



# Northwest Ports Clean Air Strategy

*2008 Implementation Report*

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Prepared by:

**ROSS & ASSOCIATES**  
ENVIRONMENTAL CONSULTING, LTD.

[www.ross-assoc.com](http://www.ross-assoc.com)

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## List of Acronyms

BC	British Columbia
CARB	California Air Resources Board
CHE	Cargo handling equipment
CMAQ	Congestion Mitigation and Air Quality
DERA	Diesel Emission Reduction Act
GHG	Greenhouse gas
IMO	International Maritime Organization
LED	Light emitting diodes
OCR	Optical character recognition
OGVs	Ocean-going vessels
PM	Particulate matter
PSCAA	Puget Sound Clean Air Agency
RFID	Radio frequency identification
TLS	Truck Licensing System
ULSD	Ultra-low sulfur diesel
U.S. EPA	United States Environmental Protection Agency
WSF	Washington State Ferries

# Introduction

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The Northwest Ports Clean Air Strategy (herein referred to as “the Strategy”), finalized in December 2007, was developed to reduce maritime and port-related diesel and greenhouse gas (GHG) emissions in the Pacific Northwest that affect air quality and climate change. The goal of the Strategy is to reduce air emissions in the Pacific Northwest from current and future maritime port operations through specific strategies and actions within each category of port operation. The Strategy was developed collaboratively by Port Metro Vancouver<sup>1</sup>, Port of Seattle, Port of Tacoma (collectively, “the Ports”), and the following regional regulatory agencies: Environment Canada, Puget Sound Clean Air Agency (PSCAA), Washington State Department of Ecology, and the United States Environmental Protection Agency (U.S.

EPA). The Strategy actions and efforts outlined in the 2008 Implementation Report are primarily voluntary and driven by the Ports’ unique and collaborative relationships with industry, agencies and other stakeholders in order to achieve early reductions in advance of, and complementary to, applicable regulations.

As part of the Ports’ and air agencies’ commitment to improving the environment, public health, and regional economy by reducing impacts on air quality and contributions to climate change, the Strategy establishes sector-based performance measures and lists a “menu” of potential emissions reduction activities for implementation by two target years, 2010 and 2015. The 2008 Implementation Report is the first annual report on progress toward the sector-based emissions reduction goals and overall primary emissions reduction objectives as stated in the Strategy. The 2008 Implementation Report includes emissions reduction activities undertaken and progress made toward the 2010 performance measures to date through the 2008 calendar year. In the 2009 Implementation Report, the Ports will begin reporting on yearly progress toward the 2010 performance measures.

The Ports and their stakeholders have all made progress toward the 2010 performance measures established in the Strategy. While this progress is notable, the Ports also recognize that closing the remaining gaps will be challenging. Quantitative performance measures still

## **Northwest Ports Clean Air Strategy Primary Emissions Reduction Objectives**

- 1) Reduce maritime and port-related air quality impacts on human health, the environment, and the economy
- 2) Reduce contribution to climate change through co-benefits associated with reducing air quality impacts
- 3) Help the Georgia Basin – Puget Sound airshed continue to meet air quality standards and objectives.

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<sup>1</sup> Port Metro Vancouver continued January 1, 2008 through the amalgamation of the Fraser River Port Authority, the North Fraser Port Authority and the Vancouver Port Authority.

need to be established for the harbor craft, rail, and port administration sectors, though some progress has been made already in all of those sectors. As 2008 was the first year of implementation, data collection and reporting methodologies are still being improved as implementation progresses. Gaps in data collection or differences in methodologies between the Ports are noted in the report along with details on 2009 data collection and reporting. As implementation activities continue in 2009 and beyond, the Ports and air agencies will continue to collaborate, share best practices, and engage with partners as part of a larger joint effort to reduce competitive pressures between the Ports, especially in light of the current economic downturn and corresponding budget constraints.

## Sector-By-Sector Reporting

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Mirroring the Strategy, this report is organized by the sectors of maritime air emissions: ocean-going vessels, cargo handling equipment, rail; trucks, harbor vessels, and port administration. Within the major sectors, the report is then organized by port. Each section begins with a description of the overall progress made in the sector followed by the 2010 performance measure established in the Strategy. The progress made at each Port toward the performance measure is then examined, noting any differences in data collection and calculation methodologies. Finally, where known, plans at each Port for 2009 emission reduction activities are discussed.

Data collected by Port Metro Vancouver, Port of Seattle, and Port of Tacoma are represented as a percentage meeting or exceeding the 2010 performance measures established in the Strategy. The data covers all activities up to and including the 2008 calendar year, rather than just the last six months of 2008 as stated in the Strategy. As this is the first year of reporting, the Ports are still refining the methodology and calculations associated with reporting progress towards the performance measures in each sector. Where possible, a consistent set of data collection methods was used across all Ports; however, comparison between Ports is in some cases not yet meaningful due to differences in those methods and in reporting methodologies as noted in the report. The differing scales of maritime activity at each Port also make comparison challenging. A detailed accounting of the methodologies used to calculate each Port's progress toward the 2010 performance measures can be found in Appendix A.

### Ocean-Going Vessels

In 2008, the Ports had a wide range of success in meeting the 2010 performance measure for ocean-going vessels, with progress toward the measure ranging from 7% to 57%. Despite the

varying levels of progress experienced by each port, the voluntary use of lower-sulfur fuels by frequently-calling<sup>2</sup> vessels at all three Ports was a common theme in the 2008 data.

The Ports used varying data collection methodologies for OGVs in 2008. Port Metro Vancouver had its voluntary Differentiated Harbor Dues Program in place before the Strategy was finalized. The Program includes verification of emission reduction measures such as use of lower-sulfur fuel and was the source of Port Metro Vancouver's data for the 2008 Implementation Report. Both the Port of Seattle and Port of Tacoma relied on commitments made by frequently-calling shipping lines to use fuels with sulfur content of 0.5% or less as a means to collect their data, as fuel records for 2008 were not available. In 2009, Port of Seattle and Port of Tacoma plan to conduct audits of bunker fuel receipts and use the accountings as their source for data in this sector.

