



## Air Quality Regulation: Canadian and BC Developments

Air. What is it? Technically, it is a mix of 78.09% nitrogen, 20.95% oxygen, 0.93% argon, and 0.039% carbon dioxide. It is one of the elixirs of life, and we inhale about 20,000 liters of air per day. Without it we pass out in three minutes and die in six to nine minutes. In the hierarchy of “must haves” for human life, air is number one – followed by water and food.

**Death Without:**

- Air - six to nine minutes,
- Water – about three to five days,
- Food – about three weeks

Ancient humans did not necessarily understand what this life-giving invisible gas was, and invented deities to explain the mystery. In Greek mythology there are 43 sky gods and goddesses responsible for everything from the change of seasons to daily weather. In fact, in every culture there is at least one god or goddess of the sky/weather.

In a pre-industrial, largely rural agricultural world, air pollution was not a concern – although in the Roman Empire people living in urban areas experienced many of the same issues as we do today, albeit at a different scale, including local air pollution and challenges around garbage, wastewater and sewage management. In 1350 A.D. there were 370 million people in the world, while today there are 310 million in the United States alone. Over time people have also gravitated increasingly toward cities. In 1976 one-third of the world’s population lived in urban areas, versus 50%<sup>1</sup> today. Urbanization has exacerbated the impact of industrial development on air quality issues.

The main culprits are our dependence on energy resources for electricity generation, industrial processes, and transportation. In 2010 there were 1 billion cars on the world’s

roads, with another 50 million added to the mix each year.<sup>2</sup>

In the late 1960s and early 1970s we collectively began to think of air quality<sup>3</sup> as an environmental problem that deserved investigation and management. Governments in Europe and North America observed the impacts of sulphur dioxide (SO<sub>2</sub>) on water and plant life and worked to find ways to manage acid rain. In 1979, 34 countries and the European Community signed the United Nations Convention on Long Range Transboundary Air Pollution.<sup>4</sup> The Convention now has six separate protocols.<sup>5</sup>

In North America, the US passed the first version of its *Clean Air Act* in 1963, but it was largely a research program designed to understand SO<sub>2</sub> emissions and impacts.<sup>6</sup> Substantial amendments to establish regulatory controls for air pollution were adopted in 1970 and 1990<sup>7</sup>, and then in 2008 greenhouse gases were added. On June 26, 2012, a US federal appeals court upheld the US Environmental Protection Agency’s (EPA) limits on greenhouse gas emissions from car tailpipes, factories and power plants, and concluded that EPA’s “interpretation of the governing [*Clean Air Act*] provisions is unambiguously correct”<sup>8</sup> – the agency can and will regulate GHG emissions. Canada did not implement a formal regulatory approach to air issues until 1999, with the passage of the *Canadian Environmental Protection Act* (CEPA).<sup>9</sup> Before that there were

<sup>1</sup> [http://www.esa.un.org/unup/pdf/WUP2011\\_Highlights.pdf](http://www.esa.un.org/unup/pdf/WUP2011_Highlights.pdf)

<sup>2</sup> <http://www.worldometers.info/cars/>

<sup>3</sup> <http://www.ec.gc.ca/air/default.asp?lang=En&n=8D367FE9-1>

<sup>4</sup> [http://www.unece.org/env/lrtap/lrtap\\_h1.html](http://www.unece.org/env/lrtap/lrtap_h1.html)

<sup>5</sup> [http://www.unece.org/env/lrtap/status/lrtap\\_s.htm](http://www.unece.org/env/lrtap/status/lrtap_s.htm)

<sup>6</sup> <http://www.epa.gov/region1/eco/acidrain/history.html>

<sup>7</sup> [http://epa.gov/air/caa/caa\\_history.html](http://epa.gov/air/caa/caa_history.html)

<sup>8</sup> [http://www.cadc.uscourts.gov/internet/opinions.nsf/52AC9DC9471D374685257A290052ACF6/\\$file/09-1322-1380690.pdf](http://www.cadc.uscourts.gov/internet/opinions.nsf/52AC9DC9471D374685257A290052ACF6/$file/09-1322-1380690.pdf)

<sup>9</sup> <http://laws-lois.justice.gc.ca/eng/acts/C-15.31/>

a series of agreements that culminated in the 1985 Eastern Canada Acid Rain Program, whose goal was to “limit the deposition of sulphates in precipitation to no more than 20 kg per hectare per year” with an agreement to cap SO<sub>2</sub> emissions at 2.3 million tonnes throughout eastern Canada by 1994. This was followed by the *Canada-US Air Quality Agreement* signed in 1991, and later by the 1998 *Canada-Wide Acid Rain Strategy for Post-2000*,<sup>10</sup> which was signed by all of Canada’s federal, provincial and territorial Ministers of Energy and Environment.

