Accelerating Zero-Emission Technology Deployment at Puget Sound Ports

US EPA FY 2024 Clean Ports Program
Grant Application

Project Narrative



Submitted by:

The Northwest Seaport Alliance

Project Title	Accelerating Zero-Emission Technology Deployment at Puget Sound Ports
Applicant Information	*Applicant Name/Organization:* Northwest Seaport Alliance (NWSA) *Address (Street, City, State, Zip):* One Sitcum Plaza, Tacoma, WA 98421-3000 *Contact Name, Title/Role, Phone Number, and Email Address:* Steve Nicholas, Senior Manager, Air Quality & Sustainable Practices, (253) 888-4713, snicholas@nwseaportalliance.com
Type of Eligible Applicant	Port Authority
Budget Summary	*EPA Funding Requested*: $499,982,542 *Applicant Costs*: $140,287,318 *Total Project Cost*: $640,269,860 Project is scalable; minimum funding $375 million
Project Locations	*Names of Ports:* Port of Seattle, Port of Tacoma *Name of Port Authority, if applicable:* Northwest Seaport Alliance *County, City, State:* Approximately 30% of activity in Seattle/King County, WA and 70% in Tacoma/Pierce County, WA
Project Period	*Project Start Date:* 1/1/2025 *Project End Date:* 12/31/2028
Short Project Description	The ports' proposal prioritizes the top three sources of seaport-related pollution in our region – vessels, cargo-handling equipment (CHE), and drayage trucks – as well as community engagement programming and capacity. Specific initiatives include installing shore power infrastructure on three major cargo ship terminals, expanding the reach of existing shore power infrastructure at two cruise ship terminals, and installing shore power to serve smaller vessels operating in our region, including the North Pacific commercial fishing fleet; transitioning diesel-powered cargo-handling/non-road equipment on port terminals and properties to zero emission technologies; and incentivizing the deployment of zero-emission drayage trucks in the Puget Sound Region.
Other Potential Federal Funding Sources	Funding for the proposed ZE CHE and ZE Drayage incentive programs is included in a CPRG application in which the NWSA is a sub-awardee.

Section 1 – Project Summary and Approach

a. Overall Project and Proposed Impact

Since the Northwest Ports Clean Air Strategy was unanimously adopted in April 2021, the Northwest Seaport Alliance (NWSA), Port of Seattle (PoS), and Port of Tacoma (PoT) have been working individually, collectively, and with a wide range of industry partners and stakeholders to advance the Strategy's central goal: to phase out all emissions from all seaport-related activities by or before 2050. The EPA Clean Ports Program is an unprecedented opportunity to accelerate progress toward a "tipping point" to fully decarbonize our seaports within the next 25 years. To make the most of this exciting opportunity, we propose a suite of high-impact projects and programs at NWSA, PoS and PoT that will:

- Significantly reduce air and climate pollution from maritime activities in the Puget Sound region, especially in disadvantaged communities near port terminals and major freight corridors.

- Deliver healthier air for near-port residents as well as the tens of thousands of people who work on or near port facilities.
- Preserve and improve the quality of thousands of port-related jobs – from dock workers to vessel-operators and truckers – while creating new opportunities in the clean energy economy.
- Significantly strengthen the ports' capacity to meaningfully engage and partner with near-port communities and other stakeholders.
- Bolster the ports' role as catalysts of large-scale, transformational sustainability and decarbonization across the broader maritime and freight industries – locally, nationally, and globally.
- Advance the goals of EPA's Strategic Plan, the National Blueprint for Transportation Decarbonization, the National Zero-Emission Freight Corridors Strategy, and Justice 40.

Suite of Projects – Total Ask = $499.9 million

Installing Vessel Shore Power Infrastructure	$144.7 million
Deploying ZE Cargo-Handling Equipment	$269.7 million
Deploying ZE Drayage Trucks	$47.0 million
Deploying ZE Vessels	$18.9 million
Strengthening Community Engagement & Workforce Development	$3.5 million
Ensuring Effective Program Administration	$16.1 million

The proposed suite of projects and programs is transformational. All deployments will comply with the conditions of the recently issued limited waiver of BABA requirements, and will occur in or near disadvantaged, overburdened communities. More than 98% of the requested funds will be used for the purchase and installation of ZE vehicles, equipment, and infrastructure (including shore power infrastructure for vessels), far exceeding EPA's 50% target and resulting in a "critical mass" of ZE vehicles, equipment, and infrastructure at our seaports. This includes projects to double the number of shore power installations on cargo terminals, reaching close to 70% of all our terminals, including our 5 largest container terminals; increase the number of pieces of ZE CHE at our seaports from 6 to more than 260, comprising about 30% of the total fleet; and double the number of ZE drayage truck deployments, from about 100 to about 200. Increased funding for our ZE CHE and Drayage incentive programs will solidify those programs as ongoing mechanisms to encourage and enable marine terminal operators, railyard operators, and trucking companies to fully transition to 100% ZE technologies over the next 20 years.

