



# Northwest Ports Clean Air Strategy

*2009 Implementation Report*



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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

## 1.0 Introduction

The Northwest Ports Clean Air Strategy (“the Strategy”) was developed in 2007 to support reductions in maritime and port-related diesel and greenhouse gas (GHG) emissions in the Pacific Northwest. The objectives of the Strategy are to reduce regional air quality impacts as well as port related contributions to climate change. The Strategy provides performance measures and targets for emissions reductions within each sector of port operation, and outlines specific strategies and actions through which the participating ports can achieve the targets.

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
- United States Environmental Protection Agency (U.S. EPA).

Additional technical and financial support toward emission reduction initiatives related to the Northwest Ports Clean Air Strategy was provided by British Columbia Ministry of Environment and the American Recovery and Reinvestment Act.

The actions undertaken by the Ports are primarily voluntary, driven by the Ports’ unique and collaborative relationships with industry, agencies and other stakeholders, and are designed to achieve early reductions in advance of, and complementary to, applicable regulations.

The Northwest Ports Clean Air Strategy 2008 Implementation Report summarized emission reduction initiatives and achievements up to and including 2008. The 2009 Implementation Report provides an update on ongoing actions, and reports on incremental progress each port has made throughout the calendar year toward achieving 2010 emission reduction targets, corresponding to the performance measures set out in the Strategy.

This report is organized by the sources of maritime air emissions associated with the sectors of port operations:

- Ocean-going vessels
- Cargo handling equipment
- Rail
- Trucks
- Harbor craft
- Port administration

### **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.

Each section includes a brief description of the sector's activities, and provides the performance measure that has been established as an indicator for emission reduction, combined with the 2010 target set for each performance measure. For each port and sector, the 2009 performance reporting includes:

- A summary of the emission reduction activities that *met or exceeded* the 2010 performance measure;
- A description of how the performance measure was met, either using the methods described in the strategy, or defining the alternative methods used;
- A description of highlights or initiatives that resulted in emission reductions that *exceeded* the performance measure, which may have been achieved by methods other than those described in the performance measure; and
- A description of other activities that *made progress toward* the 2010 performance measure, in that emissions were reduced, but did not meet the criteria of the 2010 performance measure.

The 2010 implementation plans of each port are also described, and each sector section concludes with a summary of the overall progress made in the sector in 2009, compared with 2008 results.

Where possible, a consistent set of data collection methods was used across all ports. However, a meaningful comparison between ports is in some cases not yet possible for all sectors due to differences in the way that data is collected and reported as well as differences in the type of maritime activity at each port. During future years of implementation of the strategy, the Ports will continue to work towards using consistent methods for data collection and reporting. A detailed accounting of the methodologies used to calculate each port's 2009 progress toward the 2010 performance measures can be found in Appendix A.

## 2.0 Ocean-Going Vessels

Ocean-going vessels (OGV) represent a significant source of emissions in port operations due to the use of fuels at berth and at anchor. Potential action items identified in the Strategy for reducing emissions in this sector include, but are not limited to:

- using alternative or cleaner fuels,
- identifying opportunities for cleaner engines or after-treatment technologies, and
- evaluating efficiency and conservation programs.

Other activities described in the strategy include:

- Investigating incentive programs such as differentiated harbor dues, and
- Collaborating with relevant stakeholders to take part in policy issues such as the ratification of amendments to MARPOL Annex VI or the adoption of an Emission Control Area (ECA).

**The 2010 performance measure for the OGV Sector is to:**

- By 2010: Reach the equivalent PM reduction of using distillate fuels with a maximum sulfur content of 0.5% for all hotelling auxiliary engine operations.<sup>2 3</sup> Use of fuels with a maximum sulfur content of 1.5%, or use of equivalent PM reduction measures for all hotelling main or diesel electric engine operations.<sup>4</sup>

## 2.1 2009 Progress, Ocean-Going Vessels

### 2.1.1 Port Metro Vancouver

1.6% of frequent ocean-going vessel<sup>5</sup> calls made to the Burrard Inlet and Roberts Bank areas of Port Metro Vancouver met or exceeded the 2010 performance measure. These areas of the Port had a total of 2,308 OGV calls in 2009, 749 of which were made by frequently-calling vessels.

Frequent calling vessels that met or exceeded the 2010 performance measure did so by use of  $\leq 0.2\%$  sulphur fuel at anchor and at dock in auxiliary engines or by connecting to shore power.

In addition to those calls by frequent calling vessels that met or exceeded the 2010 performance measure, emissions were reduced to the same or lesser degree by a number of additional vessels not included in the performance measure as written. The overall participation rate in the Differentiated

#### Shore Power at Port Metro Vancouver

Working with Princess Cruise Lines, Holland America Line, BC Hydro, the Province of BC and the Government of Canada, Port Metro Vancouver implemented shore power for cruise ships at both the east and west berths of Canada Place. A total of 11 test connections were made during the latter part of the 2009 cruise season, resulting in significant reductions of particulate matter and CO<sub>2</sub> equivalents in the Georgia Basin airshed.

<sup>2</sup> It has been demonstrated that up to a 70% per vessel reduction in fine particulate can be achieved by switching from bunker to distillate fuels.

<sup>3</sup> Note there may be some ships with specific technical circumstances that would not be able to comply until 2012.

<sup>4</sup> Except during active docking and departure, during which non-hotelling engine operations are running.

<sup>5</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.

Harbor Dues Program of calls to Burrard Inlet and Roberts Bank on which harbor dues were payable was 18%. Participation has been on a gradual decline since the program began in 2007 for reasons unknown. These vessels reduced emissions through, for example:

- Use of 0.5% or less sulphur distillate fuel within 24 nm of the navigational jurisdiction boundary (non-frequent callers);
- Use of 1.0% or less sulphur fuel at anchor and dock;
- Use of 2.0% or less sulphur fuel at anchor and dock; or
- Ship classification society environmental designations (which include emission reduction measures such as lower fuel sulphur limits).

Through Port Metro Vancouver's Differentiated Harbour Dues Program, vessels that go beyond requirements to reduce emissions have been rewarded through reduced harbor dues since 2007 under the then Vancouver Port Authority. Harbour dues are payable on the first five calls per vessel in a calendar year only.

## 2010 Implementation Plans

An estimated 58 shore power connections are expected to be made by cruise vessels at Canada Place during the 2010 season with significant reductions in criteria air contaminants and greenhouse gases as anticipated results.

Starting January 1, 2010, the Differentiated Harbour Dues Program will be expanded to include the entire jurisdiction of what is now the Vancouver Fraser Port Authority, which includes the Fraser River in addition to the Burrard Inlet and Roberts Bank. Additionally, some changes will be made to the options for vessels to get reduced rates, to allow for greater flexibility in achieving the overarching goal of reduced emissions.

In 2010 a comprehensive review of the program will be undertaken in consultation with industry to determine how to further facilitate higher rates of participation in the program and additional emissions reductions. Potential opportunities for encouraging higher rates of participation may include a formal recognition program, changes to emission reduction options and rates, and streamlining of the process itself.

### 2.1.2 Port of Seattle

63.5% of all frequent ocean-going vessel calls (cruise and container ships) met or exceeded the 2010 OGV performance measure. The Port had a total of 1014 OGV calls in 2009, 715 of which were made by frequent-calling vessels.