In British Columbia, the 1996 *Waste Management Act* was the province’s first regulatory tool for managing air-related discharges. It was replaced in 2003 by the *Environmental Management Act* (EMA). Under the EMA, the province can regulate all manner of air emissions, including GHGs. In BC, Metro Vancouver has been delegated authority to manage air quality within its boundaries, which cover the area from Langley to Lion’s Bay.

Both BC and Metro Vancouver have invested significant efforts at improving air quality, and the results are encouraging. In fact, “the good news is that air quality tends to be improving through the collective efforts of public education, monitoring and enforcement, better engineering, and mitigation of known polluting sources.”<sup>11</sup> As well, “Metro Vancouver currently experiences good regional air quality relative to most other urban areas in North America,”<sup>12</sup> despite geography that works against this. The challenge, generally, is that “...the possibility [of] benefits [from] further improvements fade as our air gets cleaner and cleaner...”<sup>13</sup>

<sup>10</sup> [http://www.ccme.ca/ourwork/air.html?category\\_id=31](http://www.ccme.ca/ourwork/air.html?category_id=31)

<sup>11</sup> Air Quality Health Index Variation across British Columbia, Dr. Paul Hasselback, Medical Health Officer, Interior Health, B.C. Eric Taylor Air Quality Meteorologist, B.C. Ministry of Healthy Living and Sport September 2010

<sup>12</sup> <http://www.metrovancouver.org/services/air/management/ReviewProcess/Pages/default.aspx>

<sup>13</sup> How Much do we Care about the Air? Evidence on the Value of Air Quality Improvements, Douglas S. Noonan, Associate

Economists refer to this as the law of diminishing marginal returns.

### **What are the Risks?**

According to Health Canada<sup>14</sup> and the World Health Organization (WHO),<sup>15</sup> the primary risks from poor local air quality are to the respiratory and cardiovascular body systems. The WHO notes that “exposure is a more direct environmental health risk indicator than ambient air measurements, because all environment-related health effects are triggered through exposure.”<sup>16</sup> A 2005 WHO document<sup>17</sup> provides excellent reference material that describes each pollutant, levels in various locations around the world, sources of pollutants, how toxicity is measured, and the effects of exposure; the same document makes recommendations on levels, and it establishes the reference guidelines that most countries appear to use as a starting point for discussions.

In 2008 in China 470,649 deaths (35/100,000) were attributable to air pollution.<sup>18</sup> Not surprisingly, the WHO states that “urban air pollution is a greater risk factor in middle-income countries than in high-income countries because of substantial progress by the latter in controlling this risk through public-health policies.”<sup>19</sup> In BC, air pollution as a cause of death is not included in any statistics gathered or reported by BC Stats.

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Professor, School of Public Policy, Georgia Institute of Technology, December 2011

<sup>14</sup> [http://www.hc-sc.gc.ca/ewh-semt/air/out-ext/effe/health\\_effects-effets\\_sante-eng.php](http://www.hc-sc.gc.ca/ewh-semt/air/out-ext/effe/health_effects-effets_sante-eng.php)

<sup>15</sup> <http://www.who.int/mediacentre/factsheets/fs313/en/>  
[http://www.who.int/phe/health\\_topics/outdoorair/outdoorair\\_agg/en/index.html](http://www.who.int/phe/health_topics/outdoorair/outdoorair_agg/en/index.html), p.62

<sup>17</sup> [http://www.who.int/phe/health\\_topics/outdoorair/outdoorair\\_agg/en/index.html](http://www.who.int/phe/health_topics/outdoorair/outdoorair_agg/en/index.html)

<sup>18</sup> World Health Organization statistics

<sup>19</sup> World Health Organization, Global Health Risks Report, Mortality and Burden of Disease Attributable to Selected Major Risks, 2009

