resources are not available by 2014), will result in natural gas fired

power will be relied upon for much more power production than advisable or allowable according to the existing regulation and ministerial directive.

♦ The trend to warmer summers will impact hydroelectric availability from both Ontario and imported sources. Hot, dry summers will impact both wind and hydro production leaving baseload nuclear and costly natural gas to meet power demand. (Ontario has become a summer peaking province.)

♦ "Gas-fired generation is not recommended for base-load generation because in that role it presents risks across all three dimensions of cost, environmental impact and financial risk." "the volatility of price and uncertainty of supply ... major drawbacks to gas-fired generation for base-load." (OPA)

♦ The proposed Regulation would mandate cessation of coal-fired power at the existing coal facilities sites, but would presumably allow for alternate sources of power production at these locations. If this Regulation is implemented, it is conceivable that natural gas-fired generation could be considered for these sites, contrary to OPA recommendations.

♦ The OPA has investigated and rejected the possibity of gas-fired generation at Nanticoke and notes that, “Putting these three factors together (lead time, cost and inefficiency) leads to this option not being recommended.”. Also, “The Preliminary Plan already has a substantial amount of gas-fired generation, which is a challenge to implement. … the increased use of natural gas is not considered to be a feasible alternative to the continued operation of coal-fired units for a limited period of time.” (Integration Discussion Paper, November 15, 2006)

CONCLUSION

The significant uncertainties related to resource availability in the middle of the next decade could lead to an increase in natural gas-fired generation beyond what is allowed within the parameters of existing regulations. The expected rise in prices, due to supply concerns related to natural gas at that time would further imperil the Ontario economy, contrary to the stated purposes of the Electricity Restructuring Act.

7. Concerns Related to Cost and Supply of Natural Gas

The timing for the closure of Ontario's coal plants will be directly impacted by the availability of replacement resources. According to the Electricity Restructuring Act, the cessation of coal burning should also be based on the affordability of replacement generation. The OPA has reported that natural gas-fired power will replace coal. However, the 2014 deadline proposed by this Regulation coincides with an expected increase in natural gas prices, due to the depletion of conventional gas resources in the Western Canadian Basin, where most of Ontario's gas comes from. (OPA) The dual concerns of supply issues and high cost for natural gas may force the continued use of coal-fired resources.

♦ "While it is impossible to quantify all of the risks at this point, the price and supply risk around gas as a generation source has grown significantly." (OPA)

♦ The National Energy Board states that a " barrier that could put the brakes on the growth of gas-fired generation is the availability of adequate gas supplies at competitive prices."

♦ "The North American natural gas market is facing a decline in deliverability from existing natural gas production sources as they struggle to maintain current production levels. Since 1999 the US has added over 225 GW (225,000 MW) of natural gas-fired generation ... much of it operating at relatively low capacity ... as demand grows, fuel requirements for this generating capacity will grow significantly..." (Navigant Consulting report to the OPA)

Supply Concerns

All credible government and energy agencies, Canadian and international, confirm that North American natural gas production is in decline. The large inventory of gas in the 1990s, or "bubble of oversupply" as it has been termed stabilized pricing in that decade. The situation in the last 5 years has changed dramatically. Traditional sources of supply are drying up. The largest pockets of gas have been discovered, tapped and are now depleted. Newer wells are smaller with less extraction. In 2003 there were close to 14,000 successful gas wells drilled, but production still dropped by 3.6%. In spite of unprecedented drilling efforts and increasing demand for natural gas, that demand is now outpacing supply.

♦ Recent National Energy Board (Canada) estimates suggest that nearly 2/3 of Canada's discovered resources have been consumed leaving only 7.5 years of proven reserves and another 5 years of possible reserves. British Petroleum estimates Canada's 2004 reserves to production ratio to be 8.8 years. BP's estimate for the United States' reserves to production ratio is only slightly higher at 9.8 years.

