Clarington
Leading the Way

REPORT
PLANNING SERVICES

Meeting: GENERAL PURPOSE AND ADMINISTRATION

Date: March 21, 2011 **Resolution #:** **By-law #:** N/A

Report #: PSD-028-11 **File #:** PLN 17.1.5

Subject: REQUEST FOR INFORMATION ON DRAFTING AND IMPLEMENTING AN AIR QUALITY BY-LAW

RECOMMENDATIONS:

It is respectfully recommended that the General Purpose and Administration Committee recommend to Council the following:

1. THAT Report PSD-028-11 be received;

2. THAT The Municipality through the GTA Clean Air Council monitor the progress being made by the Ministry of Environment on the cumulative impact assessment, $PM_{2.5}$ policy framework, and development of components of the Comprehensive Air Management System (CAMS);

3. THAT the Region of Durham Health Department be requested to become more involved in air quality issues, especially as they relate to health issues, on a Region wide basis;

4. THAT if Council determines that air quality improvement should be identified as a priority in the Strategic Business Plan, the issue be referred to the 2012 budget for municipal initiatives; and

5. THAT all interested parties listed in PSD-028-11 be advised of Council's decision.

Submitted by: David J. Crome MCIP, RPP
Director of Planning Services

Reviewed by: Franklin Wu,
Chief Administrative Officer

FL/df/sn
16 March 2011

1.0 PURPOSE

1.1 At the General Purpose and Administration Meeting of February 28th, 2011 a resolution (Attachment 1) was passed requesting information on the implications of drafting and implementing an Air Quality By-law under the Municipal Act. More specifically Staff were asked to report back on:

- The costs to retain a consultant to help develop guidance documents for general assessment and air modeling prior to drafting a by-law;
- The costs to determine a baseline, sources of emissions of health risk air pollutants and an atmospheric dispersion model of the airshed;
- Future budget implications for additional enforcement staffing, peer reviewers, air quality modelers; potential education and outreach programs to support by-law implementation and data management;
- The potential implications on existing industries in Clarington and the potential impact on economic development and the attraction of prospective industries/ employers;
- The potential duplication between a Clarington specific by-law and the Provincial Review that is underway; and
- An estimate of generated revenue if the Municipality were to engage in the trading of carbon credits.

2.0 BACKGROUND

2.1 Staff provided Report PSD-088-10 (Attachment 2) in June 2010 which included background information on the consultation requirements necessary prior to implementing an air quality by-law and the issues surrounding enforcement. Council accepted the information report. The background information remains relevant, including Section 7, Other Initiatives.

2.2 Particulate matter (PM) is the general term used for a mixture of solid particulates and liquid droplets in the air. It is characterized according to size mainly because of the different health effects associated with particles of different diameters. $PM_{2.5}$ or respirable particulates can penetrate the respiratory system further than larger particulates. Sources of PM are primarily formed from chemical reactions to the atmosphere through fuel combustion (motor vehicles, power generation, industrial facilities, residential sources) see Attachment 3. To produce fine particulate matter, precursors such as nitrogen oxides, ammonia, sulphur dioxide and/or volatile organic compounds are emitted into the air and through atmospheric mixing or chemical transformation, or both participate into fine airborne matter.

2.3 As noted above, there are four major sources of fine particulate matter - industry, vehicular traffic (including resuspended road dust), residential and miscellaneous (dry cleaning, fuel marketing, pesticide and fertilizer applications). The use of dispersion modelling helps predict contaminant concentrations and define the various source sectors for ambient air quality. About 50-70% comes from the vehicles and 25-35% from industrial operations.

2.4 During the air quality assessment for the Energy from Waste Facility, the baseline assessment provided information about the local air quality. The MOE Oshawa station has monitored $PM_{2.5}$ since 2001. The maximum daily average concentration measured at the MOE Oshawa station is 2007 was 38 ug/m^3 (migrograms per cubic metre) while the average concentration was 6.8 ug/m^3. Based on the baseline studies it was evident that the local airshed is compromised; however, the $PM_{2.5}$ levels are slightly below the Canada Wide Standards.

2.5 In comparison, the annual mean concentrations of $PM_{2.5}$ for Oshawa and Oakville are similar but less than those for Windsor, Hamilton and Sarnia. Since 2003, there has been a 27 percent decrease in composite annual means. Overall, provincial $PM_{2.5}$ emissions have decreased approximately 32 percent from 1999 to 2008. Reductions have occurred in industrial processes emissions by 50 percent and the phase-in of new vehicles/engines has shown a gradual decrease in transportation related emissions.

2.6 Local airsheds are not well-defined. Unlike watersheds which divide along a height of land, airsheds are influenced by wind patterns, which in Clarington are typically from the west, micro-climatic effects which cause wind patterns to shift, urban heat islands, large bodies of water and large areas of natural cover (e.g. Long Sault and Ganaraska Forests).

2.7 Some local governments have chosen to respond to issues within their local airshed by undertaking actions which are known to have benefit and are within the local government control. Examples are the actions taken by Toronto, Hamilton and Sudbury which are highlighted in the Environmental Commissioner's Report of March 2010 (http://eco.on.ca/eng/uploads/eng_pdfs/2010/Air%20Monitoring%20in%20Local%20Airsheds.pdf).

2.8 In policy development there are two approaches, which are colloquially known as the "carrot" or the "stick". "Carrots" involve incentives like grants/loans, best management practices and education programs. "Sticks" involve regulation and penalties to achieve results. Typically when an issue is identified, the background information and a fulsome understanding of the implications are well understood prior to determining which approach or combination thereof is going to be employed.

3.0 PROCESS AND TIMELINES

3.1 The basis for Oakville's air quality by-law was a multi-year study that was commissioned by the Ministry of the Environment on the Clarkson Airshed (CAS) in 2000. This multi-year study was carried out in three parts.

- Part I, carried out between 2001 and 2002 identified major sources of targeted pollutants.
- Part II, carried out between 2003 and 2005, was a 22-month ambient air monitoring program that confirmed, at times, especially during smog events, that the CAS study area represents a "taxed" or compromised area with respect to respirable particulate matter ($PM_{2.5}$).

- Part III, carried out between 2006 and 2008, focused on major sources of targeted industrial pollutants. The study involved complete emission inventories and air dispersion modelling. The findings were submitted to MOE. Regional modelling was then carried out to evaluate the contribution of these sources to the air quality in the area of the airshed.

3.2 In November 2009, the Minister of Environment appointed an Air Quality Task Force (1 member) to work with a Community Advisory Committee (14 members) called the Southwest Greater Toronto Air Quality Task Force, established in September 2009. With a six month timeframe the task force was given a mandate to produce an Action Plan (recommendations) to improve air quality and manage air pollution impacts in the Oakville-Clarkson Airshed. A local municipal by-law was not part of the recommendations, rather the study sought to prevent a patchwork of by-laws and standards across Ontario.

3.3 In advance of the report from the Air Quality Task Force in June 2010, the Town of Oakville passed a by-law that attempts to regulate the emission of fine PM. They did so relying upon the powers given to municipalities under the Municipal Act, 2001 to regulate the "health, safety and welfare of persons" and "public nuisances". Oakville staff are of the opinion that while it was helpful to have the results of the three-part (2000-2008) MOE Clarkson Airshed Study (baseline air quality assessment), there may be sufficient air quality data to establish a baseline for most areas of the province. Whether sufficient air quality data has been collected for the local Clarington airshed will require further investigation.

3.4 In November 2010, the Ministry of Environment, based on the resolutions, letters and work of the Oakville and Burlington Councils plus members of the public and within the context of the results of a decade of study of the Oakville-Clarkson Airshed and the Environmental Commissioner's Report (Attachment 4), initiated a review of the current (provincial) policy framework addressing $PM_{2.5}$. This review will include an assessment of the need to revise the policy approach to direct emissions of $PM_{2.5}$. The Review Decisions Summary (Attachment 5) contains the reasoning for the review and how particulate matter is currently regulated by both the federal and provincial governments.

3.5 The Ministry of the Environment is in the process of reviewing the provincial policy framework--see Sections 5.3 through 5.8 below.

4.0 RETENTION OF QUALIFIED EXPERTISE

4.1 Air quality is not an area of expertise that the existing municipal staff has as a specialty. Air quality comments and issues that have been raised and addressed as part of environmental assessments have been part of the peer review consultant's responsibilities.

4.2 The health aspects of air emissions are typically an area of expertise that lower tier municipalities do not have as a specialty. The Region of Durham Health Department lead, manage and deliver public health programs and services for the Region. However, the current mandate of the Regional Health Department does not Including the monitoring

or assessing of air emissions and hence they have limited or no in-house scientific or technical expertise in this regard.

4.3 There is considerable scientific evidence of serious impacts to human health associated with exposure to fine particulate matter. Understanding when, where and how people are exposed to fine particulate matter and/or "precursor pollutants", namely substances which, when emitted into the air, produce fine particulate matters is challenging. Medical expertise would have to be retained as part of the consulting team.