As part of meeting the 2010 performance measure, the Ports will continue to work with the industry over the next two years to ensure that all ships, where feasible, are operating with the highest emissions reduction potential and are moving toward the performance measure.

## 2010 Performance Measure

By 2010: Reach the equivalent particulate matter (PM) reduction of using distillate fuels with a maximum sulfur content 0.5% for all hotelling auxiliary engine operations. Use of fuels with a maximum sulfur content of 1.5%, or engage in equivalent PM reduction measures for all hotelling main or diesel electric engine operations.<sup>3</sup>

## 2008 Progress

### Port Metro Vancouver

- 7% of frequent ocean-going vessel calls made to the Burrard Inlet and Robert's Bank areas of Port Metro Vancouver met or exceeded the 2010 performance measure. These areas of the Port had a total of 2,431 OGV calls in 2008,<sup>4</sup> 1,132 of which were made by frequently-calling vessels.

Port Metro Vancouver's progress toward the 2010 performance measure limited by the data available and assumptions made for 2008. Port Metro Vancouver introduced its Differentiated Harbor Dues Program in April of 2007, to Burrard Inlet and Robert's Bank (excludes Fraser River). Vessels that implement one of a number of eligible emission reduction measures pay lower harbor due rates than those simply meeting regulatory requirements. The Port only

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<sup>2</sup> Frequent callers are defined as vessels (including cargo and cruise) in regularly-scheduled service or strings making five or more calls to any one of the three ports in twelve consecutive months.

<sup>3</sup> Except during active docking and departure, during which non-hotelling engine operations are running.

<sup>4</sup> Does not include Fraser River terminals. See Appendix A.

charges harbor dues on the first five calls in these areas, and vessel emission reduction measures are currently only tracked for calls with Harbor Dues applications. In addition to those vessels found to be reaching the 2010 performance measure, it is worth noting that many additional ocean-going vessels reduced emissions but are not included in the 7% figure above, as they either do not meet the definition of a frequent caller or their emissions were reduced, but to a lesser extent than outlined in the performance measure (see details in Appendix A).

### **2009 Implementation Plans**

Port Metro Vancouver is working with Princess Cruise Lines and Holland America Line, in addition to BC Hydro and the federal and provincial governments, to implement shore power at the Canada Place cruise ship terminal for the 2009 season. Construction and installation of landside infrastructure began February 9, 2009. Shore power will allow equipped cruise vessels calling the Port to hook up to the grid, significantly reducing emissions while at dock, thereby meeting and surpassing the 2010 Strategy performance measure. The Port is also reviewing its Differentiated Harbour Dues Program to look at ways to improve program participation and to expand it to include the Fraser River portion of its jurisdiction.

## **Port of Seattle**

- 29% of frequent ocean-going vessel calls (100% of cruise and 7% of container vessels) at the Port of Seattle met or exceeded the 2010 performance measure for ocean-going vessels. The Port had a total of 920 OGV calls in 2008, 755 of which were made by vessels deployed by shipping lines that call to the Port five or more times per year.
  - 100% of cruise vessel calls reached the 2010 OGV performance measure. Of the cruise vessel calls in 2008, 52% (108 out of 209) utilized shore power at the Terminal 30 Cruise Facility (Holland: 66 calls, Princess: 42 calls). The remaining 48% (101 of 209) of vessel calls utilized 1.5% sulfur fuel in diesel electric main engines while calling to the Port of Seattle to reach the 2010 performance measure.<sup>5</sup>
  - 7% (47 of 711) of container vessel calls reached the 2010 OGV performance measure by using 0.5% marine diesel fuel in auxiliary engines while at berth.

### **2009 Implementation Plans**

The Port of Seattle has several initiatives underway to continue progress toward the Strategy's 2010 performance measure for OGVs. On January 1, 2009, the Port of Seattle, in partnership with PSCAA, launched the At-Berth Clean Fuels Vessel Incentive Program (ABC Program). The ABC Program provides a \$1,500 per call incentive for use of 0.5% (or less) sulfur fuels in auxiliary engines while at berth to lines that call the Port of Seattle five or more times per year. The program is expected to reduce hotelling emissions by 95% for sulfur dioxide and 60% for PM. As of May 20, 2009, the participating shipping lines include: APL, Hapag-Lloyd, Matson,

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<sup>5</sup> Cruise vessels use a series of diesel-electric main engines. They do not have auxiliary engines for hotelling operations.

Maersk, CMA-CGM, COSCO, and Norwegian Cruise Line. This group of shipping lines represents 29% of all vessel calls made to Port of Seattle in 2008.

## Port of Tacoma

- 57% of frequent ocean-going vessel calls at the Port of Tacoma met or exceeded the 2010 performance measure for ocean-going vessels by using distillate (0.5% sulfur) fuel for hotelling auxiliary engine operation. The Port had a total of 1,365 OGV calls in 2008, 760 of which were frequently-calling vessels.

In addition to the frequently-calling vessels reaching the 2010 performance measure above, there were additional non-frequently-calling OGVs using distillate not counted towards the performance measure listed above.

### **2009 Implementation Plans**

In 2009, Port of Tacoma will continue to work towards 100% use of distillate fuel for hotelling auxiliary engine operations by all OGVs. The Port will also continue to work on educational outreach to shipping lines promoting the air quality benefits and recognition associated with switching to distillate fuel. The Port of Tacoma will investigate alternative measures to reduce hotelling emissions—such as minimizing vessels' time at berth through terminal efficiency, or providing an alternative to hotelling auxiliary engine operation—such as shore power.

