Air Quality

Alberta GPI

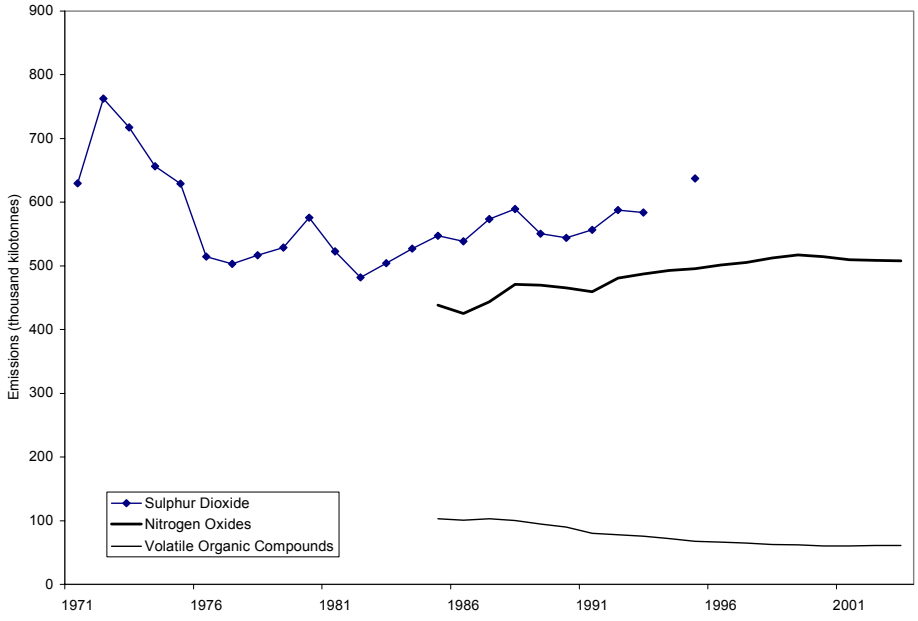
Noteworthy:

- Air emissions of concern in Alberta, and elsewhere, include carbon monoxide, volatile organic compounds, nitrogen oxides, sulphur dioxide, benzene, particulate matter, and lead.
- Nitrogen oxides are by-products of the burning of fossil fuels (e.g., gasoline, diesel fuel, natural gas, oil and coal).
- In 2000, 1/3 of Alberta's NOx emissions were produced by transportation. 43% were produced by the upstream oil and gas and the oil sands industry. Power generation accounted for 13%.
- Sulphur dioxide emissions are primarily caused by combustion of fuels that contain sulphur compounds such as coal and sour gas and released as by-product by processes that recover sulphur from oil, gas, and bitumen.
- In 2000, almost 70% of Alberta's SO_2 emissions were produced by the upstream oil and gas and the oil sands industry. Power generation accounted for about 25%.
- In 2000, agriculture accounted for 12% of Alberta's VOC emissions. Transportation accounted for 14%. The largest source of VOC emissions is again the oil and gas and the oil sands industry at 65%.

Air Quality in Alberta: What is the Status?

Across Canada, there was an overall improvement in air quality in major cities during the 1980s. However, these significant improvements have waned over the past decade because of increasing numbers of automobiles and a trend towards larger, less fuel-efficient vehicles and growth of industrial sources of pollution. The number of registered passenger vehicles in Alberta has increased by 427%, since 1961. In Alberta, emissions of some pollutants have declined in urban centres in the last few decades. For example, emissions of sulphur dioxide (SO_2) declined by 55% in Calgary East between 1982 and 2004. Over the same period of time, emissions of sulphur dioxide increased by 73% in Edmonton East. Reductions in emissions have resulted for nitrogen oxide (Nox), particular matter (PM), benzene, and lead. At the same time, emissions of carbon dioxide in the province have increased. According to the National Emission Inventory for 2000, compared to other provinces in Canada, Alberta had the highest emissions of NOx and VOCs, the second highest emissions of SO_2 after Ontario and the third highest emissions of PM2.5 after Ontario and Quebec. By 2003 flaring of solution gas in Alberta had been reduced by approximately 70 per cent from 1996 levels and venting of solution gas was down by 38% compared to 2000 levels.