♦ "North America's natural gas market has entered a new era. Higher natural gas prices, which are now seen as a feature of the natural gas market, at least over the medium-term, primarily reflect the inability of North American natural gas production to keep pace with ever-increasing demand."
Natural Resources Canada – Canadian Natural Gas Review of 2004, Outlook to 2020, January, 2006

♦ "... natural gas has shifted from the 'fuel of choice' in North America to the 'fuel of risk' – from a plentiful, relatively inexpensive fuel to one marked by uncertainty, volatility and record price levels." (CERA – Energy Research Oct. 2004)

♦ According to the U.S. government Energy Information Administration, natural gas prices 10 years from now will be "consistently higher" due to resource depletion and increased demand coupled with higher exploration and development costs. (Annual Energy Outlook 2006 with Projections to 2030)

♦ Industry is warning that too much reliance on natural gas for electricity will cause irreparable harm to the Ontario economy.

♦ "The impact of a rapid adoption of natural gas-fired generation in Ontario for power generation is also becoming a concern for neighbouring jurisdictions." (OPA)

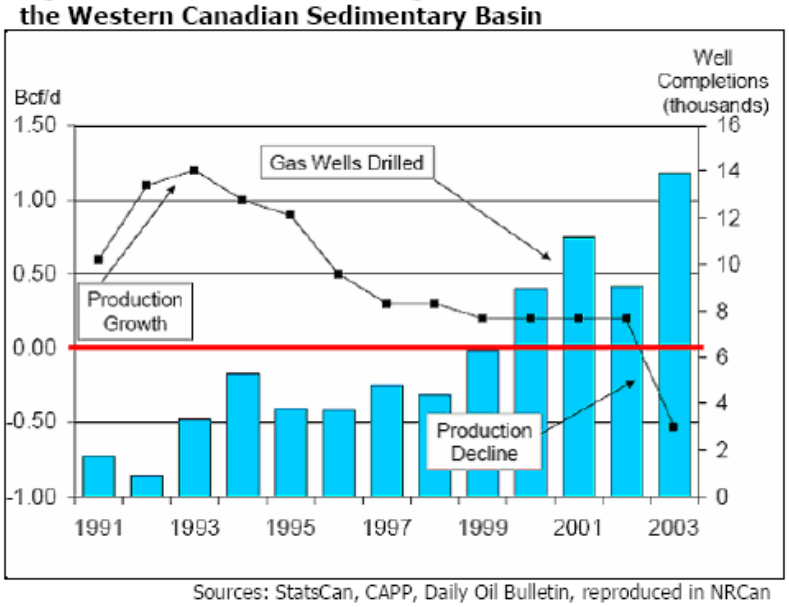
♦ "High natural gas prices resulting from the tight balance between North American gas supply and demand has been a key factor in encouraging more gas drilling. … the producing sector needs to drill more wells each year just to keep production flat." (National Energy Board, "Natural Gas for Power Generation: Issues and Implications, June 2006")

♦ "By 2017, natural gas prices are expected to rise until 2020 due to depletion of conventional gas resources in the Western basin. These conventional resources will need to be replaced by more costly supplies from coal-bed methane and the Mackenzie Delta." (OPA Supply Resources Discussion Paper)

♦The OPA reports that "More than 95% of the gas consumed in Ontario comes from outside the province, mostly from the WCSB". (Western Canadian Sedimentary Basin)

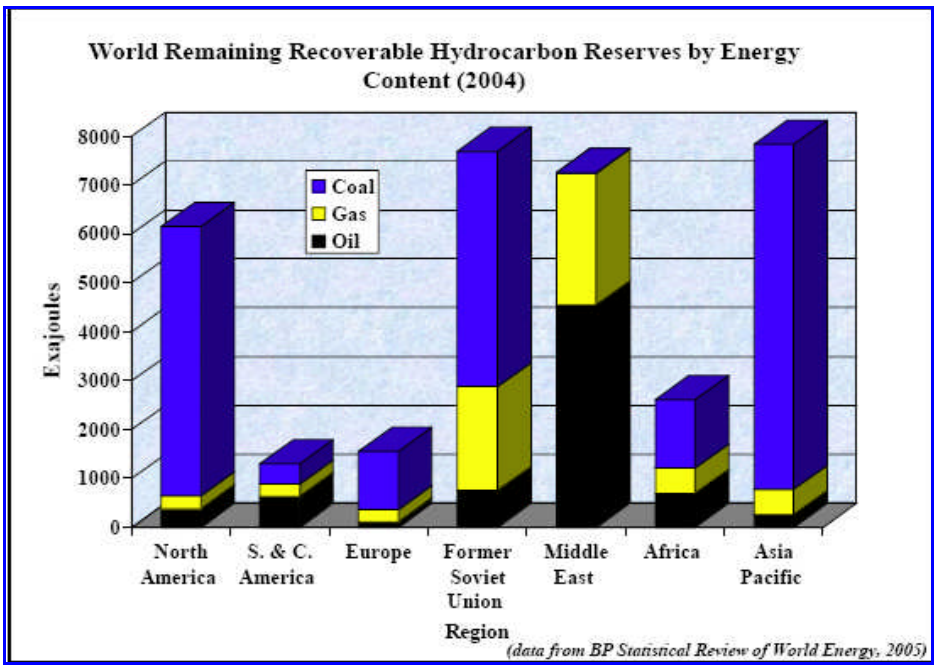
♦ The following chart demonstrates that record drilling is netting less natural gas production in the area where Ontario obtains most of its gas. "Total Canadian natural gas production declined 4% in 2003… almost 14,000 wells were drilled in the WCSB, setting a new record … average of over 38 wells per day." (Alberta produces 80% of Canadian natural gas from wells that are declining in production at a rate of 10-50% per year.)