- 100% of the 218 frequent cruise vessel calls met or exceeded the 2010 OGV performance measure.
  - 38.5% (84 calls) met the 2010 OGV performance measure by using  $\leq 1.5\%$  sulfur fuel in diesel electric main engines while at berth.
  - 61.5% exceeded the 2010 OGV performance measure through use of shore power (84 calls) or participation in the At-Berth Clean Fuels Vessel Incentive Program (ABC Fuels), utilizing fuel containing  $\leq 0.5\%$  sulfur fuel in diesel electric main engines while at berth (50 calls)
- 40% of frequently calling container vessel calls (236) met the 2010 OGV performance measure using  $\leq 0.5\%$  sulfur diesel fuel in auxiliary engines while at berth.

Working towards the 2015 OGV performance measure, in 2009, the Port of Seattle continued to evaluate the potential for providing shore power at Pier 66.

The highly successful At-Berth Clean Fuels Vessel Incentive Program (ABC Fuels), launched on January 1, 2009 provides an incentive to frequent calling vessels that use 0.5% (or less) sulfur fuels in auxiliary engines while at berth. In 2009, the incentive was \$1,500 per call and intended to cover 50% of the cost differential of using more expensive fuel. Participation in ABC Fuels requires per call reporting and periodic audits, which are conducted by Det Norske Veritas and Port staff. In addition, all homeported cruise ships that call to the Port of Seattle are required, via the tariff, to either plug in to shore power or use 1.5% (or less) sulfur fuels in their diesel electric main engines while at berth.

### **2010 Implementation Plans**

Port of Seattle will continue to work towards increased participation in the ABC program to achieve further emission reductions in 2010. In 2010, the ABC Fuels incentive will increase to \$2,250 to reflect longer times at berth and increased fuel costs. This incentive is expected to result in higher participation rates in the ABC program.

### **2.1.3 Port of Tacoma**

50% of frequent ocean-going vessel calls at the Port of Tacoma met or exceeded the 2010 performance measure by using distillate ( $\leq 0.5\%$  sulfur) fuel for hotelling auxiliary engine operation. The Port had a total of 1221 OGV calls in 2009, 672 of which were frequently-calling vessels.

In 2009, two shipping lines consolidated routes moving some cargo from Tacoma to Seattle as part of a vessel-sharing agreement. These ships were considered frequent callers using distillate fuel in hotelling auxiliary engine operations. The loss of these vessels resulted in a drop of frequent calling vessels using distillate from 57% in 2008 to 50% in 2009.

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

### **2010 Implementation Plans**

In 2010, Port of Tacoma will continue to work towards meeting the 2010 performance measure. 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 continue to 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.

In 2010, The Port of Tacoma plans to complete a retrofit project that received funding in 2009. Port of Tacoma was awarded an EPA Diesel Emission Reduction Act Grant through the 2009 American Reinvestment and Recovery Act Funding by EPA to retrofit two ships and one port terminal to provide shorepower for two 840ft Orca Class roll-on/roll-off (RO/RO) vessels, the *M.V. Midnight Sun* and the *M.V. North Star*, that service Alaska. When completed, this project will exceed the 2010 OGV performance measure by significantly reducing hotelling emissions for approximately 100 vessel calls per year.

## 2.2 Progress Summary, Ocean-Going Vessels

In 2009, the Ports achieved emission reductions in the OGV sector primarily through low-sulfur fuel programs, delivered as incentive based at Port Metro Vancouver and Port of Seattle, and as a voluntary program at Port of Tacoma. The Ports are also in various stages of exploring and implementing shore power as a source of further emission reductions.

The table below compares the three ports' progress of 2009 with the progress of 2008, in terms of the number and percentage of calls made by frequently-calling vessels that met or exceeded the 2010 performance measure (**Table 1**). In 2009 there were 71 more calls than in 2008 that met or exceeded the 2010 target.

**Table 1 Ocean-Going Vessel Sector Progress Summary**

PORT	2008		2009	
	% of Calls* Met or Exceeded	# of calls Met or Exceeded	% of Calls* Met or Exceeded	# of calls Met or Exceeded
Port Metro Vancouver	7%	79	1.6%	12
Port of Seattle	29%	219	63.5%	454
Port of Tacoma	57%	433	50%	336
<b>Average/Total</b>	<b>31%</b>	<b>731 calls</b>	<b>38%</b>	<b>802 calls</b>

**\*Note:** Refers to the % of calls by frequently calling vessels that participated in the emission reduction programs at each port, not necessarily *all* frequent calling vessels. Refer to methodology for details.

Although relevant to the 2015 performance measure for OGVs, it is worth noting that the North American Emission Control Area (ECA) was proposed and approved-in-principle at the International Maritime Organization in 2009. The ECA was formally adopted in early 2010.

## 3.0 Cargo Handling Equipment

Dockside emissions in the cargo handling equipment (CHE) sector addressed in this report are related to diesel powered equipment, such as straddle carriers, rubber tired gantries (RTG), and yard tractors. Potential action items for reducing emissions in this sector include, but are not limited to:

- Implementing the use of cleaner engines, through retrofits, engine replacements, or equipment replacements;
- Implementing the use of cleaner fuels such as ULSD and/or biofuel; and
- Conducting and evaluating pilot studies on alternative fuel sources for CHE such as electric, diesel hybrid, liquefied natural gas (LNG), compressed natural gas (CNG), or propane.

**The 2010 performance measure for the CHE Sector is to:**

- By 2010: Reach the port-wide equivalent PM reduction of Tier 2 or Tier 3 engines<sup>6</sup> operating with 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.

### 3.1 2009 Progress, Cargo- Handling Equipment

#### 3.1.1 Port Metro Vancouver

- 32% of all CHE at Port Metro Vancouver's Burrard Inlet and Roberts Bank facilities met or exceeded the 2010 performance measure.
  - 22% of all CHE in these areas exceeded the 2010 performance measure
  - 10% of all CHE in these areas met the performance measure
- 55% of all CHE in these areas used ULSD fuel and/or biodiesel blends.
- CHE meeting or exceeding the 2010 performance measure included those newer and/or retrofitted pieces of equipment running on ULSD or biodiesel with ULSD.
- In addition to the 32% of CHE that met or exceeded the 2010 performance measure, 38% of all CHE in Burrard Inlet and Roberts Bank facilities made progress toward the performance measure, through one or more of retrofitting older equipment, use of ULSD, use of biodiesel with ULSD or newer equipment running on off-road diesel.

Many of these reductions both exceeding and making progress toward have been implemented by TSI Terminal System's Inc. who operate both the Vanterm and Deltaport container terminals.

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.

Port Metro Vancouver provided funding to, and in 2009 worked with, Fraser Basin Council to provide idle free signage to terminal operators to be located in areas where on or off-road equipment may typically idle.

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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 12/12/2007.

## 2010 Implementation Plans

Port Metro Vancouver will continue to encourage terminal operators to reduce PM emissions as part of reaching the 2010 CHE performance target, both through the Environmental Review portion of the Project Review Process and through other opportunities. ULSD will become mandatory by law during 2010.

In June of 2010, interested container terminal operators will test a diesel electric hybrid yard truck.

In 2010 Port Metro Vancouver will also update its Port Landside Emission Inventory for 2010, including cargo handling equipment, trucks and rail. The inventory will be expanded to include the Fraser River portion of its jurisdiction, in addition to Burrard Inlet and Roberts Bank.

