

**DRAFT**  
**Port of Tacoma Northwest Ports Clean Air Strategy**  
**Implementation Plan**



Produced by The Port of Tacoma  
July 8, 2021

Executive Summary:

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## 1. Purpose

Improving air quality and reducing impacts on climate change are key priorities for the Port of Tacoma (PoT) and as such, it has been a partner in the Northwest Ports Clean Air Strategy (NWPCAS) since its inception in 2008. The NWPCAS is a voluntary collaboration between the PoT, Port of Seattle (PoS), The Northwest Seaport Alliance (NWSA) and Port of Vancouver (VFPA) to reduce and ultimately eliminate air pollutant and greenhouse gas (GHG) emissions from seaport activities in the Puget Sound-Georgia Basin Airshed. The NWPCAS constitutes a shared strategic framework for clean air and climate actions and investments that creates a “level playing field” across the four participating port entities, and helps them coordinate, collaborate, and hold each other accountable.

The participating ports completed a renewal of the NWPCAS in 2020, continuing their commitment to work jointly to reduce air pollution and climate impacts. The 2020 NWPCAS puts forth an aggressive, aspirational joint vision to phase out emissions from seaport activities by 2050, supported by a suite of high-level joint objectives and actions.

Given that each port exists in a unique policy environment, has different lines of business, and different community interests, there is a need for flexibility in how the ports individually implement the NWPCAS. Therefore, each port has committed to developing an Implementation Plan that details the individual actions they will take to work towards the NWPCAS vision and objectives.

This NWPCAS Implementation Plan demonstrates the PoT’s commitment to working towards the aspirational vision and objectives laid out in the NWPCAS. It was developed by the interdepartmental Clean Air & Climate Action Team, consisting of representatives from all of the business units at the PoT and NWSA with significant implementation responsibilities. It outlines workplans for the PoT’s air quality and climate programs with a focus on actions to be take over the next five years.

### 1.1. Implementation Plan Applications

Broadly, the PoT NWPCAS Implementation Plan is designed to document and communicate our air quality and climate workplan for the next five years. The following summarizes the intended audiences of the plan and how we intend for it to be used.

- ***Staff of the PoT and NWSA*** – The Implementation Plan summarizes our workplan for the next five years. It constitutes a common framework for considering new air quality and climate actions and investments, prioritizing existing actions, and making adjustments over time as information becomes available and circumstances change.
- ***NWPCAS Partner Ports*** – For our partner ports, the Implementation Plan transparently demonstrates our commitment to working towards the joint vision and objectives and feeds into our joint reporting.

- **Industry Partners** – The Implementation Plan serves as both a mechanism to communicate our intentions and as a call for collaboration, daylighting areas of joint interest where we can work together.
- **Funders** – External funding will be vital if we and our industry partners are to be successful in achieving the NWPCAS vision. In addition, external funding can help accelerate our timelines in many areas. The Implementation Plan clearly communicates our near term workplan, identifies key funding gaps, and daylights opportunities for funding support and partnerships.
- **Near Port Communities and the General Public** – The PoT is dedicated to clearly and transparently communicating our plans for reducing impacts on air pollution and climate change and partnering with near-port communities on clean air and climate solutions. The Implementation Plan serves as our method for communicating our near term workplan and identifying partnership opportunities. We will report our progress via annual progress reports as defined later in the Implementation Plan.

## 2. NWPCAS Background

The NWPCAS was created in 2008 by the PoS, PoT, and VFPA to set joint aspirational goals to reduce air pollutant and GHG emissions from seaport related operations associated with the four ports. When it was created in 2015, The NWSA joined the collaboration. The geographic and operational scope are described below.

### 2.1. Operational Scope:

The NWPCAS covers emissions from ocean-going vessels, harbor vessels, heavy duty trucks, locomotives, cargo-handling equipment, and port administration and tenant facilities (fleets and facilities). These sectors are explained in more detail in section 5.

### 2.2. Geographic Scope:

The geographic scope of the NWPCAS is the same of the port emission inventories, shown in Figure 1. For the PoT, this includes all truck, vessel, rail, and cargo handling equipment activities that occur within the green shaded area and are directly part of moving Port of Tacoma cargo. For example, an ocean-going vessel calling a PoT terminal would be counted from when it enters the Strait of Juan de Fuca until it exits the airshed.



Figure 1. Geographic scope of the NWPCAS.

### 2.3. NWPCAS Vision

Recognizing the urgent need to minimize environmental health impacts and disparities and address climate change, the 2020 NWCPAS aligns the participating ports around a common vision to ultimately phase out air pollutant and GHG emissions. This vision is aligned with the latest guidance from the Intergovernmental Panel on Climate Change (IPCC), which indicates that global carbon neutrality by 2050 is necessary to limit global temperature increase to 1.5 degrees C, thereby avoiding the most catastrophic impacts of climate change. The joint vision statement is:

*“Phase out emissions from seaport-related activities by 2050, supporting cleaner air for our local communities and fulfilling our shared responsibility to help limit global temperature rise to 1.5 degrees.”*

This implementation plan defines how the PoT will begin working towards achieving this joint vision in the next five years and reduce emissions in the interim.

## 2.4. NWPCAS Objectives

Supporting the joint vision, the NWPCAS also puts forth a suite of objectives that outline the major action themes along the pathway to achieving zero emissions. These objectives are:

- 1) *“Implement programs that improve efficiency, phase out old high emitting equipment, and increase use of lower emission fuels.”*
  - The intent of this objective is for ports to work towards minimizing emissions from the existing fleet as we wait for zero emission technology to become fully demonstrated, commercially available, and cost competitive.
- 2) “Facilitate collaboration among governments, utilities, fuel providers, and industry to ensure that infrastructure needed to enable zero emission technologies is in place at the right time, addressing key constraints by 2030”
  - The intent of this objective is for ports to work with other stakeholders to understand the scope and cost of infrastructure upgrades needed to implement zero emission technologies, understand the infrastructure needs associated with supporting adoption of zero emission technology over time, work with stakeholders to understand the individual infrastructure needs and timing, identify key infrastructure constraints and make a plan to address them, and collaborate with stakeholders to align funding to pay for infrastructure upgrades. This does not mean that all infrastructure to support zero emission equipment will be installed by 2030, but that we will strive to ensure that infrastructure is not a barrier to adoption by 2030.
- 3) “Facilitate collaboration toward commercialization and drive adoption of zero emission technology before 2050”
  - This objective articulates the pathway for deploying zero emission technologies in day-to-day operations, recognizing that the ports have a role to play in demonstration and commercialization of these technologies as well as the ultimate deployment of them.

In the first five years of NWPCAS implementation, the level of effort by the NWSA and PoT will likely be more heavily weighted towards cleaning up the existing fleets, improving efficiency, and infrastructure planning. However, we recognize that engagement and collaboration towards the longer-term vision for zero emission vision must start now and that there may be opportunities in some areas to clean up the existing fleet by jumping straight to zero emissions, where technology is commercially available and is cost competitive, or where significant funding is available.

## 2.5 NWPCAS Conditions for Success

Recognizing that the most of the NWPCAS scope is out of the ports’ direct operational control, the NWPCAS puts forth a suite of conditions for success that will need to be satisfied in order to reach zero emissions. While the ports play an important role in working towards these conditions, significant action will be needed from others if they are to be satisfied. An abbreviated summary

of the conditions for success is provided below, while a full description of the conditions is provided in the full NWPCAS document<sup>1</sup>.

- a. “Enabling policy is in place domestically and internationally to support investment in zero emissions technology and infrastructure.”
- b. “Funding and/or access to capital [is available] to support adoption of zero emission technology and infrastructure development where [the] business case is insufficient”.
- c. “Adequate electricity and/or fueling infrastructure is available when and where needed.”
- d. “Technology is commercially available and demonstrated for port applications, and total cost of ownership is competitive [with diesel] which may require enabling regulation and funding.”
- e. “Industry commitment [is made] to transition to zero emission operations through investments and business planning.”
- f. “Workforce is trained to operate and maintain zero emissions technology.”

### **3. Port Background**

The Port of Tacoma is closely interrelated with The NWSA, as The NWSA manages marine terminal facilities at both home ports of the Port of Tacoma and the Port of Seattle. The NWSA markets and manages the container, breakbulk, auto and some bulk terminals in Tacoma and Seattle. The success of the Port of Tacoma and the NWSA are intertwined. In 2020, about two-thirds of the Port of Tacoma’s operating revenue was generated through this partnership. While the PoT relies on The NWSA to manage commercial relationships and agreements among other things, The NWSA relies on the home ports to manage facilities development projects, fleet and facility maintenance, and furnishment of administration office facilities, among others.

#### **3.1. Port of Tacoma**

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 Northwest Seaport Alliance. The Port serves greater Pierce County by promoting trade, supporting family-wage jobs, and improving the environment. The PoT manages an extensive industrial/commercial real estate portfolio including a grain cargo terminal. 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 (2017). Figure 2 further describes the PoT’s relationship to The NWSA and the Port of Seattle, and how the emission sources are distributed between the three entities.

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<sup>1</sup> [FINAL 2020 NWPCAS Strategy.pdf \(amazonaws.com\)](#)

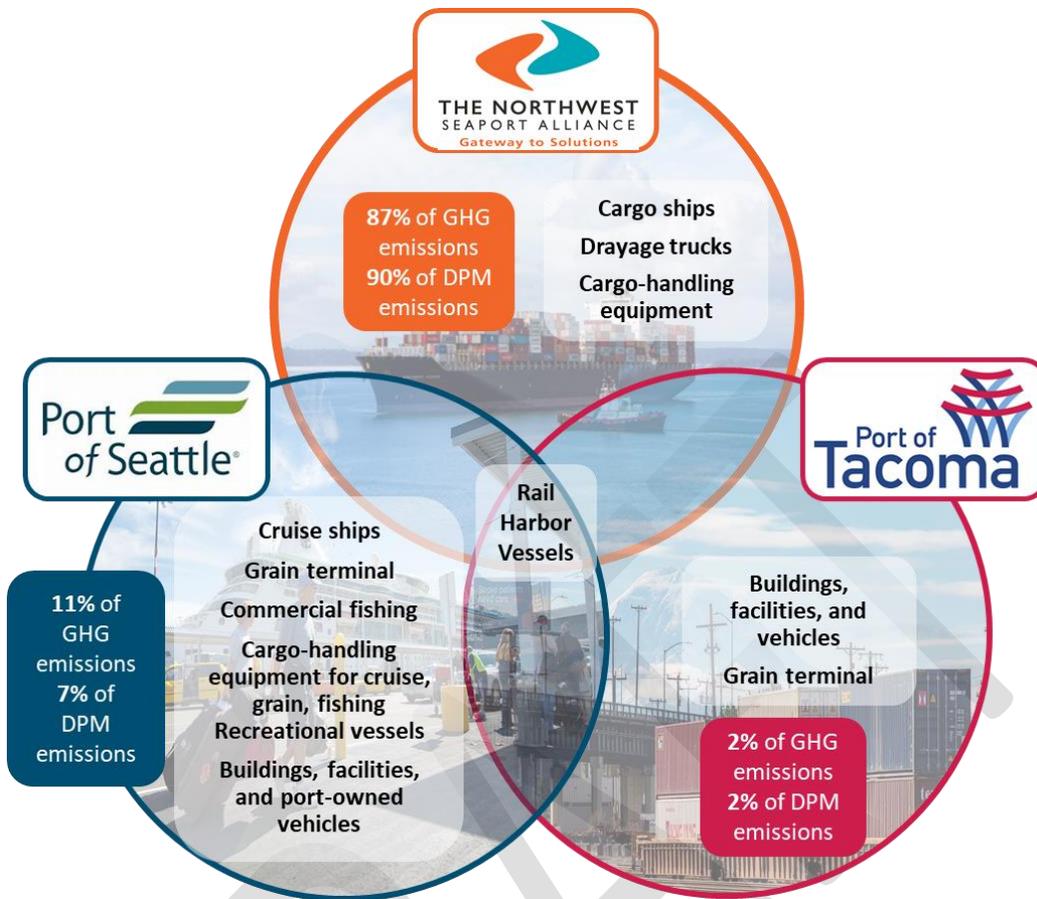


Figure 2: Sectors under Operational Control of the Port of Tacoma, The NWSA and the Port of Seattle