Installing Vessel Shore Power Infrastructure: *Cargo Ship Terminals*: The NWSA requests $105.7 million plus project management costs to install shore power infrastructure at three container terminals: Terminal 18, Washington United Terminals, and Pierce County Terminal. This builds on existing investments in shore power at three other terminals and advances our goal of installing shore power on all major container terminals by 2030. *Cruise Ship Terminals*: The Port of Seattle requests $17.6 million to enhance existing shore power infrastructure for cruise ships at Terminal 91 and Pier 66, adding new connection points that will advance the Port's goal of achieving a 100% connection rate. *Commercial Fishing Shore Power Modernization*: The PoS requests $21.4 million to upgrade shore power capacity for fishing vessels at its Terminal 91 facility, supporting modernization of the vital North Pacific Fishing Fleet.

Deploying ZE Cargo-Handling Equipment: In partnership with three operating partners and the Port of Tacoma, the NWSA requests $269.7 million to purchase 140 electric yard tractors, 28 electric top-handers, 6 electric side handlers, 1 electric reach stacker, 14 electric RTG cranes, 30 electric forklifts, and associated charging equipment. In addition, the NWSA proposes $30 million to expand our Zero Emission CHE Incentive Program, which will incentivize the deployment of 75 more electric yard tractors and leverage an estimated $7.5 million in private investment.

Deploying ZE Drayage Trucks: The NWSA requests $47M to expand our ZE Drayage Incentive Program, which will incentivize the purchase of approximately 98 ZE drayage trucks with associated

charging/fueling infrastructure. This will leverage an estimated $11.8 million in private investment and accelerate progress toward a tipping point in our efforts to help hundreds of private drayage trucking companies that serve our seaports transition to ZE technologies.

Deploying ZE Harbor Vessels: The PoS, in partnership with Arrow Launch Service, Inc., requests $18.2 million to replace two diesel-powered pilot vessels with fully electric propulsion and install associated charging infrastructure. These pilot boats provide essential services, such as ferrying marine pilots, U.S. Customs, crew, and freight to vessels calling at the PoS. These will be the first electric harbor vessels in Puget Sound, and the infrastructure will support other vessels in the future. The Port of Tacoma requests $0.7 million to purchase an electric workboat and install associated charging.

Strengthening Community Engagement & Workforce Development: The NWSA requests $2.2 million and the PoS requests $1.2 million to strengthen and augment community engagement programs and capacities. Funded activities will include: increasing staff capacity and port participation in community programs and events; organizing two clean ports-focused community roundtables annually; creating a new fund to support community-led projects that advance clean ports goals; continuing support for the Puget Sound Zero Emission Truck Collaborative and enhancing the NWSA's trucker support program; and developing and implementing a ZE Technology Workforce Development Action Agenda for Ports.

Ensuring Effective Program Administration: The NWSA requests $15.4M for program administration, supporting: project management for shore power and CHE charging projects, 4 limited duration FTE to augment the NWSA's program management, grant administration, and financial management capacity and contract support for implementation of the ZE CHE and ZE drayage truck deployment programs. The PoS requests $553,000 and the PoT requests $103,000 to augment their respective program, grant, and financial management capacities.

The foundation is set, and the time is optimal for this infusion of federal support for reducing air and climate pollution at the seaports of Seattle and Tacoma. Momentum is building, particularly since the NWSA, PoS, and PoT unanimously embraced the goal of zero emissions by 2050 or sooner. We have established strong plans and programs and have developed excellent relationships with industry partners – from shippers and vessel-owners to marine terminal operators and drayage trucking companies. Our near-port communities and non-governmental organizations (NGOs) are increasingly engaged in, and supportive of, this work. Recently adopted state policies – notably the Clean Fuel Standard and the Climate Commitment Act – are creating new incentives and revenue streams that support our efforts and encourage private sector investment. We have experienced, committed project management teams in place and ready to seize this opportunity.

b. Partnership and Collaboration

The Northwest Seaport Alliance (NWSA) is a marine cargo operating partnership of the ports of Tacoma and Seattle. The NWSA will be the prime awardee and main point of contact with EPA overseeing and coordinating the Clean Ports grant. In addition to overall program management, the NWSA will:

- Lead design and implementation of the shore power installations at Terminal 18, Washington United Terminals, and Pierce County Terminal; provide the matching funds for these projects; and own the installed equipment.
- Purchase ZE cargo handling equipment for NWSA-managed facilities (a breakbulk cargo terminal and an off-dock container yard); install charging infrastructure for that equipment; provide the matching funds for these projects; and own the purchased and installed equipment.
- Provide and administer participant support costs to three private operating partners who will purchase ZE CHE for their fleets and install associated charging infrastructure (details below).