## Cargo Handling Equipment

In 2008 the Ports and their facility operators made strides toward the cargo handling equipment (CHE) 2010 performance measure. The Ports and their stakeholders accomplished this through the use of ultra-low sulfur diesel (15 ppm) and biodiesel fuels, equipment replacement, and emission reduction retrofits, including participating in local, state and national efforts. For the U.S. Ports, many projects have already been established with funding opportunities identified to fill in the gap in 2009. The Ports aim to encourage retrofits, repowers, and use of more efficient and cost-effective technologies to improve the emission performance of CHE, and facility operators are already making substantial progress towards bringing the port-wide average CHE PM emissions to the level established by the 2010 performance measure. Retrofits and repowers of CHE will focus on utilizing technology which achieves the highest practical PM reductions, with a preference for verified technologies. In some cases, the highest practical PM reduction technology applied to older equipment will not provide sufficient emission reductions on an individual piece of equipment basis. However, as the 2010 performance measure is based on a fleet-wide average, CHE that surpass the 2010 performance measure will help offset excess emissions from the equipment that can be retrofitted to significantly reduce emissions, albeit not up to levels that reach the 2010 performance measure. CHE reporting in 2008 was done on an individual piece of equipment basis. The Ports will work to develop fleet-wide average reporting on this performance measure in 2009.

## 2010 Performance Measure

By 2010: Reach the port-wide equivalent PM reduction of Tier 2 or Tier 3 engines<sup>6</sup> operating with ultra-low sulfur diesel (ULSD) or a biodiesel blend of an equivalent sulfur level, and promote early implementation of the requirements between now and 2010. All new terminals will be equipped with new CHE equipment meeting the highest standards that are practicable for the anticipated use at the time of purchase.

## 2008 Progress

### Port Metro Vancouver

- 29% of all CHE at Port Metro Vancouver met or exceeded the 2010 performance measure.
  - 21% of all CHE exceeded the 2010 performance measure.
  - 8% of all CHE met the performance measure.
- In addition to the 29% meeting or exceeding it, 37% of all CHE made progress toward the performance measure.
- 55% of all CHE used ULSD fuel and/or biodiesel blends.

Fully electric equipment are not included in the progress reporting above, however these would fall into exceeding the 2010 performance measure. For example, TSI Terminal System's Inc. has been using fully electric rail mounted gantry cranes at their Deltaport container terminal since 1997.

### 2009 Implementation Plans

In 2009, Port Metro Vancouver will continue to implement measures and work with stakeholders to reduce PM emissions as part of reaching the 2010 CHE performance measure.

In addition, Port Metro Vancouver continues to make tenants aware of funding and other opportunities as they arise to encourage further reduction of emissions from CHE. Through the Environmental Review portion of the Project Review Process, tenants are required to demonstrate a commitment to continuous improvement in terms of reducing emissions from CHE and other sources. Port Metro Vancouver tenants continue to test, plan, and implement changes to their operation to reduce emissions, both in terms of technological and efficiency improvements.

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<sup>6</sup> Tier 2 and 3 standards are 0.15 g/hp\*hr for most CHE. See Table 1.1 in US EPA's *Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines*, August 1998, available online at: <http://www.epa.gov/nonroad-diesel/frm1998/nr-ria.pdf>, last visited on 06/09/2009.

## Port of Seattle

- 9% of all CHE at Port of Seattle met the 2010 performance measure.
- In addition to the 9% meeting it , 91% of all CHE made progress toward the performance measure.
- 100% of all CHE used ULSD fuel and/or biodiesel blends..

### **2009 Implementation Plans**

In 2009, the Port of Seattle will continue to retrofit and replace CHE through collaborative partnerships with stakeholders including PSCAA and Washington Department of Ecology. The Port also plans on utilizing EPA's Diesel Emissions Reduction Act, Washington State Clean Diesel, and PSCAA Diesel Solutions program grants to reach the Strategy's 2010 performance measure for CHE. All CHE not currently meeting the Strategy's 2010 performance measure will be reviewed for suitability as retrofit candidates. Equipment that cannot be retrofitted because of technical or mechanical restrictions will be considered for replacement through planned terminal equipment purchases or by equipment repowers under existing or future grant programs.

## Port of Tacoma

- 47% of all CHE at Port of Tacoma met or exceeded the 2010 performance measure.
  - 2.5% of all CHE exceeded the 2010 performance measure.
  - 44.5% of all CHE met the performance measure.
- In addition to the 47% meeting or exceeding it , 53% of all CHE made progress toward the performance measure.
- 100% of al CHE used ULSD fuel and/or biodiesel blends.

### **2009 Implementation Plans**

In 2009, the Port of Tacoma will continue to retrofit CHE working collaboratively with stakeholders including PSCAA and Washington Department of Ecology. The Port also plans on utilizing EPA's Diesel Emissions Reduction Act, Washington State Clean Diesel, and PSCAA Diesel Solutions program grants to reach the Strategy's 2010 performance measure for CHE by retrofitting up to 250 CHE engines with California Air Resources Board (CARB) or U.S. Environmental Protection Agency (EPA) verified Level 2 devices.<sup>7</sup> All remaining CHE equipment not currently meeting the Strategy's 2010 performance measure for CHE have been identified as retrofit candidates and will be addressed under the federal and state grant programs. Equipment that cannot be retrofitted because of technical or mechanical restrictions will be considered for replacement through planned terminal equipment purchases or by equipment repowers under existing or future grant programs.

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<sup>7</sup> A Level 2 verified diesel emissions control device must achieve a PM emissions reduction of 50% or more compared to uncontrolled emission levels.

## Rail

The 2010 performance measures for the rail sector require a commitment by the Ports to actively work with railways and terminal operators with owned or leased locomotives in a joint effort to implement currently available, cost-effective technologies; to explore new technologies as they become available; and to work to increase operational efficiencies, especially as port throughput volume increases. In 2008, all three Ports reached their 2010 performance measures for the rail sector. Port of Tacoma and Port of Seattle supported BNSF and Tacoma Rail in meeting their SmartWay commitments. Port Metro Vancouver is participating in the BC Locomotive and Rail Air Quality Work Group which began meeting in July 2008 and is working to engage rail operators and stakeholders. The Ports were also supportive of rail emission reduction technologies and retrofits. As the Ports move toward implementation of the 2015 performance measure, quantifiable emission reduction measures will need to be undertaken. The Ports will continue to support work towards implementing these measures, but commitment by the rail industry is needed to ensure success. Railways in the U.S. and Canada operate under different regulatory structures; thus, separate approaches may be undertaken to achieve emissions reductions in this sector.