### 3.1.2 Port of Seattle

- 68% of all CHE at Port of Seattle met the 2010 performance measure.
- 100% of all CHE used ULSD fuel and/or biodiesel blends.

In addition to the 68% meeting it, 32% of all other CHE made progress toward the 2010 performance measure using ULSD and/or biodiesel blends. Retrofit equipment was purchased, with installation planned for 2010. Some equipment was sent to other locations, and some older pieces of equipment were retired.

## 2010 Implementation Plans

In 2010, the Port of Seattle will continue to retrofit and replace CHE through collaborative projects, managed by the PSCAA and Washington State Department of Ecology (Ecology). The PSCAA manages a grant through the EPA Diesel Emissions Reduction Act to retrofit cargo handling equipment at the Ports, with matching funds from the Port of Seattle and state funding. Ecology is managing a companion project to retrofit cargo handling equipment. The Port of Seattle plans to utilize these funding sources and the PSCAA Diesel Solutions program grants to reach the Strategy's 2010 performance measure for CHE. All remaining CHE not currently meeting the Strategy's 2010 performance measure will be re-evaluated for retrofit suitability. 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.

### 3.1.3 Port of Tacoma

- 70% of all CHE at Port of Tacoma met or exceeded the 2010 performance measure.
  - 4% of all CHE exceeded the 2010 performance measure.
  - 66% of all CHE met the performance measure.
- 100% of all CHE used ULSD fuel and/or biodiesel blends.

In addition to the 70% meeting or exceeding it, 30% of all CHE made progress toward the 2010 performance measure by retrofitting equipment with level 3 diesel exhaust emission reduction technology or using 15ppm ULSD fuel. Emission reductions were also achieved through new equipment purchases and retirement of older equipment with higher emissions.

## 2010 Implementation Plans

In 2010, the Port of Tacoma will continue CHE retrofits in collaboration with stakeholders including Port tenants. The PSCAA and Ecology are managing these retrofit projects, with the full engagement of the Port. The Port also plans to utilize EPA's Diesel Emissions Reduction Act (DERA), Washington State Clean Diesel, and PSCAA Diesel Solutions program grants to reach the Strategy's 2010 performance measure for CHE by retrofitting up to 224 CHE engines with California Air Resources Board (CARB) or U.S. Environmental Protection Agency (EPA) verified exhaust emission control devices. 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.

## 3.2 Progress Summary, Cargo-Handling Equipment

In 2009 the Ports and their facility operators made significant progress toward achieving the 2010 performance measure targets. The table below compares the progress of 2008 with the progress of 2009, by port, in terms of the percentage of all CHE units that met or exceeded the 2010 performance measure target, (**Table 2**). There was an overall increase in the percentage of CHE that met or exceeded the target from 28% in 2008 to 57% in 2009. Port of Tacoma achieved a 53% increase in CHE meeting the performance measure compared to 2008, which was the result of new equipment purchases, equipment retirement, and level 3 retrofits. Port of Seattle increases over 2008 are attributable to improved data sources, as well as equipment retirement and retrofits.

**Table 2 Cargo Handling Equipment Sector Progress Summary**

PORT	2008	2009
	Met or Exceeded	Met or Exceeded
Port Metro Vancouver	29%	32%
Port of Seattle	9%	68%
Port of Tacoma	47%	70%
<b>Average</b>	<b>28%</b>	<b>57%</b>

## 4.0 Rail

Switching locomotives move rail cars from the ports to rail yards for long distance transportation, in addition to other activities such as building and breaking apart trains onsite. Emission reduction options for the rail sector include:

- implementing cleaner engines and fuels for the switching locomotives; and
- implementing idle-reduction and other energy efficiency programs.

The 2010 performance measures for the rail sector also 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;
- explore new technologies as they become available; and
- work to increase operational efficiencies, especially as port throughput volume increases.

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.

### **The 2010 performance measure for the Rail Sector is to:**

- By 2010: At the Ports of Tacoma and Seattle, expedite the implementation of the SmartWay Partner commitments<sup>7</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.

## 4.1 2009 Progress, Rail

### 4.1.1 Port Metro Vancouver

Port Metro Vancouver met the 2010 performance measure in 2008.

The BC Locomotive and Rail Air Quality Work Group was formed in 2008, meeting the 2010 performance measure, and continued to meet in 2009 with the February 2009 meeting hosted by Port Metro Vancouver grain terminal operator Viterra, who also provided a demonstration of the low emission multi-genset locomotive they acquired in 2008. Similar low emission locomotives were purchased in 2009 by another Port grain facility operated by Alliance Grain Terminal, and also a Port coal and potash facility operated by Neptune Bulk Terminals. At least two of these locomotives also have automatic idle shut down systems. Members of the Work Group including Port Metro Vancouver and its terminal operators also participated in a locomotive idle reduction study, led by Metro Vancouver and Environment Canada.

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<sup>7</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 12/12/2007.

## 2010 Implementation Plans

The BC Locomotive and Rail Air Quality Work Group will continue to meet in 2010, working toward its objectives of advancing emission reductions in the rail sector. The work group's first meeting will be held in April at which time the results of the 2009 locomotive idle reduction study will be presented. Port Metro Vancouver will be participating in a steering committee for a Burrard Inlet rail yard air quality impacts and health risk assessment study, being led by Metro Vancouver.

### 4.1.2 Port of Seattle

In 2009, the Port of Seattle reached its 2010 performance measure of supporting the local rail companies in adopting US EPA SmartWay standards.

## 2010 Implementation Plans

In 2010, the Port of Seattle and the Puget Sound Clean Air Agency will continue to support the EPA SmartWay commitments made by BNSF Railway and Union Pacific. In the first quarter of 2010, idle-reduction equipment will be installed on two Louis Dreyfus locomotives at Terminal 86 Grain Facility with funding support from the Puget Sound Clean Air Agency. The replacement of the three BNSF switcher locomotives with cleaner, more fuel efficient genset engines is expected to be completed by September 2010, using an EPA DERA funding awarded to the Puget Sound Clean Air Agency. The Port and the Puget Sound Clean Air Agency will continue to pursue grant opportunities with their rail partners to secure additional investments to further reduce emissions.

### 4.1.3 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. All three rail partners are currently using ULSD ahead of regulatory schedule to minimize diesel particulate emission.

Tacoma Rail is continually improving its fuel efficiency through better locomotive technology. Tacoma Rail is part of the **SmartWay Transportation Partnership**, an innovative collaboration with the Environmental Protection Agency to increase energy efficiency while reducing greenhouse gasses and air pollution.

The Port of Tacoma's grain terminal, TEMCO, is currently conducting a trial of a locomotive fuel additive that is designed to lower diesel particulate emissions while improving diesel engine efficiency and saving fuel. Pacific Rail Service has one switching locomotive that was recently retrofitted with a Kim Hotstart to keep the engine warm while the locomotive is shutdown and help to reduce emissions associated with engine start up.

#### Idle Reduction at Port of Tacoma

In 2009 Tacoma Rail installed idle reduction equipment on 6 switching locomotives that operate in the port area. Since the installation program began in 2008, 10 out of 18 switching locomotives have been equipped with idle reduction equipment. The project was made possible by partnering with the Olympic Region Clean Air Agency, the Puget Sound Clean Air Agency and the Washington State Department of Ecology.