- Manage expansion of the ZE CHE Incentive Program, through which participant support costs will be disbursed (through a competitive application process) to incentivize additional ZE CHE deployments by NWSA operating partners at port facilities in Seattle and Tacoma.
- Manage expansion of the ZE Drayage Incentive Program, though which participant support costs will be disbursed (through a competitive application process) to incentivize ZE drayage truck deployments by trucking companies and charging/fueling infrastructure developers.
- Provide and administer subawards to the ports of Seattle and Tacoma for the program elements they will lead (details below).
- Appoint a Clean Ports Program Coordinator who will meet quarterly with the Clean Ports Program Team, which will consist of key staff from the two sub-awardees (PoS and PoT) and main private partners (Husky Terminal, Washington United Terminals, Ports America, Arrow Launch Services).

Operating Partners: Husky Terminal & Stevedoring (Husky) leases and operates the NWSA's Husky Terminal, located at Piers 3 and 4 in Tacoma. Husky Terminal was recently renovated to accommodate the largest ships in the Pacific trade and is beginning a project, partially funded through the Port Infrastructure Development Program (PIDP), to re-align the terminal's backlands to maximize efficiency, install additional refrigerated container plug-in points, and expand terminal electrical capacity to support future electrification. Partially funded by a DERA award, shore power is already being installed at the terminal with completion expected by early 2025. Husky has a strong commitment to decarbonization, with an established target to achieve net-zero emissions by 2040 and an implementation plan in place to achieve it. Funding support from this grant will allow Husky to transition their entire CHE fleet to zero emissions, significantly accelerating progress towards their net zero goal and serving as a model for other terminals in our cargo gateway and beyond. Husky will lead implementation of these projects, provide the match funding, and own the purchased equipment and the installed infrastructure. Washington United Terminals leases and operates the NWSA's "Washington United Terminal" (WUT), which is one of the three large international container terminals in Tacoma. WUT joined the Green Marine program in 2024 to help guide improvement in their environmental performance. Funding support from this grant will enable WUT to make a transformational investment in ZE yard tractors. They will lead implementation of the project, provide the matching funds, and own the purchased equipment and installed infrastructure. Ports America, the stevedoring partner of Wallenius Wilhelmsen, operates equipment at East Blair 1 Terminal (EB1) in Tacoma. Ports America has a strong commitment to integrating Environmental, Social, and Governance principals into their operating framework, and has a corporate sustainability goal of net-zero emissions by 2050. Funding support from this grant will enable Ports America to begin their transition to ZE equipment in Tacoma. They will lead project implementation, provide the matching funds, and own the purchased and installed equipment.

Sub-Award to Port of Seattle: The Port of Seattle (PoS) will lead the design and implementation of the shore power upgrades at its cruise terminals and commercial fishing terminal, as well as charging infrastructure for electric harbor vessels at Pier 66. They will provide the matching funds and will own the installed equipment. In addition, the PoS will provide and administer participant support costs to Arrow Launch Services to purchase two electric pilot boats. Arrow Launch Services will provide the matching funds for these purchases and will own the boats. ***Sub-Award to Port of Tacoma:*** The Port of Tacoma (PoT) will purchase ZE cargo handling equipment for its own fleet and install the associated charging infrastructure. It will provide the match funding and own the purchased equipment.

Utility Coordination: The NWSA and the ports of Seattle and Tacoma have excellent, long-standing relationships with all three of the utilities who serve our gateway: Seattle City Light, Tacoma Power, and Puget Sound Energy. We are nearing completion of two energy planning studies (the Seattle Waterfront Clean Energy Strategy (SWCES) and the South Harbor Electrification Roadmap (SHERM)) that assess the electrical demands and infrastructure needs associated with electrifying our port facilities. We are actively engaged with our utilities to understand the grid upgrades that may be required to implement

the projects proposed in this application, as documented in the utility engagement forms. We are committed to working with our utilities to ensure that adequate electrical capacity is available to serve the projects proposed and believe the capacity will be available within the grant period of performance.

c. Coordination with Complementary Initiatives

This proposal complements and advances numerous local, state, and federal initiatives, while leveraging an estimated $82 million in private sector investment. State policies, strategies, and plans that will benefit our proposal include the Clean Fuels Standard, Climate Commitment Act (CCA), Advanced Clean Truck Rule, and recently adopted Transportation Electrification Strategy. In addition, our proposal aligns well with the CPRG-funded regional Priority Climate Action Plan and the local and regional climate action plans adopted by the cities of Seattle and Tacoma, Pierce and King counties, the Puget Sound Regional Council, and the Puget Sound Clean Air Agency. It advances the goals of the Duwamish Valley Clean Air Action Plan, a community-led program that identifies reducing diesel emissions from heavy-duty vehicles as a priority in the overburdened near-port communities of Georgetown and South Park.