**How Much Has Air Quality Improved?**

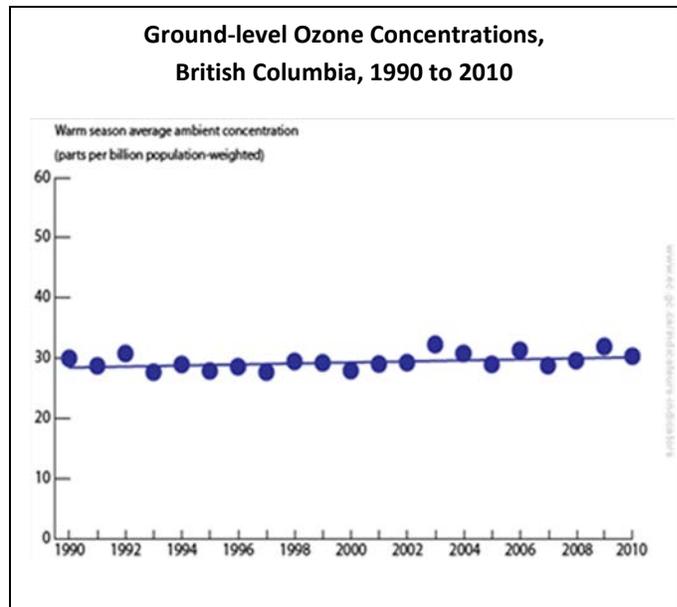
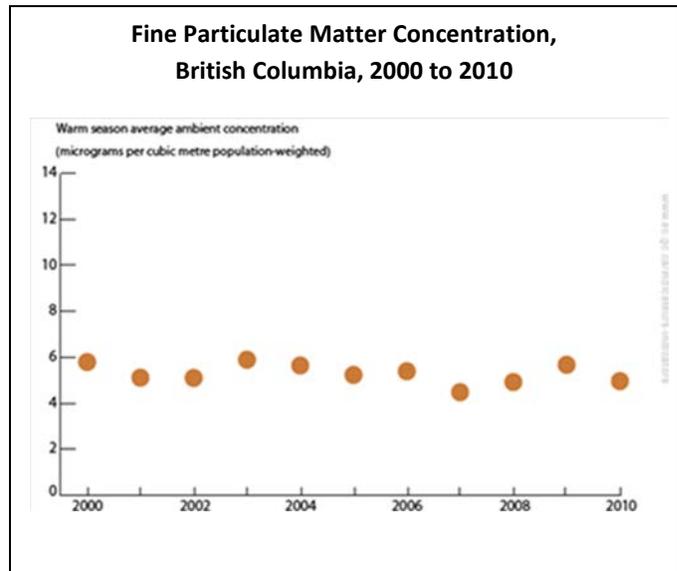
The question is, what have all our efforts and investments to improve air quality produced in terms of results?

According to a June 2012 BC Lung Association analysis,<sup>20</sup> BC is meeting its objectives, and there is a downward trend on all measures of air pollution:

- PM<sub>2.5</sub>:<sup>21</sup> the highest concentrations usually occur in Quesnel, Golden and Grand Forks in the winter, and while there were **no** exceedances of provincial levels anywhere in the province in 2011, there were a few exceedances of Canadian standards due to wildfires;
- NO<sub>x</sub>: levels were **well below** both national and provincial objectives throughout BC;
- O<sub>3</sub>: typically, ozone levels peak in summer and have been found to be worst in Hope, Chilliwack, Abbotsford and Maple Ridge, but there were **no** exceedances anywhere in BC in 2011;
- SO<sub>2</sub>: levels varied across the province, with most measures in most places showing no exceedances, but some locations saw short-term high concentrations, usually where there are large clusters of industrial production (e.g., Trail, Prince George).

The above story of good and generally improving air quality is confirmed by Environment Canada data<sup>22</sup> (see the charts that follow), which shows improvement on all five measures of air contaminants in British Columbia – SO<sub>2</sub>, NO<sub>x</sub>, VOCs, PM<sub>2.5</sub> and O<sub>3</sub>. This data also indicates that Vancouver, the largest

urban area in the province, compares well with urban regions of similar size around the world. In fact, between 1990 and 2010 almost all measure of the five pollutants had downward trends.<sup>23</sup>