## 2010 Implementation Plans

The rail sector has been identified by the Port and Port Partners as an opportunity for future particulate emission reduction projects such as additional idle reduction equipment installation, engine repower or diesel exhaust emission control equipment retrofits.

In 2010, 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 partnership with the Washington State Department of Ecology and EPA, TEMCO and Pacific Rail Service have expressed interest in installing automatic idle reduction systems. Tacoma Rail will explore options in 2010 for repowering a number of locomotives with new ultra low emission engines. Port staff will explore new and emerging locomotive emission reduction technology and work with other Port and Strategy Partners to provide retrofitting opportunities for viable technology. The Port of Tacoma, Washington State Department of Ecology and the Clean Air Agency will continue to seek state and federal grant funds to further reduce locomotive emissions.

## 4.2 Progress Summary, Rail

By the end of 2009, all three ports had reached their 2010 performance measures for the rail sector in and continued to work towards further emission reductions. 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. Port of Seattle and Port of Tacoma partnered with air quality agencies to successfully secure grant funding for locomotive repowers and idle-reduction retrofits. Each port has pursued different avenues for emission reduction in the rail sector, consistent with the options outlined in the Strategy. Table 3 summarizes the programs and initiatives supported by the Ports in 2009 towards achieving emissions reductions related to the rail sector.

**Table 3 Rail Sector Progress Summary**

Programs	Port Metro Vancouver	Port of Seattle	Port of Tacoma
BC Locomotive and Rail Air Quality Work Group	√		
Low-emission locomotive purchases	√		
Idle-reduction Retrofits		√	√
EPA SmartWay		√	√
Fuel-additives trial			√

## 5.0 Trucks

Drayage, or container, trucking is a vital component of goods movement at the Ports. Emissions from drayage<sup>8</sup> trucks include PM from diesel engines. Emission reductions can be achieved through cleaner engines and fuels, (associated with newer truck models, or achieved through engine exhaust emission control retrofits) implementing idle-reduction and decreased congestion programs, and efficiency improvements.

**The 2010 performance measure for the Truck Sector is to:**

- By 2010, reach the equivalent PM emissions level of 1994 or newer heavy-duty truck engine<sup>9</sup> model year through vehicle purchase or by using approved retrofit packages, to be identified.

One of the deliverables listed in the Strategy for 2008 was to define a package of retrofits that would sufficiently reduce emissions to meet the 2010 performance measure. In 2009, the U.S. ports and air agencies determined there were no cost-effective retrofits currently available to meet the performance measure, and as such have pursued emission reductions through or allowance of only trucks with engine years of 1994 or newer. The U.S. ports and air agencies continue to review new technologies for cost effective retrofit solutions. Port Metro Vancouver has pursued emission reductions in this sector through a multi-year program including a defined set of emission reduction measures for trucks, such as engine retrofits, alternative fuels, and engine replacements that, when used with older trucks, will meet the 2010 performance measure.

### 5.1 2009 Progress, Trucks

#### 5.1.1 Port Metro Vancouver

- 100% of drayage trucks met the 2010 performance measure.

Port Metro Vancouver has an established truck licensing program, which requires that drayage truck operators accessing Port terminals must have a valid Container Truck Licensing System (TLS) license or permit in place. Truck operators without a valid TLS license or permit are not granted access to Port property. The TLS license sets out minimum safety and environmental requirements for drayage trucks accessing Port property. In 2009, Port Metro Vancouver implemented the more stringent second phase of environmental requirements through the TLS which included stricter limits on truck age and particulate matter emissions as well as opacity. Environmental requirements were first introduced to the TLS in 2008 and have been set through 2017, by which point 100% of the fleet will be 2007 or newer or have equivalent PM emissions.

As of April 1, 2009, all trucks 1993 and older (already under a TLS license or permit) were required to have an approved age exception (eligible engine replacement or retrofit) to bring their PM emissions up to those of the 1994-2006 model years, or were banned from the TLS. The only age exceptions granted were based on replacement engines of model year 1994 or newer. Also as of April 1, 2009 only trucks 1994 and newer could be added under the TLS.

<sup>8</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 Port of Tacoma, drayage refers to all container trucks with the exception of auto transport trailers.

<sup>9</sup> The Clean Air Strategy performance measure for trucks states that progress should be measured by truck engine model year. However this information is not available in many cases; thus the Ports are reporting progress based on truck model year unless engine model year is available.

In addition to truck age and PM emission requirements, the TLS also contains mandatory annual opacity testing for trucks. As of April 1, 2009 these requirements were expanded to include all trucks 10 years and older (model years 1999 and older in 2009). Additionally, the opacity limit was reduced from the provincial limits of 40% (for 1991 and newer) and 50% (1990 and older) to 20% for all trucks regardless of age, with trucks obtaining 10% or less being given a one year exemption. Mandatory idling limits and the awareness program continue to apply to all trucks.

## 2010 Implementation Plans

Opacity limits will expand to include truck model years 2000 and older as of April 1, 2010. Port Metro Vancouver will also undertake outreach to truck owners/operators, mechanics, and distributors of eligible emission reduction technologies to prepare these stakeholders for the 2011 truck age and PM emission limits, which will apply to all trucks 1998 and older. For the period 2011-2016, a phased reduction of emissions by truck model year will take place in advance of the requirement to be 2007 or newer, or equivalent in 2017.

### 5.1.2 Port of Seattle

Based on the 2008 Drayage Truck Fleet Age Analysis and 2009 implementation of Scrapage and Retrofits for Air in Puget Sound (ScRAPs) program:

- 77.4% of drayage trucks met the 2010 performance measure.

In an effort to reduce emissions from drayage truck operations and improve efficiency, in 2009 the Port of Seattle implemented a number of initiatives, some of which are described below.

In April 2009 the Port of Seattle Commission approved the Customer Support Package that included provisions for lease amendments with the marine terminal operators (MTOs) requiring implementation of the Port's Clean Truck Program (CTP). These lease amendments were completed in 2009.

Port of Seattle partnered with PSCAA to implement the ScRAPs Program, a buy-back, scrap, and replacement program for pre-1994 engine trucks. ScRAPs provides a \$5,000 (or blue-book value, whichever is greater) incentive to scrap pre-1994 trucks that perform drayage at the Port of Seattle. Launched on November 18, 2009, ScRAPs successfully removed 27 pre-1994 drayage trucks by the end of the year.

Port of Seattle engaged in significant education and outreach efforts with stakeholders (truckers, community and environmental groups, rail, marine terminal operators, shipping lines, shippers, labor, regulatory agencies, and elected officials). Outreach included two Trucker Resource Fairs to provide information and support, such as financing, insurance, and business resources, to independent truckers.

#### Community Outreach at Port of Seattle

A comprehensive communication and outreach plan has been established by the Port to ensure successful program implementation. This plan includes an ambassador program where Port staff work directly with the trucking companies to register trucks in the Drayage Truck Registry, direct multi-media communication with the truckers, training and coordination with the MTOs, and community education about the program.