The shore power elements build on federal investments (EPA DERA grants for shore power installations at TOTE and Husky terminals in Tacoma and Pier 66 cruise ship terminal in Seattle) and $28 million in state CCA funding for the shore power installation at Terminal 18 in Seattle.

All the proposed ZE CHE investments build on the successful first deployment of six electric yard tractors at the NWSA's South Intermodal Yard in Tacoma, which was supported by a DERA award in 2020. These projects also leverage an estimated $58 million in private sector investment and two Port Infrastructure Development Program (PIDP) awards: a $54 million PIDP grant to support the expansion of Husky Terminal, which included electrical upgrades to enable future electrification; and a $15.7 million PIDP grant to the Port of Tacoma to develop the Thorne Road Off-Dock Container Yard.

The proposed expansion of the NWSA's ZE Drayage Incentive Program, set to launch in September 2024, builds on $47 million in state and federal funding already secured for this program, including: $2.8M through the FHWA Congestion Mitigation and Air Quality (CMAQ) program; $12 million through the FHWA Charging and Fueling Infrastructure program; $16 million from the FHWA Reducing Truck Emissions at Ports program; $6.3 million in CCA revenues from the State of Washington; and approximately $10 million from the USDOE's Regional Clean Hydrogen Hubs Program. The NWSA is seeking an additional $32 million for this program from the EPA Climate Pollution Reduction Grant (CPRG) program, as a sub-awardee on an application submitted by the Puget Sound Regional Council. In addition, this element of the proposal leverages an estimated $12 million in private sector investment and supports several other state and federal initiatives, including: the National Zero Emission Freight Corridors Strategy (which was the focus of a recent White House Roundtable on Zero Emission Freight Infrastructure that the NWSA was honored to attend); the U.S. National Blueprint for Transportation Decarbonization; and the State of WA's soon-to-launch Medium- and Heavy-Duty (MHDV) Zero-Emission Vehicle and Infrastructure Incentive Program.

Finally, both the ZE CHE and ZE Drayage incentive program elements support the Pacific Northwest Hydrogen Hub, funded through the DOE's Regional Clean Hydrogen Hubs Program, by creating more end-use demand for hydrogen. Given the high cost of hydrogen fuel cell mobile equipment, creating hydrogen demand in our region through the Clean Ports program is an important co-benefit. Because hydrogen in the PNW Hydrogen Hub will be generated via electrolysis using clean power, the upstream emissions from producing the hydrogen will be very low.

d. Project Risk Mitigation

The NWSA will ensure project success by working with sub-awardees and implementation partners to anticipate and mitigate potential project risks.

Shore power is a proven technology already deployed in our region. The primary risk during construction is schedule, as many electrical components can have long lead times. We will work with our

contractors to start procurement of electrical gear as early as possible, and where possible, prioritize suppliers with shorter lead times and a record of delivering products on time. We will maximize flexibility of the shore power systems by engaging shipping lines and terminal operators to optimally locate connection points and consider alternatives to traditional fixed vault technologies.

From our extensive engagement with trucking companies in our region, we know that key challenges associated with the transition to **ZE drayage truck** include: 1) lack of local familiarity with and confidence in ZE truck technology; 2) lack of local ZE truck maintenance and repair services; and 3) the costs for ZE trucks and charging infrastructure, which are 10 times the cost of the used diesel trucks that most of our drayage companies own and operate. Our proposal mitigates these risks in three ways: 1) the ZE Drayage Incentive Program will lower the cost of entry for trucking companies, and smaller companies will be eligible for larger incentives (up to 80% of total project costs); 2) the enhanced trucker engagement program will provide a range of support services to help trucking companies navigate this transition; and 3) with funding already secured via an FHWA "Reducing Truck Emissions at Port Facilities" grant, the NWSA-led Puget Sound Zero Emission Truck Collaborative will develop a regional strategy for addressing ZE truck maintenance and repair needs.

The proposed **ZE CHE** projects will require substantial electrical infrastructure upgrades and equipment purchases from a limited number of domestic OEMs, which pose both schedule and financial risks. To mitigate procurement risks, operators have already engaged with equipment OEMs to signal their demand for equipment and will place their orders as early as possible once funding is awarded. Planning level engineering studies have been conducted on the largest infrastructure improvements to mitigate financial risk and care will taken to procure long lead time electrical equipment as early as possible. Given its scale, the Husky Terminal ZE CHE project incorporates contingencies to mitigate financial risk. The ZE CHE incentive program will seek to solicit and secure participants as early as possible, front loading funding distributions for technology deployments to absorb delays. Applicants that have done significant planning/engineering and engaged utilities will be prioritized.

