



**Integrated Air Emissions Reduction Program
for the Port of Vancouver:
Actions to Address Air Quality and Climate Change**



Vancouver Port Authority

January 2007

Canada 

Executive Summary

The Port of Vancouver is working hard to reduce air emissions of criteria contaminants, air toxics and greenhouse gases through development of a data baseline, improving operational efficiency, technological innovation and supporting regulatory change. Reducing our emissions now and as we grow will help to maintain good air quality and reduce the impacts of climate change for future generations.

We have a number of air emission reduction projects already underway and planned for the future. We are collaborating with other ports, the marine industry and with government agencies to promote efficiency and the implementation of technologies to reduce air emissions.

Emissions from ports have the potential to increase due to growth in response to increasing demand for import and export of goods. This means more cargo, ships, trucks and trains will go through ports each year to meet that demand. Air quality in Vancouver is among the best in many years, and compared with most cities of this size and smaller towns in the interior of British Columbia is better-we want to help keep it that way. Climate change is a global issue and the Port of Vancouver, like many others is doing its part to reduce our contribution.

Reducing emissions from port-related activities including ships, trucks, trains and terminal equipment, as well as industrial processes are a key component of making the Port of Vancouver sustainable.

Introduction

Air quality in the Greater Vancouver Regional District is among the best in North America, regardless of population. Figure 1 compares air quality for communities based on particulate matter less than 2.5 micrometers in diameter or less (PM2.5).

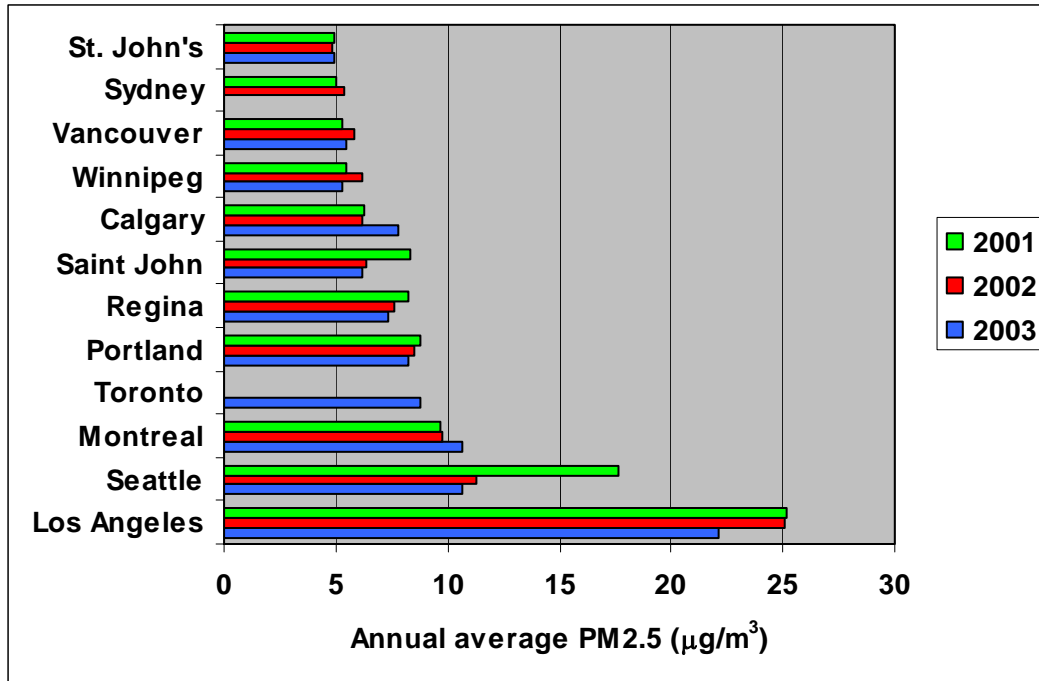


Figure 1-Annual average PM2.5 data for Canadian and U.S. communities in 2001, 2002 and 2003 (BC Progress Board 2005).

The Vancouver Port Authority is working to help maintain and improve our air quality by managing emissions of criteria air contaminants and air toxics. Our objective is to reduce emissions even with growth in trade. Figure 2 compares business-as-usual and “Sulphur Emission Control Area (SECA) + 10% reduction” for marine emissions with area and other sources.