Figure 3.9.4 – Production Change and Gas Wells Drilled on the Western Canadian Sedimentary Basin



Sources: StatsCan, CAPP, Daily Oil Bulletin, reproduced in NRCan

♦ As noted, future sources of natural gas will include LNG. However, ¾ of remaining natural gas resources are located in the former Soviet Union or the middle east. The following chart demonstrates the geopolitical concerns associated with countries where gas resources are more plentiful.



♦ As noted by the OPA, conventional resources from the Alberta Basin will need to be replaced by supplies from coal-bed methane and from the Mackenzie Delta. However, there it is a high degree of uncertainty that these resources will produce the volumes of gas estimated, or that these resources will become available to Ontario.

Coal-bed Methane (CBM)

♦ According to the Alberta Chamber of Resources, "nobody knows the resource's true potential, or even how much gas is recoverable. … There are several uncertainties when trying to determine the amount of recoverable methane gas. ... Canadian coal beds are typically less gassy and less porous, making it harder for the methane to flow to a well bore."

♦ "Speculation is that over the next five years Canada could see as many as 1000 CBM wells and the gas play could be as large as 1 billion cubic feet -- significantly less than the Canadian Gas Potential Committee's estimates of up to 486 tcf leading some to speculate that CBM will not offset North America's dwindling natural gas reserves in any significant way." (Alberta Chamber of Resources)

♦ "The geological and technical risks are huge and make CBM production a capital-intensive proposition on par with Alberta's mega-project oil sands developments." (Alberta Chamber of Resources)

♦ The National Energy Board indicates that "… still significant uncertainty surrounding the future of CBM development … The Horseshoe Canyon play in south-central Alberta was described as an example where developments have been positive. Ultimately some 50,000 wells may be needed to recover the CBM from this area alone." (Looking Ahead to 2010 – Natural Gas Markets in Transition – An Energy Market Assessments, August, 2004)

Mackenzie Delta

♦ "The Mackenzie Valley Pipeline would bring about 0.80 to 1.5 billion cubic feet per day (Bcf/d) of natural gas from the Mackenzie Delta to pipeline connections in Alberta, which connect to the North American market." ("North America The Energy Picture II - North American Energy Working Group - Security and Prosperity Partnership - Energy Picture Experts Group - January 2006")

(The CAE Alliance has reviewed the National Energy Board report, "Natural Gas for Power Generation: Issues and Implications, June 2006". All quotes in the following section regarding natural gas supply and cost are taken from this document, unless otherwise noted.)

♦ Ontario currently uses an average 2.7 Bcf of natural gas – about 2 Bcf/d in summer to over 4 Bcf/d during winter, about 10% of this is for electricity generation. A significant amount, over 3 Bcf/d, of natural gas piped and stored in Ontario is destined for other areas downstream.

