NORTHWEST PORTS CLEAN AIR STRATEGY

2020 PROGRESS REPORT

PORT of **Vancouver**

Port of Seattle

Port of **Tacoma**

THE NORTHWEST SEAPORT ALLIANCE

Table E-1. Status of 2017 and 2020 Performance Targets for 2020

Sector		2020 Performance Targets*	Results	Status
Ocean-Going Vessels	OGV 1:	Ports track number of vessel calls with Tier 3 marine engines, shore power use, cleaner fuel, or other emission-reducing technologies	4 of 4 Ports track these vessels, and 3% of vessel calls met this standard at the 4 ports	**Complete**
	OGV 2:	A: Ports participate in third-party certification programs B: 40% vessel calls participate in Port-designed or third-party certification programs that promote continuous efficiency improvements	A: 3 of 4 Ports participated in Green Marine B: 56%	**Complete**
Cargo-Handling Equipment	CHE 1:	80% of CHE meets Tier 4 interim (T4i) emission standards or equivalent	55% / 80%	**55% of 80%**
	CHE 2:	A: Ports have fuel-efficiency plans for CHE B: 100% of terminals have fuel-efficiency plans for CHE	A: 2 of 3 Ports with CHE have plans B: 17% / 100%	**17% of 100%**
Trucks	Truck 1:	100% of trucks meet or surpass EPA emission standards for model year 2007, by 2017	86% / 100%	**86% of 100%**
	Truck 2:	A: Ports and terminals have fuel-efficiency plans for trucks B: 50% truck companies have fuel-efficiency plans	Both ports with trucks have implemented programs to improve gate efficiency and reduce emissions from trucks.	**Programs in place**
Locomotives and Rail Transport	Rail 1:	100% of switcher locomotive owners/operators achieve performance measures of chosen fuel-efficiency program	1 owner/operator was known to achieve performance measures of chosen program	**Insufficient Data**
	Rail 2:	20% of unregulated switcher locomotive engines are upgraded or replaced to Tier 2 or better	6% unregulated engines were known to be upgraded or replaced since December 31, 2013 at 3 of the ports	**Insufficient Data**
Harbor Vessels	Harbor 1:	A: Partners conduct outreach B: 90% of harbor vessel companies report best practices and engine upgrades	A: All ports conducted outreach events B: 35% of companies reported; 41% performed engine upgrades and best practices	**Ongoing**
	Harbor 2:	A: Ports participate in third-party certification programs B: 40% vessels participate in Port-designed or third-party certification programs	A: 3 of 4 Ports participated in Green Marine B: 48% of harbor vessels participated in third-party certification programs	**Complete**
Port Administration	Admin 1:	Ports increase use of cleaner vehicles and equipment	A: 2 Ports increased the number of hybrid or eletric vehicles in their fleets. B: 26% on-road vehicles and 66% non-road vehicles use non-conventional fuels C: 12% of fuel used in fleets was non- conventional D: 2 of 3 Ports have fuel efficiency plans in place	**Complete**
	Admin 2:	Ports apply clean construction practices for Port-led construction projects including idle-reduction requirements and enact a plan to address Tier 4 engine emission requirements	3 of 3 Ports have clean construction practices for Port-led projects, but 0 of 3 Ports require Tier 4 non-road engines	**Ongoing**
	Admin 3:	Each Port completes 3 energy conservation projects	3 of 3 Ports have completed at least 3 projects since 2013	**Complete**
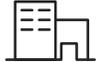
Partners are striving to meet targets by December 31st of the target year. Note that 2017 is the target year for Trucks.
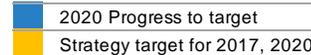
- ■ 2020 Progress to target
- ■ Strategy target for 2017, 2020

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1. Introduction

The Northwest Ports Clean Air Strategy (NWPCAS) is a voluntary collaboration among four port authorities, the Northwest Seaport Alliance (NWSA), Port of Seattle (POS), Vancouver Fraser Port Authority (VFPA), Port of Tacoma (POT), and implemented in partnership with industry and government partners in the United States and Canada. This collaboration started with the first strategy in 2008, followed by an update in 2013. **This Progress Report is the final annual report following the [2013 NWPCAS update](#)**.

During 2020, the ports were focused on the completion of the [2020 NWPCAS](#), which outlines a new vision to phase out emissions from seaport-related activities by 2050. Developing the new strategy involved extensive engagement to obtain input from government partners, industry representatives, non-profit organizations, and community members. Now each port is completing a port-specific implementation plan and have committed to continue annually reporting progress on this implementation. Starting in 2022, the ports will report progress on implementing the 2020 NWPCAS. Content and metrics for future progress reports are currently being defined, and are anticipated to include continuation of select metrics in this report, as well as new ones most relevant to the 2020 NWPCAS.

2020 was an exceptional year due to the COVID-19 pandemic. The most significant changes were to the cruise industry, which shut down entirely for the 2020 season. Most trade activities were able to continue with the introduction of new safety measures for shipping protocols to keep the workforce healthy and safe. In addition, day-to-day port operations changed significantly with the majority of employees working from home and meeting virtually. With significant shifts in port operations, there was also reduced fleet fuel use, lower solid waste volumes, and reduced energy use in port administration buildings. Changes specific to each port include:

- At *Northwest Seaport Alliance terminals*, cargo volumes were down 11% compared to 2019.
- At the *Port of Seattle,* the cruise season was canceled. As a result, there were no calls using shore power, as the shore power-equipped berths are all cruise berths. Additionally, cargo-handling equipment was not in operation for these terminals. The total number of vessel calls dropped significantly from 213 calls and 1.2 million cruise passengers in 2019 to zero in 2020. Grain cargo throughput, however, increased significantly, with cargo throughput increasing by 24%.
- At the *Port of Vancouver*, overall cargo volumes increased 1%, with significant increases in grain and potash. The total number of shore power calls decreased by 93%, due to no cruise vessel calls.
- At the *Port of Tacoma*, cargo volumes were up 48% compared to 2019.