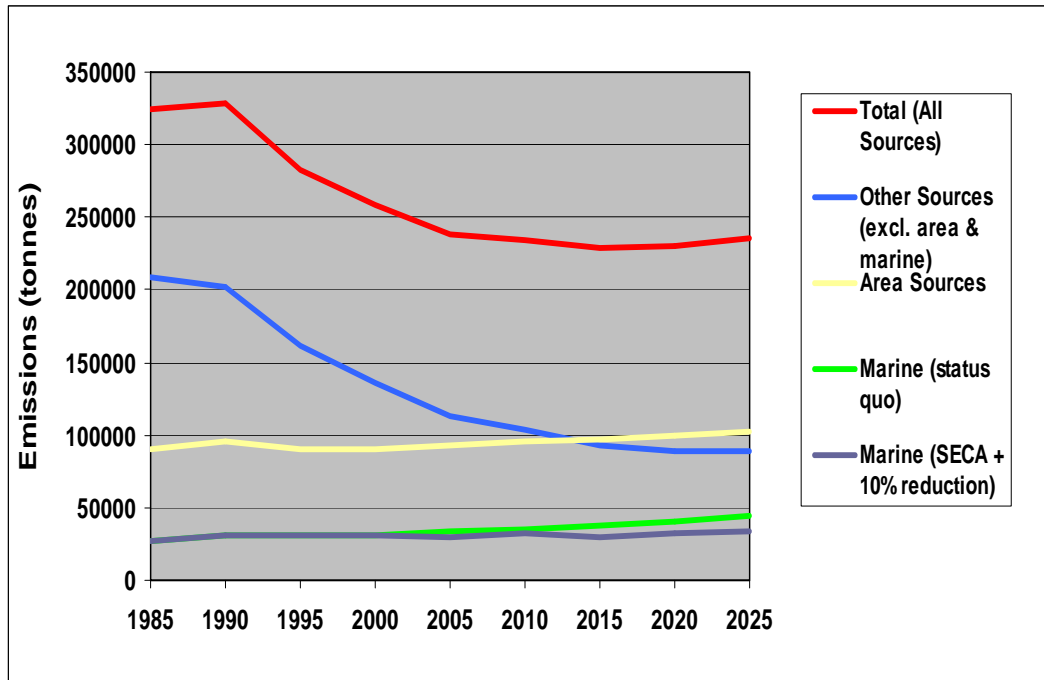


Figure 2-Backcast and forecast of summed total smog forming pollutant (nitrogen oxides + sulphur oxides + volatile organic compounds + PM2.5 + ammonia) annual emissions in the Lower Fraser Valley in tonnes (GVRD 2003), compared with marine emissions + Sulphur Emission Control Area (SECA) + 10% additional reduction.

The Vancouver Port Authority recognizes that health, environmental and economic effects occur even with current air quality and is committed through the Integrated Air Emissions Reduction Program for the Port of Vancouver, to continuous improvement in terms of reducing Port-related emissions, to help counteract increases in emissions related to growth.

Much of the work undertaken to reduce emissions of criteria air contaminants and air toxics also yields benefits in terms of reducing greenhouse gases. Wherever possible the Port of Vancouver looks for opportunities to address the issues of air quality and climate change together. For example:

- improvements to operational efficiency including
 - off-dock optimization;
 - short sea shipping;
 - truck reservation systems;
 - extended terminal gate hours;
- idle reduction education and technologies;
- hybrid technologies;
- alternative fuels including
 - biodiesel;
 - hydrogen;
- shore power (ie. hydroelectric);

- Green Power Certificates; and
- employee programs

all reduce emissions of greenhouse gases by reducing fuel use, in addition to reducing emissions of criteria air contaminants and air toxics. Furthermore, transportation by marine vessel is more efficient in terms of greenhouse gas emissions than either trucking or rail. The significant proportion of goods moved by rail to or from the Port of Vancouver offers further benefits in terms of greenhouse gases compared with areas that rely mainly on truck-based land transportation. And increasing cargo capacity with lighter rail cars, larger marine vessels and improved aerodynamics for trucks also helps to improve fuel efficiency and reduce greenhouse gases.

Integrated Air Emissions Reduction Program for the Port of Vancouver

The Integrated Air Emissions Reduction Program is comprised of four main areas of focus:

- Data baseline
- Operational efficiency
- Technological improvement
- Regulatory change

The program includes initiatives being undertaken by the Vancouver Port Authority, our tenants and other industries as well as regulatory agencies, which are all helping to reduce port-related air emissions.