4.4 It would be necessary to retain a consulting team to study the existing conditions of the airshed and develop guidance documents for general assessment and air modeling to draft an enforceable by-law. In the case of Oakville this study included three subject matter experts being: environmental law, health impacts from air quality, and air quality modeling. Part of the baseline information included sources of emissions of health risk air pollutants, an atmospheric dispersion model showing what is happening in the affected airshed, collection of information on the industries that have been issued approvals under the Environmental Protection Act, or more specifically Certificates of Approval (CofA) for air.

4.5 The development of Oakville's guidance documents cost in the order of $130,000. This does not include the Staff time that was spent in developing the by-law and administering the process. For the public consultation portion of the process a facilitator was hired for $15,000 to assist with consultation. In addition, a contract staff person was hired (see section 7.2) initially to assist with drafting the by-law and then moving into outreach/ education and enforcement.

5.0 JURISDICTION

5.1 Regulation of Particulate Matter at a municipal level would have to complement the existing federal and provincial regulation. A local by-law brought in under the Municipal Act, 2001 should not conflict or frustrate the purpose of provincial/federal regulations. The Town of Oakville have indicated that they are "very open to having any materials related to the Health Protection Air Quality By-law used as a basis for by-law development and compliance support by other municipalities".

5.2 In Ontario, industries obtain Certificates of Approval based on the Environmental Standards set out by MOE, such as the A7 Guidelines for air quality. Industries, such as St. Mary's Cement, Ontario Power Generation and other major industries in Clarington are required to meet or exceed the standards established when they obtain their CofA. Also major emitters, like those listed, provide their emissions data to the National Pollutant Release Inventory. Many of these industries have continuous improvement programs in place and are working on the upgrading and reduction of air emissions on a continuous basis.

5.3 In March 2010 the Environmental Commissioner of Ontario released a *Brief Review: Using Air Monitoring as a Tool to Assess & Address Local Airsheds & Micro-Environments in Ontario.* This report provided a summary of the Province's Role, Ministry-Led Local Air Monitoring Projects, Municipality-Led Local Air Monitoring

Programs and provided recommendations. In summation, the executive summary (Attachment 4) noted that there are overlapping interests and expertise that need to be united. Health departments (Regional Government) have responsibility for protecting the health of citizens within their communities; planning departments within regional and local municipalities have responsibility for long-range and current planning decisions within their jurisdictions; and MOE has expertise in the assessment and management of air quality issues, legislative authority for air quality issues related to point sources, and legislative authority for the environmental assessment processes that are applied to major projects including those applied to the transportation sector.

5.4 On October 20, 2010 the Canadian Council of Ministers of the Environment (CCME) announced a new approach to regionally coordinated airshed management. The regionally coordinated airshed management is part of a national commitment to introduce more ambitious air quality standards and nationally consistent industrial emissions. The Town of Oakville nominated the Oakville-Clarkson airshed as the first pilot area to implement a Comprehensive Air Management System (CAMS). The Town of Oakville is working with the Province, a signatory to the CCME through the Ontario Ministry of Environment to move airzone management forward.

5.5 The results of the Oakville-Clarkson airshed study illustrates how $PM_{2.5}$ is a complex issue that requires a comprehensive strategy to address not only industrial emissions but also residential, transportation and trans-boundary sources of $PM_{2.5}$ and $PM_{2.5}$ precursors.

5.6 The Province has undertaken a review of how particulate matter is currently regulated by both the federal and provincial governments. While municipalities can adopt by-laws addressing "health, safety and welfare of persons" and "public nuisances" under the Municipal Act, it may be prudent to wait until the Ministry has completed their review.

5.7 The GTA Clean Air Council, of which Clarington has been a member for some eight years, is monitoring the MOE's review of the cumulative impact assessment, $PM_{2.5}$ policy framework, and development of components of the Comprehensive Air Management System (CAMS) with airzones. While they are encouraged that the province is reviewing these issues, regulation of $PM_{2.5}$ has been an issue that the province has been grappling with for many years. It is not clear whether the province will make a decision to regulate emissions of $PM_{2.5}$ or intends to move into the regulation of direct $PM_{2.5}$ or integrate cumulative impact assessment into the provincial air approvals process.

5.8 The MOE review will analyze the effectiveness of the current policy framework and assess the need to revise Ontario's approach to $PM_{2.5}$, including direct $PM_{2.5}$ emissions from industrial and commercial facilities. The review includes analyzing air monitoring data, literature review and looking at other jurisdictions to make sure the Ministry's approach is effective and provides a high level of protection for Ontarians. The Ministry has been and is conducting ongoing research that will form the basis for the review. The Ministry acknowledges that this is a very comprehensive review and Ministry Staff advise that a draft report is expected to be available for public comment by March 2012.

6.0 ECONOMIC DEVELOPMENT IMPLICATIONS

6.1 Air Quality is a combination of many factors, there are the contributions of emissions from industrial sources; however, a large percentage of air quality issues come from either vehicle emissions or from beyond our borders. The pollutants being funneled into our airshed from outside sources, even from our immediate neighbour Oshawa, are beyond our control. An air quality by-law would specifically target industrial and commercial entities within Clarington and could be a factor in the expansion or relocation of existing businesses as well as the attraction of new employers to Clarington.

6.2 Oakville's approach has been to work with their Economic Development Department to raise awareness of the by-law within the business community. Oakville's economic development focuses on the types of businesses that Oakville desires and is very sector based: Oakville has over 260 national and international corporate headquarters. The monitoring included in Oakville's by-law is already imposed by either MOE CofA's (Air) or for major emitters the National Pollutant Release Inventory. For emitters that have been operating without CofA's, there has been a side benefit as now they are obtaining the necessary CofA's.

6.3 For new industries the cost of a baseline air study would be incurred regardless, they are required to obtain a CofA. The $25,000 fee Oakville has imposed for major emitters is to cover the peer review costs of $20,000, should the peer review cost less than $20,000 then the remaining monies will be rebated.

7.0 ENFORCEMENT

7.1 Should Council wish to pass an air quality by-law, the key to compliance is by-law enforcement. At noted above Oakville's application fee is intended to cover the administration and peer review costs for the approval of applications from existing and proposed facilities it does not cover enforcement.

7.2 Oakville retained a contract staff position to address outreach, compliance support and serve as the in-house technical expert starting in Aug. 2010. The costs are in the order of $75,000 per year, with an additional $15,000 budgeted in 2011 for outreach and compliance activities, along with participation in all applicable MOE consultations. The outreach/education program includes media notices, direct mailings, and regular workshops.

7.3 Clarington should determine whether it is more beneficial to spend the funds required for enforcement or alternatively provide incentives to businesses, an educational campaign and other measures that work with local emitters.

7.4 Council introduced an Anti-Idling By-law as a clean air initiative in December, 2008. However, its implementation was relatively easy; enforcement occurs on a complaint basis and is easily monitored. With regard to resources, there was limited education (an article in Clarington.net) and one complaint has been received to date. It was found that the individual that the complaint was lodged against was not breaching the by-law.

8.0 CARBON OFFSETS (CREDITS)

8.1 A carbon offset is a credit for greenhouse gas reductions achieved by one party that can be purchased and used to compensate (offset) the emissions of another party. Carbon offsets are typically measured in tonnes of CO_2 equivalents and are bought and sold through a number of international brokers, online retailers and trading platforms.

8.2 It is not clear whether the intention of the resolution is for the Municipality:

- To fund the costs of implementing a Air Quality By-law by trading for carbon offsets on improvements on CO_2 emissions from it's facilities;
- To submit projects to voluntary carbon credit schemes (e.g. Carbonzero) for funding; or
- To establish our own Clarington specific "cap and trade" system with the Municipality being the broker for Clarington industries that may want to exceed the Clean Air By-law standards by receiving credits from industries that have made improvements to be significantly under the standards.

8.3 There is no cap and trade system for carbon credits at the present time in Ontario. In May 2009, the Ontario government released a discussion paper on this matter. Ontario has joined the Western Climate Initiative and is in the process of developing a cap and trade system with Quebec, British Columbia, Manitoba and seven western states in the USA. Information on this issue is provided in Attachment 6. At the present time, enabling legislation has been introduced requiring certain industries to report on their greenhouse gas emissions. Regulation 452/09 would appear to require at least St. Marys Cement, Bowmanville Foundry and the EFW Facility to report on their greenhouse gas emissions. However, there is no system in place for trading to occur at this time.

8.4 At this time, it is unlikely that an Air Quality By-law would include carbon offsets (credits). In terms of revenue that could be generated if the Municipality were to engage in the trading of carbon credits, the following would have to be considered:

- If the Municipality were to trade credits (if any) through the improvement of its facilities, these revenues would be used to offset the costs of such improvements;
- If the Municipality were to seek funding from a volunteer carbon credit scheme, it would be used for the project itself (tree planting, energy conservation projects, renewable energy project);
- It is not feasible for the Municipality to operate it's own cap and trade scheme (e.g. no revenues to offset the costs of the Air Quality By-law).

9.0 COMMENTS

9.1 The issue of air quality is complex involving residential, transportation, agricultural, municipal and industrial sources, many beyond our municipal boundary.