### Performance Measure

By 2010: At the Ports of Tacoma and Seattle, expedite the implementation of the SmartWay Partner commitments<sup>8</sup> at intermodal facilities where BNSF, Union Pacific, and Tacoma Rail have operations in the Puget Sound region. At Port Metro Vancouver, work with the industry and regulatory agencies to develop a British Columbia Locomotive and Rail Air Quality Work Group in 2008, through which collaborative efforts to reduce emissions from the rail sector will be developed.

### 2008 Progress

#### Port Metro Vancouver

The BC Locomotive and Rail Air Quality Work Group kicked off in July 2008. Through collaboration and stakeholder engagement, it is exploring efforts to reduce emission from the rail sector through information sharing and the development of rail sector air emissions studies. The group includes representation from all levels of government, Port Metro Vancouver, and industry, including port terminal operators, as well as provincial and federally regulated railway companies. As an example of the type of efforts underway and being shared through the Work Group, in 2008 Viterra Inc. acquired a multi-genset locomotive with an automatic idle shutdown device that replaced an older conventional locomotive.

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<sup>8</sup> SmartWay is a voluntary program of U.S. EPA that establishes incentives for freight industry sectors to achieve fuel efficiency improvements and greenhouse gas emissions reductions. The three primary components of the program are to create partnerships, reduce all unnecessary engine idling, and increase the efficiency and use of rail and intermodal operations. See: U.S. EPA SmartWay, <http://www.epa.gov/smartway/index.htm>, last visited on 06/09/2009.

### **2009 Implementation Plans**

In 2009, the BC Locomotive and Rail Air Quality Work Group will continue to meet. The first meeting of 2009 was held at one of Viterra Inc.'s Port Metro Vancouver facilities, where they demonstrated their new multi-genset locomotive for the Work Group. A number of other terminal operators are also looking into or have ordered multi-genset locomotives to replace conventional ones as part of their efforts to reduce emissions associated with locomotives.

### **Port of Seattle**

The Port of Seattle reached its 2010 performance measure of supporting partner rail operators' participation in SmartWay. The BNSF Railway made commitments to participate in SmartWay, in part through its efforts to reduce emissions from CHE operations at their North Seattle International Gateway yard. These efforts included installation of the first wide-span, electric rail-mounted gantry cranes in North America. The Port of Seattle is also supporting Union Pacific's commitments to participate in SmartWay. Louis Dreyfus (a tenant of the Port of Seattle) has also made strides in reducing rail-related emissions. Louis Dreyfus has two switcher locomotives operating at the Terminal 86 grain facility using ultra-low sulfur diesel fuel, ahead of EPA's 2012 requirement.

### **2009 Implementation Plans**

In 2009, the Port of Seattle will continue to support the EPA SmartWay commitments made by BNSF Railway and Union Pacific, as well as anti-idling efforts made by Louis Dreyfus.

### **Port of Tacoma**

The Port of Tacoma reached its 2010 performance measure of supporting rail operators' participation in SmartWay. Port of Tacoma worked closely with its three rail operators, Tacoma Rail, TEMCO, and Pacific Rail Service, all of which are making strides to reduce emissions. Tacoma Rail is an EPA SmartWay Partner with four out of 18 engines using anti-idling technology. In May 2007, Tacoma Rail installed idle-reduction technologies from Kim Hotstart Manufacturing Company and ZTR Control Systems on four of its 18 locomotives, two of which are stationed at the Port of Tacoma.<sup>9</sup> Tacoma Rail has also tested two demonstrator GenSet Locomotives and converted its engines to ULSD in June 2006.<sup>10</sup> In November 2005, Tacoma Rail installed eco-tip super-stack fuel injectors on all 18 of their locomotives.<sup>11</sup>

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<sup>9</sup> Over five years, the four locomotives with the HotStart-SmartStart system should save 400,000 gallons of diesel fuel (direct GHG reductions); reduce fine particulate matter emissions by three tons; reduce nitrogen oxide emissions by 140 tons; and reduce carbon monoxide emissions by 15 tons.

<sup>10</sup> By moving to ULSD ahead of EPA's 2012 regulation, sulfur content has been reduced from 500 ppm to a maximum of 15 ppm.

<sup>11</sup> The injectors have the following emission reduction benefits: 3% fuel savings at full load (direct GHG reductions); 44% reduction in particulate matter emissions; and 75% reduction in smoke opacity.

TEMCO is using ULSD and voluntarily shutting down their two switching locomotives while not in use. Pacific Rail Service has one locomotive using ULSD that operates infrequently. These measures resulted in a 35% reduction in diesel fuel use; coupled with the switch to ULSD the result is approximately 75% reduction in diesel particulate emissions.

### **2009 Implementation Plans**

In 2009, the Port of Tacoma will continue to support stakeholder participation in the SmartWay program and the commitments and progress made by Tacoma Rail, TEMCO and Pacific Rail Service. Through a grant provided by the Washington Department of Ecology, Tacoma Rail will complete retrofits of four additional locomotives with automatic engine start/stop systems in 2009. Tacoma Rail also plans to install 10 additional anti-idle devices in switching locomotives. After the installation, 14 of the 18 (77%) of Tacoma Rail's locomotive fleet will be equipped with anti-idle technology.

## Trucks

This category is somewhat unique in that Port Metro Vancouver has an established truck licensing program which the other two ports do not have in place. This program requires that container truckers accessing port terminals must have a valid Truck Licensing System (TLS) license or permit in place. Truckers without a TLS license or permit are not granted access to Port property. The TLS license sets out minimum safety and environmental requirements for container trucks accessing port property.

Trucking is a complex sector due to the dynamic nature of the drayage<sup>12</sup> truck industry. In 2008, the Ports made significant efforts to develop and further programs to reach the 2010 performance measures for trucks. These efforts included outreach to stakeholders, which is an important step to achieving successful development and implementation of comprehensive programs. Consistent with the Strategy, in 2008 the Ports worked to gather data regarding the type, age, and destination of the port drayage trucks in order to design and implement comprehensive programs to reach the performance measures. The results of this data collection showed that, of the known drayage trucks calling any one of the three Ports, 75% to 95% are model year 1994 or newer, or have equivalent or better PM emissions. The Ports are committed to working with the trucking industry to find a model that will produce desired emissions reductions. In addition, the Ports are continuing to monitor developments in other West Coast ports. The 2010 performance measure listed below is an interim step leading to the long-term 2015 performance measure.