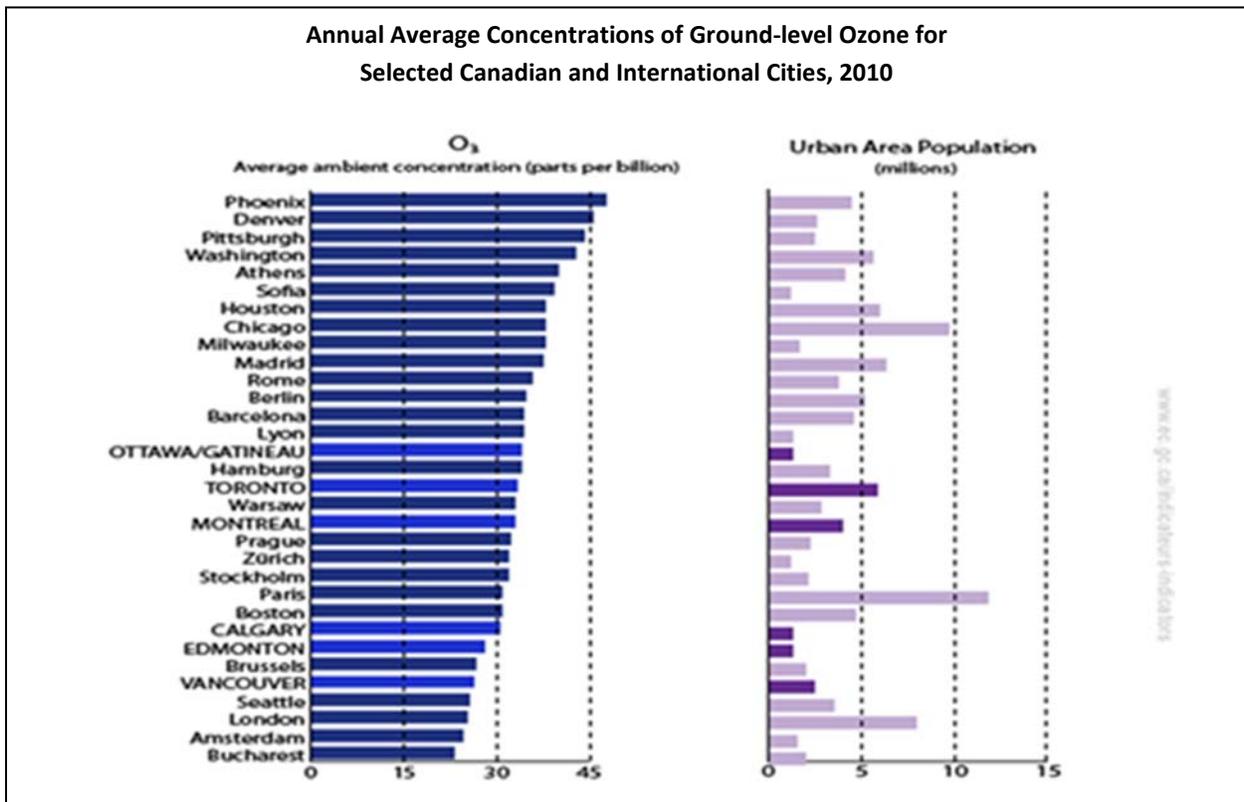
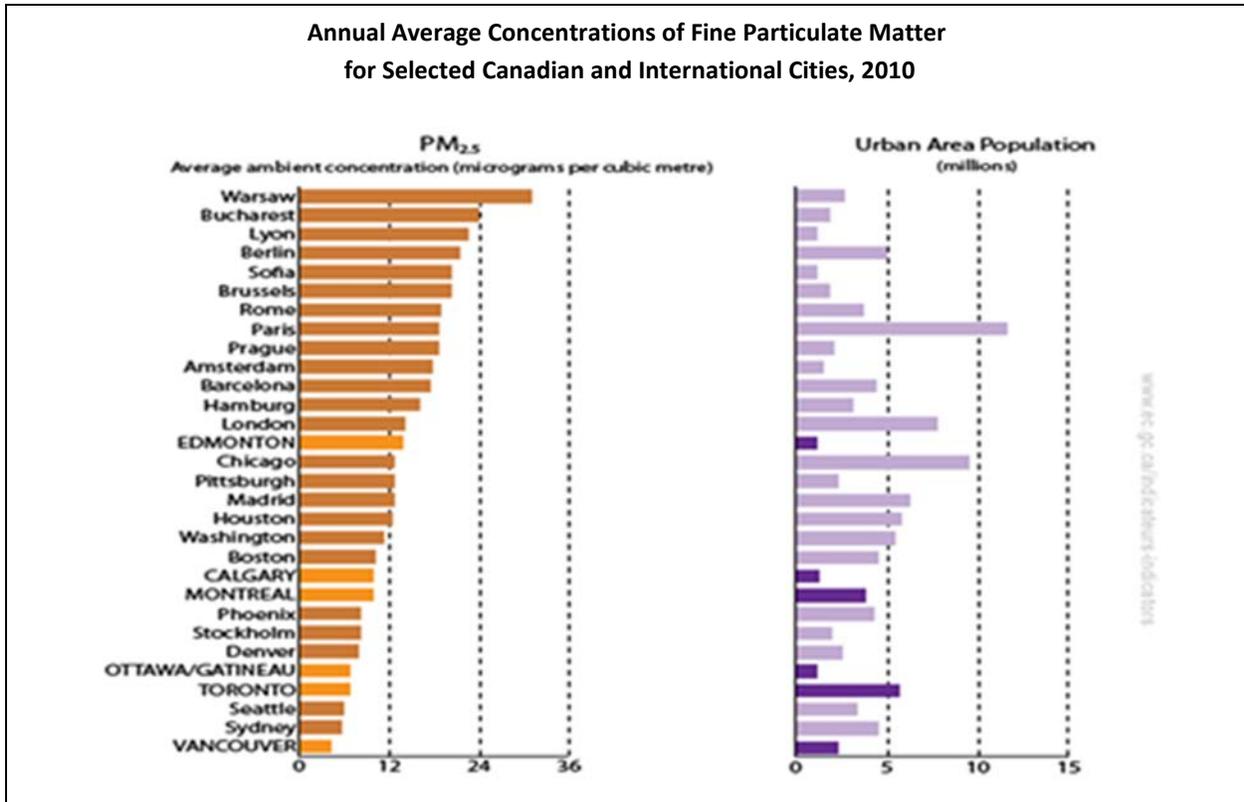


<sup>20</sup> <http://www.bc.lung.ca/airquality/stateoftheair-report.html> - p.12 for graphics