9.2 Staff have only a generalized knowledge of air quality issues and emissions. This report has been prepared to the best of our ability within the timeframe given and without expert resources to assist us. We have consulted with MOE, the Town of Oakville and carried out research and investigation of our own. We have not been able to determine which airshed or airsheds Clarington is part of, or even if this is defined.

9.3 While Clarington has a compromised airshed (as evidenced by the data from the Oshawa air quality monitoring station data), this is true of most of southern Ontario due to the flow of external emissions, the high level of population (heat island, wind dispersion and micro-climatic effects) and economic activity in the area. The Oshawa station is in the middle range for emission levels when compared with others across southern Ontario.

9.4 An Air Quality By-law is only one tool, without proven effectiveness and significant costs for preparation and enforcement. There are many other examples of "carrots" (incentives) or "sticks" (regulations) that the Municipality could employ to improve air quality. The measures taken by Toronto, Sudbury and Hamilton listed in the full report on the website noted for Attachment 4 give a wide range of air quality improvements that can be implemented.

9.5 At a minimum, an Air Quality By-law would likely cost over $125,000 to prepare, enforcement would be in addition. This is composed of:

- $100,000 for baseline studies and guidance documents, provided enough air quality data exists from the Oshawa MOE monitoring station;
- $10,000 for preparation of the by-law, using Oakville's as a basis;
- $15,000 for education and outreach;
- $75,000 annually for additional staff with specific expertise in air quality, CofA's and health effects.

9.6 It is unknown what an enforcement action would cost but assuming that it is similar to an Ontario Municipal Board Hearing or the recent action with St. Marys where experts are required, it would likely cost at a minimum $150,000 to $500,000, not including Staff time, to uphold the by-law.

9.7 Many Health Departments have undertaken air quality issues as part of their mandate. It would be appropriate for air quality to be addressed on a Regional basis rather than for Clarington on its own.

9.8 If Council wants to improve air quality, there is a large array of potential actions. These should be evaluated to determine which efforts provide the best value for the funds spent. The Municipality is already a member of the GTA Clean Air Council, and has been for the past eight years, more active involvement in the GTA Clean Air Council by political representation would be beneficial.

9.9 Air quality initiatives should be considered as a "new service" and appropriately resourced.

9.10 The Municipality has many opportunities to fund air quality improvements such as: better street sweeping equipment, zoning standards for sensitive land uses (daycares, schools), or providing a grant program (carrot) or by-law (stick) to eliminate emissions from wood-burning fireplaces which are a major source of particulate matter.

10.0 CONCLUSIONS

10.1 The Municipality through the GTA Clean Air Council has the opportunity to obtain updates on the progress being made by the Ministry of Environment of the cumulative impact assessment, $PM_{2.5}$ policy framework, and development of components of the Comprehensive Air Management System (CAMS). Staff should continue to monitor the progress of this policy review and the initiatives of the GTA Clean Air Council.

10.2 For economic development purposes, targeting industrial point source emissions would have impacts on our existing industries and may be perceived as a barrier for new companies to select and locate in Clarington. These issues are usually best addressed by the Regional and Provincial so that there is a level playing field. In addition, to monitoring the provincial regulation advances being made, the Region of Durham should be asked to become more involved in air quality issues, especially as they relate to health issues, on a Region wide basis.

10.3 If Council deems it important to be more active in the area of air quality, it should be identified as a priority in the Strategic Business Plan and the matter referred to the 2012 budget.

Staff Contact: Faye Langmaid

Attachments:

Attachment 1- Resolution
Attachment 2- PSD-088-10
Attachment 3- Fine Particulate Matter (MOE definition from website)
Attachment 4- *Brief Review: Using Air Monitoring as a Tool to Assess & Address Local Airsheds & Mirco-Environments in Ontario,* March 2010, Environmental Commissioner of Ontario. Full study available at: http://eco.on.ca/eng/uploads/eng_pdfs/2010/Air%20Monitoring%20in%20Local%20Airsheds.pdf
Attachment 5- Environment Bill of Rights (EBR) Application for Review, Review Decision Summary, November 15, 2010
Attachment 6 - Western Climate Initiative - Cap and Trade System

Interested parties to be notified of Council's decision:

Kerry Meydam
Jennifer Knox, OPG
Martin Vroegh, St. Marys Cement

February 28th, 2011 GPA Meeting

Moved by Woo, Seconded by Hooper

WHEREAS the Province of Ontario and the Government of Canada have gathered research and prepared reports on fine particulate matter and its serious harm to human health, but have not as of yet passed air regulations that focus on fine particulate matter, evaluate ambient conditions together with new emissions, assess the human and public health impacts of such emissions or limit cumulative concentrations;

WHEREAS fine particulate matter PM2.5 is typically regulated by Provincial and Federal governments, and within their mandated responsibilities;

WHEREAS the Province of Ontario in November of 2010 acknowledged that there is a policy gap that needs to be examined with respect to domestic sources of primary PM2.5.

WHEREAS the review the Ontario Ministry of Environment is proceeding with will examine the effectiveness of the current provincial policy framework in addressing PM2.5; other aspects such as cumulative effects are also under review. The results of these reviews will take a minimum of fifteen (15) months; and

WHEREAS s. 11(2) of the Municipal Act, 2001, as amended ("the Act"), permits municipalities to pass by-laws respecting the health, safety and well-being of persons;

WHEREAS s. 128 of the Act permits municipalities to prohibit and regulate with respect to public nuisances, including matters that, in the opinion of Council, are or could become or cause public nuisances;

WHEREAS for Clarington to proceed with the drafting and implementation of an Air Quality By-law under the Municipal Act, Council should be aware of:

- The costs to retain a consultant to help develop guidance documents for general assessment and air modeling prior to drafting a by-law,
- the costs to determine a baseline, sources of emissions of health risk air pollutants and an atmospheric dispersion model of the airshed
- future budget implications for additional enforcement staffing, peer reviewers, air quality modelers; potential education and outreach programs to support by-law implementation and data management;
- the potential implications on existing industries in Clarington and the potential impact on economic development and the attraction of prospective industries/employers; and
- the potential duplication between a Clarington specific By-law and the Provincial Review that is underway
- An estimate of generated revenue if the Municipality were to engage in the trading of carbon credits

NOW THEREFORE BE IT RESOLVED THAT Staff be authorized to prepare a report outlining the above noted items for presentation to the March 21st GPA meeting.

CARRIED

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REPORT
PLANNING SERVICES

Meeting: GENERAL PURPOSE AND ADMINISTRATION COMMITTEE

Date: July 5, 2010 **Resolution #:** **By-law #:** N/A

Report #: PSD-088-10 **File #:** PLN 17.1.5

Subject: REQUEST FOR AIR QUALITY BY-LAW

RECOMMENDATIONS:

It is respectfully recommended that the General Purpose and Administration Committee recommend to Council the following:

1. THAT Report PSD-088-10 be received for information.

Submitted by:
Faye Langmaid, FCSLA, MCIP
Acting Director of Planning Services

Reviewed by:
Franklin Wu,
Chief Administrative Officer

FL/df
25 June 2010

1.0 PURPOSE

1.1 At the March 1st meeting of Council a report was requested:

> "That Correspondence Item D-10 from Kerry Meydam, with respect to an Air Quality By-law, be referred to staff for a report back within a reasonable timeframe."

1.2 Council was not specific is what aspect of the by-law they were requesting staff to report back on, as such staff are providing an information report on the ramifications of enacting such a by-law.

2.0 BACKGROUND

2.1 Air Quality is typically regulated by the Provincial and Federal governments; however there are presently no regulatory standards for fine particulate matter (fine PM) emissions or ambient levels.

2.2 In February of this year, the Town of Oakville passed a by-law that attempts to regulate the emission of fine PM. They did so relying upon the powers given to municipalities under the Municipal Act, 2001 to regulate the "health, safety and welfare of persons" and "public nuisances". These are the same powers that many Ontario municipalities used to adopt by-laws addressing second hand smoke and pesticides. Eventually the patchwork of municipal by-laws throughout Ontario led the Province to address second hand smoke and the use of cosmetic pesticides on a provincial basis.

2.3 The Oakville Air Quality By-law is aimed specifically at protecting the health of Oakville residents from the effects of fine PM by collecting information on emissions from facilities within Oakville and implementing regulatory controls.

2.4 The Region of Durham Health Department leads, manages and delivers public health programs and services for the Region. To date, the Health Department has been the lead agency on health issues and effects as they have the expertise to advise on, and are the legislative authority to impose restrictions on health related issues.

3.0 CONSULTATION REQUIRED FOR AN ENFORCEABLE BY-LAW

3.1 A component of the development of any by-law is consultation with the general public. In this case it would be necessary to consider the implications for residents and existing businesses. A process involving these groups that would adequately address their issues and concerns for the development of a by-law would have to be proposed. The consultation process should be developed such that it could withstand a potential challenge to the by-law.