♦ "The Board estimates the range for the incremental natural gas requirement in Ontario will be of about 8 to 20 million m3/d (0.3 to 0.7 Bcf/d) by 2010", depending on the amount of nuclear to be considered in the mix. This was assuming about 2,550 MW of new gas generation in Ontario. At the time the NEB document was prepared, the Board assumption was that most of the coal replacement and new generation required in Ontario would come from nuclear, renewables and CDM. It is obvious that at least double that estimation of natural gas will be required, and that any new resources from the Mackenzie Delta are insufficient to supply Ontario's needs.

♦ What must also be considered is the growing competition for the declining natural gas supplies in Alberta. For example, industrial demand in Alberta averages 1.5 Bcf/d - primarily accounted for by the high demand for natural gas at the oil sands projects, which are expected to continue to grow further. "… natural gas-fired cogeneration facilities are being developed in conjunction with the growing number of oil sands and in situ bitumen projects. As a result, Alberta has experienced the largest growth in gas-fired electricity generation capacity in Canada. In 2004, about 40 percent of installed electricity generation capacity in Alberta was natural gas-fired."

♦ A large portion of the natural gas used in British Columbia and the U.S. Pacific Northwest comes from the WCSB. Gas demand, particularly in California, is expected to increase significantly for both electricity generation and industrial use. Approximately 25% of California gas comes from the WCSB. Lower hydro electric output and growing population is causing higher demand for electricity. Over 9,000 MW of natural gas fired generation is planned for California and Oregon. "All of these new developments will exacerbate natural gas demand."

Other Supply Concerns

♦ The National Energy Board studied the use of natural gas for power generation in other geographical parts of Canada and the U.S., with the conclusion that there will be increased competition for dwindling supplies, and that new resources in western Canada will not be sufficient to meet the growing needs. "the growing gas demand and uncertainty in future gas supply have meant high and volatile natural gas prices and have led to greater and renewed focus to develop other non-gas generation."

♦ The following represents some other concerns and issues described in the National Energy Board report, "Natural Gas for Power Generation: Issues and Implications, June 2006

"The EIA projects that gas demand … for the central region, including Ontario and the U.S. Midwest, are projected to range from 2.8 to 3.4 Bcf/d over the next decade.
The implications of this extend beyond simply having available gas infrastructure and supply capable of providing those additional volumes to the central region. ... With demand in the eastern region also projected to increase by more than 1.3 Bcf/d over the same period, competition and requirement for new gas supply and infrastructure will likely increase over the next several years."

There is increasing competition for Alberta natural gas, including the increased use of gas-fired power in that province. A large portion of the natural gas used in British Columbia and the U.S. Pacific Northwest comes from the WCSB. Gas demand, particularly in California, is expected to increase significantly for both electricity generation and industrial use. Approximately 25% of California gas comes from the WCSB. Lower hydro electric output and growing population is causing higher demand for electricity. Over 9,000 MW of natural gas fired generation is planned for California and Oregon. "All of these new developments will exacerbate natural gas demand."

"Replacing electricity that is currently supplied from the approximately 7,500 MW of coal-fired generation in Ontario will have significant implications on future gas and electricity … Significant weather-induced variation in gas requirement is to be expected, especially considering the large percentage of homes currently using natural gas and electricity in Ontario. New gas-fired generation will likely exacerbate swings in gas demand and increase requirements on gas infrastructure and operations to meet fluctuating loads." (7,500 MW includes Lakeview Generating Station)

Cost Concerns

"...by the time the last coal-fired plant is closed, electricity prices in Ontario will be 60%-70% higher than they are now, or roughly 6.5% per year." (CIBC World Markets Inc., July 18, 2007)

♦ "I can't protect them (Ontario consumers) from the fact that natural gas appears to be running out." (Hon. Mr. D. Duncan, August 9, 2004, Canadian Press)

♦ "... electricity prices in Ontario dance very closely to the tune of natural gas. The surge in natural gas prices during Katrina led to a 40% increase in electricity prices in Ontario. On average, a one percentage point increase in natural gas prices leads to 0.5 percentage point increase in electricity prices in Ontario." (CIBC World Markets Inc., July 18, 2007)

♦ "The price of natural gas … is expected to remain high and volatile. Residential and commercial space heating and industrial processes compete for supply and several nearby jurisdictions also rely heavily on gas, all of which puts its availability at a premium or even at risk." (OPA)

♦ According to the U.S. government Energy Information Administration, natural gas prices 10 years from now will be "consistently higher" due to resource depletion and increased demand coupled with higher exploration and development costs. (Annual Energy Outlook 2006 with Projections to 2030)