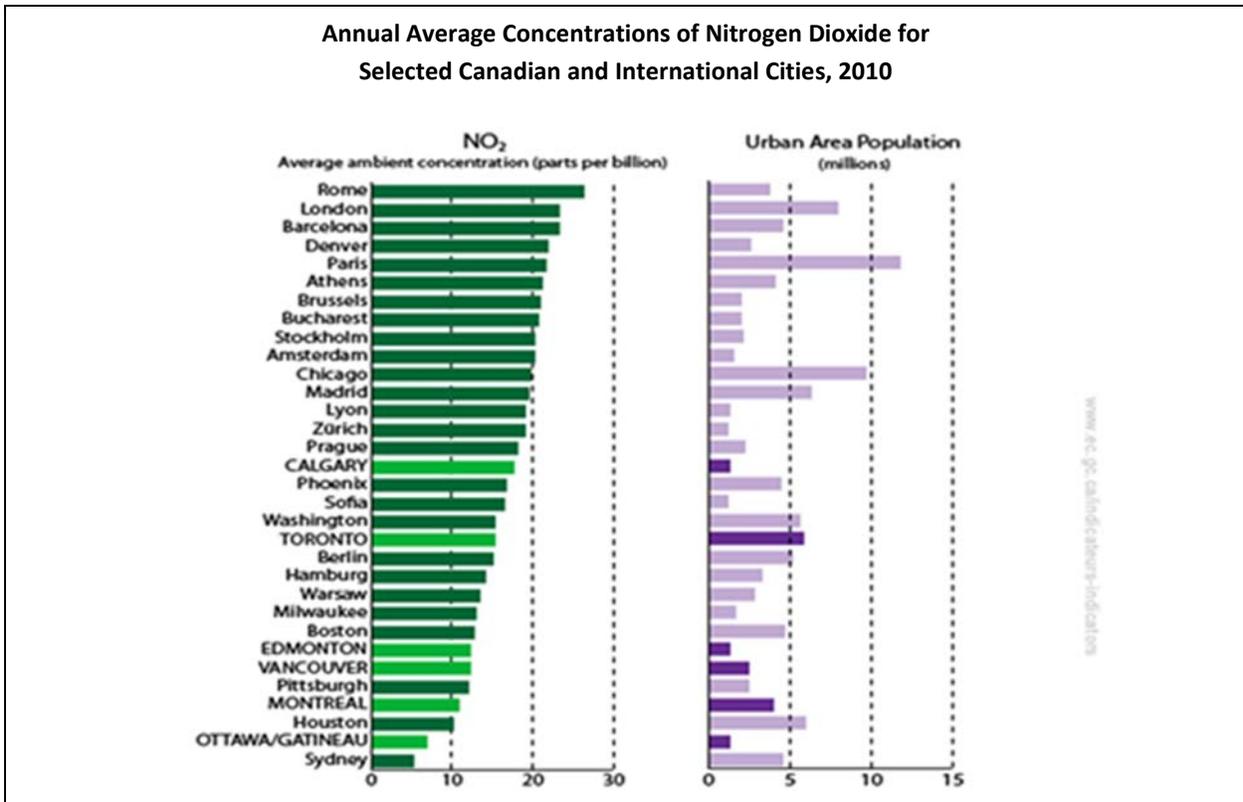
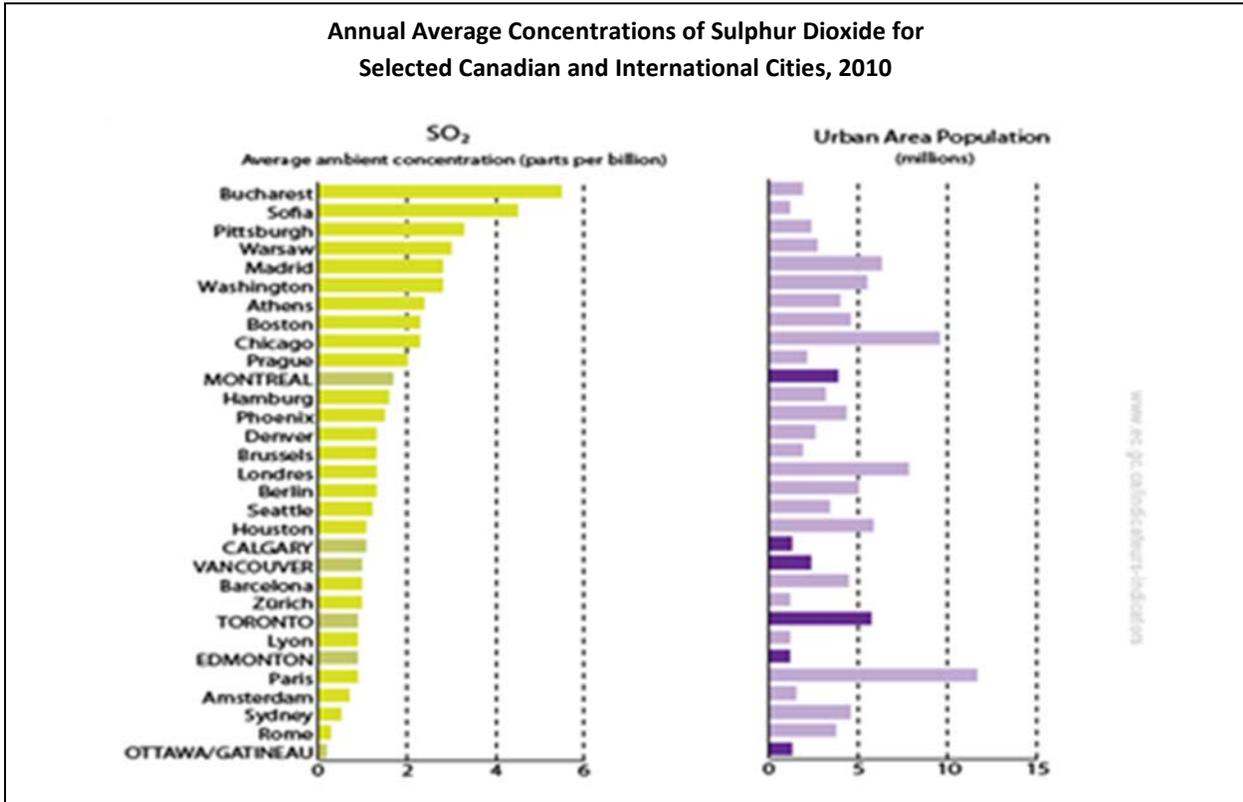
<sup>21</sup> Particles in the air that are less than 2.5 micrometers in diameter.