### 3.2. Role of the Port and Operating Model

The PoT is what is typically referred to as a “landlord” port, meaning that we do not directly operate our marine, commercial, and industrial properties ourselves (in most cases). Instead, we lease the land to private operators who directly manage operations themselves, who own their own equipment and vehicles, and manage their own contracts with customers and shipping lines. Therefore, we do not have direct control of the day-to-day operations that occur on our properties, but instead, negotiate the operating requirements periodically when new lease agreements are signed. Our leases are typically long-term leases, over a 20-30 year timeframe, so these opportunities to renegotiate do not come up often. These lease agreements are where we have the best opportunity to influence terminal and industrial operating practices. It is important to note, however, that all terms of the lease agreements are negotiated between the port and the tenant (i.e. the tenant must agree) and we operate within an extremely competitive real estate market, so it can be challenging to impose new requirements through the leases, especially if the requirements raise operating costs for tenants.

### 3.3. Emissions and Impacts

Emission inventories have been the foundation of the goals of the NWPCAS since its inception, providing an analytical basis for how to prioritize emission reduction measures across the operational sectors to maximize impact. Every five years, the PoT participates in an emissions inventory study with other ports and maritime stakeholders in the region to produce the Puget Sound Maritime Air Emissions Inventory (PSEI)<sup>2</sup>. The most recent inventory was completed for activity occurring in calendar year 2016 and the next one will be conducted for activity occurring in 2021. While we track a full suite of criteria air pollutants as part of the PSEI, we generally focus on diesel particulate matter (DPM) as an indicator of air pollutant burden, as it carries the biggest human health risk of air pollutants that we track. In addition, we focus on GHG emissions as an indicator of our contribution to climate change.

This implementation plan focuses on actions to reduce emissions from the Port of Tacoma's operational scope, separate from the NWSA. Specifically, this includes emissions from the Port of Tacoma's broad commercial, industrial, and marine real estate portfolio, cargo activities at the Tacoma Grain Terminal including grain ships, their assist tugs, locomotives, and small contributions from trucks and CHE at this facility, and administrative emissions such as facility energy use, port owned maintenance fleets, port owned passenger vehicles for the administrative staff, employee commuting, etc. Figure 3 shows that the emissions from PoT's operational scope are a relatively small fraction of those that occur as a result of seaport activities in the Tacoma harbor, as the NWSA's activities result in the bulk of the emissions in Tacoma. Though a relatively small fraction of the emissions overall, the emissions from Port of Tacoma's scope are, in some cases, those that we have the most direct control over, specifically those from port owned and operated fleets and facilities.

Figures 4 and 5 present the PoT's emission distributions for DPM and GHGs. While air pollutant emissions are almost exclusively due to cargo activities at the grain terminal, specifically OGVs, tugs, and locomotives, tenant operated facility emissions are the largest source of GHG emissions.

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<sup>2</sup> <https://pugetsoundmaritimeairforum.org/>

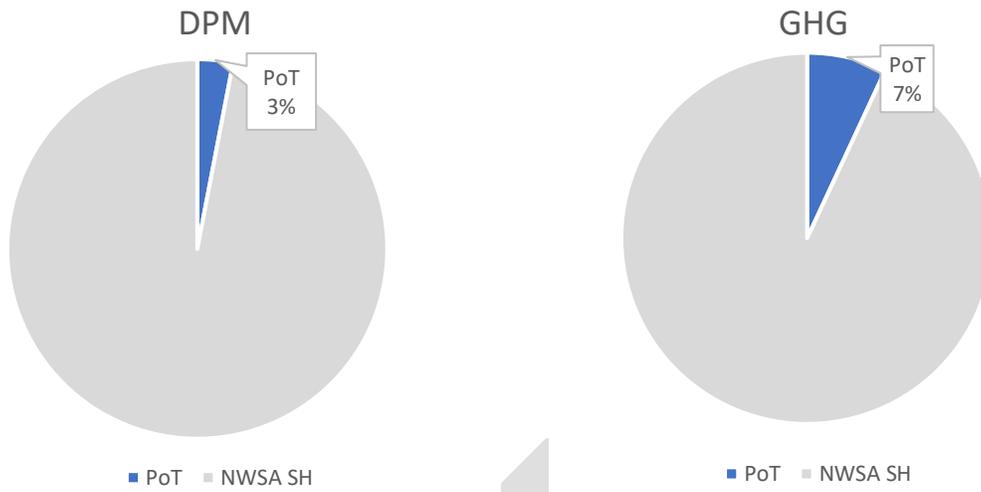


Figure 3: Airshed scale PoT emissions as a fraction of total port related emissions in the Tacoma Harbor

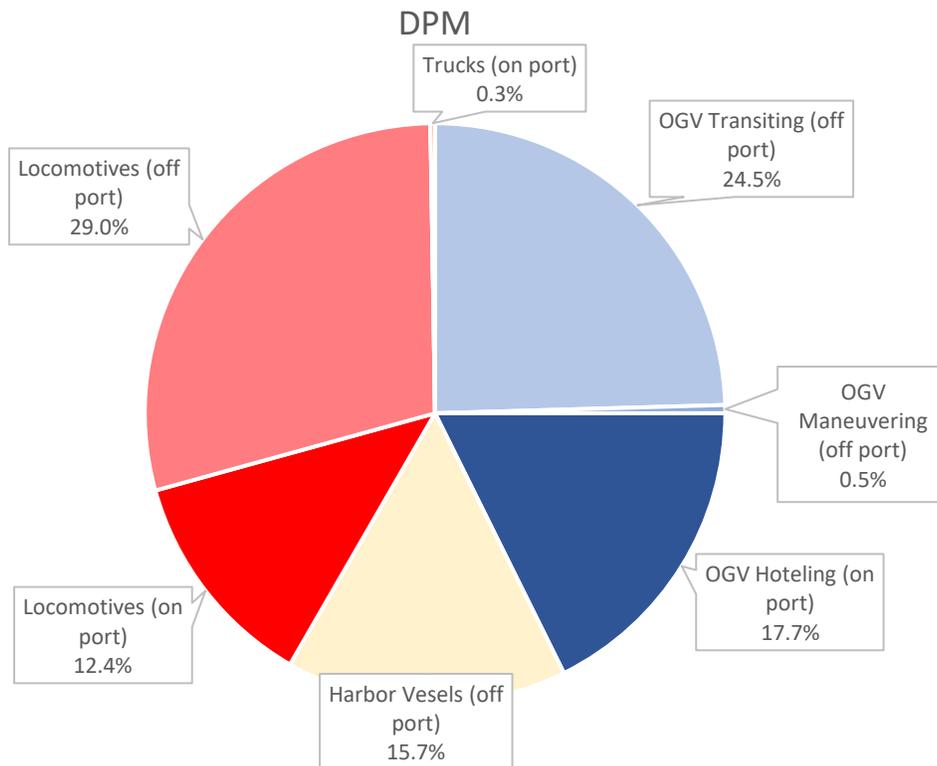


Figure 4: DPM Emission distribution for only PoT scope (excludes NWSA activities)

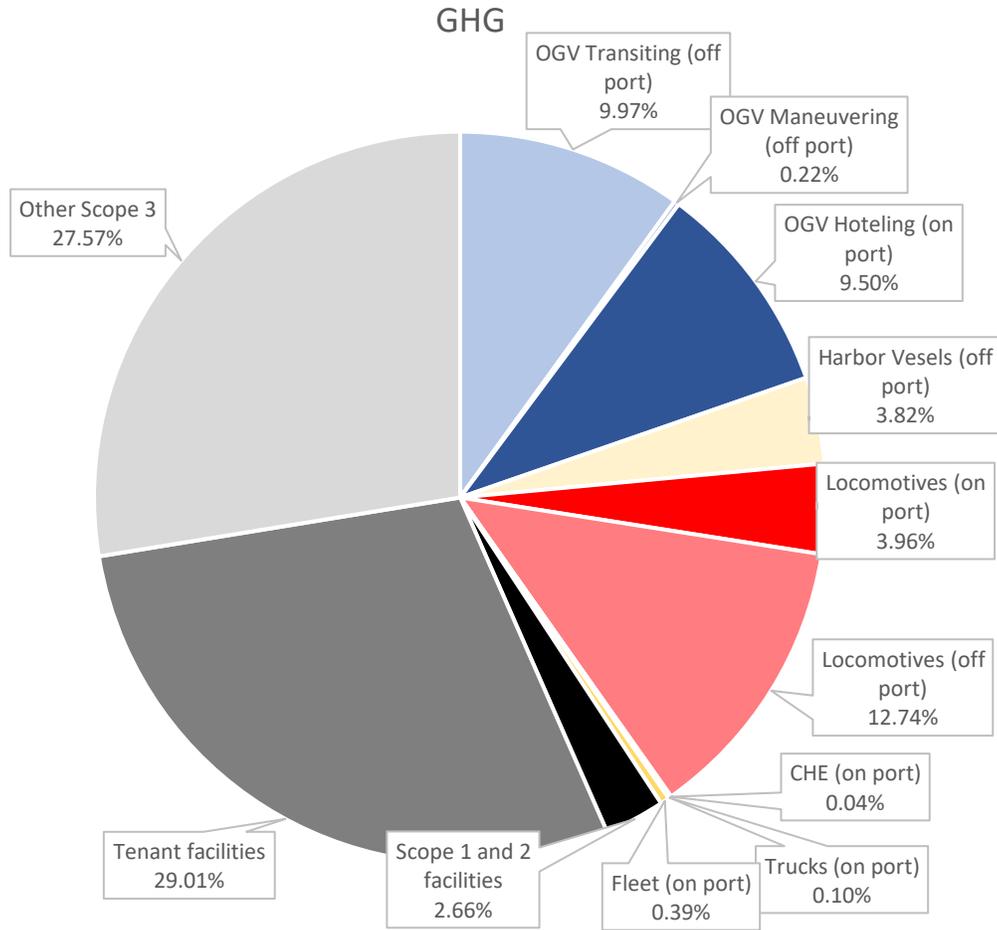


Figure 5: GHG Emission distribution for only the PoT scope (excludes NWSA activities)

#### 4. Adaptive Management Framework

An adaptive management approach to implementation of the NWPCAS is critical because there is a high degree of uncertainty around the timelines for zero emission technologies to become fully demonstrated, commercially available and affordable in each sector and because The PoT is very early in the process of planning for the infrastructure that will be needed to support the transition. We know things will be changing fast in the zero emissions technology space and we need the flexibility to adapt to exciting new technology developments, policies, and funding opportunities, as well as constraints and project delays. We plan to update our Implementation Plan on an annual basis to incorporate new information and progress from the previous year and renew the Implementation Plan every five years in parallel with renewals of the Northwest Ports Clean Air Strategy.