4.0 RETENTION OF A QUALIFIED CONSULTANT

4.1 Air quality is not an area of expertise that the existing municipal staff has as a specialty. The air quality comments and issues that have been raised and addressed as part of environmental assessments have been part of the peer review consultant's

responsibilities that have been retained by the Municipality. It may also be necessary to retain a consultant to help develop guidance documents for general assessment and air modeling prior to drafting a by-law; to determine a baseline, sources of emissions of health risk air pollutants and an atmospheric dispersion model to map what is happening in the affected airshed is necessary.

5.0 HEALTH ISSUES RELATED TO AIR QUALITY ISSUES

5.1 Air Quality is a combination of many factors, there are the contributions of emissions from industrial sources; however, a large percentage of air quality issues come from either vehicle emissions or from beyond our borders. The pollutants being funneled into our air shed from outside sources are beyond our control. The long-range transport of pollutants from other sources, especially during smog events contribute significantly to the health effects that may or may not appear in residents.

5.2 There is considerable scientific evidence of serious impacts to human heath associated with exposure to fine particulate matter. Understanding when, where and how people are exposed to fine particulate matter and/or "precursor pollutants", namely substances which, when emitted into the air, produce fine particulate matters is challenging.

6.0 ENFORCEMENT

6.1 Should Council wish to pass an air quality by-law, the by-law would have to be enforced. In the case of Oakville's By-law there is an application fee which is intended to cover the administration and peer review costs for the approval of applications from existing and proposed facilities.

6.2 In addition, there is the possibility that new staffing and budget allocations would be necessary for the enforcement of the by-law, including periodically retaining peer reviewers, air quality modelers and assigning staff to carry out education and outreach to support by-law implementations and data management.

7.0 OTHER INITIATIVES

7.1 The Municipality may have greater impact on air quality issues through other avenues than an air quality by-law such as the implementation of transit initiatives, smart commute programs and other sustainable development measures.

7.2 Since 2003, the Municipality has been a member of the Greater Toronto Area Clean Air Council (GTA CAC). As part of this initiative the Municipality is working with the other member municipalities on air quality issues, participating in the annual Smog Summit, Clean Air Partnership and signing the declaration of actions and commitments.

7.3 The Green Community Strategy and the Municipal Energy Management Plan both of which were endorsed by Council at the June 28th meeting have initiatives within them that will contribute to better air quality when they are implemented.

8.0 CONCLUSIONS

8.1 Should Council wish staff to draft an air quality by-law based on the health impacts of fine particulate matter, specific direction should be provided for a budget estimate to be obtained for consideration during the 2011 budget deliberations.

Staff Contact: Faye Langmaid

Interested Parties: Kerry Meydam

Fine Particulate Matter

What is fine particulate matter?

Particulate matter is characterized according to size - mainly because of the different health effects associated with particles of different diameters. Particulate matter is the general term used for a mixture of solid particles and liquid droplets in the air. It includes aerosols, smoke, fumes, dust, ash and pollen. The composition of particulate matter varies with place, season and weather conditions. Fine particulate matter is particulate matter that is 2.5 microns in diameter and less. It is also known as $PM_{2.5}$ or respirable particles because it penetrates the respiratory system further than larger particles.

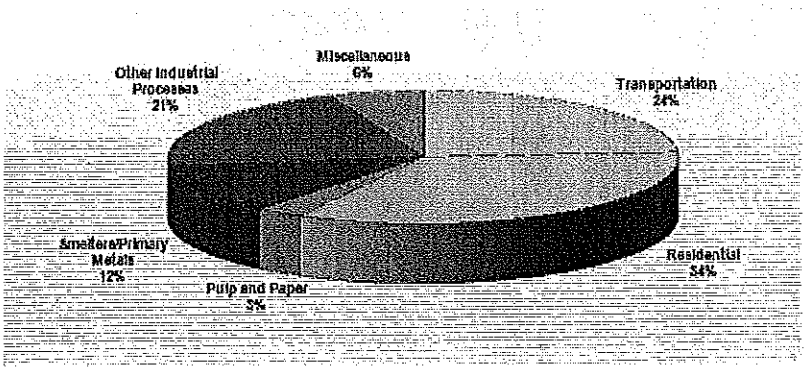
$PM_{2.5}$ in Ontario is largely made up of sulphate and nitrate particles, elemental and organic carbon and soil.

What are the sources of fine particulate matter?

$PM_{2.5}$ material is primarily formed from chemical reactions in the atmosphere and through fuel combustion (e.g., motor vehicles, power generation, industrial facilities, residential fire places, wood stoves and agricultural burning). Significant amounts of $PM_{2.5}$ are carried into Ontario from the U.S. During periods of widespread elevated levels of fine particulate matter, it is estimated that more than 50 per cent of Ontario's $PM_{2.5}$ comes from the U.S.

Ontario $PM_{2.5}$ Emissions by Sector
(Emissions from Point/Area/Transportation Sources, 2006 Estimates)

Pie Chart



Category	Percent
Residential	34%
Transportation	24%
Other Industrial Processes	21%
Smelters/Primary Metals	12%
Miscellaneous	6%
Pulp and Paper	3%

***Note:** 2006 is the latest complete inventory. Emissions may be revised with updated source/sector information or emission estimation methodologies as they become available.*

Approximately 34 per cent and 24 per cent of $PM_{2.5}$ emitted in Ontario in 2006 came from residential and transportation sectors, respectively, while other industrial processes accounted for 21 per cent. Lesser sources of $PM_{2.5}$ include smelters/primary metals, miscellaneous and, pulp and paper.

What are the effects of fine particulate matter?

The greatest effect on health is from particles 2.5 microns or less in diameter. Exposure to fine particulate matter has been associated with hospital admissions and several serious health effects, including premature death. People with asthma, cardiovascular or lung disease, as well as children and elderly people, are considered to be the most sensitive to the effects of fine particulate matter. Adverse health effects have been associated with exposure to $PM_{2.5}$ over both short periods (such as a day) and longer periods (a year or more).

Fine particulate matter is also responsible for environmental effects such as corrosion, soiling, damage to vegetation and reduced visibility.

The following table shows the health effects of different AQI levels caused by fine particulate matter.

Health effects of different Air Quality Index (AQI) levels caused by fine particulate matter

Category	AQI	Pollutant Concentration Breakpoints ($\mu g/m^3$)	Fine Particulate Matter ($PM_{2.5}$)
Very Good	0 - 15	0 - 11	Sensitive populations may want to exercise caution.
Good	16 - 31	12 - 22	Sensitive populations may want to exercise caution.
Moderate	32 - 49	23 - 45	People with respiratory disease at some risk.
Poor	50 - 99	46 - 90	People with respiratory disease should limit prolonged exertion; general population at some risk.
Very Poor	100 or over	91 or over	Serious respiratory effects even during light physical activity; people with heart disease, the elderly and children at high risk; increased risk for general population.

Note: The AQI sub-index for $PM_{2.5}$ is based on a 3 hour running average concentrations.

$\mu g/m^3$ = micrograms per cubic metre.

For more information, see our list of publications.

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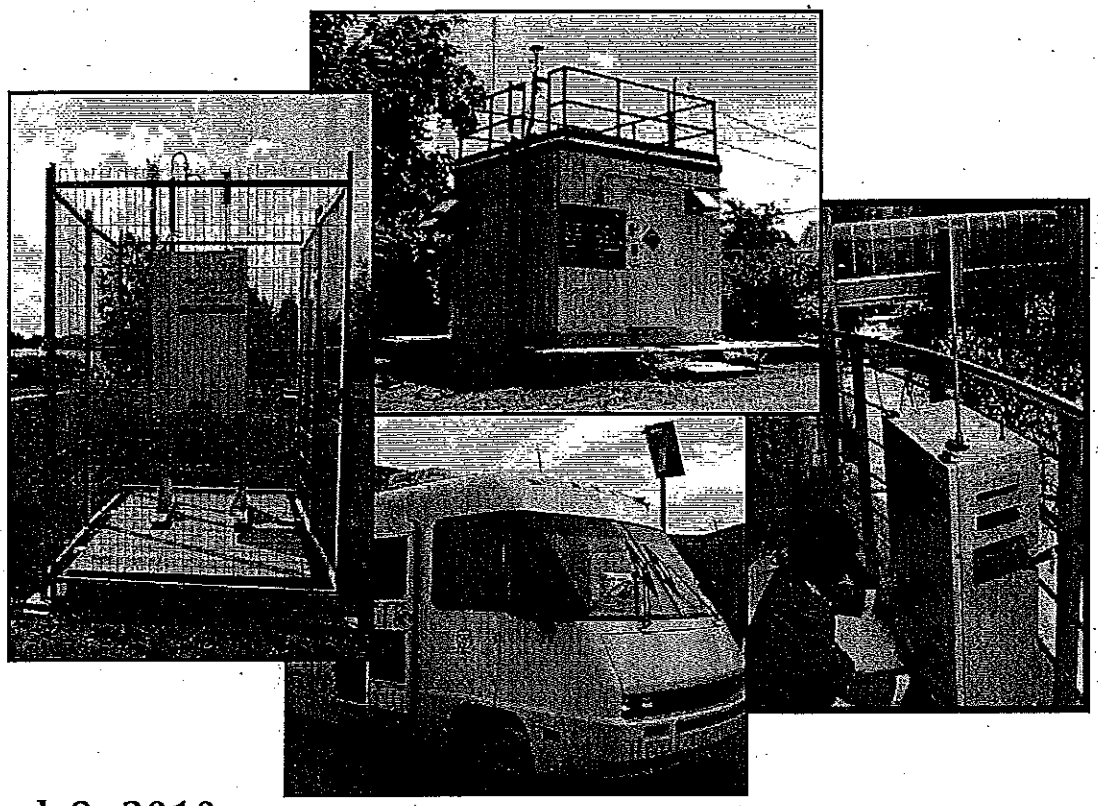
Brief Review:
Using Air Monitoring as a Tool to Assess & Address Local Airsheds & Micro-Environments in Ontario



March 9, 2010

Prepared by Kim Perrotta
For the Environmental Commissioner of Ontario

Perrotta & Associates
Environment. Health. Public Policy.