<sup>22</sup> <http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=7DCC2250-1>

<sup>23</sup> [http://www.metrovancouver.org/services/air/management/Review Process/Pages/default.aspx](http://www.metrovancouver.org/services/air/management/Review%20Process/Pages/default.aspx), p.33

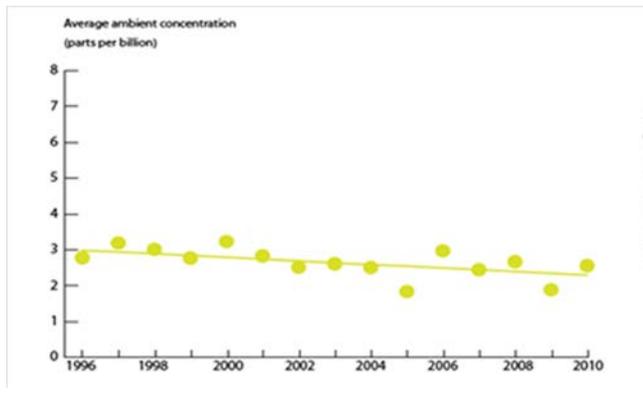


Questions or comments? Please contact us at [info@bccbc.com](mailto:info@bccbc.com) or 604-684-3384.

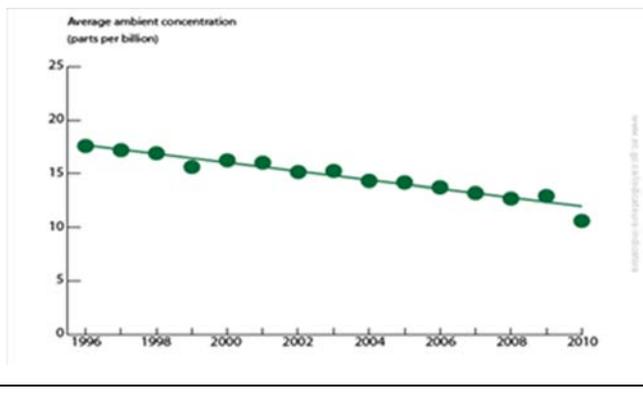


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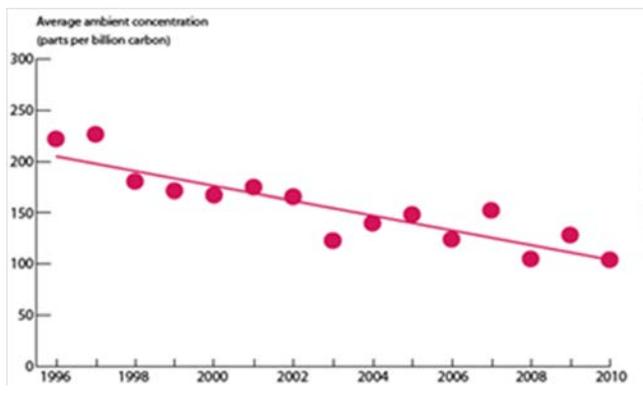
**Sulphur Dioxide Concentrations,  
British Columbia, 1996 to 2010**



**Nitrogen Dioxide Concentrations,  
British Columbia, 1996 to 2010**



**Volatile Organic Compound Concentrations,  
British Columbia, 1996 to 2010**



**Who is Doing What**

At the national level, in 2010 the Canadian Council of Ministers of the Environment (CCME) was presented with an air pollution and greenhouse gas management framework called the Comprehensive Air Management System, now called the Air Quality Management System (AQMS); the process leading to this initiative began in 2007. The major elements of the AQMS include:

- New Canadian Ambient Air Quality Standards (CAAQS);
- The development of base-level industrial emissions requirements (BLIERs) for key sectors and equipment groups, with a focus on SO<sub>2</sub>, NO<sub>x</sub>, VOCs and total particulate matter;
- Local air quality management by provinces in specified air zones (identified as an activity within the 2008 BC Air Action Plan);
- Regional air shed coordination to identify and address trans-boundary flows of air pollution; and
- Enhanced collaboration among governments to reduce emissions from the mobile sector.