One of the deliverables listed in the Strategy for 2008 was to define a package for retrofits meeting the performance measure. However, for the U.S. Ports, the Ports and air agencies determined there are currently no cost-effective retrofits to meet the standards. Port Metro

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<sup>12</sup> To be consistent with the Clean Air Strategy, the term "drayage" means the following at different Ports. At Port Metro Vancouver and Port of Seattle, drayage refers to all container trucks. At the Port of Tacoma, drayage refers to all container trucks with the exception of auto-transport trailers.

Vancouver has included a defined set of measures, including retrofits, alternative fuels, and engine replacements that when used with older trucks will meet the performance measure. These options keep the program as flexible as possible for affected trucks, by allowing those truckers who want to keep a particular vehicle to do so, while continuing to operate at the Port. The language will be amended in the Strategy as part of the next round of revisions to reflect the findings on retrofits.

## Performance Measure

By 2010: Reach the equivalent PM emissions level of 1994 or newer heavy-duty truck engine<sup>13</sup> model year through vehicle purchase or by using approved retrofit packages to be identified in 2008 (per above).

## 2008 Progress

### Port Metro Vancouver

- 95% of drayage trucks met or exceeded the 2010 performance measure..

Port Metro Vancouver introduced increasingly stringent environmental requirements into the TLS beginning in 2008, including truck age limits, opacity limits, idling limits and an awareness program. Starting April 1, 2008, trucks already in the TLS that were 1988 and older were banned without an approved age exception (emission reduction measure). Trucks not already in the TLS had to be 1989 or newer to be added. All trucks 1993 and older had to be tested and pass no more than 40% (for 1991 and newer) or 50% (for 1990 and older) opacity. Port Metro Vancouver also imposed an idling limit of maximum three consecutive minutes in any 60-minute period.

### 2009 Implementation Plans

In April 2009, Port Metro Vancouver met or exceeded the 2010 performance measure of 1994 or newer model year equivalent PM emissions for drayage trucks. Through the TLS Environmental Requirements, Port Metro Vancouver has a schedule defined through 2017, by which time the TLS fleet will be brought up to the equivalent of 2007 trucks for PM<sub>2.5</sub>. As of April 1, 2009, trucks 1993 or older already in the TLS were banned without an approved age exception and trucks added to the TLS now have to be 1994 or newer. In addition, starting April 1, 2009, all trucks 10 years and older must be tested and pass no more than 20% opacity on an annual basis. Trucks achieving 10% or less opacity are granted a one-year exemption. The idling limit and awareness program continue to apply to trucks of all ages in the TLS.

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<sup>13</sup> The Clean Air Strategy performance measure for trucks states that progress should be measured by truck engine model year. However this information was not available in many cases; thus the Ports are reporting progress based on truck model year unless engine model year was available.

## Port of Seattle

- 75.6% of drayage trucks met or exceeded the 2010 performance measure.

In August 2008, as part of its data collection, the Port of Seattle conducted an age analysis of drayage trucks operating at the Port. The Port cross-referenced information from the radio-frequency identification pilot project with the Washington Department of Licensing Vehicle/Vessel Inquiry system to obtain model years of approximately 1,500 known drayage trucks operating in the harbor. In addition, the Port conducted extensive outreach to stakeholders, including terminal operators, railroads, trucking companies, independent owner/operators, beneficial cargo owners, third-party logistics, environmental and community groups, labor, and regulatory agencies to discuss options for a clean truck program.

### **2009 Implementation Plans**

In 2009, the Port of Seattle will finalize an implementation plan to reach the 2010 truck performance measure, based on stakeholder input. In April 2009, the Port Commission adopted two elements of a detailed plan, a truck scrapping and buy-back program proposed by PSCAA, and proposed negotiation of tenant lease agreements to implement the Strategy's 2010 performance measure for trucks. Other details such as funding mechanisms and verification and reporting will be developed later in 2009.

## Port of Tacoma

- 86% of drayage trucks met or exceeded the 2010 performance measure.

As part of efforts to reduce truck-related emissions, Port of Tacoma conducted a study in 2008 to identify drayage truck age profiles. The study examined how trucks move within the Port and their interactions with terminal operators. As part of this study, the Northwest Ports Clean Air Strategy drayage truck performance measures were discussed with terminal operators and trucking companies, who were also solicited for information about truck flow and/or vehicle specific information.

### **2009 Implementation Plans**

In spring 2009, the Port of Tacoma Drayage Truck Emission Improvement Program was presented to and approved by the Port of Tacoma Commission. The Program takes a market-based approach to assist the remaining 14% of pre-1994 drayage trucks in reducing emissions to meet the Strategy's 2010 performance measure. The Program's 2009 objectives are:

- Generate and promote a Best Management Practice list of pre-qualified drayage trucking companies and owners that meet the Strategy's performance measure and have EPA SmartWay certification.
- Create a database of trucks serving the Port, including truck age and owner information.
- Partner with trade and non-governmental organizations to identify funding opportunities and options to modernize and retrofit drayage fleets.

- Communicate with the local trucking community through real-time “push” telecommunications<sup>14</sup> and quarterly meetings to share best practices.
- Create a dedicated website allowing truckers to check turn times at terminals, vessel arrivals, and other information.

## Harbor Craft

The Ports and the air agencies recognize harbor vessels (including ferries, commercial vessels, tugs,<sup>15</sup> and pleasure craft) are also a source of maritime emissions. However the Ports have little or no authoritative control over, or direct relationships with harbor vessels, making port-generated commitments to act challenging to implement. Since the Ports have little to no jurisdiction over harbor craft, the air agencies have assumed responsibility for developing and implementing the Strategy’s harbor craft performance measures. With the agencies taking the lead for this sector, they and the Ports have agreed to create and implement an outreach strategy to work directly with the owners and operators of harbor vessels to help raise awareness and support implementation of emissions reductions. While there is still no quantitative performance measure for this sector, efforts to reduce harbor craft related emissions are clearly moving forward and the potential for further improvement remains. The entities responsible for harbor craft, the Government of Canada and Puget Sound Clean Air Agency, are exploring opportunities for retrofits and the use of cleaner fuels for harbor vessels. The air agencies and Ports have agreed to encourage and support implementation of pilot projects. In addition, they recognize the independent efforts by Washington State and British Columbia Ferries to reduce emissions, and encourage the continuation of these actions.