##### 4.1.1. Timeframe and Interim Targets

This Implementation Plan covers the actions that the PoT plans to take over the next five years to implement the Northwest Ports Clean Air Strategy. This timeframe aligns with the PoT's financial and capital planning horizons, allowing us to budget appropriate resources for the

specific actions and programs identified. Additionally, the tremendous amount of uncertainty that exists in the zero emission space makes it extremely difficult to predict what the right actions will be five or more years down the road. A few examples of these uncertainties are:

- It is presently unclear when zero emission technology will be cost competitive with diesel powered technologies in most port related sectors.
- We need to do significantly more planning work to understand the costs and realistic timelines for deploying the infrastructure needed to support zero emission technologies.
- The funding pathways for transitioning to zero emissions are unclear. Presently there is not enough funding to drive this transition in Washington State.
- The future policy landscape is uncertain and changing rapidly.
- Business drivers to adopt zero emission technology are uncertain.

These uncertainties also make it extremely challenging to set aggressive yet achievable interim milestones between now and 2050. Therefore, the five year milestones presented in section 5 of this Implementation Plan serve as our interim targets for measuring the success of our action plans. As part of each five year NWPCAS update, we will set new five year milestones to serve as our interim targets. We will also remain open to setting longer reaching interim milestones if they make sense based on evaluation of the technology, policy, and funding landscapes.

#### **4.1.2. Annual Updates**

The annual update process for this Implementation Plan will focus on revising priorities and annual workplans and budgets based on progress to date and the changing political, funding, commercial, and technology landscape. The primary goal of the annual review is to create the workplan and budget for the coming year. This will be done as part of the PoT's budget process which culminates in late fall of each year, before public approval by our Port of Tacoma Commissioners, allowing the workplan to be in place before the start of the next year. As part of the Implementation Plan update, new actions may be added that support the existing milestones and timelines for existing actions may be adjusted. Engagement will be performed as needed to inform the annual implementation updates. A summary of the upcoming year's projected implementation actions will be published in our annual report, described in section 8.

#### **4.1.3. Five Year Renewals**

When the NWPCAS reaches the end of its five-year implementation period, the participating ports will collaboratively renew the NWPCAS. After this renewal is complete, this Implementation Plan will need to be renewed as well, to ensure that it aligns with the updated strategic direction. Depending on the outcome of the NWPCAS renewal process the Implementation Plan renewal may be limited to minor revisions, or may require a full rewrite if required by the renewed NWPCAS. As part of this renewal, all milestones, actions, and workplans will be revisited.

The NWPCAS and this Implementation Plan will be renewed through a robust engagement process that will seek to incorporate perspectives across from community, industry, government, tribal government, and environmental non-government organizations. We will strive to make engagement on the NWPCAS and Implementation Plans as accessible as possible to ensure that all perspectives are considered.

When renewing the NWPCAS and Implementation Plan, we will consider the following criteria as we consider new strategies, actions, and milestones:

- ***GHG emission reductions*** – Achieving our vision will require that we achieve carbon neutrality by 2050, critical for doing our part to limit climate change.
- ***Air pollutant emission reductions*** – Air pollutant emissions, especially those from diesel engines, result in negative health impacts for those exposed. Our actions will strive to reduce air pollutant emissions, prioritizing emissions of diesel particulate matter, which are thought to have the most significant health implications of port related air pollutant emissions.
- ***Address environmental health disparities*** – We will continue to refine our understanding of the PoT’s relationship to environmental health disparities and prioritize air emission reduction efforts in areas that are disproportionately impacted.
- ***Level of influence*** – We will prioritize actions for which the PoT has more influence over success. For example, the PoT has more influence over infrastructure installed on our property than the locomotives purchased by private companies.
- ***Technical feasibility*** – It is important that technologies to be implemented in an action can “do the job” and can be reasonably integrated into operations.
- ***Cost*** – The cost of the action and funding available to offset those costs will be a critical consideration both for the PoT and our industry partners. We will seek to prioritize actions that get the largest benefit for the lowest cost.
- ***Alignment with commercial goals*** – We will prioritize actions that increase, or at least maintain the competitive position of the Puget Sound cargo gateway in the global marketplace. This means we will need to be conscientious about adding additional costs and prioritizing actions that cargo owners find desirable.
- ***Advancement of the pathway to zero*** – Our ultimate goal is to transition to zero emissions. We will prioritize actions that push us farther down the path towards achieving the desired end state.

## **5. Port of Tacoma Sector Action Plans**

This section lays out the five-year action plan in each sector, as well as cross-cutting actions, to advance the joint vision and objectives of the NWPCAS. It also outlines the five-year milestones we plan to accomplish.

### **5.1 Cross Sector Actions**

Cross sector actions are those that apply broadly across more than one operational sector. This section of the implementation addresses cross-cutting actions in community engagement and

partnership; industry engagement and partnership; policy engagement and advocacy; infrastructure planning and development; and technology assessment and advancement.

### 5.1.1 Community Engagement and Partnerships

Improving air quality for workers and near-port communities through reduced emissions from port related sources is a central priority of the NWPCAS and this implementation plan. We will continue and strengthen our work to engage and partner with near port communities in our Tacoma harbor to ensure that our efforts reflect community priorities and lived experience – and tap into community wisdom, experience, and expertise.

Based on the Washington State Department of Health’s Environmental Health Disparities Map,<sup>3</sup> significant environmental health disparities exist along the I-5 corridor, and in and around the Tacoma industrial center, of which the port is a part. Quantifying environmental health is a complicated exercise; the Washington State Department of Health uses 19 indicators including environmental exposures, proximity to certain activities that are thought to elevate risk to human health, population sensitivity, and socioeconomic factors<sup>4</sup>. Diesel emissions from port activities are among the many contributors to these long-standing environmental health disparities that will need to be addressed by a wide consortium of stakeholders. The NWPCAS and this Implementation Plan is the PoT’s effort to reduce our diesel exhaust contributions to these disparities. As part of our work to reduce our impacts we will work with communities and other agencies to refine and expand our analysis of how port related air emissions contribute to environmental health disparities and identify the highest impact strategies for reducing and mitigating those contributions.

The main programmatic priorities for our air quality and climate community engagement programs over the next five years are:

- 1) Increase mutual understanding of port related air quality and climate opportunities and challenges in the Tacoma harbor.
- 2) Continue to build mutual trust and capacity for collaboration.
- 3) Better understand the PoT’s relationship to environmental health disparities experienced by near port communities in the Tacoma harbor.
- 4) Collaborate on the development and implementation of port related air quality and climate solutions.

The following list of actions seeks to describe in general terms how we will approach our partnerships with near port communities in Tacoma, in close collaboration with NWSA activities. Individualized actions will be identified in close partnership with community groups during implementation.

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<sup>3</sup> [Information by Location | Washington Tracking Network \(WTN\)](#)

<sup>4</sup> [Washington Environmental Health Disparities Map :: Washington State Department of Health](#)

Table A: Community Engagement and Partnerships Action Plan

Action	Timeline	Roles and Responsibilities
<p><b>1. In Tacoma Harbor:</b></p> <ul style="list-style-type: none"> <li>a. Working with Citizens for a Healthy Bay and others, expand network of near port community groups that we engage and partner with.</li> <li>b. Perform targeted analytical work to better understand port related diesel emission impacts in near port communities.</li> <li>c. Identify and implement partnership opportunities that advance near port community priorities and the NWPCAS.</li> </ul>		<p>Lead: AQSP Support: PoT Government Affairs, Communications</p>
<p><b>2. Gateway-Wide:</b></p> <ul style="list-style-type: none"> <li>a. In collaboration with the NWSA and Port of Seattle, and near-port communities produce a resource guide on seaport-related clean air and climate challenges and opportunities that increases understanding and facilitates engagement and partnership</li> <li>b. Work with community-based organizations in both harbors to develop an on-going, gateway-wide community engagement program. Possibilities include: <ul style="list-style-type: none"> <li>i. Organize a multi-stakeholder Clean Air &amp; Climate Action Round Table (C-CART)(biannual)</li> <li>ii. Publish an e-newsletter (biannual)</li> </ul> </li> </ul>	<p>2021-2025+</p>	<p>Lead: AQSP Support: PoT Communications, PoT Government Affairs and POS Public Affairs</p>

**5.1.2. Industry Engagement and Partnerships**

Achieving the 2020 NWPCAS vision will require action across all industry stakeholders in the port networks including terminal operators, ocean carriers, tug operators, rail operators, and real estate tenants. Because the PoT directly controls very few of the assets that will need to be upgraded to zero emissions, engagement and partnerships with industry stakeholders is vitally important to motivate action and align external funding needed to make investments in clean technology. The PoT will continue and strengthen its efforts to engage and partner with its industry partners by providing information, assistance, and incentives to facilitate and encourage the transition to zero-emission technologies.

The main programmatic priorities for air quality and climate industry engagement over the next five years, summarized in Table B, are:

- 1) Enable and empower our industry partners to implement cleaner technology, especially zero emission technology.
- 2) Identify partnerships through which the PoT can enable implementation of zero and near zero emission technology by helping to secure external funding.
- 3) Maximize the use of zero emission infrastructure installed by the PoT, especially EV charging infrastructure.

Table B: Industry Engagement and Partnerships Action Plan

Action	Timeline	Roles and Responsibilities
<p><b>1. Strengthen tenant engagement and support:</b> Develop a robust tenant engagement and support program to: share information about infrastructure and technology developments; communicate grant and other funding opportunities; identify project and partnership opportunities; and provide technical support to tenants related to clean air/climate efforts and/or zero emission technology.</p>	2021-2025+	Lead: AQSP Support: Commercial, Operations, Real Estate
<p><b>2. Partner with tenants and industry partners on funding applications:</b> Lead grant applications and other efforts to secure external funding to support tenant and other industry led projects to implement clean technology.</p>		
<p><b>3. Identify and pursue additional clean air/climate partnership opportunities with key industry partners:</b> Conduct a thorough review of the climate and sustainability goals and programs of major customers and identify additional industry partnership opportunities to be pursued.</p>		
<p><b>4. Strengthen engagement with rail operators:</b> Partner with PSCAA to engage with Tacoma Rail and the Class 1 rail lines to identify opportunities for emission reduction projects and partnerships like repowers.</p>		

### 5.1.3. Public Policy Engagement and Advocacy

Supportive public policy that both creates a level playing field for air quality and climate action and allocates funding for the transition to zero emissions will be critical for achievement of the 2020 NWPCAS vision. In particular, we know that transitioning to zero emissions will come at significant cost beyond “business as usual”. Therefore, it is critical that these incremental costs be offset by

external funding and that federal and international policy set a level playing field across the board, so these additional costs do not put our gateway at a competitive disadvantage.

The PoT will increase its efforts under the 2020 NWPCAS, in partnership with the other participating ports and government agency, industry, and community partners, to promote policies that enable emission reductions and the transition to zero emissions while maintaining a competitive cargo gateway. The following are the main programmatic priorities for the PoT’s air quality and climate policy engagement program.

- 1) Advocate for increased funding opportunities for implementation of zero and near zero emission technologies in the port and maritime sectors and direct as much of that funding as possible to the Tacoma gateway.
- 2) Advocate for international and federal policies that increase ambition on air pollutant and greenhouse gas emissions in ways that create a level playing field across ports.
- 3) Build relationships with local, state, federal, and international agencies and policy makers to advance deployment of lower emission technologies and direct funding towards these projects in the Tacoma gateway.