Availability of BABA-compliant equipment: The limited waiver issued in May 2024 will allow many of the purchases under our proposal to begin immediately, while domestic manufacturing of compliant ZE vehicles accelerates. The NWSA and its sub-awardees and implementation partners will submit orders soon after execution of a grant agreement, to maximize time for deployments. Even with the targeted waiver in place, there are other risks associated with BABA compliance the ports are prepared to manage. For example, the limited timeline for the waiver relies on the availability of BABA-compliant manufacturers in 2028 onwards (2027 for yard trucks). There is a risk that domestic manufacturing does not accelerate to comply with this timeline. We will monitor progress through the Association of American Port Authorities and direct discussions with manufacturers.

Power and Electrical Equipment Availability: The proposed deployments will increase demand for power in our region. To stay ahead of that curve, the ports are nearing completion of comprehensive energy planning studies in both the Seattle and Tacoma harbors and have partnering closely – on those studies and on development of this proposal – with all three of the utilities who serve our region: Seattle City Light, Tacoma Power, and Puget Sound Energy.

e. Applicant Fleet and Infrastructure Description

This proposal spans a range of fleets, including container ships, cruise ships, cargo-handling equipment, drayage trucks, harbor vessels, and commercial fishing. This section provides a high-level description of the fleet and related infrastructure. More detailed data is provided in the fleet description and scrappage sections of the attached Supplemental Application Template.

NWSA container terminal shore power: The NWSA will install shore power connections for container vessels at Terminal 18 (T-18), Washington United Terminal (WUT), and Pierce County Terminal. The table below shows the number of shore power equipped berths to be installed at each terminal and vessel

activity statistics. We expect the number of shore power capable vessels to increase over time as more new builds enter the Pacific trade.

Terminal	Shore Power Installed (# of berths)	Total Vessel Calls	Shore Power Capable Calls	Total at Berth Hours	Shore Power Capable at Berth Hours
T-18	3	289	131	13,440	5,274
WUT	2	98	46	7,618	3,509
PCT	1	93	78	4,229	3,564

Port of Seattle cruise shore power improvements will install additional connection points at existing cruise shore power systems to solve vessel orientation and mid-ship connection point issues preventing plug in of shore power-capable homeport cruise ships.

Terminal	Infrastructure Description	2023 Shore Power Usage	Additional Annual Connections Enabled
Terminal 91 – West Berth	Install additional power connection point at each terminal	76 connections	40 additional calls
Terminal 91 – East Berth		26 connections	20 additional calls
Pier 66		Online in 2024	20 additional calls

Port of Seattle Fishing Vessel Shore Power: The project will install eight new power pits, upgrade three on-terminal substations essential to delivering additional power and provide for higher voltage connection points. These upgrades are needed to ensure that as the North Pacific Fishing Fleet modernizes, ships calling the terminal can connect to shore power. An estimated 59 vessels are anticipated to use the system annually by 2035.

Husky Terminal ZE CHE: Husky will purchase 75 battery electric yard tractors and 26 battery electric top handlers, 6 battery electric side handlers, an electric reach stacker, 14 grid-electric RTG cranes, 10 electric forklifts and install associated charging. This equipment will replace existing diesel equipment and increase fleet capacity matching Husky's terminal expansion plans. Battery energy storage systems will also be installed to reduce peak demand on the grid.

Washington United Terminal ZE CHE: Washington United Terminal will purchase 60 battery electric yard tractors and install associated charging to replace existing diesel equipment in their fleet. Existing electrical infrastructure will be leveraged to support the yard tractor charging, minimizing infrastructure upgrade costs.

WWL/Ports America ZE CHE: Ports America will purchase 3 battery electric yard tractors, 13 battery electric forklifts, and install associated charging stations to replace diesel equipment in their fleet.

NWSA-Owned Cargo Handling Equipment (ZE CHE): The NWSA will purchase a battery electric yard tractor and a battery electric top handler and install associated charging at the new Thorne Road Off-dock container yard facility, and five battery electric forklifts and a top handler, which will be deployed at the East Blair One Terminal. The forklifts will replace existing diesel-powered equipment. The top handlers and the yard tractor are fleet expansions; Clean Ports funding will enable these purchases to be zero emission as opposed to diesel.

Port of Tacoma-Owned CHE: Port of Tacoma will replace two diesel powered forklifts and one yard tractor with battery electric versions.

ZE CHE Incentive Program: The NWSA ZE CHE Incentive Program will be open to all marine terminal operators in the NWSA gateway. Because program participants will be solicited after the grant award is made, the specific equipment that will be purchased/replaced is still to be determined.

ZE Drayage Truck Incentive Program**:** The NWSA ZE Drayage Truck Incentive Program will be open to all trucking companies that meet the Clean Ports Program eligibility requirements and regularly haul cargo to or from port facilities, as verified by gate entry data. To be eligible, trucks to be scrapped will

have to have entered NWSA terminals at least 100 times, which will be verified by NWSA gate entry data. Because incentive recipients will be identified through a competitive application process post-award, the specific ZE trucks that will be purchased, and the age and model year of the trucks that will be scrapped, is not yet known. Similarly, the types and locations of the charging and fueling infrastructure that will be incentivized are to be determined. The ports are actively exploring the potential for ZE truck charging at two port-owned properties in King County – the CEM site and Terminal 25 South.