2. Progress on emission reduction goals

The 2013 NWPCAS included the following:

Strategy objectives	Emission reduction goals	Sector performance targets
• Reduce port-related air quality impacts of diesel particulate matter (DPM). • Reduce greenhouse gas (GHG) emissions. • Help meet air quality standards and objectives for the airshed.	• Reduce diesel particulate matter (DPM) emissions 80% per metric ton of cargo by 2020, from 2005. • Reduce greenhouse gas (GHG) emissions 15% per metric ton of cargo by 2020, from 2005.	• Several targets for each sector: ocean-going vessels, harbor vessels, cargo-handling equipment, trucks, rail, port administration.

The ports met the DPM and GHG emission reduction goals for 2020 by the end of 2016. Based on the 2015/16 inventories, a total of 174.8 million metric tons of cargo were moved through the four ports, and port-related activities resulted in the emission of 501 metric tons of DPM and 1.75 million metric tons of GHG emissions.[1]

☑ DPM emissions per metric ton of cargo moved: **80% lower in 2015/16**, compared to 2005.

☑ GHG emissions per metric ton of cargo moved: **17% lower in 2015/16**, compared to 2005.
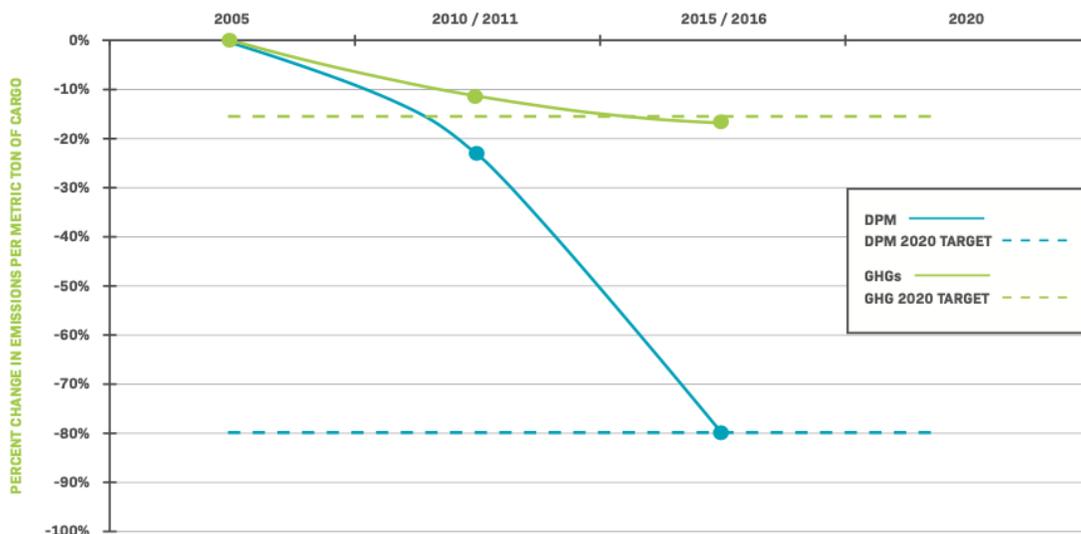
The significant reductions in DPM emissions can be attributed to changes in international, national and provincial regulations, industry action, and port policies and programs to accelerate the turnover of equipment and use cleaner fuels, with the most substantial impact resulting from implementation of sulfur limits on fuel used in the North America Emission Control Area. Overall DPM emissions also dropped by 75%.

The reductions in the intensity of GHG emissions demonstrate an overall increase in efficiency of vehicles, equipment and operations over time. However, growth in cargo movement outpaced the reduction of GHG emissions over this period, and as a result, total GHG emissions went up by almost 5%. The 2020 NWPCAS shifts the focus to total emission reductions, despite projected increases in cargo movement over time.

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[1] 2015 Port of Vancouver Emissions Inventory and 2016 Puget Sound Maritime Air Emission Inventory.

3. Progress on sector performance targets

To track progess on an annual basis, the 2013 NWPCAS identified performance targets for each sector to be completed by 2015, 2017 or 2020. Performance targets are reported as an aggregate of the activities occurring at all participating ports. Port-specific information is summarized by port in Section 4.

By the end of 2020, significant progress was made in some areas, while other areas have not yet met the targets. This section highlights the progress made on the 2017 and 2020 targets using one of the following statuses:

- **Green**: Performance target has been met and is considered complete - <u>five</u> targets are complete.

- **Blue**: Ports are undertaking ongoing efforts to meet the performance target - <u>three</u> targets have ongoing efforts in place.

- **Red**: Performance target is not currently on track, with percent progress provided where applicable. Ports continue to work towards <u>three</u> targets.

- **Grey**: Insufficient data is available to report on <u>two</u> targets.

In addition to assessing the progress made in 2020, ports are currently reviewing each performance target to inform updated reporting metrics in future years. For each performance target, this section outlines the progress made since reporting began in 2014, and reflects on the key successes and challenges faced in meeting the targets. Reflections on the most relevant metrics to carry forward into future reporting are provided with other lessons learned in Section 5.