Based on these priorities, the actions to be taken are summarized in Table C below.

Table C: Policy Engagement Action Plan

Action	Timeline	Roles and Responsibilities
<p><b>1. Strengthen International Engagement</b></p> <p>a. Continue to support the NWSA’s international engagement program, advocating for more aggressive action on air quality and climate in international shipping (especially for grain vessels, under PoT’s emissions profile).</p> <p>b. Strengthen cross-port collaboration on international engagement with the other NWPCAS partner ports.</p>	2021-2025+	Lead: AQSP Support: Commercial, Government Affairs
<p><b>2. Strengthen Federal Engagement</b></p> <p>a. Continue to support the NWSA’s federal engagement program, advocating for strengthened air quality and climate policies that create a level playing field between ports across the US and for more funding for port emission reduction efforts.</p> <p>b. Maintain and strengthen working relationships with Federal agencies.</p> <p>i. Continue partnership with EPA through the Ports Initiative and DERA program.</p>		Lead: Government Affairs Support: AQSP, Planning, Commercial, Operations

<ul style="list-style-type: none"> <li>ii. Strengthen relationship with US DOE, PNNL, and US DOT.</li> </ul>		
<p><b>3. Strengthen State Engagement</b></p> <ul style="list-style-type: none"> <li>a. Continue to implement and refine our state engagement program, advocating for policies that create increased funding opportunities for port related emission reduction efforts.</li> <li>b. Maintain and strengthen relationships with state agencies. <ul style="list-style-type: none"> <li>i. Department of Ecology through the Clean Diesel Program, VW Settlement Program, Low Carbon Fuel Standard Program, and others.</li> <li>ii. Department of Commerce through the Clean Energy Fund; Electrification of Transportation program, energy efficiency program, etc.</li> </ul> </li> </ul>		<p>Lead: Government Affairs Support: AQSP, Planning, Commercial, Operations</p>
<p><b>4. Strengthen Local Engagement:</b></p> <ul style="list-style-type: none"> <li>a. Puget Sound Clean Air Agency: support rail and tug repower programs, partner on clean truck initiatives, serve on Advisory Council, among others.</li> <li>b. Utilities (Tacoma Public Utilities): Collaborate on energy planning and deployment of infrastructure to support zero emission operations.</li> <li>c. City of Tacoma: Continue partnership with Office of Sustainability and Sustainable Tacoma Commission and participate in development and implementation of Environmental Action Plan.</li> <li>d. Pierce County: Track Sustainability 2030 Pierce County and look for partnership opportunities.</li> <li>e. Regional freight flow strategy: Work with regional partners, via infrastructure investments and/or traffic flow strategies to reduce congestion and improve freight flow regionally, with a focus on near port.</li> </ul>	<p>2021-2025+</p>	<p>Lead: AQSP Support: Government Affairs</p>

### 5.1.4 Infrastructure Planning and Development

The transition to zero-emission vehicles and equipment will require charging and fueling infrastructure that is accessible and affordable to a wide range of owners and operators including ocean carriers, marine terminal operators, railyard operators, rail companies, and tug companies. Facilitating the planning and installation of this infrastructure is one of the most important roles that port authorities will play in NWPCAS implementation. It also is one of the most challenging given the monumental cost, likely constraints of the power distribution grids, and uncertain trajectory of zero emission technology advancement and affordability.

The following are the main priorities for infrastructure planning and deployment, summarized in Table D:

- 1) Plan for the infrastructure needed to support zero emission operations.
- 2) Facilitate installation of infrastructure as needed to support adoption of zero emission technologies.

Table D: Infrastructure Planning and Development Action Plan

Action	Timeline	Roles and Responsibilities
<p><b>1. Develop the South Harbor Electrification Roadmap:</b> In partnership with Tacoma Power, evaluate infrastructure needs to support zero emission cargo handling equipment, shore power, drayage trucks, and rail in the Tacoma harbor. This study will take a detailed look at the infrastructure needed on port property as well as in the distribution networks as well as investigating innovative solutions. The NWSA will lead this planning effort with support and funding from the PoT.</p>	<p>Begin in 2021 Complete by end of 2022</p>	<p>Lead: AQSP Support: Commercial, NWSA Real Estate, PoT Real Estate, PoT Facilities Development, Operations, Finance, Planning</p>
<p><b>2. Facilitate Infrastructure Installation</b> Implement the recommendations of the South Harbor Electrification Roadmap. The timelines and specifics of this action will depend on the outcome of the study and will need to be adaptable based on the state of technology and tenant needs.</p>	<p>TBD</p>	<p>Lead: PoT and NWSA facilities development Support: AQSP, Commercial, Operations, PoT Maintenance</p>

### 5.1.5 Technology Assessment and Advancement:

Achieving the 2020 NWPCAS vision will require a transition to zero-emission technologies that are in varying stages of development – and in some cases don’t yet exist. For example, zero-emission class 8 tractor trucks (the type of truck that hauls port cargo over the roads) exist, but still are in the early stages of commercialization and are about three times as expensive as their diesel counterparts as of early 2021. Zero-emission grain vessels do not yet exist; the Maersk-led

Getting to Zero Coalition has a goal of getting the first commercially viable deep sea zero emission vessel powered by zero emission fuels into operation by 2030. The PoT’s role in advancing these new, zero-emission technologies focuses primarily on tracking the development and total cost of ownership of relevant technologies, sharing information about these developments with the owners and operators of vehicles and equipment with whom we partner, and looking for strategic opportunities for “early adoption” of zero-emission technologies as they are commercialized and as funding becomes available.

The following are our main priorities for technology assessment and advancement.

- 1) Track the state of zero and near zero emission technology in each operational sector including purchase price and total cost of ownership.
- 2) Facilitate demonstration and early adoption of zero emission technologies.

Table E: Technology Assessment and Advancement Action Plan

Action	Timeline	Roles and Responsibilities
<p><b>1. Technology Assessment</b></p> <p>a. In collaboration with other NWPCAS ports, determine the appropriate breadth depth and frequency for technology assessment in each sector. Assemble a framework for jointly delivering and sharing these technology assessments.</p> <p>b. Perform technology assessments to analyze the cost and state of commercialization of zero emission technologies in the PNW market.</p>	<p>Develop technology assessment framework in 2021. Begin implementing in 2022.</p>	<p>Lead: AQSP Support: Operations, Commercial</p>
<p><b>2. Technology Demonstration</b></p> <p>a. Work with industry partners to facilitate zero-emission technology demonstration projects and support early adoption. These efforts are described in greater detail in the individual sector sections below.</p>	<p>2021-2025+</p>	<p>Lead: AQSP Support: Operations, Commercial</p>

## 5.2 Ocean-going Vessels (OGVs)

The OGV source category consists of cargo carrying vessels equipped with large marine propulsion engines, auxiliary engines, and boilers. The most common origin and destination of ships calling the PoT are Asia (China, Japan, South Korea, Vietnam). All the container shipping, breakbulk and auto vessel traffic in the Tacoma Harbor is handled by the NWSA’s terminals. Only bulk grain vessels calling at the Tacoma Grain Terminal remain under the Port of Tacoma’s emissions profile. In 2019, there were 47 grain vessel calls by 45 unique grain vessels at the Tacoma Grain Terminal.

### 5.2.1 Emissions from OGVs

OGVs are the PoT's largest source of DPM emissions, but are a much smaller contributor to PoT's total GHG emissions. The majority of emissions occur when vessels are in transit (i.e. traveling between the airshed boundary and the port terminals), but emissions during the at dock (hoteling) segment are also significant. The maneuvering segment, i.e. when grain vessels transition between transit and hoteling, often under tug assist, results in the least emissions of the three.

### 5.2.2 Level of Influence

PoT's ability to influence emissions from OGVs depends greatly on the segment of operation. We have greatest influence over operational practices of vessels while they are at berth, since they have a direct business agreement with the terminal operating tenant, who use port owned facilities to load and unload cargo. Therefore, the PoT can work with the terminal operators and shipping lines to encourage cleaner operating practices. However, the measures that can be taken to reduce emissions at berth is quite limited, especially for bulk grain ships.

The PoT has much less influence when vessels are in transit and when maneuvering, as the PoT has no jurisdictional control over vessels as they transit through Puget Sound and the Strait of Juan de Fuca. State, Federal, and international regulations govern the operation of vessels in transit. The PoT does have indirect commercial relationships with the shipping lines through the NWSA and may influence them through incentives and voluntary programs. However, even these avenues are limited because the terminal operators, not the PoT, make berthing arrangements with the shipping lines. Unlike other ports, the PoT does not charge dockage fees and therefore does not have a direct financial avenue through which to offer incentives and collect revenue to fund an incentive program.

The PoT can also, through the NWSA, advocate internationally, particularly with the International Maritime Organizations (IMO) that sets these policies and other organizations that influence the IMO, such as the International Association of Ports and Harbors (IAPH). While we are just one of many voices, this international engagement targets what is likely the most significant driver of change in the industry and the one that will best maintain a level playing field while doing so.

### 5.2.3 State of Technology and Outlook

The state of zero emission technology is greatly different depending on operational mode and type of improvements targeted.

For controlling emissions while vessels are at berth, shore power and capture and treat technologies currently exist, but have generally not been utilized by bulk grain ships globally even in areas like California where shore power use is required for other vessel types. Shore power is the provision of grid power to vessels at the dock, which allows them to shut their engines down at berth. When paired with a low emission power supply, shore power can approach zeroing out emissions associated with onboard power use when a vessel is at dock. To use shore power,

infrastructure must be installed on the port side as well as on the vessel, both of which are very expensive and complex undertakings.

While shore power is being used for container cargo vessels in some other west coast and Asian ports, bulk grain vessels have not yet been determined a good use case or priority for shore power. Therefore, they generally are not equipped with shore power infrastructure and do not use shore power while at berth. The primary reason that grain vessels are a poor use case for shore power is that the vessel fleet is quite transient; a vessel that calls at a port may not return for many years. For example, the PoT Grain Terminal saw only two repeat callers in 2019. Without international standardization of shore power provision, installing shore power capabilities on grain ships is likely to provide marginal benefit and create an underutilized asset. In addition, the potential emission benefits of connecting bulk grain ships to shore power is much less than the benefits of connecting a container ship. For example, the average power demand of a grain vessel at berth is less than 400 kW and the demand of container ship can exceed 1000-2000 kW, meaning bulk grain vessels burn less fuel when at berth and emit less.

In California, CARB's Existing At Berth Regulation, which requires container vessels to use shore power at Californian ports, has recently been expanded to include requirements for other vessels to use shore power at Californian ports – namely roll-on/roll-off vessels (auto carriers) and tanker vessels from 2025<sup>5</sup>. However, grain vessels are not covered by this CARB Regulation. As there are no other North American shore power installations for grain vessels, and currently very few grain vessels with the ship-side capability, shore power installation is not currently a viable option at the Port of Tacoma.

Emission capture and treatment systems (“bonnet” or “hood” systems) have also been under development in recent years and are an option for reducing air pollutant emissions from OGVs while at berth. The upside to these types of systems is that the vessel does not need special onboard infrastructure to use it, which makes it an option for vessels that aren't shore power capable<sup>6</sup>. However, these systems are very expensive, are not yet broadly deployed at other ports, and do not reduce GHG emissions. Fuel cell and battery energy storage systems are also being evaluated within the industry<sup>7</sup> that could allow vessels to operate with zero emissions while at dock but have not yet been demonstrated or commercialized on large international container ships to our knowledge.