Executive Summary

This report examines when, where and how air monitoring is currently being used in Ontario as a tool to assess and address local airsheds and/or micro-environments, and when, where and how it could or should be used as a tool to assess air quality impacts and protect human health. This report is based largely on key informant interviews conducted with:

- Staff in the in the Air Monitoring & Reporting Section of the Ontario Ministry of the Environment (MOE);
- Staff in the MOE regional offices that conducted the Clarkson Airshed Study and the Hamilton Road Dust Study;
- Staff in the three Ontario municipalities that are assessing their local airsheds with airshed modelling and monitoring tools;
- Participants in industry-led and partnership-led air monitoring projects; and
- Staff in six public health units that are active on air quality issues about when, where and how air monitoring can or should be used as a tool to assess and address air quality in local airsheds and/or micro-environments.

Among public health units and municipalities that are active on air quality issues, there is a great deal of interest in understanding how air quality varies across a local community. While they see a great deal of value in air monitoring as a tool for assessing local airsheds and micro-environments, they see it as an expensive tool that must be used in a complementary way with air modelling tools. They would however, like to see air monitoring used to:

- Validate and calibrate air modelling tools that can be used to assess various policies and decisions related to land use planning and transportation planning;
- Inform and support specific land use and transportation planning policies;
- Assess land use planning applications such as those related to the placement of daycare facilities or schools relative to commercial operations such as trucking depots;
- Measure background air levels to be used to evaluate the cumulative air quality impacts associated with proposed projects and facilities;
- Confirm air levels predicted with air modelling for proposed projects or facilities after projects are completed and/or facilities are operating; and

- Inform purchasing policies within municipalities.

The public health units and municipalities interviewed did not envision a network of many air monitors sited in multiple locations for long periods in their communities. Rather, with a few exceptions, they envisioned air monitoring equipment being used for limited periods to inform processes related to certificates of approval, environmental assessments, land use planning decisions, municipal purchasing policies, and policy development.

There is no consensus among the parties interviewed about who should be responsible for air monitoring that is directed at local airsheds as a whole or at micro-environments that are not related to point sources. As a rule, the MOE does not get involved in the assessment of local airsheds in a comprehensive way because the MOE does not see itself having regulatory authority or jurisdiction for many of the emission sources within a community. On the other hand, as a rule, staff within public health units and municipalities do not see themselves having the expertise or the resources to undertake assessments of their local airsheds. In addition, many do not feel that this is the responsibility of local governments. A number believe that this is the responsibility of the Province as the government body that has responsibility for compliance with Canada Wide Standards and the expertise, resources and authority to act on air quality.

All of the public health staff interviewed indicated that they thought that the MOE should be taking a greater role in this type of work because of its technical expertise and resources. From comments offered, it appears that the Province may need to recognize that: the MOE air quality expertise is needed to assess and address air quality in a cumulative way; and the MOE needs to move beyond its focus on point source to include mobile and area sources as well as point sources. Judging by the comments of staff within public health units, and by the studies that are being directed at local airsheds and micro-environments by those interviewed, emissions associated with vehicles and traffic corridors are considered a very high priority.

When it comes to the urban airshed, there appears to be a trinity of interests and expertise that need to be united on this issue: public health departments have responsibility for protecting the health of citizens within their communities; planning departments within regional and local municipalities have responsibility for long-range and current planning decisions within their jurisdictions; and the MOE has expertise in the assessment and management of air quality issues, legislative authority for air quality issues related to point sources, and legislative authority for the environmental assessment processes that are applied to major projects including those applied to the transportation sector.

It is recommended that the MOE:

1. Provide technical support and financial resources to public health departments and/or municipalities that are seeking to assess air quality across their airsheds to inform land use and transportation planning processes giving priority to those municipalities that:

   a. Are expected to grow rapidly over the next 20 years;

   b. Have, or are expected to achieve, high population densities; and

   c. Have stressed airsheds because of transboundary air pollution and/or local emission sources.

2. Work with public health units and/or municipalities to identify, coordinate, and conduct air monitoring studies that assess micro-environments of common concern, such as traffic corridors, for the purpose of informing land use and transportation planning decisions and policy development at both a provincial and local level.

3. Provide technical support and resources to those public health units and/or municipalities that are doing air monitoring and/or air modelling studies to assess micro-environments that are of common concern to public health units and/or municipalities.

4. Actively work with public health units and/or municipalities to build an understanding of the air monitoring and modelling tools, technologies, and strategies that can be used to assess local airsheds and micro-environments, along with their strengths, limitations, and applications.

5. Conduct research on policies and protocols that can be used to address both regional and local air quality issues through the land use and transportation planning processes that are conducted by local, regional and provincial levels of government.

Environmental Bill of Rights (EBR) Application for Review
Review Decision Summary
November 15, 2010

MOE File No.: 10EBR001.R

1. Issue

The Ministry of the Environment (ministry) received an application under the *Environmental Bill of Rights, 1993* (EBR) to review the need for a new air pollution Act or regulation that focuses on particulate matter less than 2.5 microns in size (fine particulate or $PM_{2.5}$), and to address the combined effects of proposed emissions and existing ambient concentrations.

2. Applicants' Request

The applicants have requested a review to determine if a new air pollution Act or regulation is needed.

> [One that] specifically addresses $PM_{2.5}$ and its role in air quality degradation on which human health depends ... because:
> 1) there is a public health crisis in Ontario due to ambient air concentrations of $PM_{2.5}$;
> 2) the existing regulatory regime does not protect against serious health impacts of $PM_{2.5}$; and,
> 3) fatal and other serious health impacts will continue to grow unless immediate action is taken.

The applicants are requesting this review on the basis that:

> 1) the 2005 reforms resulting in Ontario's regulatory regime for air pollution control, through O. Reg. 419/05, do not address the emissions of $PM_{2.5}$;
> 2) there is no other existing regulatory regime suitable to address the unique circumstances of $PM_{2.5}$ across Ontario;
> 3) a new binding regime (Act or regulation) is needed to protect human health from $PM_{2.5}$ airborne concentrations across Ontario; and
> 4) the requested review is in the public interest...

The applicants submit that existing Ontario regulations are not protective of human health with respect to adverse health effects of $PM_{2.5}$. The applicants refer to several of Ontario's Environmental regulations and state the following:

- *Environmental Protection Act* (EPA) which provides provincial authority to regulate Ontario pollution, but has authorized no regulation of $PM_{2.5}$; and, provides that the director may issue a Certificate of Approval (CofA) to discharge a contaminant, and regulations prescribe conditions and criteria that apply to such decisions, but no such conditions or criteria address $PM_{2.5}$.

- Ontario Regulation 419/05 Air Pollution – Local Air Quality which includes a standard for suspended particulate (particulate matter less than 44 µm in diameter) which is regulated for "visibility" issues. It does not regulate $PM_{2.5}$ which causes serious health effects. This regulation requires no consideration of background ambient air quality, and is not suitable to protect public health as there is no safe level of $PM_{2.5}$.

- The now revoked Ontario Regulation 337 Ambient Air Quality Criteria (AAQC) which included an AAQC for suspended particulate but did not address fine PM and its health effects. This regulation was replaced by "Ontario's Ambient Air Quality Criteria" (February 2008) which does not include an AAQC for $PM_{2.5}$. Even if it did, there is no legal requirement that an area not exceed any applicable AAQC; nor is there any requirement that the ministry consider the AAQC or existing ambient air quality when making CofA decisions.

- Existing regulations do not address $PM_{2.5}$ precursor pollutants.

- Existing regulations do not address existing ambient $PM_{2.5}$ levels in Ontario air.