Ocean-Going Vessels (OGV)

Ocean-going vessels (OGV) include container ships, cruise ships, tanker ships, bulk cargo ships and breakbulk cargo ships. These vessels are regulated through the International Maritime Organization and the flag states where they are registered. Vessels can visit many ports of call on each voyage, and may or may not visit a port of call more than once, which limits individual port influence. The OGV metrics track areas where ports have some level of influence: the use of shorepower provided at select berths (or other emission reduction measures used) and participation in programs demonstrating continuous improvement in environmental performance.

**Table 1. Number of ocean-going vessels and vessel calls at the ports in 2020**

Port	Number of vessels	Number of vessel calls	% change in calls from 2019
Northwest Seaport Alliance	405	1,580	-11%
Seattle	57	67	-75%
Tacoma	74	76	62%
Vancouver	1,745	2,730	-12%

OGV-1: By 2020, ports track number of vessel calls with Tier 3 marine engines, shore power use, cleaner fuel, or other emission-reduction technologies	**Complete**

From 2015 to 2020, vessel calls with Tier 3 engines, using shore power, and/or using cleaner alternative fuel increased from 259 calls in 2015 to a peak of 298 calls in 2019. In 2020, this dropped to 123 calls due to the shutdown of cruise ships that use shore power. Vessel calls meeting this metric represent 3% of calls in 2020.

The number of ships with Tier 3 engines gradually increased each year across the ports.
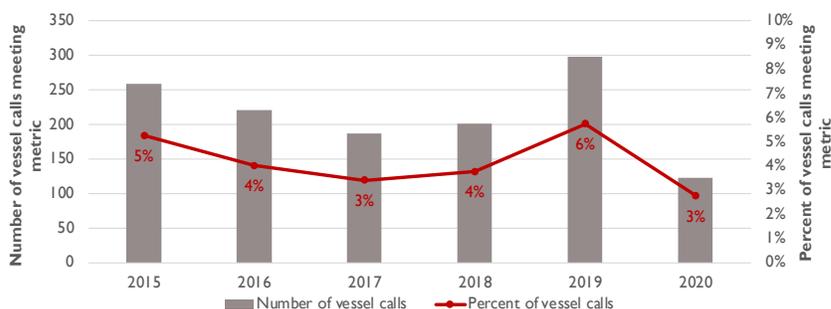
OGV-2: By 2020, ports and 40% of vessel calls participate in port-designed or third-party programs that promote continuous efficiency improvements	**Complete**

From 2015 to 2020, the percentage of vessel calls to the ports that were made by vessels participating in at least one continuous improvement program has increased from 54% in 2015 to 66% in 2019, however, this decreased to 56% in 2020 due to zero cruise visits, which use shore power, and reduced industry participation in the Environmental Ship Index program (likely because ESI introduced modest fees for participants).

Three port authorities also participated in the Green Marine program, which involves annual reporting and demonstrating continuous improvement.
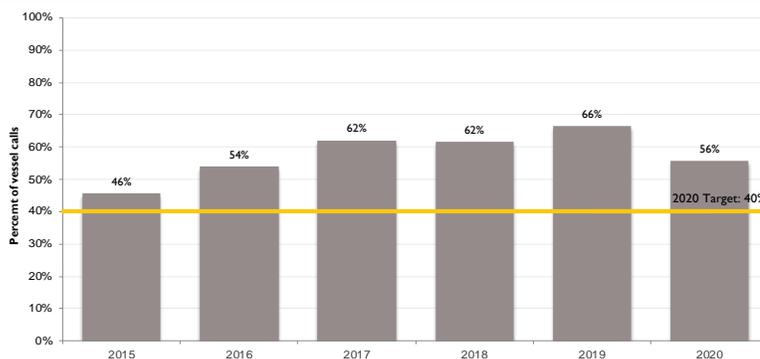
Cargo-Handling Equipment

Cargo-handling equipment (CHE) moves goods at marine terminals between ships, railcars, and trucks. The types of CHE in use vary by terminal operating model and line of business. Examples include: straddle carriers, rubber-tired gantry (RTG) cranes, reach stackers, top and side picks, forklifts, skid loaders, yard tractors/yard trucks, and other types of non-road equipment. Terminal operators, who have lease agreements with the port authorities, own or lease almost all CHE equipment operated at the ports. Due to this commercial relationship, port authorities can influence CHE emissions through programs or lease agreements.

**Table 2. Number of terminals with CHE, and number of units in 2020**

Port	Number of CHE[2]	Number of terminals with CHE
Northwest Seaport Alliance	779	11
Seattle	110	3
Tacoma	0	0
Vancouver	1,488	28

CHE-1: By 2020, 80% of CHE meets Tier 4 interim   55% of 80%

From 2015 to 2020, CHE meeting Tier 4 interim emission standards or equivalent increased from 34% to 55%.