While significant research and development effort is underway within the industry, the technology for zero emission vessels capable of trans-pacific transits remains nascent. Given the monumental energy requirements of the trans-pacific transit, liquid fuels such as hydrogen, ammonia, and synthetic renewable fuels, are most likely to be part of the suite of solutions. However, to date there has not been a single zero emission trans-pacific transit, nor is there consensus in the industry on what the fuel or fuels of the future will be. Maersk says it will have a net zero carbon vessel on

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<sup>5</sup> [Control Measure for Ocean-Going Vessels At Berth | California Air Resources Board](#)

<sup>6</sup> <https://shipandbunker.com/news/am/985727-long-beach-backs-sock-on-a-stack-emissions-reduction-technology#:~:text=ACTI%20say%20it%20works%20by%20first%20sealing%20a.Oxide%2C%20Sulfur%20Oxide%2C%20and%20Particulate%20Matter%2C%20are%20removed.>

<sup>7</sup> <https://www.seatrade-maritime.com/technology/energy-storage-solutions-are-future-suppliers-must-do-more>

the water by 2023, likely to be fueled with bio methanol, though it will be much smaller than the Pacific trade's typical container and grain ships<sup>8</sup>.

While zero emission vessels are not likely to be commercialized for some time, the shipping industry has made monumental strides to improve efficiency and thereby emissions in recent years and will continue to do so. In addition, international policy, driven by the IMO, is likely to continue to advance through the IMO's Initial Strategy to Reduce Emissions from Ships<sup>9</sup>, by which the IMO seeks to achieve a goal of reducing the carbon intensity of international shipping by 75% and the absolute emissions by 50%. Implementation plans for achieving these goals are still in progress. On the air pollution side, the IMO enacted a global limit on fuel sulfur content in 2020<sup>10</sup>, lowering the standard from 3.5% to 0.5%, greatly reducing emissions of sulfur oxides and particulate matter.

#### 5.2.4 OGV Sector Action Plan

Although shore power has been robustly demonstrated in use for container vessels, this is not currently a viable strategy for the Port of Tacoma to pursue for grain vessels, as the industry and other ports have not determined bulk grain vessels to be a good use case for shore power and therefore, the vessels themselves do not have the ship-side infrastructure installed. As described above, this is primarily because the grain vessels visit ports unpredictably and infrequently, in many cases calling once and never returning, so we don't have a 'captive market' to use any shore power infrastructure we might install.

While shore power is not currently a viable solution for reducing OGV emissions at PoT, it may be in the future if the CARB At Berth Regulation were ever to expand to include grain vessels and or shore power capabilities were broadly installed by grain vessels and other ports in the Pacific trade. We will continue to monitor in the state of shore power for grain vessels.

As OGV transiting emissions (i.e. traveling between the airshed boundary and the port terminals) are the largest source of OGV emissions for both DPM and GHG, these are therefore an important area of focus for emission reduction efforts. It is worth noting, however, that the PoT has very limited influence in this segment, as we do not have jurisdiction over vessel operations before the reach our docks. We can maximize our limited influence to reduce emissions from vessels while not at our docks, particularly through engagement on the international level, in partnership with the NWSA, and by understanding and implementing voluntary emission reduction measures as practicable within our airshed. It is also important to note that efforts to get vessels to zero emissions while transiting would typically make them zero emissions while hoteling as well.

The main programmatic priorities in the OGV sector over the next five years are:

1. Engage internationally to advance environmental standards for vessels and support the industry as it develops zero emission fuels.

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<sup>8</sup> [Maersk says it will launch a carbon neutral vessel by 2023 \(cnbc.com\)](https://www.cnbc.com)

<sup>9</sup> <https://www.imo.org/en/MediaCentre/HotTopics/Pages/Reducing-greenhouse-gas-emissions-from-ships.aspx>

<sup>10</sup> <https://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx#:~:text=Known%20as%20E2%80%9CIMO%202020%20E2%80%9D%2C%20the%20rule%20limits%20the%20control%20areas%20the%20limits%20were%20already%20stricter%20280.10%25%29.>

2. Explore methods to encourage vessels to reduce emissions in our airshed while transiting.

Based on these priorities, the actions to be taken in the next five years are summarized in Table F below.

Table F: Actions to be taken by 2025 to reduce emissions from OGVs.

Action	Timeline	Roles and Responsibilities
<i>Shore power tracking and implementation</i>		
<ol style="list-style-type: none"> <li>1. <b>Annually analyze the vessel fleet at the grain terminal to assess the fraction of calls shore power capable</b></li> </ol>	2021-2025+	Lead: AQSP
<i>Develop program to reduce emissions from transiting vessels</i>		
<ol style="list-style-type: none"> <li>2. <b>Support the NWSA in performing a study by the end of 2021 to identify voluntary and/or incentive-based initiatives that would improve air emissions from cargo ships transiting through the Puget Sound to NWSA and PoT terminals.</b> <ol style="list-style-type: none"> <li>a. Survey of what other ports do and the estimated effectiveness of each action</li> <li>b. Analysis of co-benefits from “quiet-sound” underwater noise program</li> <li>c. Analysis to slow steaming efficacy in Puget Sound</li> <li>d. Analysis of PoT governance structure to analyze possibility for incentives</li> <li>e. Program recommendations</li> </ol> </li> </ol>	Complete study by end of 2021	Lead: AQSP Support: Commercial, Operations
<ol style="list-style-type: none"> <li>3. <b>In 2022 and beyond, implement recommendations from study as they apply to grain vessels.</b> <ol style="list-style-type: none"> <li>a. Create program(s)</li> <li>b. Develop activity metric(s)</li> </ol> </li> </ol>	2022-2025+	Lead: AQSP Support: Commercial, Operations
<i>International engagement towards emission reductions from shipping</i>		
<ol style="list-style-type: none"> <li>4. <b>Advocate, through the NWSA, for policies to reduce emissions from international vessels</b> <ol style="list-style-type: none"> <li>a. Participate in IMO’s Marine Environment Policy Committee (MEPC) and Intersessional Working Group (ISWG) on GHG Emission Reduction.</li> <li>b. Participate in IAPH Climate and energy committee</li> </ol> </li> </ol>	2021-2025+	Lead: AQSP Support: Commercial

<p>c. When appropriate and impactful, send letters and use Bruce Anderson (Starcrest) to advocate for our positions</p>		
<p><b>5. Support industry efforts, through the NWSA, to develop and demonstrate cleaner fuels</b></p> <p>a. IMO Green Voyage 2050 project</p> <p>b. IAPH/WPSP/WPCAP Clean Marine Fuels Working Group</p>	<p>2021-2025+</p>	<p>Lead: AQSP Support: Commercial</p>

**5.3 Trucks**

The trucking sector is made up of heavy duty (class 8) combination tractors that move cargo to and from port marine terminals and railyards. While the Port of Tacoma managed their own Clean Truck Program until 2015, all truck emissions now come under the NWSA’s responsibility under the NWSA Clean Truck Program - the Port of Tacoma has no direct responsibility for truck emissions. Grain cargo is transported into and out of the port by rail, not requiring trucking.

The PoT’s role is to support the NWSA efforts to reduce emissions from drayage trucks, supporting the NWSA’s goal of eliminating emissions from trucks by 2050 [see the NWSA implementation plan for further details on actions in the next 5 years].

**5.4 Cargo-handling equipment**

Cargo handling equipment (CHE) are nonroad equipment (i.e. not licensed for over the road use) that are used for moving cargo (containers, general cargo, and bulk cargo) around terminals and to and from marine vessels, railcars, and on-road trucks. As the Port of Tacoma no longer handles containerized cargo following the formation of the NWSA in 2015, PoT tenants do not use cargo-handling equipment. However, the Port of Tacoma does still own some CHE purchased by the port itself prior to the formation of the NWSA, that the NWSA currently uses to move cargo at NWSA facilities. This equipment will be replaced by the NWSA as they are retired and eventually this entire fleet will be NWSA owned. The PoT will still provide maintenance services to the NWSA.

The PoT will work closely with the NWSA on actions in the NWSA Implementation Plan related to the PoT owed CHE to help the NWSA meet its milestones [see the NWSA implementation plan for further details on actions in the next 5 years].

**5.5 Locomotives**

Locomotives work at the grain terminal at the Port of Tacoma – both switcher locomotives and Class 1 locomotives move grain in and out of the terminal to be loaded onto grain vessels. The railroad system is a nationwide enterprise consisting of national and local railroad companies that together serve to move a diverse variety of cargo over long distances. The two major “Class 1” railroad companies in the US are Burlington Northern Santa Fe and Union Pacific, who move all rail cargo into and out of the region. The rail activities included in the NWPCAS scope are those that take place within and between ports and the near-dock rail yards that handle port-related cargos, and between these places and the airshed boundary.

Port related cargo is transferred to and from rail cars at the grain terminal and NWSA’s on-dock railyards (such as those at PCT, WUT and the North Intermodal Yard (NIM)) and near dock rail facilities like the South Intermodal (SIM) yard. Many railyards in the region also accommodate “transload” cargo, or cargo that is truck to a warehouse and repacked into 53-foot domestic containers before being loaded on to railcars.

Locomotives are generalized into two categories based on their operational scope: switching (switchers) and line-haul locomotives. Switchers operate primarily on port terminals and railyards, sorting rail cars and assembling and disassembling trains. Switchers are generally stationed locally, especially those owned by our local operator, Tacoma Rail, but the switchers owned by the Class 1 railroads are periodically moved between facilities in different regions as needed. Switching locomotives generally have smaller engines than linehaul locomotives, typically between 1,000 and 3000 horsepower and sometimes are older linehaul locomotives that have been converted. Line-haul locomotives are used by the railroads to haul trains over long distances and are the ones that move cargo into and out of the region. Locomotives used for line-haul operations are typically large, powerful diesel engines of 4,000 hp or more.

Locomotives have very long lifetimes (30-50 years), are very expensive, and are more often remanufactured than fully replaced (which does not require them to implement the strictest emission controls). As a result, very few conform to the latest (Tier 4) emission standards and many remain from the era when emissions were unregulated and earlier emission standards, based on data from California<sup>11</sup>. This is true of both switchers and line-haul locomotives.

While we have limited insight into the switching and line-haul locomotive fleets owned by the Class 1 railroads, detailed information on the fleet of switchers that are owned by local operators has been gathered as part of the 2016 Puget Sound Maritime Air Emissions Inventory. A summary of switching locomotive numbers by Tier, excluding the Class 1 railroads, can be found in Table J below. These locomotives operate both on and off port property.

Table G: Switching Locomotives Excluding Class 1s by Emission Tier

<b>Emission Tier</b>	<b>Number</b>
Unregulated	5
Tier 0	6
Tier 1	0
Tier 2	2
Tier 3	4
Tier 4	0
<b>Total</b>	<b>17</b>

<sup>11</sup> [https://ww2.arb.ca.gov/sites/default/files/2020-06/final\\_rail\\_tech\\_assessment\\_11282016%20-%20ADA%2020200117.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-06/final_rail_tech_assessment_11282016%20-%20ADA%2020200117.pdf)

### 5.5.1 Emissions from Locomotives

Locomotives are a significant source of emissions, especially DPM, ranking second behind OGVs in DPM emissions across the airshed. However, locomotives are the fourth largest source of GHGs. This reflects that as other sectors, (like trucks and CHE) have adopted emission control measures for air pollutants, locomotives have not made similar progress.