Canadian ambient air quality standards for PM<sub>2.5</sub> are 30 ug/m<sup>3</sup> (24-hour),<sup>24</sup> and 65 ug/m<sup>3</sup> (average annual, 8 hour maximum) must be achieved by 2015. BC’s current standard for PM<sub>2.5</sub>, 25 ug/ m<sup>3</sup> (24-hour) and 8 ug/ m<sup>3</sup> (annual), is below the Canadian standard and is already being achieved. Limits for O<sub>3</sub> on an average annual basis are tracking well. New standards for NO<sub>x</sub>, SO<sub>2</sub> and VOCs are under development, but based on Ministry of Environment Air Quality Standards<sup>25</sup>, it is clear that BC is meeting its objectives in this area.

<sup>24</sup> Micrograms per cubic meter of air.

<sup>25</sup> <http://www.bcairquality.ca/regulatory/pm25-objective.html>

Spatially represented air sheds and air zones are integral to the concept of a place-based management framework. Under AQMS, these will be defined regionally and are envisioned to provide new tools to address local, trans-border and inter-regional air quality objectives. Geographically depicted zones are a useful tool for regulators as well as businesses wanting to understand cumulative effects and can help in managing site or regionally specific issues. The challenges will be in ensuring that boundaries are clearly demarcated and that data layers are current, accurate and accessible.

BLIERS are industry-specific quantitative or qualitative emissions requirements proposed for new and existing major industrial sectors – aluminum/alumina, base metal smelting, cement, chemicals, electricity, iron ore pellets, iron and steel, oil sands, petroleum refineries, pipelines, potash, pulp and paper, and upstream oil and gas – as well as for some equipment types related to NO<sub>x</sub>, SO<sub>2</sub>, VOC and PM. There are also cross-sectoral equipment groups for boilers and heaters, non-utility combustion turbines and reciprocating engines, and VOC emissions from fugitive equipment leaks and storage. The current and preferred approach is to develop and implement BLIERS in such a way as to avoid duplication, complement provincial or territorial requirements, and have a federal backstop should a facility be out of compliance over an extended period of time.

CAAQS and BLIERS are connected, in that the former establish limits on air pollutants while the latter are “quantifiable requirements that could be reflected in regulations or permits applicable to new or existing facilities [and can] ... be expressed in any one of a variety of ways (e.g., individual sources or pieces of equipment, a facility, a specific process, or a fuel type).”<sup>26</sup> Considerations for establishing both CAAQS and

BLIERS include baseline emissions, technical feasibility, business cycles (i.e. for capital procurement or plant turnover), and the marginal cost of abatement versus social benefits derived. The important thing to consider with BLIERS is that because they are equipment- and industry-specific they cannot be viewed as the main or only tool for achieving ambient standards. They must be realistic, reflect the realities of the investment and capital stock turnover cycle, be viewed cumulatively, and not incorporate unrealistic assumptions about technological capabilities.

In terms of participation in the AQMS national process, the BC Ministry of Environment has noted it is active in developing the concept of air sheds and air zones, but is only selectively involved in the BLIERS process. Perhaps this is because BC’s standards are already more stringent than the Canada-wide standards in some instances. The Ministry of Energy and Mines has been involved in the oil and gas BLIERS as well as in monitoring other sectors. Business Council members are concerned, however, with what appears to be limited participation by the BC government in all aspects of the national air quality review and standard setting process.

Recently, industry representatives were asked for their perspectives on the BLIERS process. The Business Council understands that the results of this survey will be used to help BC define how the province wants to engage with both industry and in the BLIERS process for remaining standards that have yet to be developed. The Business Council believes it is critical for BC to be proactively involved in the development process to ensure the province’s interests are enmeshed in the conversation and negotiations.

It is not too late, but almost, to have influence over what the appropriate standards should be.

<sup>26</sup> [http://www.ccme.ca/assets/pdf/cams\\_proposed\\_framework\\_e.pdf](http://www.ccme.ca/assets/pdf/cams_proposed_framework_e.pdf)

The Canadian Council of Ministers of Environment (CCME) is meeting in October 2012. At that meeting, Ministers will be asked to consider a package of CAAQS, recommendations on air zones, and a process for finishing the BLIERS work with a target completion date of 2013/2014. From there BC will be following rather than leading, which causes concern given that there are several challenges remaining, including maintaining momentum, engagement of all provinces on all issues, ensuring there are adequate resources for enforcement and monitoring, managing jurisdictional overlap, and – most importantly – making sure that the incremental cost of the “next unit” of air quality improvement does not undermine competitiveness or entail an economic burden that significantly exceeds any measured benefits.