## 2010 Implementation Plans

In 2010, the Port of Seattle and its partners, the PSCAA, Ecology, and Cascade Sierra Solutions, will continue to implement the CTP in order to reach the mandatory implementation date of January 1, 2011. Beginning on that date, only compliant trucks that are registered with the Port's Drayage Truck Registry (DTR) and have been issued a sticker of compliance will be allowed access to the container terminals. The DTR will be a web-based system that will collect the following data: truck license plate, VIN number, truck make and model year, and contact information for the registered owner and/or trucking company. Compliance will be primarily determined through an automatic verification of the VIN number via VIN Check, as well as utilization of the Engine Family Name (EFN) to determine if, in fact, MY 1994 trucks have MY 1994 engines. Contact information will be used to distribute the stickers and provide program updates. The compliance stickers will be printed with three items that can be used for audit purposes: a bar code, truck license plate number, and a unique identification number. In addition, Port staff will evaluate different radio-frequency identification (RFID) technologies, which will automate the gate compliance determination. Depending on the type of RFID system selected, it will either replace or compliment the sticker-based program.

The Port's Office of Social Responsibility is continuing efforts to assist the truckers in finding resources, such as insurance, training, financing, and other needs they may have. Approximately 3 Trucker Resource Fairs are planned for 2010, with the first being scheduled for June 30, 2010.

The Port will also continue to work in coordination with the Puget Sound Clean Air Agency and Cascade Sierra Solutions on the ScRAPS program.

### 5.1.3 Port of Tacoma

- 90% of drayage trucks met the 2010 performance measure.

Port of Tacoma conducted a 2009 Port Drayage Truck Fleet study to provide current drayage truck age profiles. As part of the 2009 study effort, terminal operators and trucking companies were solicited by Port staff for information about truck flow and/or vehicle specific information. The 2009 study updated truck age information and examined the changes between the 2008 and 2009 study. The study showed that the overall number of trucks serving the Port has not changed significantly and those older pre-1994 trucks were being replaced by newer trucks.

In the spring of 2009, the Port of Tacoma developed a Drayage Truck Emission Improvement Program that created a market-based approach to reducing emissions in order to meet the Strategy's 2010 performance measure. This approach promotes a healthy partnership with the trucking community and shipping industry and demonstrated significant progress in 2009.

The Port of Tacoma's market-based approach has three components: 1) promoting clean truck fleets to existing and prospective Port businesses; 2) working with terminal operators to improve terminal and gate efficiency; and 3) assisting the trucking community to improve their truck fleet.

To improve communication with the trucking community and promote the clean truck program, the Port launched a dedicated website to provide the trucking community with information about the program objectives and compliance dates. This website includes terminal information and links to terminal traffic information including live web cameras of terminal inbound gates.

## 2010 Implementation Plans

In 2010, the Port of Tacoma will continue implementing the following Clean Truck Program objectives to:

- Add to and promote the 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 truck age information to track and report progress towards the drayage truck performance measures.
- 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>10</sup> and continue the quarterly meetings to share best practices.
- Enlist Port of Tacoma Terminal operators to support the Clean Truck Program and assist the Port with truck data collection, program development, program communication, and program enforcement, if needed.
- Develop and implement a Clean Truck Sticker Program to identify non-compliant trucks for the purpose of program awareness, education, and enforcement.
- Partner with the City of Tacoma, Department of Ecology, Puget Sound Clean Air Agency and Cascade Sierra Solutions to launch a drayage truck scrap and replacement program for the Port of Tacoma Drayage Truck community. The City of Tacoma and Cascade Sierra Solutions plan to open an office by the fall of 2010 to assist drayage truck owners scrap their old dirty truck and replace their truck with a newer truck meeting the Port of Tacoma Clean Truck Program Standards. It is the Port of Tacoma’s goal to replace pre-1994 trucks with retrofitted trucks meeting the 2015 Clean Truck Program Standards.

## 5.2 Progress Summary, Trucks

In 2009, the Ports made significant efforts to develop and advance programs toward achieving the 2010 performance measure. Port Metro Vancouver implemented the second phase of its multi-year environmental requirements through the Truck Licensing System, requiring engine replacement or approved emission reduction measure for trucks 1993 and older. Port of Tacoma continued to gather truck age data, and launched an emission reduction incentive program. Port of Seattle and its partners implemented a buy-back, scrappage, and replacement program, and focused on outreach and education of the trucking community. Table 4 compares the percentage of trucks accessing the port that met the 2010 performance measure in 2008 and 2009 (Table 4).

**Table 4 Truck Sector Progress Summary**

PORT	2008	2009
	Met Performance Measure	Met Performance Measure
Metro Vancouver	95%	100%
Seattle	75.6%	77.4%
Tacoma	86%	90%
<b>Average</b>	<b>85.5%</b>	<b>89%</b>

<sup>10</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.

## 6.0 Harbor Craft

Harbor vessels include non-ocean-going vessels such as ferries, commercial vessels, tugs, and pleasure craft. The operations of harbor vessels contribute to maritime air quality impacts, and this report considers specifically emissions from diesel fuels. Emission reduction measures for harbor vessels include the use of ULSD or alternative fuels, as well as increasing fuel efficiencies. Since the Ports have little to no jurisdiction over harbor craft, the agencies have assumed responsibility for developing and implementing the Strategy's harbor craft performance measures.

There is currently no performance measure for the harbor craft sector. Performance measures specific to each type of harbor craft are to be developed in an upcoming Strategy update. Regulation of emissions from harbor craft is at a different stage in the U.S. and Canada. Both nations have regulated fuel sulfur content, but emissions standards for engines are not yet in place in Canada. Therefore, the focus of activities varies in the two nations, with outreach in Canada in the near future likely to focus on regulatory development and readiness. Transport Canada expects to amend the relevant regulations by 2012. In the Strategy, the Ports and agencies proposed to 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 has not taken place yet and will now become part of 2010/11 emissions inventory efforts.

### 6.1 2009 Progress, Harbor Craft

#### 6.1.1 Georgia Basin

Strategy supporters Environment Canada and Transport Canada are working with their partners to reduce criteria air contaminant and GHG emissions in the Georgia Basin region by reducing emissions from harbor craft.

In addition, British Columbia (BC) Ferries is taking steps to reduce its greenhouse gas and air pollutant emissions. Since 2003, BC Ferries has reduced its 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 has successfully trialed and is now implementing B5 blend biodiesel use in most of its fleet, while the remaining petroleum diesel continues to be low sulfur. Shore power is available at all terminals where ferries berth overnight, allowing vessels to shut engines down and hook up to hydro power. BC Ferries is also a PowerSmart partner with BC Hydro and has begun an energy conservation program at terminals and onboard vessels. BC Ferries is also investigating the feasibility of using a cable ferry on one of its shortest routes, which would reduce the number of engines required to operate a vessel on the route. Beyond its vessels, BC Ferries has replaced gasoline-powered baggage vans and service vehicles with propane- or electric-powered units, has undertaken an anti-idling campaign for vehicles at terminals and onboard vessels, and has extensive environmentally-friendly procurement, cleaning, recycling and composting programs.