### 5.5.2 Level of Influence

Our ability to influence emissions from locomotives is extremely limited. Because the options for line-haul and switching services are limited to the two major Class 1 Railroads and Tacoma Rail, the PoT has little to no ability to drive use of cleaner locomotives through lease agreements with terminal operators, as the terminal operators do not have control over which locomotives are used by the Class 1 railroads and any such requirements would severely hamper a terminal's ability to move cargo. Additionally, the choice of rail operators is driven by the beneficial cargo owner, who is not part of lease and operating agreements – the PoT is not involved in that business relationship.

Switching locomotives owned by local operators represent the most significant opportunity to influence emission reductions, particularly those owned and operated by Tacoma Rail, which is an agency of the Tacoma City government. For example, the Port of Tacoma partnered with Tacoma Rail in 2014 to facilitate federal grant funding to support a repower project for one of their switching locomotives. Tacoma Rail has also worked with the Puget Sound Clean Air Agency on repower projects for their switcher locomotives. In addition, Tacoma Rail has been proactive about installing devices to improve efficiency like automatic stop/start technology to reduce idling. There will likely be opportunities to work with Tacoma Rail and the Puget Sound Clean Air Agency in the future to encourage and support further upgrades to cleaner diesel technology. Since they are owned by a local agency, upgrades to locomotives owned by Tacoma Rail are much more likely to be competitive for grant funding than those owned by the Class 1 Railroads, since they will not be moved out of the region – air quality benefits would stay within Tacoma.

The switcher fleets owned and operated by the Class 1 railroads are generally housed at railyards owned by the railroad companies, but also provide some service to on-dock rail facilities, particularly in Seattle (Tacoma Rail is the primary provider of switching services in Tacoma). Regulatory control over these engines is held by the federal government, state, and Puget Sound Clean Air Agency. Because these locomotives can often be rotated region to region, it is much more challenging to secure grant funding to support replacements, and without grant funding there is little to no incentive for the railroads to voluntarily upgrade their engines. Our partners at the Puget Sound Clean Air Agency are working on advancing voluntary efforts to reduce rail emissions from the Class 1 railroads, using their influence and reputation as the regulatory entity.

Similar challenges exist for the line-haul locomotives but are exacerbated by the fact that line-haul locomotives spend a relatively small proportion of their time within our airshed and may or may not regularly visit our facilities. Therefore, a broader national or continental approach to reducing rail emissions is likely needed if significant progress is to be made. For this sector, engagement and advocacy at the federal level is likely the most impactful way to influence change.

### 5.5.3 State of Technology

Since 2015, new locomotives built have been required by federal law to meet Tier 4 emission standards, which for particulate matter, allow 95% less emissions than pre-Tier 0 standards. Given that there are no known Tier 4 locomotives operating in our region and a majority of the switching locomotives for which we have data are Tier 0 or unregulated, significant progress can be made by replacing or repower locomotives to conform with the latest standards. In many cases, older locomotives can't be upgraded to Tier 4 (or in some cases Tier 3) due to space constraints on board the locomotive, but significant emission reductions can still be achieved by upgrading the older engines to Tier 2 or Tier 3. In addition, CARB believes that implementing aftertreatment devices on Tier 4 locomotives is a cost effective and impactful way to further reduce emissions. Further emission reductions can be achieved by installing onboard batteries to augment the power supply for diesel-electric locomotives, reducing emissions and allowing for temporary zero emission capabilities to be applied nearest to population.

Electric locomotives have been around since the 1800s<sup>12</sup> and electric rail systems power by catenary wires or electrified “third rail” systems exist in many locations around the world. While it is physically possible to electrify the whole American freight rail system, the staggering cost is prohibitive<sup>13</sup>. Change on this scale will require action on the federal policy level, and significant federal funding. Since most locomotives use electric drivetrains powered by diesel generators, one method of creating a zero emission locomotive is to replace the diesel generator with a zero emission power source such as batteries or a fuel cell. Both of these technologies are in the relatively early stages of research and development, though early stage pilots are beginning to get underway. For example, BNSF is beginning a pilot of a battery electric locomotive in California<sup>14</sup>. Given the early stage of technology development and commercialization, it will likely be some time before clarity is achieved as to which zero emission technology is best for each rail application.

### 5.5.4 Action Plan

Given our limited influence in the locomotive sector, our best methods for reducing emissions are to support, facilitate, and advocate for financial incentives for operators to repower their engines and implement fuel efficiency measures. The Puget Sound Clean Air Agency is an important partner in this effort, as they have been successful in building partnerships with rail operators and facilitating grant funded repower projects in the past and have broader reach to address these regional sources of pollution that extend beyond port boundaries than we do.

The main programmatic priorities in the locomotive sector over the next five years are:

1. Work with our agency partners and rail operators to encourage repowers of the oldest switching locomotives in the fleets serving Port of Tacoma facilities.

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<sup>12</sup> <https://www.american-rails.com/electric.html>

<sup>13</sup> [https://ww2.arb.ca.gov/sites/default/files/classic/railyard/docs/uoi\\_rpt\\_06222016.pdf?\\_ga=2.229875544.519388810.1612913378-65149391.1570662747](https://ww2.arb.ca.gov/sites/default/files/classic/railyard/docs/uoi_rpt_06222016.pdf?_ga=2.229875544.519388810.1612913378-65149391.1570662747)

<sup>14</sup> <https://chargedevs.com/newswire/bnsf-railway-and-wabtec-begin-battery-electric-locomotive-pilot-in-california/>

2. Support agency partners and rail operators in efforts to improve locomotive energy efficiency. 3. Advocate for more funding to support locomotive repowers and for advancement of federal rules on air emissions from locomotives.

Table H: Actions to be taken by 2025 to reduce emissions from Locomotives

Action	Timeline	Roles and Responsibilities
<i>Support partner efforts to implement cleaner engine technologies and increase efficiency</i>		
<ul style="list-style-type: none"> <li>- <b>Meet with Tacoma Rail and PSCAA annually to assess opportunities for locomotive repowers or implementation of other measures to reduce emissions.</b></li> </ul>	2021-2025+	Lead: AQSP Support: Commercial
<ul style="list-style-type: none"> <li>- <b>Collaborate with PSCAA on efforts to engage Class 1 railroads on opportunities to repower or otherwise reduce emissions from switching locomotives.</b></li> </ul>	2021-2025+	Lead: AQSP Support: Commercial
<ul style="list-style-type: none"> <li>- <b>Collaborate on efforts to secure external funding to support switching locomotive repowers or other emission reduction measures.</b> <ul style="list-style-type: none"> <li>o Provide letters of support.</li> <li>o Lead grant application and management if necessary.</li> </ul> </li> </ul>	2021-2025+	Lead: AQSP Support: Government Affairs
<i>Advocate for funding to support locomotive repowers and advance federal emission requirements</i>		
<ul style="list-style-type: none"> <li>- <b>Develop a policy agenda to increase funding for locomotive repowers and advance federal standards</b></li> </ul>	Develop by end of 2021 Continue to refine and implement through 2025	Lead: AQSP Support: Government Affairs

## 5.6 Harbor Vessels

The harbor vessel sector for the Port of Tacoma’s scope includes assist tugs that help ocean-going vessels maneuver into and out of their berths at the grain terminal. In total, there are 14 tugs operated by two companies that serve vessels serving NWSA and PoT terminals – no tug solely serves one entity. These tugs are all powered by large diesel propulsion engines up to 4,100 horsepower. They also have auxiliary engines to supply power for onboard processes that can be as large as 500 horsepower. Most of the propulsion engines of these assist tugs are from the 1990s or older, while auxiliary engines tend to be newer. Assist tug emissions are calculated for their activity throughout the airshed and apportioned to each port proportional to its number of OGV calls.

As harbor vessels in the Puget Sound serve vessels serving both NWSA and the PoT terminals, the PoT will work closely with the NWSA to jointly work towards the goals in this sector.

### **5.6.1 Emissions from Harbor Vessels**

Harbor vessels are the 3<sup>rd</sup> largest source of DPM and the 5<sup>th</sup> largest source of GHG emissions across the airshed. They do not operate on port property and therefore do not contribute to the on-port totals.

### **5.6.2 Level of Influence**

Assist tugs are typically hired by the ocean-carrier when their vessels need to maneuver into berth and therefore, the NWSA does not have a direct business relationship with them. In addition, tugs do not operate on port property and no tug company is a tenant on PoT property, so there is not a mechanism within our lease agreements for directly influencing their behavior. The primary mechanisms that exist are incentives, and advocacy for stricter standards. Our partners at the Puget Sound Clean Air Agency have a long history of working with the tug operators to incentivize engine repower projects. Supporting the Agency in these repowers is likely the most impactful way we can help drive tug emission reductions.

### **5.6.3 State of Technology**

The most current emission standard for diesel tugs is Tier 4 and would be installed on any tugboat built today. However, due to the size of emission control equipment that is required for Tier 4 engines, older tugboats may not be able to accommodate Tier 4 engine systems and Tier 3 engine repowers may be the best that can be done in many cases. Renewable diesel and biodiesel blends, while not currently widely available in the Puget Sound region, are drop in fuels that could be used to reduce emissions. Additionally, diesel electric hybrids are currently available<sup>23</sup> and can substantially reduce emissions. Shore power for tugs is also another demonstrated technology for reducing emissions while at dock, though the PoT does not currently lease tug docking locations.

Zero emission tug boats are still in the concept to research and development phase. However, the debut of zero emission technology in the tug sector is likely to occur in the next few years, for example, there are reports that a battery-electric tug is slated to be delivered at Port of Auckland in 2021<sup>15</sup>. In addition, hydrogen fuel cell tugs are also being developed<sup>16</sup>. Until real world testing has occurred, it will be impossible to determine which technology will be technologically and financially feasible.

### **5.6.4 Action Plan**

Because zero emission technology is not near commercialization, the most impactful emission reduction measure that can be taken over the next five years is repower of tug propulsion engines to Tier 3 or better. Transitioning to this cleaner diesel will still provide significant air quality benefits in the region. Given our limited influence in this sector, our most efficient course of action is to support the Puget Sound Clean Air Agency's tug repower program.

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<sup>15</sup> <https://maritime-executive.com/magazine/the-zero-emissions-tug>

<sup>16</sup> <https://www.electrive.com/2019/05/23/ballard-abb-developing-fc-tugboat/>

The main programmatic priorities in the harbor vessel sector over the next five years are:

1. Support Puget Sound Clean Air Agency’s tug repower program to repower the oldest tug engines.
2. Advocate for more funding opportunities to support tug repowers.

Table I: Actions to be taken by 2025 to reduce emissions from Harbor Craft

Action	Timeline	Roles and Responsibilities
<i>Support the Puget Sound Clean Air Agency tug repower program</i>		
<b>1) Support efforts by others to secure grant funding to support tug repowers.</b> <ol style="list-style-type: none"> <li>a. Provide letters of support</li> <li>b. Contribute to application writing if necessary</li> </ol>	Assist tug fleet age distribution  Tug repowers completed	Lead: AQSP
<i>Advocate for funding opportunities for tug repowers</i>		
<b>2) Develop an advocacy position to increase funding opportunities for tug repowers, while not compromising other priorities.</b>	Develop advocacy agenda by end of 2021 Continue to refine and implement through 2025	Lead: AQSP Support: Government Affairs

### 5.7 Administration: Fleets and Facilities

The administration sector includes emissions from port and tenant fleets and facilities. Air and climate pollution from buildings, facilities, vehicles, and equipment – some owned and operated by the Port of Tacoma itself and others managed by tenants – represents a very small percentage of the overall emissions that are focus of the NW Ports Clean Air Strategy. However, as most of the cargo shipping operations are managed by the Northwest Seaport Alliance, emissions from fleets and facilities now make up the largest source of GHGs under the Port of Tacoma’s direct control.