Port of Seattle ZE Harbor Vessels**:** Two 70-foot pilot boats with unregulated diesel engines, owned and operated by Arrow Launch Services, will be scrapped and replaced with two new battery electric vessels. Charging infrastructure will be installed at the Port of Seattle's Pier 69 to serve both boats.

Port of Tacoma ZE Workboat: One existing gas-powered workboat will be replaced with a battery electric version.

Section 2 – Environmental Results – Outcomes, Outputs, and Performance Measures

a. Expected Project Outputs and Outcomes

A summary of the key outputs and outcomes associated with each project element is provided in the table below. All proposed activities significantly accelerate the transition to zero emission technologies at our ports and will serve as a catalyst for future deployments.

Shore power emission reductions were calculated using the EPA's shore power calculator tool. For container vessels, default energy demand for 8,000 TEU container vessels were used to model two scenarios; connecting all current shore power capable hours (as shown above in the fleet description section) and connecting 90% of all vessel at berth hours. This represents the range of likely shore power usage at these facilities. Cruise vessel shore power emission reductions were calculated based on the projected increase in shore power connections and projected shore power electrical demands.

CHE, truck, and vessel emission reductions were calculated using the EPA's diesel emissions quantifier, with operational data directly from operators as inputs. Emission reductions were calculated based on the fleets displaced if applicable and in cases of fleet expansion were based on the alternative of purchasing a model year 2024 diesel equivalent (the likely outcome in absence of grant funding). Useful lives of 10 years for light and medium forklifts, 12 years for drayage trucks and yard trucks, and 15 years for heavy nonroad equipment were assumed. The ZE CHE Incentive program emission reduction estimates assumed replacement of 40 Tier 2 and 35 Tier 4 yard tractors and the ZE drayage incentive program assumed replacement of 98 2013 diesel trucks.

Anticipated Outputs and Outcomes		
Activities	**Outputs**	**Outcomes**
T-18 Shore Power	Three vessel berths equipped with shore power; at least three connection points per berth Power distribution infrastructure installed to supply shore power connections	Reductions over 30-year life: - **Emissions** (metric tons): - GHGs: 123,510 – 245,130 - $PM_{2.5}$: 29.1 – 57.8 - NO_x: 2,136 – 4,239 - **Fuel Usage** (metric tons): 38,054 – 75,524
WUT Shore Power	Two vessel berths equipped with shore power; at least three connection points per berth Power distribution infrastructure installed to supply shore power connections	Reductions over 30-year life: - **Emissions** (metric tons): - GHGs: 73,470 – 140,550 - $PM_{2.5}$: 17.3 – 33.2 - NO_x: 1,269 – 2,428 - **Fuel Usage** (metric tons): 22,657 – 43,344

Anticipated Outputs and Outcomes		
PCT Shore Power	One vessel berth equipped with shore power; at least three connection points per berth Power distribution infrastructure installed to supply shore power connections	Reductions over 30-year life: - **Emissions** (metric tons): - GHGs: 73,470 – 78,180 - $PM_{2.5}$: 17.3 – 18.5 - NO_x: 1,269 – 1,350 - **Fuel Usage** (metric tons): 22,657 – 24,109
Husky ZE CHE	75 electric yard tractors purchased 26 electric top + 6 side handlers purchased 1 electric reach stacker purchased 10 electric forklifts purchased 14 electric RTG cranes purchased 118 chargers installed 14 RTG grid connections installed 4 battery energy storage systems installed 32 diesel engines scrapped	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 62,648 - $PM_{2.5}$: 19.4 - NO_x: 376 - **Fuel Usage** (gal): 6,138,385 Establish replicable model of fully electrified terminal.
WUT ZE CHE	60 battery electric yard tractors purchased 30 electric yard tractor chargers installed 60 diesel engines scrapped	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 14,397 - $PM_{2.5}$: 33.1 - NO_x: 378 - **Fuel Usage** (gal): 1,410,696
Ports America ZE CHE	3 electric yard tractors purchased 13 electric forklifts purchased 12 diesel engines scrapped	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 1,059 - $PM_{2.5}$: 1.75 - NO_x: 19.4 - **Fuel Usage** (gal): 103,710
NWSA ZE CHE	5 electric forklifts purchased 2 electric top handlers purchased 1 electric yard tractor purchased 4 diesel engines scrapped	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 2,214 - $PM_{2.5}$: 0.90 - NO_x: 12.6 - **Fuel Usage** (gal): 217,008
Port of Tacoma ZE CHE and Workboat	2 ZE forklifts purchased 1 electric yard tractor purchased 3 diesel engines scrapped 1 electric workboat purchased 1 marine charging station installed	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 103 - $PM_{2.5}$: 0.02 - NO_x: 0.8 - **Fuel Usage** (gal): 10,079
NWSA ZE CHE Incentive Program	75 ZE yard tractors purchased 75 chargers installed Up to 75 diesel engines scrapped	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 26,463 - $PM_{2.5}$: 17.8 - NO_x: 373 - **Fuel Usage** (gal): 2,592,900