♦ The average cost per unit of energy was over 3 times higher for natural gas than coal, over the 2002-2005 period. (US Energy Information Administration)

♦ Industry is warning that too much reliance on natural gas for electricity will cause irreparable harm to the Ontario economy. "The problem is particularly acute for industries relying on natural gas in their manufacturing process and as a fuel for electricity since they get hit twice by high natural gas prices." (New York Power Authority, Oct. 25, 2005)

♦ Prices are currently hovering around $8 US ($8.80 Can) versus the $6.25 Can used in the Cost Benefit Analysis - i.e gas prices are presently 40% higher than those used to determine the merit of using natural gas for power generation.

♦ "based on our assumption that natural gas prices will reach $12-$14/mnBtu by 2015." (CIBC World Markets Inc., July 18, 2007)

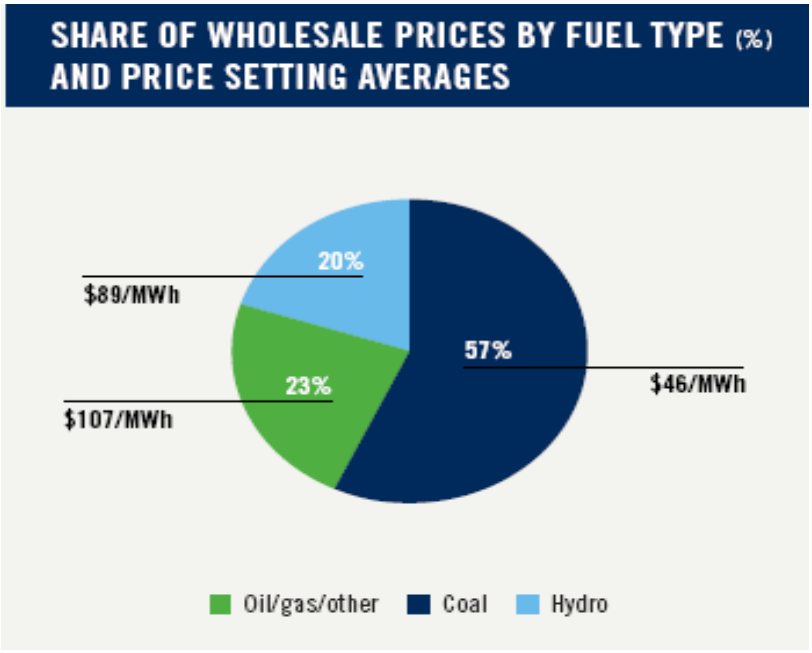


Chart from IESO, 2005 Year in Review

♦"When gas generation set the price, it is more than twice as high (about $78/MW.h, versus about $33/MW.h for coal). ... increased gas-fired generation in Ontario will likely result in higher electricity prices due to greater frequency in setting the price of electricity" (National Energy Board report, "Natural Gas for Power Generation: Issues and Implications, June 2006)

♦ "Not only will electricity prices be influenced by that of natural gas but, with power generation becoming the fastest growing sector of natural gas demand, natural gas prices will also be increasingly influenced by electricity markets. This growing interdependency may contribute to higher costs for natural gas and electricity that will have to be absorbed by a range of energy consumers." (National Energy Board)

♦ Other consumers of gas, whether small residential and commercial customers or large industrials, may face higher energy costs as a greater portion of natural gas demand becomes increasingly weather sensitive. Further, some of these consumers may be challenged to compete with gas-fired generators for supplies of natural gas and related transportation services." (National Energy Board)

CONCLUSION

Replacing coal fired generation in Ontario with natural gas will, according to the Ontario Energy Board, consume more gas than all natural gas residential customers in the province combined. Natural gas for home heating is used at high efficiency rates, 95%. Natural gas produces power at about 35% - 50% efficiency. The CAE Alliance challenges the wisdom and ability to provide reliable power to Ontario in the critical next decade, considering the dwindling supplies of traditional sources of Ontario natural gas and uncertain expectation of newer and unconventional sources. Billions of dollars will be spent for infrastructure changes to accommodate gas-fired power; an additional $1.5 billion per year will be spent for fuel alone for gas-fired generation; market price setting will add billions more; home heating costs will rise in parallel. We are committing to billions of dollars in replacement generation, while staking our future on something that may not exist or materialize.