Replacing equipment before the end of its useful life is very expensive, takes many years and/or requires supportive policies to make the switch more cost effective. The ports will continue to work towards this target and report on progress in the 2020 NWPCAS, while also facilitating the transition to zero-emissions equipment by 2050.
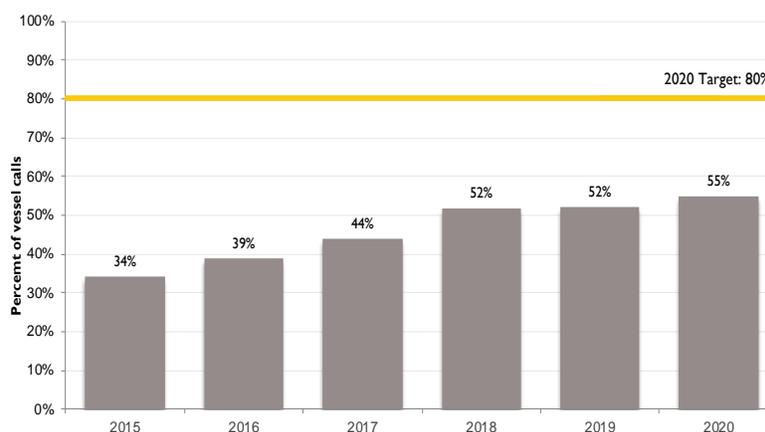
CHE-2: By 2020, ports and 100% of terminals have fuel-efficiency plans   17% of 100%

Port authorities are responsible for the direct operation of very few pieces of cargo-handling equipment. The ports focused their efforts on developing programs and policies that influence emissions from terminal CHE. In 2020, ports had CHE fuel-efficiency or emission reduction initiatives in place, including the Non-Road Diesel Emission Program at the Port of Vancouver, requirements for newer, cleaner equipment in updated lease agreements at the NWSA, and anti-idling policies at the Port of Seattle and Tacoma.

17% of terminals (seven out of 42) had a known fuel-efficiency plan for CHE in place in 2020.

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[2] Number of CHE excludes equipment that is exclusively electric (e.g. conveyor belts and ship-to-shore cranes) but includes electric equipment that could operate on other fuels. Vancouver data includes other non-road equipment.

Trucks

The trucks sector in the NWPCAS includes on-road heavy-duty container trucks that move cargo to and from marine terminals at the Port of Vancouver and Northwest Seaport Alliance terminals (containerized cargo of ports of Seattle and Tacoma are managed by the NWSA). Historically, most container trucks serving the ports have been older, used trucks. Port authorities have more direct relationships with container truck companies than companies operating other heavy-duty trucks on port property, and this is reflected in the container truck program environmental requirements at both ports that require operation of newer, cleaner engines.

Table 3. Number of container terminals, truck companies, trucks in 2020

Port	Number of container terminals	Number of truck companies	Number of trucks
Northwest Seaport Alliance	10	141	3,374
Vancouver	4	100	1,838

Truck-1: By 2017, 100% of trucks meet or surpass 2007 EPA emission standards for model year 2007	**86% of 100%**

In 2020, 86% of trucks met the target across the ports combined. This has increased annually since 2011, when it was 15%.

The two ports with container terminals both have programs restricting the registration of older trucks. At NWSA, 100% of trucks met the target under the NWSA Clean Truck Program, while 71% of trucks at Port of Vancouver met the target. In February 2022, the Port of Vancouver is shifting to a rolling truck age program that will age out trucks older than 10 years.
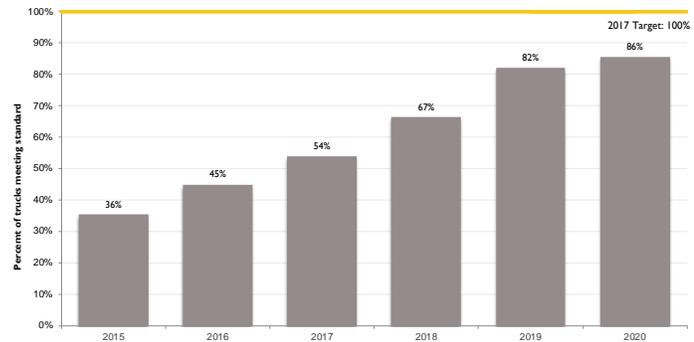
Truck-2: By 2020, ports, terminals and 50% of truck companies have fuel-effiency plans	**Programs in place**

In 2020, ports continued to facilitate gate queue efficiency which improves fuel efficiency. Initiatives included the container truck reservation system at the Port of Vancouver, and the NWSA expanded RFID program and data visibility in truck queues.

In 2020, 23% of trucking companies that service NWSA terminals participated in EPA's SmartWay Program, which has a focus on fuel efficiency.

Locomotives and Rail Transport

The rail sector includes locomotives that move railcars in a rail yard (yard locomotives or "switchers") or that move trains from the ports across North America (line-haul locomotives). National rail lines own line-haul locomotives, which are largely operated off of port property and have little to no relationship with port authorities. Both national rail lines and port tenants operate switchers, and port authorities have a direct relationship through lease agreements with those port tenants. Due to the existing relationships, port authorities have limited data to report on environmental practices of national rail lines, and updated metrics will be developed for 2020 NWPCAS reporting.

Rail-1: By 2020, 100% of owners/operators achieve performance measures of chosen fuel-efficiency program	Insufficient Data

In 2020, one owner/operator at U.S. ports is known to have participated in a fuel-efficiency program with published goals and results, and two owners/operators at the Port of Vancouver had known fuel-efficiency plans in place based on acceptable scores in Green Marine.

Rail-2: By 2020, 20% of unregulated locomotive engines are replaced with Tier 2 or better engines	Insufficient Data

Of the 72 port-related switcher locomotives operating at or near the four ports, 11 are known to be unregulated, 19 are Tier 0 or Tier 1, and six are known to be Tier 2 or better. The remainder are unknown Tiers. Two unregulated locomotive engines have been repowered since 2014, both by Tacoma Rail (one in 2015 and one in 2016). BNSF Railway reported the retirement of nine unregulated locomotive engines in 2020.