Anticipated Outputs and Outcomes		
NWSA ZE Drayage Incentive Program	98 ZE Trucks purchased 98 truck chargers/fueling stations installed 98 diesel Class 8 drayage trucks scrapped 98 truck telemetric tracking units installed	Reductions over Equipment Life: - **Emissions** (metric tons): - GHGs: 60,011 - $PM_{2.5}$: 0.21 - NO_x: 134 - **Fuel Usage** (gal): 7,800,000 Increased knowledge and capacity for transition to ZE drayage trucks
Cruise Shore Power at Port of Seattle	Two additional connections added to Terminal 91; 1 west and 1 east side of pier. One additional connection added to Pier 66 Solve orientation issues that prevent shore power connections at PoS cruise terminals	Reductions over 30-year life: - **Emissions** (metric tons): - GHGs: 98,149 MTCO2e - $PM_{2.5}$: 27 - NO_x: 2,820 80 additional connections per year; increase cruise shore power connection rate to 93% toward PoS goal of 100%*
ZE Harbor Vessels	2 ZE electric pilot boats constructed 4 existing internal combustion engines scrapped 1 AC Shore Power Charging Pedestals installed	*Reductions over equipment life:* - GHGs: 13,824 - $PM_{2.5}$: 26.4 - NO_x: 354.6 - **Fuel Usage** (gal): 1,228,800 First all-electric vessel deployment in Puget Sound; create visibility & support a regional vessel electrification network (proposed via PoS CPP Planning grant).
Commercial Fishing Shore Power at Port of Seattle	8 shore power pits 3 new substations 10 switches upgraded to 600V, 800A Enable shore power connection of 59 modern vessels per year	Reductions over 30-year life **Emissions** (metric tons): - GHGs: 46,743 - $PM_{2.5}$: 49.8 - NOx: 2,396.6 - Fuel (gal): 4,572,000
Community Engagement & Workforce Development	At least 3 Clean Air Quarterly newsletters published annually; increased readership Web portal (www.nwcleanports.org) maintained; increased viewership 2 community roundtables organized per yr. 3-5 community-led climate and clean air projects supported per yr. 10 community meetings/events annually Ports' ZE Technology Deployment Workforce Development Action Agenda	Increased flow of information between ports and external stakeholders Increased understanding of and capacity to engage in port efforts to transition to zero-emission technologies

b. Performance Measures and Plan

The NWSA has a long history of successfully managing grant-funded emission reduction initiatives and has a team of highly qualified project managers, community engagement specialists, grant managers, and financial specialists who will ensure effective implementation of the proposed projects. Some funding will also be used to augment project and grant management capacity. The NWSA, PoS, and

PoT have collaborated effectively on clean air and climate solutions for many years as partners on the Northwest Ports Clean Air Strategy. A project manager on the NWSA's Air Quality and Sustainable Practices team will serve as Clean Ports Program Coordinator (CPPC) and main point of contact with the EPA for this grant award. The CPPC will hold quarterly meetings with project managers, sub-awardees, and key implementing partners; track progress on outputs and outcomes; coordinate grant drawdown for eligible expenses as well as reimbursement to sub awardees and program beneficiaries; ensure that all required reporting is completed; and identify schedule or budget issues and work with project managers to enact corrective action and notify EPA as needed. The ports will assign project managers (PMs) for each individual projects and program. The PMs will coordinate with the CPPC to ensure smooth implementation of the project and timely grant drawdowns.

Cargo and Cruise Shore Power: Both the NWSA and PoS require shore-power capable vessels to plug in when a connection point is available. The ports will track outcomes by collecting data on shore power connections, connection time, and power consumed. This data is used to estimate emissions avoided.

Commercial Fishing Shore Power: PoS tracks shore power usage by commercial fishing vessels to bill companies for power consumed. This data will be used to verify outcomes.

ZE CHE: Each purchase of ZE CHE and installation of charging equipment at Husky and Washington United Terminals, Ports America, and the ZE CHE Incentive program will be field-verified by the NWSA. Recipients will be required to report annual hours of usage for 5 years after receiving delivery to assess real world emission reductions. Verification of scrappage will be required as described in the scrappage section. The NWSA and PoT will track usage of ZE CHE directly purchased to assess benefits.