The applicants have recommended that the proposed Act or regulation would have eight components:

1) it would focus on the airborne contaminant posing the greatest danger to human health, namely $PM_{2.5}$;
2) it would regulate not only direct emissions of fine $PM_{2.5}$, but also the $PM_{2.5}$ resulting from the emissions of "precursor" substances, that is, substances that mix together in the atmosphere to create additional quantities of $PM_{2.5}$;
3) it would apply initially to "major emitters" of $PM_{2.5}$ and precursor substances, but would provide an approach that could be applied eventually to all other significant existing and proposed sources of $PM_{2.5}$;
4) for an emitter, it would require three-dimensional mapping that would illustrate the extent of the affected airshed, as well as the concentration of $PM_{2.5}$ within the affected airshed due to the proposed emitter (the "affected airshed");
5) it would require an emitter to evaluate, using an appropriate atmospheric dispersion model that has the capacity to address atmospheric chemistry, the combined air concentrations across the affected airshed of:
    a) the existing levels of $PM_{2.5}$ in the affected airshed, and
    b) the future levels of $PM_{2.5}$ resulting from the proposed source of new emissions of $PM_{2.5}$ directly, and as a result of new emissions of precursor substances;
6) it would assess the risks to public health (i.e., communities or populations) associated with predicted ambient concentrations of $PM_{2.5}$ in the affected airshed, being a combination of:
    a) predicted ambient levels of $PM_{2.5}$ resulting from the proposed emitter; together with,
    b) existing ambient levels $PM_{2.5}$ within the affected airshed;

7) it would establish a limit on ambient concentrations of $PM_{2.5}$ that is based on health risks to people within the affected airshed, such that existing or future sources of emissions would be prohibited where they present an unacceptable degree of health risk; and,
8) it would ensure assessments are publicly communicated to affected communities in advance of any regulatory decision-making, and that affected communities have an appropriate opportunity to comment on such assessments and possible decisions, and an opportunity to use existing EBR rights to appeal any decision of concern.

The applicants state that the province has a responsibility to address the problem and to compel reduced emissions or intrusions of $PM_{2.5}$ and precursor substances into Ontario air. It is the applicants' position that a new Act or regulation is needed since existing Ontario regulations are not protective of human health respecting the adverse effects of $PM_{2.5}$.

The applicants recommend that a committee be struck to conduct the review and make recommendations to the minister on an expedited basis. The applicants recommend that the committee comprise: the Ontario Medical Association, Medical Officers of Health, and any other person the minister considers may have relevant environmental or public health expertise, interest or local authority over public health matters.

3. Ministry Review of Application

The decision to assess this EBR Application for Review (Application) has been delegated by the Minister of the Environment (Minister) to the Assistant Deputy Minister (ADM) of the Integrated Environmental Policy Division. The assessment of this Application involved staff from the ministry's Air Policy and Climate Change Branch, Standards Development Branch, Environmental Monitoring and Reporting Branch, the Environmental Assessments and Approval Branch and Operations Division. The assessment was based on the evidence provided in the application as well as ministry initiatives that address the Applicant's request.

Air Management of Fine Particulate Matter in Ontario

$PM_{2.5}$ may be directly emitted from processes ranging from transportation to residential to industrial sources or it may be a secondary pollutant generated through complex reactions in the atmosphere. $PM_{2.5}$ in ambient air presents significant air quality management challenges because of the wide-range of sources and the long distances it can travel; as a result, $PM_{2.5}$ requires a broad regional air management strategy and is difficult to manage at a local level.

To illustrate, the ministry has conducted a series of studies in the Clarkson area of southern Ontario. The Clarkson Airshed is typical of urban areas in southern Ontario with significant industry, heavy traffic volumes, residential intensification and impacts

from transboundary pollution. The Clarkson Airshed Study[1] showed that the most significant contributor to contaminant concentrations measured at ministry monitoring stations was vehicular emissions. Vehicular emissions can account for over 49% of fine PM and nitrogen oxides (NO_x) in ambient air in this part of Ontario. Residential and transboundary sources were also found to be significant: it was concluded that 39% of observed $PM_{2.5}$ levels could be attributed to sources outside of the study area. On occasion, long range transport from the United States contributed to over 50% of the measured $PM_{2.5}$ levels in the Clarkson Airshed.

The results of the Clarkson study illustrate how $PM_{2.5}$ is a complex air quality problem that requires a comprehensive management strategy to address not only industrial emissions, but also residential, transportation and transboundary sources of $PM_{2.5}$ and $PM_{2.5}$ precursors. Ontario has responded to the $PM_{2.5}$ challenge by making commitments towards reducing $PM_{2.5}$ concentrations and emissions of precursors including a 45% reduction of nitrogen oxide (NO_x) and volatile organic compounds (VOCs) emissions from 1990 values by 2015 under Ontario's Anti-Smog Action Plan; a 50% reduction of sulphur dioxide (SO_2) emissions beyond the 1985 Countdown Acid Rain Cap by 2015; and achieving the Canadian Council of Ministers (CCME) Canada-Wide Standards (CWS) for $PM_{2.5}$ and ozone by 2010.

With respect to the targets described above, provincial NO_X emissions had been reduced by 33% and VOC emissions had been reduced by 42% (based on 2007 data). In 2007 Ontario also met its commitment to reduce SO_2 emissions by 50% - 8 years ahead of schedule.

As described in more detail below, Ontario has implemented comprehensive regulations and programs to address ambient levels of $PM_{2.5}$ and continues to take significant action to improve air quality across Ontario. Many of these regulations and programs directly address components of the applicants' recommendations for a proposed new air regulation. Ontario's approach has resulted in measurable reductions in emissions of $PM_{2.5}$ and precursors, and improvements to air quality.

Canada-Wide Standard for $PM_{2.5}$

The ministry is very aware of the human health burden associated with fine particulate matter and acknowledges the results of the various studies presented in the application. Ontario has adopted the Canada-wide Standard (CWS) for $PM_{2.5}$[2] developed by the Canadian Council of Ministers of the Environment (CCME). The CWS is 30 $\mu g/m^3$ 24-hour averaging time to be met by 2010. Achievement is to be based on the 98^{th} percentile ambient measurement annually, averaged over three consecutive years.

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[1] Ontario Ministry of the Environment, 2008. *Clarkson Airshed Study - A Scientific Approach to Improving Air Quality - Part III The Air Quality Dispersion Modeling Source Contribution Assessment.* http://www.ene.gov.on.ca/publications/6768e.pdf

[2] Canada-wide Standards for Particulate Matter (PM) and Ozone, Canadian Council of Ministers of the Environment, 2000 http://www.ccme.ca/assets/pdf/pmozone_standard_e.pdf

Currently, this standard is under review by the CCME which may result in the standard becoming more stringent.

The CWS is implemented on a regional basis with one designated monitoring station placed in each city having a population greater than 100,000. As of 2008, all designated sites in Ontario meet the CWS[3]. Many of the initiatives that follow are commitments and actions to reduce fine PM concentrations and have helped Ontario meet the CWS.

State of the Environment Monitoring and Reporting

A component of the adoption of the CWS is the establishment and maintenance of monitoring networks which are needed to characterize fine PM air quality problems, to design management programs and to track progress.

The ministry has a network of 40-state-of-the-art Air Quality Index (AQI) stations across the province. The AQI is an indicator of air quality based on air pollutants, including fine PM and its precursors, that have adverse effects on human health and the environment. The ministry takes real-time air quality data from its AQI monitoring stations to produce AQI readings for each location. Index values can be accessed by the public through the ministry's Air Quality Ontario website[4]. The data from these stations are also used to produce the ministry's annual Air Quality in Ontario reports which are available through the ministry's website[5].

The ministry monitors air pollution levels and through smog advisories alerts the public when there is a strong likelihood that widespread elevated and persistent smog levels are expected. Members of the public can also subscribe to the Smog Alert Network[4] notification service that provides advance warning that poor air quality may be on its way.

Current State of Air Quality in Ontario

Ontario's publicly available 2008 Air Quality in Ontario report[3] provides an overview of Ontario's air quality and presents provincial $PM_{2.5}$ emissions and ambient concentrations. Highlights of the report with respect to $PM_{2.5}$ include:

- overall provincial $PM_{2.5}$ emissions have decreased by approximately 30% in the 10-year period from 1998 to 2007 while the provincial annual average ambient concentration has decreased by 20% from 2003[6] to 2008;
- fine PM emissions from industrial processes have been reduced by over 50% in the 10-year period from 1998 to 2007;

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[3] Ontario Ministry of the Environment, 2010, *Air Quality in Ontario 2008 Report*, http://www.ene.gov.on.ca/publications/7356e.pdf

[4] http://www.airqualityontario.com/

[5] www.ene.gov.on.ca

[6] The ministry standardized continuous $PM_{2.5}$ monitoring across Ontario in 2003 allowing for trend analyses from that date.

- significant amounts of $PM_{2.5}$ measured in southern Ontario are of secondary formation and of transboundary origin;
- the CWS target of 30 $\mu g/m^3$ was not exceeded at any of the CWS designated sites in 2008, including urban areas such as Toronto, Oshawa and Mississauga;
- 75% of Ontario's $PM_{2.5}$ CWS designated sites were at or below 25 $\mu g/m^3$ in 2008 (CWS is 30 $\mu g/m^3$); and,
- $PM_{2.5}$ levels relative to the CWS have been consistently decreasing in southern Ontario.

Similar trends can also be observed in $PM_{2.5}$ precursors including NO_x and SO_2.