## Performance Measure

The agencies and Ports will work together to draft an outreach strategy targeted at the owners and operators of harbor vessels to help raise awareness and support implementation of emission reduction activities. The Ports and agencies will also work with major harbor vessel owners and operators to annually report on the number and tier of vessel engines, emission-related retrofits, and alternative fuel use. This data will be reported in the 2009 Implementation Report.

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<sup>14</sup> A push message is an automatically transmitted message that can be sent to a mobile phone, PDA, other portable device or email account. The push message is typically sent to a targeted or subscribed list of users and provides the user content without them having to ask for it. For example, a mobile phone text message or email alert can both be considered push messages.

<sup>15</sup> The Ports recognize harbor tugs and ocean-going tugs may need to be approached differently.

## 2008 Progress

### Georgia Basin

Port Metro Vancouver's Differentiated Harbor Dues Program, described in detail in the Ocean-Going Vessel section also applies to tugs, barges and integrated tugs and barges in Burrard Inlet and at Robert's Bank (excludes Fraser River). In addition, British Columbia (BC) Ferries is taking steps to reduce its air emissions. Since 2003, they have reduced annual fuel consumption through a variety of measures, including resurfacing vessel hulls, installing new fuel-efficient engines on some vessels and fuel monitoring systems on others. BC Ferries undertook an anti-idling campaign for vehicles at terminals and for onboard vessels, and uses low-sulfur fuel on all ships while actively researching alternative fuels such as biodiesel. BC Ferries is also replacing existing ground transportation vehicles with more fuel-efficient and lower-emission vehicles. To date, BC Ferries has purchased 11 propane-powered units to replace gasoline-powered baggage vans and five electric-powered vehicles to replace gasoline-powered service vehicles. BC Ferries also has extensive environmentally-friendly procurement, cleaning, recycling, and composting programs with air quality and greenhouse gas benefits. For example, diverting about 1900 kg of organic material to composting each week avoids GHG emissions.

BC Ferries' three new Super C-class ferries, which entered service in late 2007 and early 2008, are designed to exceed the environmental standards set by the International Maritime Organization (IMO) and the U.S. EPA. They are among the most advanced marine vessels in the world when it comes to energy consumption. They are fitted with sophisticated power management systems, so if the load is light, only three of the four main engines are engaged. The hull and propulsion systems are designed for peak energy efficiency. Heat from the engine is captured and used to warm passenger spaces and generate hot water, eliminating the need for large boilers. Light Emitting Diodes (LED) in the engine rooms and on the vehicle decks use less energy and last many times longer than conventional lights.

#### **2009 Implementation Plans**

In 2009, Port Metro Vancouver will review the Differentiated Harbor Dues Program, including how to improve it for tugs, barges and integrated tugs and barges, as well as expansion of the program to the Fraser River. BC Ferries will continue its efforts to reduce air emissions and explore new emissions reduction technologies. The Government of Canada hopes to make additional progress with other types of harbor vessels in 2009.

### Puget Sound

The Puget Sound Clean Air Agency (PSCAA) is working with its partners to reduce criteria air contaminant and GHG emissions in the region by reducing emissions from harbor craft related to fuels and engines.

PSCAA is promoting ULSD fuel and new technologies in all harbor craft with a focus on tugs and ferries. PSCAA and the ports have been working with tug companies and marine fuel distributors to increase the use of ULSD and with engine manufacturers to promote cleaner technology. Washington State Ferries (WSF) is using ULSD (15 ppm) or low-sulfur diesel fuel in all of its vessels. WSF has been conducting an on-going evaluation of the use of biodiesel fuel in its vessels to determine the best course of action.

In 2008, PSCAA applied for and in 2009 received a U.S. EPA Diesel Emission Reduction Act (DERA) grant to upgrade the engines on a Seattle-based fishing vessel as part of EPA's Emerging Technology Program. Once certified by the U.S. EPA, the engine upgrade kit will become mandatory for the specific engine under the EPA's Inland Marine and Locomotive Rule. This kit will reduce PM emissions by approximately 25%.

### **2009 Implementation Plans**

The WSF Draft Long Range Plan contains a number of fuel conservation strategies that reduce emissions including reducing boat speed, engine upgrades, and alternate tie-up methods for vessels. The state ferry M/V Tillikum is being retrofitted with Ultra-Low Lube Oil power assemblies for diesel engines to reduce emissions. PSCAA and WSF are submitting an application to use federal Congestion Mitigation and Air Quality (CMAQ) funds to retrofit the entire fleet with the same technology. The WSF Plan calls for one new replacement ferry by 2010 and three more replacement ferries by 2015. In April and May 2009, PSCAA submitted two DERA grant applications to repower or retrofit three Foss tugs that operate at both Port of Seattle and Tacoma. PSCAA submitted another DERA grant application to install a sea-water scrubber on a harbor cruise vessel.

## **Port Administration**

The Ports made progress in reducing port administration-related emissions. Some of the examples of efforts undertaken by one or more of the Ports include use of hybrid vehicles, introduction of alternative fuels, reduction of electricity usage, and various other measures to reduce their environmental footprint. The Ports and air agencies will continue to discuss establishment of quantitative performance measures for the future.

The Ports and the air agencies recognize that while most emissions come from equipment that the Ports do not own or operate themselves, they do have administration-related emissions, diesel or otherwise, that can be reduced and it is important that the Ports lead by example. As such, Port of Seattle and Port of Tacoma have reported the number of on- and off-road vehicles and vessels in their fleet and identified the number and kinds of emissions-related retrofits that have been installed on the equipment; how much and what fuel(s) their fleet is using; and other information that would be relevant to air emissions estimates. Port Metro Vancouver intends to gather this information in 2009. All three Ports have also provided information on other strategies such as employee commute reduction programs, green buildings, and energy efficiency initiatives that have been implemented to reduce emissions.