8. Benefits of Retrofitting Coal-Fired Units With Best Available Emissions Reduction Technology

♦ The proposed Regulation would set a final coal closure date of December 31, 2014 - almost 7 ½ years from now. If this proposed Regulation was implemented, it may discourage the installation of best available emissions reduction technology on Ontario's coal units. It is the purpose of the Environmental Protection Act, to "provide for the protection and conservation of the natural environment". Equipping Ontario's coal-fired power plants with remediation technology would provide optimum protection to the environment.

♦ The report, Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation, produced after the coal closure mandate was announced, has been repeatedly cited by the Ministry of Energy as the justification for coal closure. This report estimated the annual costs of coal-fired generation, including health and environmental costs, to b $4.4 billion …" (December 1, 2005)

♦ If this report is to be believed, it would be a bargain for the government to install emissions reduction technology without delay. To chose not to do so, on the basis of this report, would be negligent. The OPA proposed a cost of $1.6 billion for pollution abatement technology. Navigant Consulting reports that refurbishment would take "one year ... $205 million per unit". (Report to the OPA) If the installation took 1-3 years, there would be a net savings of $13.2 billion in health and environmental costs.

♦ A report reviewing the government's "Cost-Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation" was prepared by Thomas Hughes Consulting (Corunna) Ltd. This review indicates that the Report was issued long after the government had decided the fate of the coal-fired stations, and that "the analysis is a very simplistic approach to a complex issue and is skewed in favour of the ... predetermined goal." The health and environmental costs are statistical numbers, not actual deaths and damages, and were determined by methods having high degrees of margin for errror. A copy of this review is available on our website.

♦ As we have noted throughout this document, there is a significant degree of uncertainty regarding power demand and available resources in the next decade. The Premier has acknowledged that he was ill advised regarding the coal closure timeline. The deadline has been moved three times already. Further delays in implementing emissions reduction technology will result in more years of unnecessary emissions from the coal fired power plants.

♦ Alternative energies (wind, solar, etc.) are not sufficiently developed or cost effective, as yet, to dispace fossil fuels. Maintaining the coal-fired power plants will allow time for Ontario to utilize these technologies at the optimum time.

♦ According to a recent MIT study, "carbon-free technologies, chiefly nuclear and renewable energy for electricity, will also play an important role in a carbon-constrained world, but coal, in significant quantities, will remain indispensable" (The Future of Coal, MIT, March 19, 2007) Affordable for base load, coal has optimum load following capabilities, quick response balancing capability and dispatch flexibility to supply intermediate and peak needs. These characteristics will be even more valuable as less predictable (i.e. wind) resources are added to the provincial energy portfolio.

♦ "In Canada and globally, there are huge proven reserves of coal which contribute enormously to our energy mix and to our nation's economic prosperity. To not continue to use coal is to deny many

Canadians access to an inexpensive, secure and readily available fuel, which is free from price volatility and completely capable of being utilized in an environmentally acceptable manner ..." (Natural Resources Canada's Canada's "Clean Coal Technology Roadmap")

♦ "... from the perspective of supply reserves, North America is to coal what Saudi Arabia is to oil. We have the world's largest reserves of coal in North America, and much of that is in Canada. ... in the context of growing concern about geopolitical tensions and security of energy supply, indigenous sources of supply will become increasingly attractive." (Jan Carr – OPA, April 28, 2006)

♦ The proposed Regulation is worded in such a manner that coal-fired generation in Ontario must cease at existing facilities. However, this unnecessarily closes the door to developing technologies and advances; hinders the OPA in the ability to plan for contingencies and changing conditions; and refuses to consider unforeseen geopolitical ramifications.