The report also shows how Ontario's $PM_{2.5}$ emissions profile has changed over the past decade. In 1998, industrial emissions accounted for more than half of Ontario's $PM_{2.5}$ emissions but have decreased over time to represent less than 35% of emissions in 2007. The dominant sector is now residential where $PM_{2.5}$ emissions account for 37% of provincial totals, up from 20% in 1998.

Regulation of Direct $PM_{2.5}$ Emissions
Ontario does not currently regulate direct emissions of $PM_{2.5}$ from industrial or commercial facilities. Regulating direct emissions from facilities is not the most effective way to reduce $PM_{2.5}$ levels in an airshed since most ambient $PM_{2.5}$ is secondary in nature and originates from transboundary and transportation sources.. We do acknowledge that we have not fully assessed local impacts of individual industrial sources.

Regulation of $PM_{2.5}$ Precursor Emissions
Ontario has a broad range of regulations and guidelines in place to address both the regional and local impacts of secondary $PM_{2.5}$. These include:

- Ontario's industrial emissions reduction plan and emissions trading program for electricity and industry sectors (O. Reg. 194/05 and O. Reg. 397/01) require reduction of emissions through setting caps and trading mechanisms. Limits have been applied for two of the most significant smog and acid-rain causing pollutants: nitrogen oxides (NO_X) and sulphur dioxide (SO_2). Since 2003, smog-causing emissions from the electricity sector have been trending downward. In 2008, Ontario's coal-fired plants had reduced emissions of NO_X by 47% and emissions of SO_2 by 51% from 2003. The emissions of NO_X and SO_2 for industrial facilities regulated under O. Reg. 194/05 were respectively approximately 5.7% and 4.9% lower in 2008 than 2007.

- Ontario is leading the way in North America by legally committing to closing coal-fired generation. Closing out coal-fired generation will end emissions from these sources, improve air quality, and reduce smog-causing pollutants. Under O. Reg. 396/01 (Lakeview Generating Station) the closure of the Lakeview Generating

Station occurred in April 2005. O. Reg. 496/07 (Cessation of Coal Use – Atitkokan, Lambton, Nanticoke and Thunder Bay Generating Stations) requires the owner and operator of the remaining four coal-fired generating stations to cease using coal as of December 31, 2014.

- Ontario's EPA, Section 9, requires a facility releasing emissions to the atmosphere to have a Certificate of Approval before it can lawfully operate. A review of an application includes an assessment of air quality impacts and may result in the issuance of a Certificate of Approval with conditions requiring the facility to minimize emissions.

- Guidelines and codes of practice are used to address $PM_{2.5}$ and precursor emissions and are enforced through Certificates of Approval, for example:
  - Guidelines A-1 (Biomedical Waste Incinerators) and A-7 (New Municipal Waste Incinerators) which apply to incinerator systems. The limits in these guidelines include those for particulate matter, SO_2 and NO_x in addition to other compounds.
  - Guideline A-5 (Atmospheric Emissions from Stationary Combustion Turbines) to control emissions of NO_x from new and modified stationary combustion turbines by specifying atmospheric emission limits for NO_x, SO_2, and carbon monoxide.
  - Guideline A-9 (NO_X Emissions from Boilers and Heaters) imposes NO_X emission limits on large boilers and heaters. The purpose of this policy guideline is to reduce smog in Ontario by reducing the emission of NO_X by new or modified large boilers and heaters.
  - Guideline F-1 (Particulate Emissions at New Cement Plants) which establishes emission limits for particulate matter from new cement plants.

- Ontario has included a 24-hour value for $PM_{2.5}$ in its AAQC guideline (February 2008)[7]. The value is provided with guidance for decision making near individual sources and is most commonly used in environmental assessments, special studies using ambient air monitoring data, and the assessment of general air quality in a community.

- Ontario recently passed a regulation (O. Reg. 455/09) under the *Toxics Reduction Act* that sets out a framework for toxics reduction action by facilities including requirements to track and evaluate toxics, to develop reduction plans, and to make summaries of plans available to the public. Some of the toxics covered by the regulation contain fine particulate fractions or are precursors to fine PM.

- Ontario's *Environmental Assessment Act* (EAA) applies to electricity, waste management, and transportation projects as well as a range of public sector infrastructure projects. It defines the Environmental Assessment process which

[7] Ontario's Ambient Air Quality Criteria, 2008, http://www.ene.gov.on.ca/publications/6570e-chem.pdf

evaluates potential environmental effects of a project or undertaking, including an assessment of any contaminants emitted to air, such as $PM_{2.5}$ if applicable.

- O. Reg. 419/05 (Air Pollution – Local Air Quality) is a general air pollution regulation requiring industrial and commercial point sources to limit emissions of a broad range of contaminants which includes total suspended PM and fine PM precursors (i.e., SO_2, NO_X and some specific VOCs) based on acceptable, health-based point-of-impingement concentration standards. The regulation also outlines emission estimating and dispersion modelling requirements.

Transportation Initiatives

Ontario has a variety of transportation initiatives to improve air quality both today and in the future:

- Ontario's Drive Clean program is an emissions inspection and maintenance program for vehicles. From 1999 to 2005, the program reduced smog-causing emissions from light duty vehicles by more than 150,000 tonnes. The Drive Clean Heavy Duty Diesel Vehicle (HDDV) program targets harmful emissions from large trucks and buses. During the 6 year period from 2000 to 2005, Drive Clean reduced fine PM from heavy duty diesel vehicles by nearly 1,300 tonnes. Drive Clean requirements are based on O. Reg. 361/98 (Motor Vehicles).

- Public transit is a priority for Ontario. In spring 2009, the government announced that Ontario is moving ahead with over $9 billion in priority rapid transit projects (the 'Big 5') identified in the Metrolinx Regional Transportation Plan. Construction is underway on two projects — the Sheppard East LRT in Toronto and York Viva Bus Rapid Transit. All five projects are expected to be completed by 2020.

- In order to address automotive sulphur emissions before federally regulated limits came into effect in 2005, Ontario implemented the Sulphur-in-Gas Reporting Regulation (O. Reg. 212/02). The regulation required Ontario gasoline manufacturers, blenders and importers to report to the government on the average level of sulphur in their gasoline.

Transboundary

Ontario is taking strong action on transboundary sources of air pollution which significantly affect the air that Ontarian's breathe. This includes:

- Ontario's active participation in the Canadian federal delegation for the Canada-US Air Quality Agreement. The federal government will be negotiating a PM Annex under this agreement; the Annex will include emission reduction commitments, and monitoring and reporting commitments.

- Ontario has implemented a four-point Transboundary Air Strategy in support of the Premier's commitments at the 2005 Shared Air Summit. The strategy includes pursuing cooperative agreements with the United States, supporting

U.S. states in legal battles with Washington for cleaner air, public education campaigns and enhancing scientific research, air quality monitoring and emissions modelling.

New Initiatives

In addition to the activities described above, Ontario is actively working to address airborne fine PM through other forums and processes, including incorporating cumulative effects assessment in decision making processes and establishing the Southwest Greater Toronto Area (SWGTA) Air Quality Task Force.

- The ministry is currently reviewing how it applies the principles of its Statement of Environmental Values (SEV), including cumulative effects assessment and the ecosystem approach, in its environmentally significant decision making. Through this process the ministry is developing the long-term tools, including science, policies and guidelines to support the application of an ecosystem approach. The SEV places priority first on prevention and second on minimizing the creation of pollutants that cause damage to the environment.

- Ontario established the SWGTA Air Quality Task Force in September 2009. Dr. David Balsillie was appointed as the one-person Task Force in late November 2009. The Task Force has developed an Action Plan making recommendations on managing air pollution in the SWGTA in order to improve air quality now and in the future. The Action Plan examines how to reduce air emissions from industry, transportation and residential sources.

- The work of the Task Force is directly relevant to future ministry policies and programs for managing "local airsheds" in the rest of the province. The Order in Council which established the Task Force required the Action Plan to recommend: air quality improvement targets; timelines for achieving the targets; strategies for achieving the targets; reporting requirements for implementing the action plan; reporting requirements; and oversight, coordination and leadership for plan implementation. The Task Force appointed a Community Advisory Committee of residents, industries, tier 1 and tier 2 municipalities, and the Chief Medical Officers of Health for Halton and Peel.

Public Communication of Regulatory Decision-making

The applicants state a need for public communication and comment in advance of regulatory decision-making. The ministry posts all environmentally significant proposals on the Environmental Registry. Under the Environmental Bill of Rights (EBR), any member of the public can participate in ministry decisions about the environment and hold the government accountable for those decisions. The public has the right to comment on environmentally significant government proposals, to seek permission to appeal a ministry decision, or to ask a ministry to review a law or investigate harm to the environment.

The *Environmental Assessment Act* (EAA) has public consultation and notification requirements; therefore, projects subject to approval under the EAA are not required to be posted on the Environmental Registry for comment. An Environmental Assessment (EA) is both a study and planning process which evaluates the potential environmental effects and benefits of a project or undertaking on the environment. Projects subject to an EA require public notification and a public review period. More information regarding the EA process can be found on the ministry's website.