Air Quality Related Emission Estimates, 1971 to 2003

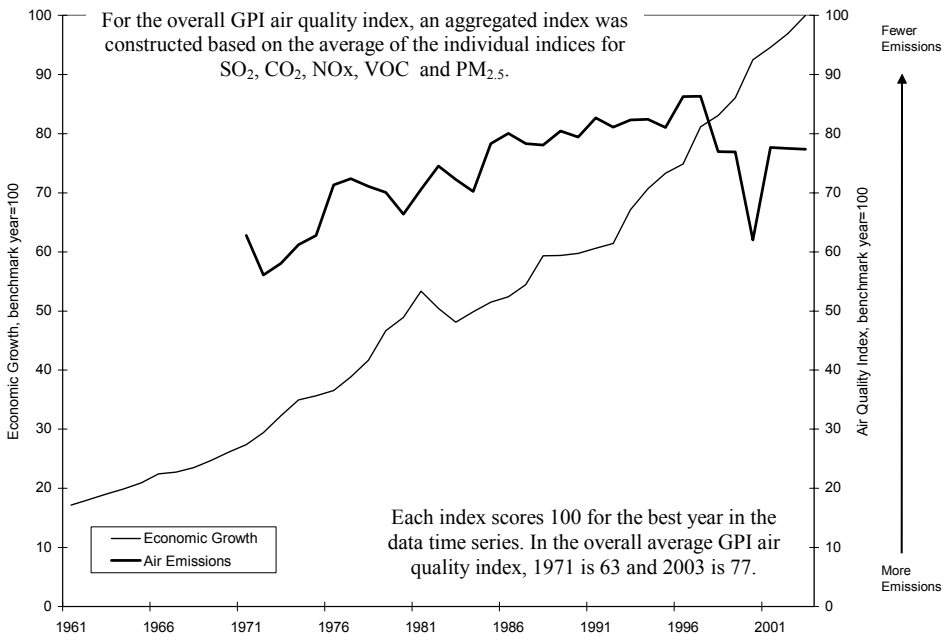


Source: Clean Air Strategic Alliance, Environment Canada, Alberta Energy and Utilities Board

Noteworthy:

- Urban ambient air concentrations of VOCs have improved in Calgary since 1990 due to stricter emission controls on vehicles.
- Despite the trend described above, in 2002 Alberta was among the top 4 states and provinces in North America for VOC emissions.
- In 2000 transportation accounted for 28% of PM2.5 emissions with about 2/3 of this amount is attributed to off road use of diesel in large mining, construction and agricultural vehicles. Wood and pulp and paper accounted for almost 20% and power generation accounted for almost 10% of PM2.5 emissions.

Air Quality Index: Where are we today?



So What?

There are strong links between air pollution and health problems, especially for the elderly, children and for those with respiratory and cardiac problems. A large number of studies, including some from the Government of Canada, the Ontario Medical Association and the Toronto Public Health Department show that air pollution can lead to premature death, increased hospital admissions, more emergency room visits and higher rates of absenteeism. Nitrogen Oxides are a group of gases that can irritate the lungs, cause bronchitis and pneumonia and increase susceptibility to respiratory infection. Nitrogen oxides are of concern because of their role in ozone, acid rain and particulate matter formation and in eutrophication. Nitrogen oxides are created during combustion. Sulphur Dioxide is a colorless, pungent gas, which can react with other chemicals in the atmosphere to form sulfate particles. Health effects include premature death, increased respiratory symptoms and disease, decreased lung function, and alterations in lung tissue and structure and in respiratory tract defense mechanisms." SO_2 emissions are a major contributor to acid deposition, commonly known as "acid rain".

Volatile Organic Compounds are a large category of chemicals that share one characteristic, the evapourate or volatilize into the air. VOCs are one of the building blocks of smog. VOC's can form particulates in the atmosphere.

Particulate matter is all airborne solid and liquid particle, except pure water, that are microscopic in size. Particulates can contain many different types of chemicals such as sulphates, nitrates, ammonia, trace metals and carbon compounds." --- Numerous studies have linked particulate matter to cardiac and respiratory problems such as asthma, bronchitis and emphysema. Particulates can also reduce visibility by scattering and absorbing light.

The health and environmental costs of air pollutants (calculated per tonne of greenhouse gas emissions) were an estimated $2.7 billion ($18/tonne of CO_2 emitted) (1998$), equal to 2.1% of Alberta's 2003 Gross Domestic Product. On a scale of 0 to 100, where 100 is best, the status of air quality ranked 77 in 2003.