Data Baseline

A ground-breaking ocean going vessel emission inventory led by the BC Chamber of Shipping was developed for 2005-6 in collaboration with BC Marine Vessel Air Quality Work Group, members including the Greater Vancouver Regional District, Environment Canada and the Vancouver Port Authority among others. The inventory used local Coast Guard data and results of vessel-by-vessel surveys sent out over a one-year period to compile locally specific emissions for ocean going vessels off the BC coast. The results of this inventory will improve our understanding of the contribution to regional emissions by the marine sector, and facilitate implementation of the most appropriate monitoring and mitigation.

The Vancouver Port Authority is leading the development of a 2006-7 local port land-related emission inventory including trucks, rail and terminal equipment. This inventory is also being developed in collaboration with BC Marine Vessel Air Quality Work Group members including Environment Canada and the Greater Vancouver Regional District among others.

Operational Efficiency, Technological Improvement and Regulatory Change

Marine vessels

- Participation in seawater scrubber feasibility and demonstration project with Holland America Line, U.S. Environmental Protection Agency, Puget Sound Clean Air Agency, Environment Canada, Port of Seattle and others.
- Pilot tests using West Vancouver developed fuel-borne catalyst in ocean going vessel auxiliary and main engines completed in 2005. Success of pilots led to catalyst's continued, regular use in Seaboard International Shipping's the M.V. Skaubryn and the M.V. Skaugran's auxiliary engines
- A feasibility assessment for use of shore power at Port of Vancouver cruise ship berths has been completed. Currently the focus is on resolution of implementation issues, primarily those related to cost pricing
 - Information gathered through VPA's Differentiated Harbour Dues Program will provide input to shore power assessment
- Shore power infrastructure provisions that will allow for future installation with minimum disruption to terminal operation have been incorporated into Centerm and Vanterm container terminals and will be installed at Deltaport's Third Berth as well
- Implementation of VPA's Differentiated Harbour Dues Program starting April 1, 2007 that recognizes through lower fees, vessels that reduce their air emissions
- Vessel Opacity Program including education of vessel operators on excessive opacity levels and follow-up with specific vessels as required
 - Program is expected to evolve through 2007
- Trend toward increasing vessel size
- Actively supporting federal government ratification of International Maritime Organization's MARPOL 73/78's Annex VI, Regulations for the Prevention of Air Pollution from Ships, and subsequent application to designate the west coast of North America as a Sulphur Emission Control Area post-ratification
- Transport Canada's Pollution Prevention Guidelines for the Operation of Cruise Ships under Canadian Jurisdiction is a voluntary agreement with cruise ships to "use fuels with the lowest sulphur content available for the class of fuel that the ship's engines are designed for"
- Federal marine diesel fuel quality and engine emission standard improvements

Terminals

- Pilot test using West Vancouver developed fuel-borne catalyst in container handling equipment in 2004. Success of pilot led to catalyst's continued, regular use in Vanterm terminal equipment, operated by TSI Terminal Systems Inc.
- In partnership with the GVRD, Environment Canada, Corporation of Delta and Tsawwassen First Nations, siting and installation of an ambient air quality monitoring in the vicinity of Deltaport operations as part of the Deltaport Third Berth commitments to ensure good air quality in Delta
- 2007 terminal equipment idle reduction program

- Early 2007 on-road vehicle idle reduction program that included education packages sent to all VPA commercial tenants
- On-road diesel fuel being used in off-road equipment at Deltaport, Vanterm and West Coast Reduction
- Biodiesel is being used as B10-B50 at Vanterm and Deltaport container terminals operated by TSI Terminal Systems Inc., and at West Coast Reduction
- Alternating current ship-to-shore cranes that regenerate energy on lowering of containers, sending it back to the electricity grid are in use at all container terminals. These cranes run on electricity, and we no longer have any diesel versions.
- A number of rail mounted gantries (RMG) also regenerate energy, sending it back to the grid, with the remaining RMGs expected to be converted to do so as well.
- TSI Terminal Systems Inc. will test hybrid diesel-electric power units in three rubber tired gantry (RTG) cranes in 2007. If successful they will retrofit existing and new RTGs with the technology.
- Federal off-road diesel fuel quality and engine emission standard improvements