Harbor Vessels

The harbor vessel sector in the NWPCAS focuses on harbor and ocean tugs. There are approximately 110 tugs across the ports, and these are owned and operated by private tug companies hired by shipping lines to escort ships or move barges and goods. Some tug companies are tenants of the ports, and in Vancouver, the port authority collects harbor dues from tug companies. However, in the U.S., there is no business relationship between the port authorities and tug companies. Harbor vessel metrics focus on conducting outreach and encouraging participation in programs that promote continuous improvement.

Harbor-1: By 2020, ports or partners conduct outreach and 90% of harbor vessel companies report best practices and engine upgrades	Ongoing

In 2020, the ports and partners continue to host outreach sessions and/or work with harbor vessel companies on replacing marine engines, and 35% (six of 17) companies reported their progress through submissions to Green Marine or through communication with NWPCAS partners. This represents an increase in the number of harbor vessel companies that reported their progress this year, compared to 28% in 2019. 41% (seven of 17) companies undertook best practices or engine upgrades.

Harbor-2: By 2020, ports and 40% of harbor vessels participate in port-designed or third-party certification program that promote continuous improvement	Complete

Three of the four ports (NWSA, Seattle and Vancouver) continue to participate in the Green Marine program. VFPA also provided discounted harbor dues to those tugs operated by companies who are Green Marine certified, or that have shore power. 48% of harbor vessels participated in third-party certification programs.

Port Administration

Port authority administration includes emissions sources that are within the direct operational control of the port authorities, including owned or leased vehicles and vessels, office buildings, support facilities, and employee functions that are needed for the administration of port activities.

Admin-1: By 2020, ports increase use of cleaner vehicles and equipment	Complete

Percentage of vehicles and equipment that use alternative fuels: While this remained the same between 2019 and 2020 at 26% for on-road, it does represent a growth from 18% in 2015. For non-road, it increased from 50% to 66%, compared to 48% in 2015.

Proportion of total fuel used that is non-conventional: This remained the same between 2019 and 2020 at 12%, a decrease from 15% in 2015.

Fuel-efficiency plans: Two of three ports who own vehicles and equipment have plans in place for their fleets.

Admin-2: By 2020, ports continue to apply clean construction practices for port-led construction projects including idle-reduction requirements and enact a plan to address Tier 4 engine emission requirements	Ongoing

All ports have adopted clean construction practices in various forms, including: sustainable procurement guidelines, use of the Envision Sustainable Infrastructure rating system, Sustainable Evaluation Framework Policy Directive, and the West Coast Ports Sustainable Design Checklist.

All the ports have requirements for Tier 2 non-road equipment in contracts (at least for major projects), but none of the ports have a plan to require Tier 4 non-road engines in contracts currently.

Admin-3: By 2020, each port completes 3 energy conservation projects	Complete

Over the last five years, the ports have completed numerous energy conservation projects annually, each one exceeding the target of three. In 2020, the ports collectively completed eight energy studies and nine energy conservation projects for port or tenant facilities.

For more detailed information on NWPCAS performance targets, please refer to the 2019 NWPCAS Implementation Report.

4. Summary of accomplishments by port
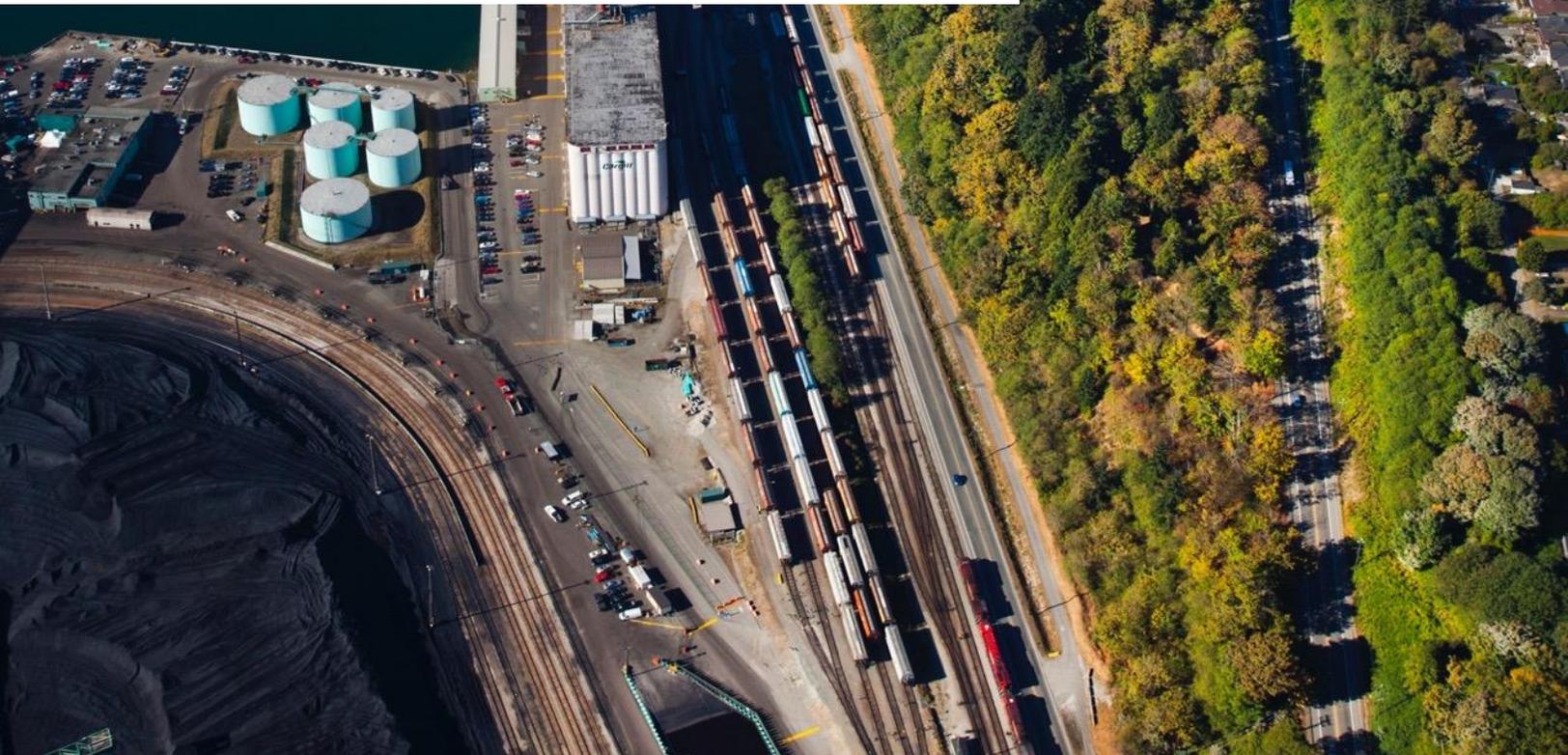
The NWSA is a marine cargo operating partnership of the Ports of Seattle and Tacoma, which formed in 2015 to increase the competitiveness of the cargo operations at these neighboring ports. The NWSA is an independent port development authority that constructs, maintains, and operates marine terminals, and addresses related transportation and air quality issues.