The PoT provides fleet and facility services for the Northwest Seaport Alliance i.e. passenger and security vehicles owned by the PoT are also used by the NWSA. The PoT also provides administrative facilities to the NWSA at the main office (Administration Building) in Tacoma and the Fabulich Center. Tenant fleets include passenger cars, pickup trucks, passenger vans, and other vehicles necessary for administration and maintenance. Tenant operated facilities include office buildings, equipment maintenance bays, yard lighting, fueling, among others. Emission impacts from fleets and facilities include fuel combustion and energy use.

Working to reduce and ultimately eliminate emissions from the PoT’s fleets and facilities is an important contribution to meeting the overall vision of the NW Ports Clean Air Strategy and demonstrates the Port’s commitment to clean air and climate solutions to government and industry partners and the community-at-large. At the same time, our goal is to sustain and strengthen the Port’s competitiveness in the cargo shipping and real estate development industries through this work.

Progress in this sector should position the Port for sustained commercial success, for example by increasing the efficiency of port operations and by transitioning to lower cost-of-ownership technologies as they become available. Because of the Port's access to clean, affordable electricity from Tacoma Power, there will be a strong emphasis on electrifying buildings, vehicles, and equipment in the coming years and decades.

### **5.7.1 Emissions from Fleets and Facilities**

Fleets and facilities are the smallest source of emissions in the scope of all emissions targeted by the Northwest Ports Clean Air Strategy as a whole but are a significant part of the Port of Tacoma's emissions profile. DPM emissions from fleets and facilities are negligible but make up the largest source of GHG emissions attributable to the PoT.

### **5.7.2 Level of Influence**

Emissions in this sector come from both port-owned and operated fleets and facilities, and PoT tenant's fleets and facilities, meaning there are different levels of influence depending on the management of the assets. Since the formation of the NWSA, most of the marine terminal properties owned by the PoT have been licensed to the NWSA, meaning that the NWSA is now responsible for their management. These properties are covered by the NWSA's Implementation Plan. The remaining properties not licensed to the NWSA, primarily industrial and commercial, are covered by the actions in this implementation plan. The Port of Tacoma is a "landlord port"; many of these buildings and facilities are leased to tenants, which constrains the Port's control over the energy use and management. Tenants manage the day-to-day operations occurring on facilities, pay the utility bills, and in many cases perform routine maintenance. Tenants may be motivated to make energy efficiency improvements if they will save money on utility bills in the long run. The PoT can help assess the business case for energy efficiency improvements and connect tenants with incentives to incentivize making them. The most practicable pathway is likely for the parties to agree to consider cost effective energy efficiency upgrades and to collaborate on claiming incentive and grant funding to help offset costs.

The PoT can influence tenant fleet purchase decisions in a similar manner as can be done in the CHE sector, by negotiating requirements into the lease agreements. Agreements for facility maintenance and upgrades are covered in lease agreements and could include energy efficiency upgrades.

The PoT also owns and operates its own fleet of vehicles and equipment, and operates some buildings itself, such as the Port Administration Building. The PoT has full operational control and ownership of these assets, presenting an opportunity for leadership in the energy efficiency and clean fleets space.

### **5.7.3 State of Technology**

#### Facilities

Electricity can be used in buildings to provide power to heat and cool buildings, water and for cooking. Many cities and counties have begun banning the use of natural gas for heating in new

buildings<sup>17</sup>, such as the City of Seattle changing their energy code in 2021 to ban installation of natural gas to provide heating in new commercial and apartment buildings<sup>18</sup>. The City of Tacoma also passed a resolution in 2021 prohibiting all new buildings built by the City from using natural gas and other fossil fuels for heating, lighting and power from 2022 onwards, and will assess the potential impact of expanding this rule to new residential and commercial buildings<sup>19</sup>. Regulations have not yet restricted natural gas use for industrial facilities. State-level legislation was proposed in Washington but didn't move forward in the 2021 session<sup>20</sup>. The U.S. Energy Information Administration reports that 1 in 4 homes are now entirely powered by electricity<sup>21</sup>. However, port tenants use natural gas in buildings for a range of uses, far beyond cooking and heating, and approximately 93% of commercial buildings in the U.S use non-electric heating fuel, according to the Lawrence Berkeley National Laboratory<sup>22</sup>.

Tracking and reducing energy use at PoT facilities is also complicated by the way in which electricity and natural gas is metered, and by the complex array of relationships through which energy use and costs are distributed between the Port and its tenants. To assess the potential impact of reducing and eliminating natural gas use in port buildings, the PoT will assess the current inventory and uses of natural gas use in facilities and assess alternative energy sources for these uses.

There are a large number of types of energy efficiency measures that can be taken on port buildings and facilities including but not limited to: upgrading yard and interior lighting to modern light emitting diode (LED), upgrading building HVAC systems, upgrading windows and switching from natural gas heating to electric heating. As new buildings and facilities are built, energy codes generally prescribe best practices in energy efficiency. However, efficiency improvements can also be retrofitted to existing buildings and facilities. Utilities' conservation programs are often a good source of incentive funding to help make energy efficiency retrofits cost effective.

### Vehicles

Electricity will be a key energy source in helping us meet our NWPCAS goals since in Tacoma, electricity is a very low carbon source of energy. The local utility, Tacoma Power, sources more than 90% of its electricity from hydropower and overall, their energy is 99% less carbon intense than diesel. In addition, electricity is cheaper on a per unit of energy basis than diesel and electric drivetrains require less maintenance and are more efficient than internal combustion drivetrains, indicating the potential for electric drive equipment to be a disruptive technology.

Battery electric, zero emission versions of light duty vehicles are broadly commercially available, and pickup trucks are nearing commercial availability<sup>23</sup>. While zero emission vehicles are, or will soon be, commercially available, they are still more expensive than gasoline and diesel vehicles to purchase and require charging infrastructure to support. Some projections have stated that 2025

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<sup>17</sup> [San Jose, Oakland join growing list of California cities to ban natural gas construction | Smart Cities Dive](#)

<sup>18</sup> [Mayor Durkan Announces Ban on Fossil Fuels for Heating in New Construction to Further Electrify Buildings Using Clean Energy - Office of the Mayor \(seattle.gov\)](#)

<sup>19</sup> [City of Tacoma - File #: RES40776 \(legistar.com\)](#)

<sup>20</sup> [Washington Legislature Considers State-Level Natural Gas Ban \(natlawreview.com\)](#)

<sup>21</sup> [One in four U.S. homes is all electric - Today in Energy - U.S. Energy Information Administration \(EIA\)](#)

<sup>22</sup> [LBNL-Electrification-of-Buildings-2018.pdf \(msu.edu\)](#)

<sup>23</sup> <https://www.caranddriver.com/ford/f-150-electric>

is roughly the year that passenger cars will reach price parity<sup>24</sup>, while price parity is likely further away for pickup trucks and other heavier vehicles.

#### 5.7.4 Action Plan

The main programmatic priorities in this sector over the next five years are:

1. Work with tenants to identify cost effective energy efficiency projects and incentive funding
2. Perform an assessment of natural gas use in port owned and leased facilities
3. Accelerate the adoption of zero emission vehicles into the port’s own fleet
4. Planning and installing the EV charging infrastructure necessary to enable that transition
5. Encourage and assist tenants to adopt zero emission fleet vehicles

Table J: Actions to be taken by 2025 to reduce emissions from Administrative Sector: Facilities and Fleets

Action	Timeline	Roles and Responsibilities
<i>Facilities</i>		
<p><b>1. Increase energy efficiency and clean energy usage in existing Port buildings and facilities</b></p> <ol style="list-style-type: none"> <li>a. Create a Sustainable Facilities Working Group that meets regularly to identify and prioritize potentially cost-effective opportunities to increase energy efficiency and/or clean energy use in Port and tenant buildings and facilities</li> <li>b. In partnership with Tacoma Public Utilities, conduct energy audits/assessments on top-ranked opportunities, beginning with lighting and HVAC (heating, ventilation, and air-conditioning) systems in larger buildings (e.g. administration buildings) and exterior lighting at PoT buildings.</li> <li>c. Continue to seek external funding support (e.g. grants, utility rebates) for top-ranked opportunities; incorporate funding into port budgets as needed to support priority projects.</li> </ol>	<p>2021-2025+</p>	<p>Lead: AQSP Support: Real Estate, Commercial, Maintenance, Engineering</p>
<p><b>2. Work with the Sustainable Facilities Working Group to develop and implement a Sustainable Building &amp; Infrastructure Policy</b></p>	<p>Interim guidelines</p>	<p>Lead: AQSP, in close partnership with Real</p>

<sup>24</sup> <https://about.bnef.com/blog/electric-cars-reach-price-parity-2025/>

<p>to guide design and construction of new Port buildings, as well as major remodels and infrastructure projects</p> <ul style="list-style-type: none"> <li>a. Develop interim guidelines to be considered in new design and construction and major remodels while the Sustainable Building Policy is being developed, finalized, and adopted</li> <li>b. Do a scan of best practices in sustainable design and construction policies and programs in a port/public agency context (e.g. available frameworks, model policies, etc.)</li> <li>c. Include in the Sustainable Building Policy the Port’s policy on natural gas use in buildings <ul style="list-style-type: none"> <li>i. Complete a detailed inventory of natural gas use in Port-owned and leased buildings</li> <li>ii. Track implementation of the City of Tacoma’s “Decarbonization Resolution,” including assessment of the benefits and costs of prohibiting natural gas use in new commercial buildings</li> <li>iii. Assess the business case for choosing natural gas or electric options in buildings and facilities to inform future investment decisions.</li> </ul> </li> </ul>	<p>adopted by end of 2021</p> <p>Policy adopted by 2022</p>	<p>Estate, Maintenance, Engineering</p>
<p><b>3. Create a policy and program to help tenants identify and finance opportunities for cost-effective energy efficiency and clean energy improvements</b></p> <ul style="list-style-type: none"> <li>a. Consult with tenants and developers on policy and program development.</li> <li>b. Engage tenants regularly to identify and pursue as appropriate cost-effective energy efficiency or clean energy upgrades.</li> <li>c. Maintain a pool of Port funding for energy efficiency audits conducted by a consultant.</li> </ul>	<p>2021-2025+</p>	<p>Lead: AQSP Support: Commercial/Real Estate, Operations</p>

<p>d. Work with the utility to identify and secure incentive funding to support energy efficiency projects.</p>		
<i>Fleets</i>		
<p><b>4. Plan/install EV charging infrastructure for Port vehicles:</b></p> <p>a. Map out infrastructure needs for Port and tenant vehicles through the South Harbor Electrification Roadmap (SHERM)</p> <p>b. Install EV charging at new Port Administration Building</p> <p>c. Install additional charging stations needed for Port fleets at other Port locations, as identified in the SHERM</p>	<p>Complete SHERM by the end of 2022</p>	<p>Lead: AQSP Support: Real Estate, Engineering, Security, Maintenance, Finance</p>
<p><b>5. Develop a Sustainable Fleet Plan for transitioning the Port’s entire vehicle fleets to zero-emission vehicles by 2050 at the latest</b></p> <p>a. Track the development and total-cost-of-ownership of electric SUVs, vans, security vehicles, light-duty trucks</p> <p>b. Review best practices in sustainable public fleet management, including the use of decision-making tools that help fleet managers compare the total cost of ownership across vehicle choices</p> <p>c. Create a plan for transitioning the Port’s Administration fleet to zero emission or plug in hybrid by 2030.</p> <p>d. In the meantime, during the development of the Sustainable Fleet Plan, unless infeasible for specified reasons, purchase only plug-in hybrid or electric vehicles for the Port’s fleet(s)</p> <p>e. Seek external funding for acceleration of adoption of zero-emission vehicles and associated charging infrastructure (i.e. through rebates and grant funding)</p>	<p>By June 2022</p>	<p>Lead: AQSP Support: Real Estate, Engineering, Maintenance</p>
<p><b>6. Strengthen the Port’s commute trip reduction program</b> (expanded teleworking, improved access to transit, etc.)</p>	<p>By June 2022</p>	<p>Lead: Human Resources Support: AQSP</p>
<p><b>7. Develop a program for encouraging tenants to transition</b> to zero-emission vehicles and equipment and implement commute trip reduction programs.</p>	<p>Program in place by end of 2022</p>	<p>Lead: AQSP Support: Real Estate, Maintenance, Legal</p>

## 6. Summary of Milestones

The following table summarizes the major milestones we hope to achieve during our five-year implementation plan. For each milestone, we have provided a timeframe over which we will strive to achieve it. It is important to note, however, that achieving most of these milestones in the timeframe described is not fully in the control of the PoT and will need certain external conditions to be met. In some cases, significant external funding is needed. The major external conditions are described in the conditions for success column of the table below.