## Performance Measure

Performance measures have not yet been established for the port administration sector.

## 2008 Progress

### Port Metro Vancouver

As part of the goal to continue to look for ways to reduce administrative emissions, Port Metro Vancouver has accomplished the following:

- Replaced all conventional gasoline pool vehicles with gasoline-electric hybrids.
- Leased two trucks fuelled by combustion of waste hydrogen.
- The Port's 999 Canada Place, Vancouver office continues to meet LEED-CI Gold requirements.
- Purchased Green Power Certificates from British Columbia Hydro's Power Smart Program to cover 50% of the power needs of the 999 Canada Place, Vancouver office. These certificates represent the additional cost associated with obtaining power from more environmentally friendly sources.
- Required security contractors to use gasoline-electric hybrid vehicles, rather than conventional gasoline vehicles.
- Provided staff with secure bike lockers, change rooms and showers for those biking, walking or jogging to work.
- Participated in Translink's Employer Pass Program, which offers reduced-price transit passes to staff.
- Provided education programs for staff, including commuter challenges, an idle-reduction lunch and learn, and an opportunity to test drive and learn about alternative fuelled vehicles.

### 2009 Implementation Plans

In 2009, Port Metro Vancouver will continue to work to reduce administrative emissions. The Port will also conduct an inventory of emissions associated with its corporate (administrative) operations. In March 2009, the Port also hosted a "lunch and learn" on "Improving Your Home's Energy Efficiency" for staff, presented by the City of Vancouver.

### Port of Seattle

As part of the goal to continue to look for ways to reduce administrative emissions the Port of Seattle has accomplished the following:

- Used biodiesel/ULSD blend, including B99 and B20 in all Port-owned diesel equipment.<sup>16</sup>

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<sup>16</sup> In 2008, the Port used 25,500 gallons of biodiesel blends.

- Converted two Toyota Priuses to plug-in hybrid electric.
- Included 29 hybrid vehicles in its Seaport fleet.
- Reduced electricity consumption by 43% at the Pier 69 headquarters.
- Diverted 32.2 tons of solid waste from landfills.
- Diverted 17.5 tons of organic waste from landfills.
- Is a founding reporter of The Climate Registry.

### **2009 Implementation Plans**

In 2009, the Port of Seattle will continue to purchase hybrid or alternative-fuel vehicles when replacing fleet vehicles. The Port will also work to increase recycling efforts and reduce water and electricity consumption at all Port facilities.

## Port of Tacoma

As part of the goal to continue to look for ways to reduce administrative emissions the Port of Tacoma has accomplished the following:

- The Port purchased eight hybrid vehicles and two all-electric vehicles to reduce combustion-related pollutants including GHGs.
- The Port participates in Tacoma Power’s Evergreen Option at the 11% level. The Evergreen Option is offered by Tacoma Power as a means to purchase electrical power generated by wind or solar sources. By purchasing 11% of its power from wind or solar sources, Port of Tacoma has offset the non-renewable portion of its power purchases to become a 100% renewable energy consumer.
- As part of the 2008–2009 Port Demolition Program, the Port offered a financial incentive to its demolition contractor for various levels of diversion of demolition materials from the landfill. For the two projects completed in 2008, 78% and 99% of demolition waste, respectively, was diverted from landfills through recycling and reuse.
- Administrative costs for paper purchasing and garbage pickup were reduced 50% through recycling.

### **2009 Implementation Plans**

In 2009, the Port of Tacoma will continue to take action to reduce air emissions.

## 2009 and Beyond

In the coming year the Ports, working with industry, agencies and other stakeholders, will continue their efforts to reduce maritime-related air emissions. As part of measuring their progress toward the 2010 performance measures, all of the Ports have engaged in analysis projects and tracking systems that will allow them to evaluate additional implementation measures. All three Ports are working on improving their methods of data collection and

reporting to more accurately reflect the progress being made. This report represents the first test of the cycle of planning, implementing, reviewing and improving the actions that the Ports and their stakeholders undertook up to and including 2008 to reach emission reduction goals. In 2009, the Ports will refine their data collection and reporting standards. As mentioned earlier in the report, the Ports are also in the midst of developing auditing and tracking programs to more closely monitor progress for ocean-going vessels and port administration.

Despite the progress made toward the 2010 performance measures across the sectors, there are many opportunities remaining for the Ports and their stakeholders to achieve these performance measures and begin work toward the 2015 performance measures. The Ports, industry, agencies and other stakeholders are also working to address the gaps that remain in the 2010 performance measures. In addition to the activities planned for 2009 listed above, the Port of Tacoma and Port of Seattle supported grant applications to EPA for diesel emission reduction projects for cargo handling equipment and ocean-going vessels submitted by the Puget Sound Clean Agency. Port Metro Vancouver is reviewing and improving its Differentiated Harbor Dues Program, to further reduce emissions from ocean going vessels and harbor craft. As implementation efforts continue in 2009, the Ports may be limited in the scale of efforts they can accomplish due to the current economic situation and subsequent budget shortfalls. Nevertheless the Ports and air agencies are committed to seeking out opportunities to keep the momentum moving forward.

## Conclusions

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Port Metro Vancouver, Port of Seattle, Port of Tacoma, and the stakeholders of each port have all demonstrated progress in meeting the 2010 performance measures established in the Northwest Ports Clean Air Strategy. In addition to identifying the progress made, this report also examines the areas that warrant further improvement. The Ports will continue efforts to reduce maritime emissions in 2009 and beyond. As implementation plans and activities continue as part of the Ports' voluntary efforts to reduce air emissions, many near-term opportunities exist to aid their progress. The rate at which new, cleaner technologies emerge will assist the Ports in devising implementation activities to reach both the 2010 and 2015 performance measures. Stimulus funding may also create opportunities for the Ports in the U.S. to continue and perhaps broaden the scale of their emission reduction efforts. The spirit of cooperation and collaboration between Ports, agencies and stakeholders drives the primarily voluntary implementation of Strategy performance measures as does the commitment of all partners to reduce criteria air contaminant and GHG emissions in the Pacific Northwest. The Ports will continue to collaborate and engage with agencies, stakeholders, partners, and the community to make the Georgia Basin-Puget Sound region a cleaner and healthier place to live.