The NWSA in Context

Types of activity	2020 Cargo moved	2020 Cruise passengers	Number of terminals
Containers, Breakbulk, Bulk, Automobiles	26,764,655 tonnes	n/a	11

For more information on air emissions, see the most recent air emissions inventory.

Key Air and Climate Initiatives 2014 – 2020

- Reduced maritime-related diesel particulate matter emissions from local sources by 80% and GHG emissions by 17% from the 2005 baseline as of the 2016 Puget Sound Maritime Emissions Inventory.
- Adopted GHG reduction targets that align with the Paris Climate Agreement in 2017.
- Joined Green Marine environmental certification program.
- Operations Service Center (OSC) focused on improving freight efficiency and mobility establishing a truck appointment system.
- Worked with EPA and WA Department of Ecology to use grant funding to scrap and replace old diesel cargo-handling equipment to Tier 4 diesel.
- Retrofitted straddle carriers with Diesel Particulate Filters using WA Department of Ecology grant funding.
- Worked with Environmental Defense Fund to assess cargo-handling equipment replacement program.
- Implemented Clean Truck Program at all international container terminals:
  - Installed RFID at all in and out gates at all international container terminals
  - Since Jan 1, 2019, all trucks must now have a 2007 engine or newer
  - Established Clean Truck Fund, working with Community Development Financial Institutions to provide affordable market-rate loans to truck owners to purchase a new truck
  - Scrapped over 450 old, pre-2007 diesel trucks and replaced with new, clean diesel versions using grant funding from EPA, WA Department of Ecology, PSCAA, and Department of Transportation.
- Developed Shore Power Program to install shore power at all international container terminals and maximize its use.
- TOTE vessels calling Tacoma plug into shore power approximately 100 times a year.
- Passed state bill allowing ports to invest in clean air projects.

Visit our website to see what we have planned next year.

The Port of Seattle (POS) is an independent special purpose government representing the people of King County, Washington. POS is comprised of three operating divisions, namely Aviation, Maritime and Economic Development. The Port Commission, which includes five individuals elected by King County voters, is the legally constituted governing body. The port's cruise ship industry, commercial fishing industry, recreational marinas and other maritime operations generate $3.9 billion in total business output and support over 25,000 jobs.

Port of Seattle in Context

Types of activity	2020 Cargo moved	2020 Cruise passengers	Number of terminals
Largest cruise port on West Coast, Bulk cargo (mostly grain), Commercial and recreational marinas	4,239,804 tonnes	No cruise sailings in 2020 due to COVID-19 restrictions	3: 2 cruise terminals and 1 grain terminal

For more information on air emissions, see the most recent inventories:

- Puget Sound Maritime Air Emissions Inventory
- Port of Seattle GHG Emissions Inventory

Key Air and Climate Initiatives 2014 – 2020

- Reduced maritime-related diesel particulate matter emissions from local sources by 69% and GHG emissions by 20% from the 2005 baseline as of the 2016 Puget Sound Maritime Emissions Inventory.

- Adopted port-wide GHG reduction targets and accelerated the targets in 2021.

- Completed the Port of Seattle Maritime GHG Emissions Inventory in 2018 to quantify port-owned and port-influenced GHG emissions sources following the GHG Protocol Corporate Standard and began conducting annual GHG emissions inventories.

- Initiated development of the Port's first ever comprehensive maritime climate change and air quality plan: Charting the Course to Zero: Port of Seattle's Maritime Climate and Air Action Plan, which will serve as the Port's implementation plan for the 2020 NWPCAS.

- Formed a partnership with Seattle City Light and the NWSA to develop a Seattle Waterfront Clean Energy Strategy to plan for the infrastructure and power needs to provide zero-emission energy for port, maritime, industrial, and other waterfront uses.

- Reduced at-berth cruise emissions with shore power for cruise ships and observed increasing rates of cruise vessels equipped with shore power calling at the port. In 2019, the two shore power connection points at the Smith Cove Cruise Terminal at Terminal 91 eliminated over 600 hours of onboard diesel engine use, avoiding 2,900 tonnes of CO_2 in just one season.