The Washington Marine Group (WMG) operates a wide variety of vessels in and around Port Metro Vancouver. WMG's tug division, Seaspan International Ltd. is comprised of a combination of conventional tugs used for local, coastal, and ocean-going tows, as well as specialized ship assist tugs used for ship-docking and tanker escorts within Vancouver Harbor and the Georgia Basin. WMG also operates a fleet of five intermodal ferries servicing rail customers, and the truck and trailer industry. WMG has maintained a corporate greenhouse gas (GHG) emissions inventory for all of their marine fleet and

land-based shipyard operations since their baseline year of 2006, including implementing intensity-based GHG emission metrics to track progress within the Seaspan tug fleet. To date, emissions reduction initiatives for the Seaspan tug fleet include targeting onboard control of speed and voyage planning, operator education, an engine replacement program, and overall journey and dispatch management for optimal fleet efficiency. WMG policies also exist to limit exhaust and unnecessary fuel consumption and emissions while at the dock during crew change-outs and loading. This includes using shore power for the tug and ferry fleet where possible.

## **2010 Implementation Plans**

BC Ferries will continue its efforts to reduce air emissions and explore new emissions reduction technologies. Transport Canada will begin the amendment of regulations under the *Canada Shipping Act* to limit emissions from domestic marine engines of air pollutants such as nitrogen oxides and particulate matter. Harmonization with U.S. requirements will be a key consideration.

As part of WMG's externally verified ISO 14001 Environmental Management System (EMS), Environmental Action Plans are developed to track performance of annual objectives and targets. WMG's focus for 2010 includes a commitment to ongoing pollution prevention initiatives (including air emissions), and improved awareness and communication on environmental issues directed towards all WMG employees.

### **6.1.2 Puget Sound**

The PSCAA is working with its partners to reduce criteria air contaminant and GHG emissions in the Puget Sound region by reducing emissions from harbor craft.

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 2009, PSCAA and its partner, Caterpillar Corporation completed a U.S. EPA Diesel Emission Reduction Act (DERA) grant project to upgrade the engines on a Seattle-based fishing vessel, Fierce Allegiance, as part of EPA's Emerging Technology Program. Once certified by the U.S. EPA, the engine upgrade kit will become mandatory for this engine model under the EPA's Inland Marine and Locomotive Rule. This kit has reduced PM emissions by approximately 25% from the Fierce Allegiance and significantly improved fuel economy.

Washington State Ferries (WSF) was awarded a \$2.1 million dollar US Department of Transportation Congestion Mitigation and Air Quality (CMAQ) grant. This grant was awarded in partnership with the Clean Air Agency, which provided \$40,000 toward the required local match for the federal grant. The project will retrofit existing diesel engines by replacing existing engine power assemblies (engine cylinder, piston and piston ring assembly) with new power assemblies that burn less lubrication oil and as a result emit significantly less particulate matter (PM).

The Clean Air Agency submitted additional DERA grant applications to EPA to install a sea-water scrubber on a harbor cruise vessel and to repower a Foss Maritime Tug Boat. The outcome of these applications will be announced in 2010.

## 2010 Implementation Plans

In 2010, WSF will implement the \$2.1 million CMAQ grant by retrofitting ten engines or two complete vessels and one half of the work on a third vessel. WSF expects to retrofit the Spokane and Kaleetan, and work on two or three of the Puyallup engines in the 2010 to 2012 timeframe. The Spokane and Puyallup operate primarily between Edmonds and Kingston. The Kaleetan operates between Seattle and Bremerton. The ferry system is the second largest high capacity transit system in the state serving a region of over 3.6 million people and carrying over 23 million people annually.

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 Plan also calls for one new replacement ferry by 2010 and three more replacement ferries by 2015.

IN 2010 The PSCAA will implement projects funded in 2009, and continue to pursue additional state and federal funding opportunities that will reduce harbor craft emissions.

## 6.2 Progress Summary, Harbor Craft

While there is no quantitative performance measure or target for this sector, efforts to reduce harbor craft related emissions are moving forward. Transport Canada will amend regulations under the *Canada Shipping Act* to limit emissions from domestic marine engines. Transport Canada and PSCAA have explored opportunities for retrofits and the use of cleaner fuels for harbor vessels. Participation by this sector in Transport Canada's ecoFREIGHT funding programs was lower than expected. The agencies and Ports continue to encourage and support implementation of pilot projects and work to secure funding for them. In addition, they recognize the independent efforts by Washington State and British Columbia Ferries to reduce emissions, and encourage the continuation of these actions.

## 7.0 Port Administration

Emissions from port administration are associated with vehicle use, and electricity and gas consumption for daily port operations. These emissions can be reduced through the use of cleaner technology or alternative fueled vehicles, employee programs to facilitate sustainable commuting options, adoption of green building practices such as LEED®, and implementation of energy efficiency improvements. Performance measures have not yet been established for the port administration sector, and as such the Ports have taken a variety of approaches to reduce emissions at each port. This section includes a summary of the initiatives the Ports have implemented to reduce administration related emissions in 2009, as well as a summary of ongoing programs designed to reduce each port's overall environmental footprint.

### 7.1 2009 Progress, Port Administration

#### 7.1.1 Port Metro Vancouver

As part of the goal to reduce administrative emissions and reduce environmental impacts, Port Metro Vancouver accomplished the following in 2009:

- Corporate Emission Inventory and Greenhouse Gas Neutral Plan, which documented emissions of criteria air contaminants and greenhouse gases from administration of the Port and identified opportunities to reduce energy consumption and associated emissions.
- Corporate Balanced Scorecard, which identifies corporate social responsibility targets, for which progress will be reported on annually, including:
  - Corporate Environmental Footprint:
    - Waste generation
    - Energy consumption
    - Employee commuting
- Live Smart BC lunch and learn for staff to raise awareness about home energy and emissions efficiency opportunities

Actions and achievements associated with Port Metro Vancouver's ongoing efforts to reduce air emissions associated with administrative activities include the following:

- Purchasing Green Power Certificates through BC Hydro's Power Smart Program, to cover 50% of the power needs of the Port Metro Vancouver head office at 999 Canada Place. These certificates represent the additional cost associated with obtaining power from more environmentally friendly sources, recognizing that the majority of power in B.C. is hydro electric based.
- Achieving Leadership in Energy and Environmental Design for Commercial Interiors (LEED-CI) Gold certification for Port Metro Vancouver head office at 999 Canada Place.
- Using U.S. EPA Smartway and Smartway-Elite ranked hybrid pool vehicles
- Leasing hydrogen internal combustion engine truck as participant in the Integrated Waste Hydrogen Utilization Project
- Providing employees with secure bike lockers, change rooms and shower for those interested in biking, walking or jogging to work

- Providing discounted transit passes to employees through participation in Translink Employer Pass Program
- Providing education programs to employees including commuter challenges, idle reduction lunch and learns and opportunities to test drive and learn about alternative vehicles

## 2010 Implementation Plans

In 2010, additional programs will be developed in support of each of the factors listed in the Corporate Balanced Scorecard summary above, including:

- Guaranteed ride home program
- Office composting program
- Changes to lighting and HVAC system to reduce electrical consumption
- Participation in Commuter Challenge and Bike-to-Work Week events
- Adding gear drying area for staff commuting by cycling, walking, and jogging
- Going carbon neutral for 2010 Olympic period of January 4 – March 24

### 7.1.2 Port of Seattle

As part of the goal to reduce administrative emissions and reduce environmental impacts, the Port of Seattle accomplished the following in 2009:

- Joined the “Evergreen Fleets” organization, promoting cleaner air, minimizing greenhouse gas emissions, and reducing fuel consumption through smart and efficient fleet management practices.
- Conducted a GHG inventory of Port operated facilities (including offices and maintenance shops) to guide GHG reduction efforts as well as for submission to The Climate Registry.
- Received an award of excellence from the American Association of Port Authorities for the 2009 Environmental Report to the Community.
- Implemented tire re-tread program for all Seaport/Real Estate/Corporate vehicles

Actions and achievements associated with the Port of Seattle’s ongoing efforts to reduce air emissions associated with administrative activities include the following:

- Reduced energy use at Pier 69 Port of Seattle corporate offices and Terminal 91 Smith Cove Cruise Facility as a result of efforts taken through the Energy Conservation Program (initiated in 2000).
- Continued implementation of solid and hazardous waste recycling programs with more than 30 items were recycled.
- Use of biodiesel/ULSD blend; B20 in all diesel equipment in Real Estate and Seaport
- Eliminated the purchase of aerosol products, chlorinated solvents, and isocyanate containing products used in marine maintenance.
- On-going effort to reduce the fleet and replace older equipment with cleaner alternatives:
  - Marine Maintenance eliminated 4 pieces of older diesel equipment
  - Engineering eliminated 5 gas powered trucks
  - Use of plug-in hybrid cars.

## 2010 Implementation Plans

In 2010, 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.

### 7.1.3 Port of Tacoma

As part of the goal to reduce administrative emissions and reduce environmental impacts, the Port of Tacoma accomplished the following in 2009:

- Joined the “Evergreen Fleets” organization promoting cleaner air, minimizing greenhouse gas emissions, and reducing fuel consumption through smart and efficient fleet management practices.
- As part of the 2008–2009 Port Deconstruction Program, the Port offered a financial incentive to its demolition contractor for various levels of diversion of demolition materials from the landfill. For 58 structures deconstructed as part of this program, 87% of demolition waste, or 7071 tons of material was diverted from landfills through recycling and reuse.

Actions and achievements associated with the Port of Tacoma’s ongoing efforts to reduce air emissions associated with administrative activities include the following:

- Continued participation 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. Tacoma Power supplies 89% of its power from renewable hydroelectric. 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.

## 2010 Implementation Plans

In 2010, the Port of Tacoma will continue to take action to reduce air emissions resulting from Port administration activities.

## 7.2 Progress Summary, Port Administration

The Ports have taken a variety of approaches to reducing emissions from several aspects of port administration, and have also implemented initiatives to reduce their broader environmental impacts. A summary of the Ports’ new and ongoing achievements in this area is provided below (**Table 5**).

**Table 5 Port Administration Sector Progress Summary**

Environmental Programs	Port Metro Vancouver	Port of Seattle	Port of Tacoma
Green Building	√		
Corporate Emissions Inventory	√	√	
Energy Conservation	√	√	
Air Quality Improvement	√	√	√
Solid Waste reduction	√	√	√
Vehicle Fuel Efficiency/Clean Fuels	√	√	√

## 8.0 2009 Progress Overview

Collectively, the efforts of the Ports, agencies, and stakeholders have resulted in significant strides toward meeting or exceeding the 2010 performance measure in each sector. A summary of the overall 2009 performance is provided in the table below.

**Table 6 Summary of 2009 Performance**

Sector	2009 Performance
Ocean Going Vessels	<ul style="list-style-type: none"> <li>• 308 calls made by frequently calling vessels achieved emission levels that met or exceeded the OGV 2010 performance measure</li> </ul>
Cargo Handling Equipment	<ul style="list-style-type: none"> <li>• An average of 57% of port cargo handling equipment achieved emission levels that met or exceeded the CHE 2010 performance measure</li> </ul>
Rail	<ul style="list-style-type: none"> <li>• Purchase of 2 low-emission locomotives</li> <li>• 8 idle-reduction systems on switching locomotives</li> <li>• Fuel Additives Trial</li> <li>• Participation in EPA SmartWay program</li> <li>• Participation in Locomotive and Rail Air Quality Working Groups</li> </ul>
Trucks	<ul style="list-style-type: none"> <li>• An average of 89% of drayage trucks accessing the Ports achieved emission levels that met the 2010 performance measure</li> </ul>
Harbor Craft	<ul style="list-style-type: none"> <li>• Implementation of fuel efficiency programs by ferries</li> <li>• Use of clean fuels by ferries and tugs</li> <li>• Use of shore power for ferries</li> <li>• Engine retrofits and replacements</li> </ul>
Port Administration	<ul style="list-style-type: none"> <li>• Corporate emission inventory</li> <li>• Equipment fleet efficiency programs</li> <li>• Green procurement policies</li> <li>• Energy efficiency programs</li> <li>• Waste management programs</li> </ul>

## 9.0 2010 and Beyond

### 9.1 Summary of Implementation Plans

In the coming year the Ports, working with industry, agencies and other stakeholders, will continue their efforts to reduce maritime-related air emissions, as summarized in the table below.

**Table 7 Summary of 2010 Implementation Plans**

Sector	2010 Implementation Plans
Ocean Going Vessels	<ul style="list-style-type: none"> <li>• Evaluate existing programs and increase the participation in the programs through increased incentive and expanded jurisdiction</li> <li>• Evaluate and implement shore power; and pursue operational efficiencies for energy conservation.</li> </ul>
Cargo Handling Equipment	<ul style="list-style-type: none"> <li>• Encourage terminal operators to identify and implement opportunities to achieve reductions</li> <li>• U.S. Ports:               <ul style="list-style-type: none"> <li>▫ Expand equipment exhaust retrofit, equipment replacement, and engine repower programs.</li> </ul> </li> </ul>
Rail Sector	<ul style="list-style-type: none"> <li>• U.S. Ports:               <ul style="list-style-type: none"> <li>▫ Pilot test new emission reduction technologies</li> <li>▫ Advance plans to implement idle-reduction technology in switching locomotives</li> <li>▫ Develop port-wide idle reduction policies</li> </ul> </li> <li>• Port Metro Vancouver               <ul style="list-style-type: none"> <li>▫ Participate in further studies related to emission reduction and air quality impacts in this sector.</li> </ul> </li> </ul>
Trucks	<ul style="list-style-type: none"> <li>• Implementing new and existing, programs to result in greater applicability of emission reduction regulations and voluntary programs.</li> </ul>
Harbor Craft	<ul style="list-style-type: none"> <li>• Implement engine retrofits and replacements on harbor craft</li> <li>• Review and make improvements to existing programs</li> <li>• Explore new emission reduction technologies</li> <li>• Support development of new regulations</li> <li>• Pursue additional funding opportunities</li> </ul>
Port Administration	<ul style="list-style-type: none"> <li>• Develop new emission reduction programs</li> <li>• Replace fleet vehicles with hybrid or alternative fuel vehicles</li> <li>• Implement waste management and resource (water and electricity) conservation programs</li> </ul>

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. In 2010, the Ports will refine their data collection and reporting methods. 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.