♦ The all-party Select Committee on Alternative Fuels, "19 leaders from all parts of the electricity industry, met weekly and heard presentations from nearly 100 experts". They concluded "… energy market experts no longer see natural gas as a stable and affordable fuel ... Some members of the Task Force believe that the phase out (of coal) poses large economic costs and that the environmental benefits can be achieved by other means (than phasing out coal)." (Tough Choices, Addressing Ontario's Power Needs – Final Report to the Minister – Process & Recommendations, January, 2004)

9. Other

"The Select Committee on Alternative Fuel Sources was appointed by motion of the Ontario Legislature on June 28, 2001 with a broad mandate "to investigate, report and recommend ways of supporting the development and application of environmentally friendly sustainable alternatives to our existing fossil [carbon based] fuel sources." (Final Report to the Legislative Assembly of Ontario, June, 2002) The Report of this Committee has been cited as justification for the closure of coal-fired power plants in Ontario. The following quotes from this Report demonstrate concerns raised that are not being considered with the coal phase out considered in this proposed Regulation.

♦ "… Ontario should work to eliminate its reliance upon coal based power generation, unless future technological advances result in dramatically reduced air emissions that are equivalent to or lower than emissions from natural gas generation."

Certain information and reports are being ignored which suggest that current, available emissions reduction technology can and does bring emissions from coal-fired power plants near equivalent to those of natural gas. Technology implemented at Lambton Generating Station since this Report was produced, has proven successful in reducing emissions.

♦ "Oil and natural gas-fired generation should also be phased out." Contrarily, the OPA, at the direction of the Minister of Energy, is contracted for 20 years + of natural gas generation in Ontario.

♦ "Ensure that the relative cost of different energy sources, fiscal implications, energy security, impact on job creation, export development and the provincial economy are all considered."

The impact of significantly higher power generation is not being considered. This will directly – and negatively – impact job creation, exports and the provincial economy.

World political events are putting greater emphasis on energy security and greater emphasis on independence from OPEC nations since the drafting of this document. Increased reliance on natural gas inevitably ties the Ontario electricity system in to imported gas resources in future, from politically unstable countries.

♦ "The Ontario government shall use a 'Life Cycle Costing' approach to assess costs and impacts of new fuel/energy technologies. In assessing the costs of new alternative fuel/energy sources, comparisons should be made with the costs of new conventional sources of fuel/energy."

A full and complete assessment on this basis has not been completed for, or on behalf of the Ministry of Energy, or its agencies.

♦ "… one option might be to replace these stations (coal-fired power plants) with new combined-cycle natural gas plants. The Committee was also concerned that a future re-powering of these stations with natural gas could cause a major increase in demand for this fuel, and a resulting increase in price. This could affect the long-term supply and price of natural gas within Ontario."

Natural gas prices have doubled, and an awareness of supply issues has increased since this Report was produced.

10. FINAL CONCLUSIONS

The CAE Alliance believes that the installation of this proposed Regulation is both unnecessary, and unlawful. The stated purposes - from an environmental and economic perspective - are not supported and in fact contradict Ministry of the Environment and Ministry of Energy reports. "Removing coal as an electricity generation fuel will provide significant human health and wider environmental benefits" is an overstatement, and misrepresentation of the facts.

1. All decisions regarding electricity generation in the province must be made within the context of existing legislation which includes ensuring "that Ontarians have access to safe, reliable and environmentally sustainable energy supplies at competitive prices" (EBR - Statement of Environmental Values) and which "protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service. (Electricity Restructuring Act) A mandated closure date conflicts with this existing legislation.

2. The Ontario Power Authority, in cooperation with the IESO have been given legislated authority to determine the coal closure timetable, including when the coal-fired generating units can be removed from service, in the context the Electricity Restructuring Act, as noted above.

3. The coal fired units in Ontario have a small impact on overall air quality in our province. There is absolutely no environmental justification for closing the Thunder Bay and Atikokan Generating Stations. Environmental goals regarding the Lambton Generating Station and Nanticoke Generating Station can be achieved at significantly less cost and impact to the Ontario economy.

4. Installing emissions reduction technology on all coal-fired units at this time is the best safeguard for power reliability, without compromise to the environment. The implementation of this proposed Regulation will unnecessarily stall the use of equipment that could reduce emissions of concern, and is therefore contrary to the principles and purpose of the Environmental Protection Act.

5. Reliability of electricity supply is at risk if this proposed Regulation is implemented. The closure of the coal-fired facilities, particularly as seen in light of their replacement with natural gas generated power, is a political, not an environmental imperative. This move will strain both reliability and affordability of power, creating economic havoc and resulting in unnecessary negative environmental impacts.