- Achieved over 90% of CHE meeting Tier 4 interim or equivalent emission standards, including 40% of 110 equipment assets powered by electricity.

- Completed four solar arrays on Port facility rooftops that have generated over 400,000 kWh of renewable power to date, installed EV charging at two port properties, and switched to renewable diesel for all onsite diesel fueling of port-owned vehicles and equipment.

Visit our website to see what we have planned next year in Port of Seattle's implementation plan for the 2020 NWPCAS.

The Port of Vancouver is Canada's largest port, and third largest in North America in terms of annual tonnes of cargo. The port is home to 29 major marine cargo terminals and served by three Class 1 railroads. The port authority's jurisdiction includes 16,000 hectares of water, more than 1,500 hectares of land and hundreds of kilometres of shoreline. It borders 16 municipalities and intersects the asserted and established territories and treaty lands of several Coast Salish First Nations.

Port of Vancouver in Context

Types of activity	2020 Cargo moved	2020 Cruise passengers	Number of terminals
Containers, Bulk, Breakbulk, Automobiles, Cruise	145.5 million tonnes of cargo	No cruise sailings in 2020 due to COVID-19 restrictions	28 terminals

For more information on air emissions, see the most recent Port of Vancouver air emissions inventory.

Key Air and Climate Initiatives 2014 – 2020

- Included additional options under the EcoAction Program for NO$_x$ Tier 3 vessels and added eligible alternative power sources and technologies (e.g., battery, wind and solar assist).

- Participated in the World Ports Climate Action Program, including leading the Sustainable Low Carbon Marine Fuels, and Policy Work Groups.

- Facilitating the use of LNG as a ship fuel by working to safely accommodate LNG bunkering at the Port of Vancouver.

- Participated in the MarHySafe joint development project, which aims to create a knowledge base for safe hydrogen operations in shipping. The consortium of 25 leading companies and associations, led by DNV, has launched the "Handbook for Hydrogen-fuelled Vessels" to address the uncertainties surrounding hydrogen as ship fuel.

- Installed shore power at 2 container terminals.

- Implemented the Non-Road Diesel Emisisons program in 2015.

- Starting in 2015, partnered annually with Climate Smart to offer discounted training and certification program for port tenants, supporting them in tracking and reducing greenhouse gas emissions.

- Led a global survey on improving green vessel incentive programs and environmental infrastructure as part of the International Collaboration on Ship Emission Reductions Initiative.

- Funded demonstration of Effenco Stop-Start anti-idle systems on container terminal yard trucks.

- Conducted the 'Low Carbon Drayage' and 'Port of Vancouver Roadmap to Electrification' studies. The studies paved the road towards the Clean Technology Initiative that includes low carbon fuel and electric vehicle, equipment and vessel pilots, and infrastructure upgrades planning.

Visit our website to see what we have planned next year.

The Port of Tacoma (POT) is a special purpose government established in 1918 representing the people of Pierce County, Washington and makes up half of the NWSA. The Port of Tacoma manages an extensive industrial/commercial real estate portfolio including a grain cargo terminal. In 2017, activities at POT supported more than 42,100 jobs, generated nearly $3 billion in economic activity, and produced more than $100 million annually in state and local taxes.

Port of Tacoma in Context

Types of activity	2020 Cargo moved	2020 Cruise passengers	Number of terminals
Bulk (grain), Real Estate	4,900,000 tonnes	n/a	1

For more information on air emissions, see the most recent air emissions inventory.

Key Air and Climate Initiatives 2014 – 2020

- Reduced maritime-related diesel particulate matter emissions from local sources by 80% and GHG emissions by 19% from the 2005 baseline as of the 2016 Puget Sound Maritime Emissions Inventory.
- Adopted GHG reduction targets that align with the Paris Climate Agreement in 2017.
- Partnered with PSCAA and Tacoma Rail to repower one diesel switcher locomotive using DERA grant funding.
- Expanded recycling program at port facilities to capture all recyclable waste.
- Established a composting program at Port Administration building to eliminate organic waste from administrative activities.
- LED lighting upgrades at tenant facilities.
- Lighting sensors installed at the Port Administration building and Fabulich Center to minimize electricity usage.
- Trained port staff on GHG emissions and tracking and attained Climate Smart certification for the port.
- Developed a vehicle purchasing policy that emphasizes fuel economy and low-emission vehicles.
- Purchased hybrid vehicles for the administrative vehicle fleet.
- The port's Commuter Trip Reduction program encourages telecommuting and use of public transit and vanshares.
- Supported PSCAA's program to repower harbor vessel engines using EPA grant funding.
- The port participates in Tacoma Power's Evergreen Options service plan, which allows the port to buy electricity produced from renewable energy sources, including non-polluting wind or solar generators in the Northwest.

Visit our website to see what we have planned next year.

5. Lessons learned and next steps

Over the last seven years of implementing the 2013 NWPCAS, the port authorities and their partners have undertaken substantial internal and external engagement, developed and implemented programs, competed for and secured grant funding, and more in an effort to reduce air emissions from port activities and achieve the targeted outcomes identified in the strategy. Through these efforts, and the associated successes and challenges, much has been learned that can help shape future successes under the 2020 NWPCAS. Key lessons are summarized here, together with how those lessons are influencing the ports' collective next steps.