Table K: Summary of PoT Milestones

Milestone	Targeted Timeframe	Conditions for Success	Benefits
<b><i>Cross Cutting</i></b>			
Complete the South Harbor Electrification Roadmap	By the end of 2022	- Partners are willing to share data in a timely manner	- Allow development of a capital program to deliver infrastructure as needed. - Be prepared to apply for external funding to support this capital program.
Establish strong community partnerships and begin investing in community led air quality projects	By the end of 2022	- Willing and able community partners	- Build trust and collaborative relationship with our communities - Mitigate community air pollution impacts
Establish tenant engagement workshops	By the end of 2022	-Tenants are willing to engage and attend	-Build trust and collaborative relationship with our tenants -Communicate funding opportunities -Information sharing - Peer learning
<b><i>Locomotives</i></b>			
Support partners in completing at least one locomotive repower project	By the end of 2025	- Locomotive operating partners are willing to partner with our agency partners on a repower project. - Agency partners are willing to administer the grant, or we are able to dedicate staff resources to administer the grant -Funding is awarded	- Reduce DPM 0.1 tons per year

<b><i>Harbor Vessels</i></b>			
Support partners in completing at least one tug repower project	By the end of 2025	<ul style="list-style-type: none"> <li>- Tug operating partners are willing to partner with our agency partners on a repower project.</li> <li>- Agency partners are willing to administer the grant, or we are able to dedicate staff resources to administer the grant</li> <li>-Funding is awarded</li> </ul>	- Reduce DPM 0.1 tons per year
<b><i>Administration (Fleets and Facilities)</i></b>			
Complete natural gas building inventory	By June 2022	<ul style="list-style-type: none"> <li>- Partners are willing to share data in a timely manner</li> </ul>	<ul style="list-style-type: none"> <li>-Establish baseline of natural gas use in port buildings</li> <li>-Inform future natural gas policy</li> </ul>
Identify and complete one energy efficiency or clean energy project	By the end of 2025	<ul style="list-style-type: none"> <li>- Adequate incentive funding is awarded to ensure that the project satisfies rate of return requirements laid out in our master policy</li> <li>- Where electricity bills are not paid by PoT, tenants are willing to partner with us to fund the project</li> </ul>	<ul style="list-style-type: none"> <li>- Reduce energy consumption and costs</li> <li>- Emission benefits likely small but non-zero, magnitude depends on project.</li> </ul>

## 7. External Funding Strategy

Achieving the vision of the NWPCAS 2020 will require monumental investments in clean technology across the marine transport, trucking, port terminal operations, light and medium duty vehicle and rail sectors, along with the supporting infrastructure. Given the magnitude of this challenge, the PoT recognizes that we can't do this alone; significant investments will be needed from industry, governments, and other external partners to transition to zero emission port operations. We have identified where external funding could expand and accelerate our efforts towards a zero-emission future, and where the PoT will focus our efforts on raising funding to accelerate this work.

### **South Harbor Electrification Roadmap:**

***Sponsor: Northwest Seaport Alliance and Port of Tacoma***

***Total cost: \$500k***

***PoT Funds: \$50k [10%]***

***NWSA funds: \$250k [50%]***

***External funds: \$200k [40%]***

This study will provide a flexible plan to deliver energy infrastructure to support future needs including vessel shore power, zero emission cargo handling equipment, and charging for electric light duty fleets, and others. External funding and support will allow us to do more in-depth engineering on specific short-term projects identified as high priority in the plan and allow us to take a more comprehensive look at innovative energy solutions like storage, on-site generation, and connected microgrids.

#### **Zero Emissions Technology Assessment:**

***Sponsor: Ports of Seattle, Tacoma and Northwest Seaport Alliance***

***Total cost:*** \$260,000

***Port funds:*** \$86,667 [33%]

***External funds:*** \$173,333 [67%]

Zero- and near-zero-emissions technologies are advancing rapidly, and the availability, performance and cost of technology as well as the availability of warranties and service in the PNW market are all important factors which will have a significant impact on the ability of the ports, terminal operators, trucking companies, vessel operators, utilities and others to transition to these technologies. The Ports envision conducting periodic assessments in multiple sectors.

#### **EV Charging Stations and the New Port of Tacoma Administration Building:**

***Sponsor: Port of Tacoma***

***Total cost:*** \$903k

***Port funds:*** \$451k [50%]

***Other external funds:*** \$451k [50%]

Transitioning the Port of Tacoma's light duty vehicle fleet to zero emissions is a critical early action as these vehicles are commercially available at moderate incremental cost today. A major obstacle is the charging infrastructure required to support this fleet. In the next five years, the Port of Tacoma will be relocating its administration building and we plan to install charging infrastructure for zero emission vehicles at this facility. At a minimum, 15 chargers will be installed to support the Port's fleet. External funding would allow us to install an additional 15 units for employee and public charging.

#### **Transition the Port of Tacoma's Administrative Fleet to Zero Emissions**

***Sponsor: Port of Tacoma***

***Total cost:*** \$600k

***Port funds:*** \$475k [75%]

***Other external funds:*** \$125k [25%]

Transitioning the Port of Tacoma's light duty vehicle fleet to zero emissions is a critical early action on our work to phase out emissions. Having the incremental cost of purchasing electric vehicles as opposed to gas vehicles covered by external funding would allow us to move faster in replacing this fleet.

#### **Lighting and Building Energy Efficiency Projects**

***Sponsor: Northwest Seaport Alliance and Port of Tacoma***

***Total cost:*** \$5.2M

***Port funds:*** \$500k [10%]

***Tenant funds:*** \$2.1M [40%]

***Other external funds:*** \$2.6M [50%]

Improving the energy efficiency of our facilities is a critical component of reducing emissions associated with energy usage and by reducing existing demand on the grid. Projects include yard lighting retrofits to move to high efficiency LED lighting, and we could perform at least three significant building energy efficiency projects in the next 5 years given sufficient funding. Since tenants bear the responsibility of paying utility bills, they would pay the majority of matching funds to make these projects happen.

## 8. Budget and Timeline

The workplans for the next five years are summarized in the tables below including itemized costs and indication of whether each expense can be capitalized. These workplans, built from the sector action plans above, represent the PoT's year-by-year action plans and budgets for implementing the NWPCAS over the next five years and will be revised annually as part of our adaptive management process. The distinction between capital and expense projects is quite important because they are budgeted for separately and each have different tax implications to the NWSA and home ports.

The Port of Tacoma's overall operating budget is approved on an annual basis at a public meeting and voted on by Port of Tacoma Commissioners. Although a project may be included in this annual budget and approved by the PoT Commission, individual projects have to undergo an additional project authorization process by the relevant Port Department, Executive Director authorization or at a separate Commission approval at a subsequent public meeting, dependent on the level of funding required. All public meeting materials are posted beforehand on the Port of Tacoma website, and meetings are open for public comment<sup>25</sup>.

Table L: 2021-2025 Workplan

Action	Cost	Capital/ Expense
<b><i>Cross Cutting</i></b>		
Industry engagement	\$25k/year	Expense
Community engagement	\$50k/year	Expense
Policy engagement – International, Federal, State, and Local	\$10k/year	Expense
South Harbor Electrification Roadmap	\$50k	Expense
Technical support	\$20k/year	Expense
Annual reporting and communication	\$20k/year	Expense
Puget Sound Maritime Air Emissions Inventory	\$50k net (projected: \$400k total shared by all participating ports)	Expense
Annual technology assessment	\$20k/year	Expense

<sup>25</sup> [Commission | Port of Tacoma](#)

Joint NWPCAS Implementation Report (rotating contract between ports – once every 4 years)	\$20k	Expense
<b><i>Ocean-Going Vessels</i></b>		
Vessel fleet shore power capability analysis	Staff time only	Expense
Vessel emission reduction initiatives study	\$15k	Expense
<b><i>Locomotives</i></b>		
Meeting with Tacoma Rail and PSCAA annually	Staff time only	Expense
Support or lead funding applications to support locomotive repowers	Staff time only	Expense
Develop advocacy position to advance funding for locomotive emission reductions and improve environmental performance	Staff time only	Expense
<b><i>Harbor Vessels</i></b>		
Support partner efforts to secure funding for tug repowers	Staff time only	Expense
Develop advocacy position to advance funding for tug emission reductions and improve environmental performance	Staff time only	Expense
<b><i>Administration (Fleets + Facilities)</i></b>		
Tenant Energy Efficiency Program	\$20k/year	Expense
Energy Efficiency upgrades	\$250k	Capital
Natural Gas Building Inventory	\$30k	Expense
Energy assessments	\$20k/year	Expense
TPU Evergreen Power	\$10k/year	Expense
Clean Fleet Plan	\$20k	Expense
EV charging infrastructure at new Administration Building	\$450k	Capital
EV Admin vehicle fleet	\$600k	Capital
Support and strengthen Commute Trip Reduction program	Staff time only	Expense
Pursue grant funding to support tenant and PoT clean building and fleet projects	Staff time only	Expense
<b>Total Expense over Implementation Plan period</b>	<b>\$1,160k</b>	<b>-</b>
<b>Total Capital over Implementation Plan period</b>	<b>\$1,300k</b>	<b>-</b>

## 9. Reporting

The PoT will use two reporting media to communicate our progress. First is the annual Progress Report jointly produced by the four NWPCAS participating ports. The purpose of the joint report is for the ports to collectively report progress towards shared objectives, actions, and metrics as well as for each port to report individual progress towards actions in their own implementation

plans. The PoT will report progress against metrics detailed in the NWPCAS and against milestones laid out in section 6 above.

In addition to the joint NWPCAS report, the PoT will collaborate with the NWSA to construct an abbreviated digest (called The NWSA Clean Air and Climate Digest) on an annual basis, detailing our progress in a concise and accessible way. This digest will focus on the highlights of our implementation actions and achievements in the Tacoma harbor over an implementation year and give a brief preview of the year to come.

DRAFT