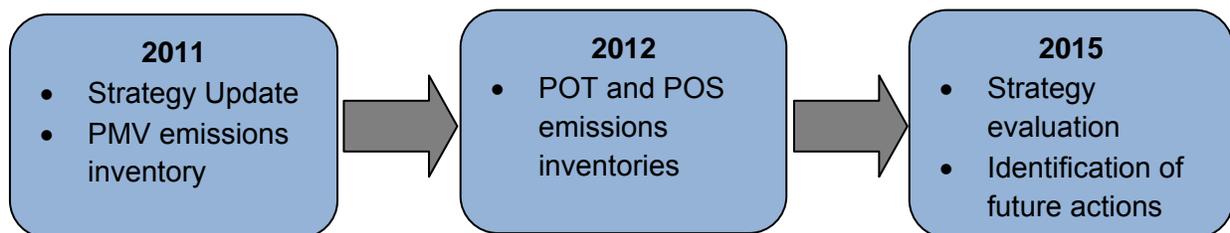
## 9.2 Strategy Update and Related Activities

The Ports have now completed the second year of Strategy implementation and have made significant on-the-ground progress in reducing emissions in ways that reflect the unique operations and conditions associated with each of the Ports.

In addition to continuing to develop and implement initiatives to reduce emissions associated with each of the sectors considered in the strategy, the Ports have identified additional collective actions that will be undertaken in order to support progress towards meeting the 2015 performance measures and looking for opportunities to continue to reduce air emissions beyond 2015 as follows.

- **Annual Strategy Implementation Reporting** – Over the next five years, the Ports and agencies will continue to report annually on implementation of the strategy.
- **Emissions Inventories** – Each of the Ports will conduct emissions inventories, which will allow for more accurate measurement and reporting of emission reduction measures and guide development and implementation of future initiatives. Port Metro Vancouver plans to complete its 2010 emissions inventory in 2011 with the Port of Tacoma and the Port of Seattle completing their 2011 emissions inventories in 2012.
- **Strategy Update** – The current Strategy (developed in 2007) will be updated in order to reflect the availability and feasibility of new and emerging technologies and set quantitative performance measures for the rail, harbor craft, and port administration sectors. This update will be undertaken by the Ports and Port Partners in 2012.
- **Strategy Evaluation** – In 2015, the year of the last performance measure targets in the current Strategy, the Ports will conduct an evaluation of the implementation of the current strategy and identify successes and challenges associated with the Strategy. The results of the evaluation will be used to determine what steps should be taken by the Ports, after 2015, in order to continue to reduce port-related air emissions.

**Figure 1 Key Milestones in Strategy Implementation 2011-2015**



## 10.0 Conclusions

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 progress made, this report also highlights areas where further action is needed in order to meet the 2010 performance measures.

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 and their stakeholders in devising implementation activities to reach both the 2010 and 2015 measures.

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.

## Appendix A: Data Methodology and Calculations

### Ocean-Going Vessels

#### Port Metro Vancouver

Port Metro Vancouver's progress toward the 2010 OGV performance measure is based on information available for the Burrard Inlet and Roberts Bank only, and does not include the Fraser River. Progress was estimated based on results of the Differentiated Harbor Dues Program. Approved applications for emission reduction measures equivalent to or better than the 2010 performance measure for frequent calling vessels formed the basis of the % meeting or exceeding estimate. All other approved applications formed the basis of discussion around progress made towards the performance measure. Because the Port charges harbour dues on the first five calls per calendar year only, there is no information available about what frequent calling vessels may do to reduce emissions after the first five calls. Where a frequent calling vessel had 5 applications approved equivalent to the 2010 performance measure, all calls for the calendar year by that vessel were assumed to continue to meet the performance measure. Where a frequent calling vessel had less than 5 applications approved equivalent to the 2010 performance measure, only those calls approved were assumed to meet the performance measure. Calls with emission reductions equivalent to or better than the performance measure made by non-frequent callers were included in the progress towards, not met or exceeded estimates, since the performance measure applies to frequent callers only. Likewise, calls with emission reductions to a lesser degree than the performance measure, by frequent or non-frequent callers were also included in the progress towards estimate.

#### Port of Seattle

(2009)The Port of Seattle used At-Berth Clean Fuels reporting forms from participating carriers and a database of all Port vessel calls at each of our terminals. In addition, we audited two vessels from each participating carrier to validate the reporting forms. This was done primarily through reviewing bunker fuel receipts and oil logs.

#### Port of Tacoma

The Port of Tacoma relied primarily on written verification from shipping lines as a record. In 2009, the Port requested bunker delivery notes directly from one international shipping lines call that was randomly selected and without prior notice. The Port also conducted three vessel boardings to review each vessel's operation and fuel usage. Fuel records were requested from one of the three vessels boarded for the 2009 implementation verification.

### Cargo Handling Equipment

#### Port Metro Vancouver

Port Metro Vancouver's progress toward the 2010 CHE performance measure is based on forecasting cargo handling equipment to 2009, from the 2005 baseline, consistent with methodologies outlined in the Port Metro Vancouver Landside Air Emissions Inventory Phase I: Burrard Inlet and Roberts Bank. Fraser River data was not available and so is not included. The forecast includes planned changes by tenants and an estimated equipment changeover rate (e.g. if 10% of the fleet in 2005 was 5 years old, it assumes 10% of the fleet in 2009 is 5 years old). The inventory assumed U.S. engine tier timelines as much of the

equipment is from U.S. manufacturers. PM2.5 emission reductions of  $\geq 63\%$  from Tier 1 equipment only were included as equivalent to or exceeding Tier 2 or Tier 3. All other emission reductions formed part of the estimate for progress toward the 2010 performance measure.

### **Port of Seattle**

The Port of Seattle reviewed 2009 data from terminal operators managing cargo handling retrofit projects at the Port, as well as comprehensive CHE lists prepared by the Washington State Department of Ecology and the Puget Sound Clean Air Agency. Data included vehicle model year, recognition of on-road engines and control device installation. Information from retrofit projects was checked against the terminal-provided information. Information was compared against published U.S. EPA standards for model year and engine power.

### **Port of Tacoma**

The Port of Tacoma reviewed 2009 data collected from terminal operators and agencies managing cargo handling retrofit projects at the Port. Data included vehicle model year, recognition of on-road engines and control device installation. Information from retrofit projects was 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 was gathered by Port Metro Vancouver.

### **Port of Seattle**

Data was obtained from the Puget Sound Clean Air Agency and Louis Dreyfus.

### **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. Data and general information was gathered from a review of Tacoma Rail's annual grant report submitted to the Washington State Department of Ecology.

## **Trucks**

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 container 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 semiannual truck fleet surveys – 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 Port Metro Vancouver Container Truck Licensing System.

### **Port of Seattle**

Through Cascade Sierra Solutions, the Port has been tracking the number of pre-1994 trucks that have been purchased and scrapped as part of the Clean Truck Program. Data collected in 2008 from the Port's radio frequency identification (RFID) pilot with SSA at Terminal 18 provided necessary information about drayage truck model years.

### **Port of Tacoma**

Data was collected from two sources: terminal operators and drayage 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. Two terminal operators had OCR systems recording truck license plate information. Other terminal operators were able to supply discrete license plate data collected from manual truck-gate screening process.

Drayage companies identified by terminal operators were contacted to provide supplemental information for this report. All drayage trucking companies contacted were able to provide license plate information.

Washington Department of Licensing provided truck model year in exchange for license plate information. More than 18,000 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 Washington Marine Group, British Columbia Ferries, Transport Canada and Environment Canada.

### **Puget Sound**

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

## **Port Administration**

### **Port Metro Vancouver**

Information was gathered by Port Metro Vancouver.

### **Port of Seattle**

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

### **Port of Tacoma**

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