### **BC Enjoys Good Air Quality**

For the most part BC’s air quality and air pollution issues are now more local rather than provincial; there are some communities with air quality challenges. However, we have a well established air monitoring network, and a standardized [Air Quality Health Index](#) that is easily accessible and provides a graphic representation of the current real time state of air quality in many communities in BC. For the most part we also seem to understand that there has been substantial progress at improving air quality and addressing “hot spots.” For example, in June 2012, BC announced the expansion of air quality (and water) monitoring actions in the Northeast, to address concerns raised by residents about the possibility of increased air pollution from oil and gas related activities.

Metro Vancouver has delegated authority for managing air quality under the EMA. Like the BC and Canadian assessments of air quality, Metro Vancouver confirms the downward trend in sources of air pollution in its Integrated Air

Quality and Greenhouse Gas Management Plan (October 2011).<sup>27</sup> Despite this, we note that there was an 8% increase in 2012 in Metro Vancouver’s air quality budget. Metro pessimistically forecasts increasing emissions on several measures, largely due to population growth and related transportation emissions, as well as agricultural activities. These forecasts are belied by the progress that the region has made in improving air quality over recent decades.

The Business Council believes the province should re-claim jurisdiction for setting air quality standards in Greater Vancouver, as it makes no sense to assign this responsibility to a municipal-type government which could lead to inconsistent standards and enforcement in the same airshed.<sup>28</sup> The normal practice elsewhere in Canada and the United States is for senior levels of government to take the lead in developing and updating air quality standards to ensure consistency and capacity.

### **What Next?**

A fundamental question that is rarely asked is this: if air quality is improving, what kind of additional investment is reasonable and cost effective? In British Columbia, 2/3 of ambient emissions are from non-industrial sources - transportation generates 1/3, wood stoves and open burning another 1/3. Therefore, a preoccupation with industrial air emissions seems out of balance with their relative contribution to air quality. Moreover, most BC industries responsible for stationary emissions make ongoing efforts to improve their processes, replace equipment and modernize their facilities – and major sources are already regulated and enforced under operating permits.

<sup>27</sup> [http://www.metrovancouver.org/services/air/management/Review Process/Pages/default.aspx](http://www.metrovancouver.org/services/air/management/Review%20Process/Pages/default.aspx)

<sup>28</sup> Metro Vancouver shares a common airshed with parts of the Fraser Valley and with Whatcom County in Washington State.

Achieving zero emissions is unrealistic, unnecessary, and would accelerate de-industrialization – a scenario that fails to consider the resource-based nature of BC’s export economy. For the most part, BC is already meeting its air quality objectives, and in some cases its standards are more stringent than those proposed in the current national AQMS review. Therefore, particularly in the BC context, the level of investment and additional spending on the next increment of air quality improvement should be considered carefully, as “failure to recognize the importance of dosage leads straight to misguided environmental regulations. Instead of focusing on quantitatively significant risks, the government wastes resources trying to eliminate minute dangers.”<sup>29</sup> Business Council members would like to see stepped-up provincial participation in the CCME process, active outreach and collaboration by policy-makers and regulators with the business community, and deliberate consideration of the costs and benefits of the next unit of quality.

We must not forget that the main foundation of BC’s export economy is energy development and natural resources, which are fundamentally energy-intensive. Setting the wrong emissions standards, both ambient and equipment/

industry specific, could undermine BC’s competitiveness by adding unnecessary costs that do not yield substantive improvements in air quality. Whatever standards the province adopts should also be consistent with the economic development strategy elaborated in the BC Jobs Plan.

### **Conclusion**

The Business Council prefers regulation closer to home. We support active BC government and industry involvement in standard-setting, based on the expert knowledge and practical experience that the private sector can bring to bear. We do see a role and need for a federal backstop on air quality standards as an emergency measure, and to guard against the risk of an overly balkanized system. In the same vein we see some merit in an air zone/air shed concept, as long as it is flexible, doesn’t pit regions against one another, and doesn’t become an internal trade barrier or contributor to competitive imbalance. We also want full engagement of provincial regulators in discussions with other governments, to ensure that any new national standards reflect BC’s economic interests and that the incremental costs of the next unit of air quality improvement make sense and do not become a competitive disadvantage.

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Denise Dalmer  
Director, Environment and Sustainability  
([denise.dalmer@bccbc.com](mailto:denise.dalmer@bccbc.com))

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<sup>29</sup> The Myth of the Rational Voter, Why Democracies Choose Bad Policies, Bryan Caplan, 2009, p. 160