# Appendix A: Data Methodology and Calculations

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## Ocean-Going Vessels

### Port Metro Vancouver

The information gathered was based on calls to Burrard Inlet and Roberts Bank only (excludes Fraser River). The percentage toward the 2010 performance measure was calculated based on frequently-calling vessels that had approved harbour dues applications deemed equivalent to the 2010 performance measure for all of their first five calls. It was assumed that any additional calls during 2008 by those vessels also reached the 2010 performance measure. Frequently-calling vessels that had less than five approved applications for the Differentiated Harbor Dues Program (deemed equivalent to the 2010 performance measure) were not included in the calculation toward the 2010 performance measure. Additionally, vessels that did not meet the definition of a frequent caller that had approved harbor dues applications deemed equivalent to the 2010 performance measure were not included in the percentage toward the 2010 performance measure.

### Port of Seattle

The Port of Seattle relied on the commitment made by APL as a record for container vessels and on the cruise tariff for cruise vessels. The Port was not in a position to review fuel records for the 2008 Implementation Report.

### Port of Tacoma

The Port of Tacoma was not in a position to review fuel records for the 2008 Implementation Report. For 2008, the Port relied on commitments from shipping lines as a record. There are no frequent callers using main engines for hotelling.

## Cargo Handling Equipment

### Port Metro Vancouver

Port Metro Vancouver's progress toward the 2010 CHE performance measure was based on the *Port Metro Vancouver Land Side Air Emissions Inventory Phase I: Burrard Inlet and Roberts Bank*. The data used to calculate progress toward the 2010 performance measure does not include the Fraser River. The inventory included 2005 as the baseline year, and the 2008 forecast incorporates changes planned by tenants, and an estimated changeover rate (i.e., if

10% of fleet in 2005 is 5 years old, assume 10% of fleet in 2008 is 5 years old). The inventory assumed U.S. engine tier timelines as much of the equipment is from U.S. manufacturers. PM<sub>2.5</sub> emission reductions of 63% from Tier 1 only were included as equivalent to Tier 2 or Tier 3.

## **Port of Seattle**

The Port of Seattle requested its 2008 data from terminal operators. Data included vehicle model year, fuel type, recognition of on-road engines and control device installation.

## **Port of Tacoma**

The Port of Tacoma requested its 2008 data from terminal operators. Data included vehicle model year, recognition of on-road engines and control device installation. Port-sponsored retrofits were checked against the terminal-provided information. Information was compared against published U.S. EPA standards for model year and engine power.

## **Rail**

### **Port Metro Vancouver**

Information on the British Columbia Locomotive and Rail Air Quality Work Group was gathered by Port Metro Vancouver.

### **Port of Seattle**

Data was obtained from Louis Dreyfus, Union Pacific and BNSF Railways.

### **Port of Tacoma**

Data was gathered from review of public information posted on the Tacoma Rail website and communication with TEMCO and Pacific Rail Service.

## **Trucks**

### **Truck Data Collection Equivalencies**

The Strategy performance measure for trucks states that progress should be measured by truck engine model year. However this information was not available in many cases; thus the Ports are reporting progress based on truck model year, unless engine model year is available.

The following definitions and assumptions are included in the calculation of progress toward the 2010 performance measure:

- Drayage trucks are defined as trucks that serve the Port terminals. The existing reporting systems for trucks—Port Metro Vancouver Truck Licensing System, Port of Seattle Radio Frequency Identification (RFID) Program, and the Port of Tacoma survey—rely on the best available data.
- Port of Seattle and Port of Tacoma will continue to work to accurately identify the full inventory of the truck population calling the ports—approximately 80% of the population is known, and the other 20% are assumed from the statewide inventory. Port Metro Vancouver has an accurate inventory based on their truck licensing program.

## **Port Metro Vancouver**

Drayage truck fleet age distribution data was collected via the Truck Licensing System and based on the October 2008 fleet profile.

## **Port of Seattle**

Port of Seattle conducted drayage truck fleet age analysis in 2008 to identify the drayage truck age profile. The analysis was conducted using approximately 1,500 RFID tags issued via a gate efficiency pilot project. This analysis was compared to the Washington State heavy-duty vehicle fleet provided by the Washington State Department of Ecology and to an independent survey conducted by the Washington Trucking Association.

## **Port of Tacoma**

Data was collected from two sources: terminal operators and dray trucking companies. Three terminal operators were able to provide data from gate security and efficiency operations. Gate data sources include trucking companies that serve the terminal and license plate information gathered by optical character recognition (OCR) systems. Only one terminal operator had OCR systems recording truck license plate information. Other terminal operators were able to supply license plate data incidentally.

Drayage companies identified by terminal operators were contacted to provide supplemental information for this report. Some of the drayage trucking companies were able to provide license plate, engine model year, and specific port service information. More than 6,000 records were queried to produce a unique vehicle population of 3,100 drayage trucks and a drayage truck age profile.

## Harbor Craft

### **Georgia Basin**

Information on harbor craft was provided by Port Metro Vancouver, British Columbia Ferries and Environment Canada.

### **Puget Sound**

Data and information on harbor craft was provided by Puget Sound Clean Air Agency.

## Port Administration

### **Port Metro Vancouver**

Data was gathered by Port Metro Vancouver on administrative activities to reduce, directly and indirectly, criteria air contaminant and greenhouse gas emissions.

### **Port of Seattle**

Port Administration data was gathered from reporting of activities that represent reductions directly or indirectly of criteria air contaminant and greenhouse gas emissions.

### **Port of Tacoma**

Data was gathered by Port of Tacoma on administrative activities to reduce, directly and indirectly, criteria air contaminant and greenhouse gas emissions.