Trucking

- Introduced licensing system to provide for requirements to improve efficiency, safety and environmental performance of trucks accessing terminals
- Introduced mandatory reservation systems and are currently implementing extended gate hours to alleviate congestion and line ups at terminals, as well as reducing general roadway congestion
- Radio frequency identification system pilot introduced to improve efficient flow of goods through terminals and reduce unnecessary trips
- Port-targeted opacity testing and safety inspections by BC Ministry of Transportation
 - Opacity portion of program designed to increase awareness of emissions with potential to evolve over time under Truck License System
- Truck idle reduction assessment and education program rolled out in Fall 2006 developed with help from Better Environmentally Sound Transportation (BEST) and City of Vancouver that included education packages distributed to drivers and road signs
- VPA, through a subsidiary acted as a catalyst in development of Coast 2000 Terminals Ltd. in 1999 with Fraser Group Holdings. Coast 2000 is an off-dock facility that reduces the number of empty container truck trips
- Exploring short sea shipping as an alternative to reduce local/regional truck trips
- Federal on-road diesel fuel quality and engine emissions standard improvements

Rail

- The rail sector is reducing emissions through fleet renewal, co-production, train handling, rail lubrication, freight car productivity improvements and locomotive shut down systems
- The rail sector is also testing hybrid locomotive technologies

- Use of idle shut down technologies on locomotives
- Increasing capacity of rail cars
- Federal rail diesel fuel quality and engine emissions standard improvements

Innovation and Collaboration

- Actively participating in the West Coast Collaborative, a partnership between all levels of government, the private sector and environmental groups along the West Coast of North America. The group focuses on reducing diesel emissions and has dedicated work groups for marine vessels/ports, trucks, rail, construction and agriculture. VPA coordinated development of an online technical clearinghouse for the marine vessels/ports sector to share experience with emission reduction options and to facilitate use by others.
- Actively participating in the BC Marine Vessel Air Quality Work Group, whose other members include Environment Canada, Transport Canada, Ministry of Environment, Greater Vancouver Regional District, BC Ferries and the Chamber of Shipping among others. The group is developing emission inventories and cooperates by exchanging information and analyzing options for reducing emissions.
- Application of technologies to increase operational efficiency and velocity of cargo throughout the supply chain. These technologies help to identify at an early stage potential issues, and facilitate prevention of problem development

Communication

- Significant improvements to the VPA Environment web site are ongoing, including completion in 2005 of a section on “Air Quality, Climate Change and the Port of Vancouver”, that details initiatives to reduce emissions. Plans are in place to develop similar sections for land and water quality.
- Through the Vancouver Port Environmental Managers Association, meet regularly with tenants to discuss environmental issues and opportunities, and to exchange information.
 - December 2006 meeting dedicated to topic of air emissions

Construction

- Developed list of options for reducing air emissions (combustion and dust related) from construction projects that are available to tenants and the public through the VPA web site. Options were developed based on a survey of numerous ports and regulatory agencies along the West Coast and are broken into Tier 1 (options that are readily available for local implementation) and Tier 2 (options that would require more involved development for local implementation ie. fuel infrastructure development).
 - As part of VPA’s Project and Environmental Review Process, are requiring tenants to commit to construction emission reduction measures

Vancouver Port Authority

- Through Project and Environmental Review Process, requiring tenant commitment to continuous improvement in terms of reducing operations related air emissions, and commitment to reducing exhaust and dust construction related emissions
- VPA office located at 999 Canada Place was designed to meet Leadership in Energy and Environmental Design for Commercial Interiors (LEED-CI) Gold requirements, and was the largest building in Canada to achieve Gold certification
- VPA purchases Green Power Certificates from BC Hydro's Power Smart Program, to cover 50% of the power needs of our 999 Canada Place office. These certificates represent the additional cost associated with obtaining power from environmentally friendly sources
- VPA required U.S. EPA Smartway ranked hybrid vehicles to be used by contractors providing security to the Port starting in Spring 2006
- VPA has committed to lease one hydrogen fuelled internal combustion engine pick up truck for our Security Department starting Winter 2007, as a participant in the Integrated Waste Hydrogen Utilization Project (IWH₂UP)
- Since 2004 VPA has used a West Vancouver developed fuel-borne catalyst in its diesel powered maintenance equipment
- VPA provides employees with secure bike lockers, change rooms and showers for those interested in biking, walking or jogging to work
- VPA provides discounted transit passes to employees through participation in Translink's Employer Pass Program
- VPA provides education programs to employees, including commuter challenges, idle reduction lunch and learn, and opportunities to test drive and learn about alternative vehicles such as the security hybrids