4. Review Decision

The ministry has implemented a comprehensive strategy to address fine particulate emissions and precursors in Ontario. The province has accomplished this through its comprehensive regulatory framework, adoption of the CWS, emission guidelines and other programs which address a wide range of industrial and non-industrial sources of fine particulate matter. The ministry is also actively addressing the issues identified by the applicants through its SEV review. The applicants' evidence and proposed regulatory components do not consider many of the measures currently in place nor the resulting significant improvements in air quality.

The ministry does acknowledge that there may be a policy gap with respect to domestic sources of primary $PM_{2.5}$. After careful consideration of the information available and the requirements of the EBR, the ADM of the Integrated Environmental Policy Division has concluded that a review by the ministry is warranted of the effectiveness of the current policy framework in addressing $PM_{2.5}$. This review will include an assessment of the need to revise the policy approach to direct emissions of $PM_{2.5}$. Other aspects of the request, such as cumulative effects, are already currently under review as part of the SEV review. Please note that the review will take a minimum of fifteen (15) months to complete.

Western Climate Initiative

Clean Energy: Creating Jobs, Protecting the Environment

The WCI has achieved consensus on a regional strategy to reduce greenhouse gas emissions that accommodates the diversity of its 11 Partner jurisdictions and is a model for transitioning to a green economy and reducing our dependence on foreign oil.

From the Arizona deserts to the mountains of British Columbia, from the high-tech campuses of Silicon Valley to the automobile manufacturing plants of Ontario, the seven U.S. states and four Canadian provinces that comprise the Western Climate Initiative reflect diverse geographies, industries, climates, populations, and energy and transportation infrastructures.

They have one important thing in common, however: a commitment to building a green economy and reducing the greenhouse gas (GHG) emissions that are leading to climate change.

Working together, the WCI states and provinces have achieved a unique consensus, forging a comprehensive strategy to mitigate climate change and spur investment in clean-energy technologies that create green jobs and reduce our dependence on foreign oil. When fully implemented, the plan will cover 90 percent of GHG emissions in the region and will reduce those emissions to 15 percent below 2005 levels by 2020.

The WCI Partner jurisdictions' regional approach is based on extensive economic analyses and stakeholder input over three years of technical work, collaboration, and compromise. It reflects an understanding among the WCI jurisdictions that a comprehensive solution to our economic, energy, and environmental challenges requires a coordinated regional strategy that respects the interests, needs, and circumstances of each jurisdiction.

A Comprehensive Initiative

The WCI jurisdictions' regional plan includes the following elements:

Carbon emissions limits. A market-based cap-and-trade system will provide incentives for companies and inventors to seek out new technologies that increase energy efficiency, promote greater use of renewable or lower-polluting fuels, and foster process improvements that reduce dependence on fossil fuels.

Offset credits. To reduce abatement costs for emitters, a limited number of emissions offset credits will be allowed for projects in industries outside the capped sectors—such as forestry and agriculture.

Complementary policies. To achieve the regional GHG emissions reduction goal and encourage investments in low-carbon technologies, complementary policies that work in concert with cap-and-trade are essential. The WCI jurisdictions will continue to explore—together and individually—policies that work in concert with cap-and-trade to lower carbon emissions and reduce the cost of transitioning to a green economy. These include:

- Energy efficiency measures. Energy efficiency programs, standards, incentives, and process improvements that make factories, buildings, homes, and appliances more energy efficient and reduce fuel consumption.
- Clean car standards. Standards for new passenger vehicles that reduce carbon emissions and fuel costs for consumers.
- Renewable energy. Solar photovoltaic systems, community-scale wind turbines, geothermal systems, and generating systems that run on waste material to help meet power needs and reduce GHG emissions.
- Low-carbon fuel standards. Low-carbon fuel standards that encourage use of alternative transportation fuels, including electricity, biofuels, and hydrogen.

The Economic Case for Action

Clean-energy policies are good for the environment as well as for the economy. The WCI's economic modeling suggests that complementary policies will result in cost savings to the regional economy of more than US$100 billion from 2012 to 2020. In combination with the cap-and-trade program and offset credits, the policies will also foster innovation, investment, and job creation in the green economy.

Western Climate Initiative

U.S. Partner jurisdictions comprise 19% of the total U.S. population and 20% of the U.S. GDP
Canadian Partner jurisdictions comprise 79% of the total Canadian population and 76% of the Canadian GDP.

Manitoba
GDP ..... 48,586 Million C$
Population..... 1,186,700
Largest Source of Emission .. Transportation

British Columbia
GDP ..... 190,214 Million C$
Population..... 4,380,300
Largest Source of Emission .. Transportation

Washington
GDP ..... 311,270 Million US$
Population..... 6,468,424
Largest Source of Emission .. Transportation

Oregon
GDP ..... 158,233 Million US$
Population..... 3,747,455
Largest Source of Emission .. Transportation

California
GDP ..... 1,812,968 Million US$
Population..... 36,553,215
Largest Source of Emission .. Transportation

Arizona
GDP ..... 247,028 Million US$
Population..... 6,338,755
Largest Source of Emission .. Electricity*
*Includes tribal lands

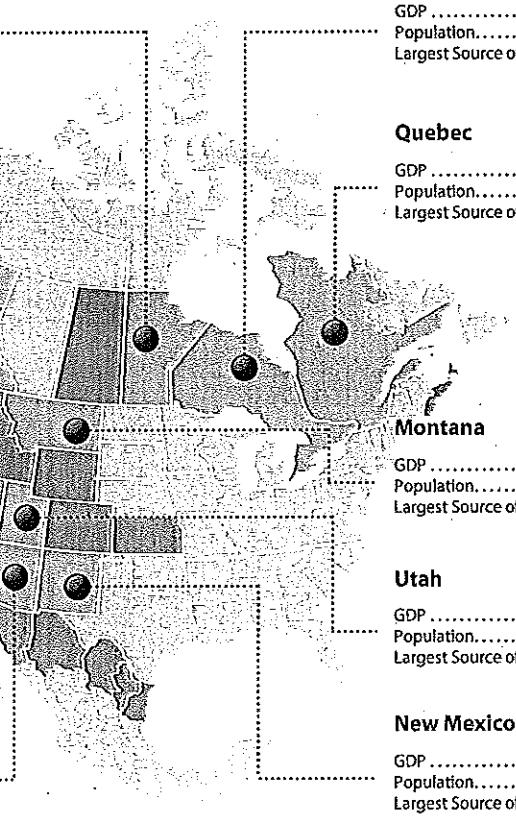
Ontario
GDP ..... 582,019 Million C$
Population..... 12,803,900
Largest Source of Emission ... Transportation

Quebec
GDP ..... 298,157 Million C$
Population..... 7,700,800
Largest Source of Emission ... Transportation

Montana
GDP ..... 34,253 Million US$
Population..... 957,861
Largest Source of Emission ... Electricity

Utah
GDP ..... 105,658 Million US$
Population..... 2,645,330
Largest Source of Emission ... Electricity

New Mexico
GDP ..... 76,178 Million US$
Population..... 1,969,915
Largest Source of Emission ... Electricity



Partners Observers

Observers

CANADA: Nova Scotia, Saskatchewan, Yukon; **UNITED STATES:** Alaska, Colorado, Idaho, Kansas, Nevada, Wyoming; **MEXICO:** Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, Tamaulipas

Source for US data: U.S. Census Bureau and U.S. Bureau of Economic Analysis; Source for Canadian data: Statistics Canada
U.S. and Canada population figures 2009; U.S. and Canada GDP figures 2008

The WCI jurisdictions are already realizing economic benefits from the green economy. In the U.S., for example, the seven state jurisdictions comprise 20 percent of the U.S. economy but garnered 60 percent of venture capital investments directed toward clean-technology businesses from 2006 to 2008. In 2007, the proportion of green businesses and green jobs in the economies of the WCI state jurisdictions was 20 percent higher than in the U.S. economy as a whole. And in British Columbia, green businesses contributed C$15.3 billion to the provincial economy in 2008 and accounted for nearly 166,000 jobs either directly or indirectly. B.C.'s green economy is expected to grow significantly in the next decade, reaching 225,000 jobs in 2020.

Looking Ahead

The WCI jurisdictions are moving forward on several fronts, including:

- Release of the Detailed Design Summary in summer 2010. This document will support implementation of the cap-and-trade program by the jurisdictions.
- Development of protocols associated with the emissions offset program.
- Setting of carbon emission allowance budgets for each jurisdiction.
- Ongoing collaboration and development of complementary policies.

More than half the states and provinces have action plans in place to transition to clean-energy economies. The WCI jurisdictions collaborate regularly with the Midwestern Greenhouse Gas Reduction Accord and the Regional Greenhouse Gas Initiative in the Northeastern U.S. on cap-and-trade program design, complementary policies, and other efforts. They also share information with 15 jurisdictions in Canada, Mexico, and the U.S. that have "official observer" status with the WCI.

In addition, the WCI jurisdictions work closely with our national governments to explore how the WCI jurisdictions' plan can complement other national and international efforts to transition to a green economy and mitigate the effects of climate change.

More Information: www.westernclimateinitiative.org