

# British Columbia Air Quality and Health Benefits Report - Backgrounder

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## Introduction

Although air quality in B.C. is better than in many locations around the world, poor air quality still affects the health of British Columbians. The 2003 Provincial Health Officer's report found that outdoor air pollution in B.C. likely causes 70-200 premature deaths per year. A recent Canadian Medical Association Study found that 306 premature deaths in B.C. were attributable to poor air quality, and projected that figure to rise to 585 by 2031.

In 2008, the BC Government released two complementary plans to improve provincial air quality and reduce greenhouse gas (GHG) emissions – the Air Action Plan and the Climate Action Plan. The Air Action Plan contains 28 policy and regulatory measures targeted at improving air quality by reducing emissions of air pollutants. The measures include a wide range of actions, covering transportation sources, industry, and communities. The Climate Action Plan contains a number of policy and regulatory and fiscal measures to respond to the challenge of global warming by bringing about reductions in GHG emissions. In addition to reducing GHGs it is known that many of the measures in the Climate Action Plan will also reduce air pollutant emissions, since many of the same sources that produce GHGs also emit air pollutants.

In 2009 the Ministries of Environment and Healthy Living and Sport obtained an independent assessment of the combined health benefits of implementing the two plans.

## Methodology

The modelling work to estimate the health benefits resulting from implementing the two plans was completed by ENVIRON, an independent contractor with expertise in air quality and health benefits assessment. The contractor authored the technical report that accompanies this backgrounder and that describes the methodology and results in detail.

The report methodology consisted of the following steps:

- The impact of the Climate Action Plan on emissions of air pollutants was estimated by M.K. Jaccard and Associates using the CIMS model, a state-of-the-art, energy and economic model that has been widely used in Canada to assess the effectiveness of GHG policy.
- The impact of the Air Action Plan on emissions of air pollutants was estimated by the Ministries using established emission factors for different activities affected by the plan.
- Using the above two sources, the Ministries provided the contractor with projected air pollutant emissions for the reference scenario (no Climate or Air Action Plans) and the policy scenario (implementing the Climate and Air Action Plans) for 2005 through 2020.
- The contractor allocated the emission changes to the appropriate industrial and societal sectors and the appropriate geographical locations using an emissions model known as SMOKE.

- A US EPA developed air quality model (CMAQ), was used to estimate air quality based on the projected emissions
- The health benefits of implementing the two plans were estimated using the modelled air quality as input into Health Canada's Air Quality Benefits Assessment Tool (AQBAT). The difference between the air quality projected for the reference and policy scenarios was used to estimate the health benefits.
- The final report from ENVIRON was peer reviewed by an expert reviewer from the Pacific Institute for Climate Solutions

### Results

The results of the study indicate that the improved air quality directly resulting from implementing the Climate Action Plan and the Air Action Plan will provide significant health benefits to the residents of B.C. Key findings in this regard include a predicted decrease in premature mortality and significant reductions in the incremental burden placed on BC's health care system by air pollution. Over the 13 year period of 2008 to 2020, the direct benefits derived from implementing the Climate Action Plan and the Air Action Plan are estimated to include a reduction of approximately:

- 724 incidents of acute mortality;
- 1,436 emergency room visits;
- 575 hospital admissions;
- 1,997 adult chronic bronchitis cases;
- 2,032 child acute bronchitis episodes; and
- 302,000 asthma symptom days.

The results of the report were derived using well established models supported by Health Canada and the US Environmental Protection Agency. Due to the multiple modelling steps and the projection into the future there are significant uncertainties in the calculated health benefits. Sources of uncertainty are acknowledged in the technical report. Key uncertainties include the emission estimates, biases within the air quality model, the spatial resolution of the air quality model, and uncertainty around the coefficients of the health benefits model. Notwithstanding the uncertainties, the projected health benefits may actually be conservative since this study only assessed a subset of the policies and actions in the Climate Action Plan and Air Action Plan. The impact of foundational actions such as piloting innovative new technologies and supporting airshed planning could not readily be quantified for this project but have potential to lead to significant additional emissions reductions.

All areas of the province were projected to experience improved air quality and health benefits from implementing the two plans. However the projected health benefits were concentrated in the Lower Mainland as that area is home to the majority of people in the province as well as significant air pollution.

The study did not attempt to quantify the separate health impacts of the Air Action Plan and the Climate Action Plan. However the emissions reductions were calculated separately. Both plans resulted in significant air pollutant reductions. The Air Action Plan results in major reductions of particulate matter and carbon monoxide pollution, while the Climate Action Plan results in

sizeable reductions in nitrogen oxides and sulfur dioxide pollution. Both plans contribute to reducing emissions of volatile organic compounds.

The results of the health benefits assessment show that the Air Action Plan will significantly reduce the health impacts of air pollution in B.C. The results also show that the Climate Action Plan results in major health benefits by reducing emissions of air pollutants (in addition to its main goal of reducing GHGs). These health benefits are a co-benefit of the Province's climate action leadership which is aimed at establishing healthy, vibrant, and sustainable communities across the province.