Collaboration enables port authorities to accomplish more: Having a shared strategy across ports creates a platform for leadership in clean air and climate action among ports internationally, and ensures that lower costs or competitive advantage are not realized in one port due to environmental action. Working together allows the port authorities to pool ideas and resources to save time and money, reduce duplication of effort, and accomplish more than by acting alone. For example, the four port authorities together can send a stronger market signal to spur development and deployment of clean fuels and technologies for port applications in the Northwest, and form a more impactful, common voice when advocating for policy change at the international level. Within each port authority, integrating environmental action into existing programs and policies can further advance emission reductions.

Focus on results, with flexibility on the approach taken: Where the strategy follows a flexible, results-based approach, the ports can work toward common goals in a way that makes the most sense for each port and their respective stakeholders. This was evident in the 2007 engine truck goal of the 2013 Strategy, where each port implemented their own truck program tailored to the different operational and regulatory landscapes facing their trucking community, working towards the same end goal. Although the previous strategy adopted a flexible approach with respect to specific action planning, it was less flexible in the types of metrics selected to monitor progress. Moving forward, the 2020 NWPCAS will continue to embrace and build on the flexible model. Each port will develop a port-specific plan to implement the 2020 NWPCAS vision and objectives. This will enable the ports to identify, prioritize, and focus resources on actions in a way that is strategic and relevant to their varying businesses, governance structures, policy contexts, and the regions where they operate. In addition, metrics

will be updated, tracked, and used to inform an adaptive management approach – ensuring they remain relevant and drive action in the intended direction. Ports also note that information management will increasingly be a critical component of the decarbonization of shipping and ports.

The ports met the goals set in 2013, but it is urgent to do more: Although maritime transport is a highly efficient means of transporting goods and people compared to other modes, the port network continues to rely heavily on fossil fuels. Even with the implementation of emission reduction strategies, total GHG emissions across all activity sectors at the four ports as of the latest emissions inventories in 2015/2016 increased 5% above the 2005 baseline. While the ports met the emissions-intensity goals set in the 2013 NWPCAS, urgent action is needed to transition ports and the maritime industry to zero emission operations in order to limit global temperature increases to 1.5°C this century and avoid increasingly catastrophic impacts from climate change. Additionally, while DPM emissions across the four ports decreased 75% from the 2005 baseline, near-port communities continue to experience high concentrations of air pollutants, which can lead to adverse health outcomes. Urgently eliminating emissions entirely is the new vision and focus for the 2020 NWPCAS.

Focus on areas of greatest influence: Port authorities play an important role in facilitating commerce and have various tools to work with maritime industries to meet climate and clean air goals, even though ports do not directly own the vessels, locomotives, trucks, and equipment that transport cargo to, through and from terminals. Ports will identify ways to influence emissions through programs, advocacy for competitive emission-reduction policies, seeking funding, and developing partnerships. For example, low-use rates for container terminal shore power at the Port of Vancouver presented an unexpected challenge in the early years of implementation. Lessons learned by the port authority include the need to effectively navigate hidden costs, and placing more emphasis on using incentives to encourage connections.

Policy change is a key driver to reducing emissions: In the past, the ports have successfully advocated for regulatory changes to help achieve NWPCAS emission reduction goals. One such example is the implementation of the North America Emissions Control Area (ECA), which led to significant reductions in DPM and sulfur dioxide emissions after it went into effect in 2015. Moving forward, advocacy for policy change and regulations that complement the 2020 NWPCAS vision and objectives will be critical to the strategy's success.

Ongoing engagement is a critical part of implementation: Ports support and contribute to communities through job creation, transportation of goods, and creation of community amenities; however, port activities and associated transportation networks can also have negative community impacts, which include air quality, noise and light pollution, and traffic/rail safety. As a result, environmental health disparities exist in some near-port communities. Ongoing engagement is important to help port authorities understand the impact of port operations on communities, better plan and manage operations and development projects, and identify and prioritize areas for improvement. Forming stronger relationships with communities and continuing to seek community input is a key strategy to advance environmental justice and social equity in implementation of the 2020 NWPCAS vision.

More funding is needed to transition ports and maritime industries to clean energy: Phasing out emissions over the coming decades will require unprecedented levels of investment across the port network on the order of billions of dollars in this region alone. A proactive and strategic approach to transitioning to zero emissions is needed, including funding for infrastructure development and to improve the cost-competitiveness of zero-emissions technology and fuels. The 2020 NWPCAS increases the focus on identifying, coordinating, and facilitating all parties involved to direct funds in a manner that swiftly transitions maritime industries toward zero emissions, taking interim measures only where zero emission options are not feasible in the shorter term.

Annual reporting and communications can be improved: Port authorities need to continue to annually report key metrics to partners, governments, stakeholders and communities, but the reports need to be concise and focused on the most relevant information that demonstrates whether ports are on track toward emission targets and if not, why they are off course, and how to get back on course (e.g., key policies, investments, funding,

collaborations needed to fill those gaps). Ports will continue to improve transparency and communications with stakeholders and the public.

Next steps

Successful implementation of the 2020 NWPCAS will involve continued and increased collaboration, partnerships, supportive policies and substantial funding across numerous agencies, industry and port communities.

Going forward, the ports will build on these lessons learned and continue to collaborate on the path to meeting the 2020 NWPCAS vision and shared objectives. Key metrics from the past NWPCAS will continue to be reported where relevant, and these will be supplemented with new metrics that improve transparency and clearly communicate progress being made. The port authorities are each developing port-specific implementation plans that will outline in greater detail the actions each port intends to take in support of the NWPCAS vision and goals.

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