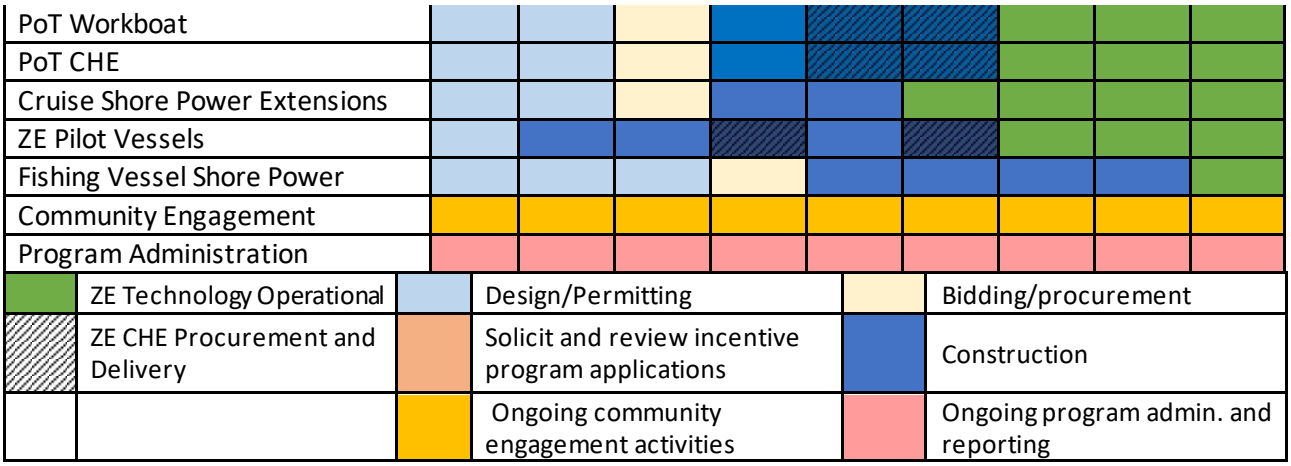
ZE Drayage Trucks: Each purchase of ZE trucks and installation of charging/fueling equipment funded will be field-verified by NWSA or third-party administrator. Telematics data, alongside self-reported annual mileage will be used to calculate emission reductions. Verification of scrappage will be required as described in the scrappage section. Attendance and materials from outreach events will be recorded.

ZE Harbor Vessels: The ZE pilot vessel deployments will field verified by PoS. Arrow Launch will provide reports on annual hours of operation for 5 years after delivery of the vessels to assess real world emission reductions. Verification of scrappage will be required in accordance with EPA requirements.

Community Engagement: The NWSA will coordinate community engagement activities, working closely with the community engagement teams at PoS and PoT. A new NWSA community engagement specialist (funded by this grant) will serve as program coordinator and will ensure that community engagement outputs and outcomes are coordinated, tracked, reported on, and achieved. A community survey will be conducted annually to gauge the extent activities are achieving the desired outcomes.

c. Timeline and Milestones

Timelines for Major Project Elements									
	2025		2026		2027		2028		2029
Project	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2
Terminal 18 Shore Power									
WUT Shore Power									
PCT Shore Power									
Husky ZE CHE									
WUT ZE CHE									
WWL/Ports America CHE									
NWSA ZE CHE									
ZE CHE Incentive Program									
ZE Drayage Incentive Program									



d. Scrappage

To ensure our proposal maximizes emission reductions, the ports and their partners will scrap old diesel equipment as much as practicable where a ZE replacement is being funded. In some cases, flexibility on when scrappage occurs will be needed to reduce the risk and potential for operational downtime.

ZE CHE: All equipment owners participating in the ZE CHE incentive program or direct CHE deployments will be required to scrap an equivalent piece of Tier 3 or older equipment for each piece of ZE equipment purchased up to the number of Tier 3 and older equipment at the site the new equipment will be deployed. Scrappage of Tier 4 equipment will not be required. The ZE CHE Incentive Program will prioritize replacement of Tier 3 and older equipment to maximize emission benefits and scrappage.

ZE Drayage Trucks: After one year of successful operation, each program participant will be required to scrap a diesel truck for each ZE truck purchased with program funds, with documentation sent to the NWSA project manager. The NWSA has managed a successful truck scrappage program for more than 10 years, working with truckers to document the scrap and replacement of their old diesel trucks. Historically, funding is not released to the trucker until they have completed the scrappage process, on a reimbursement basis. Extensive engagement through the Puget Sound Zero Emission Truck Collaborative makes clear that this reimbursement approach will not work for ZE trucks, given lack of regional familiarity and confidence with the technology. Delaying scrappage to after a year of successful operation will reduce perceived risk to operators and help ensure strong participation.

ZE Harbor Vessels: Arrow Launch Service, Inc. will scrap two unregulated diesel-powered pilot boats and replace them with two ZE, battery-electric versions; scrappage will be equivalent 1:1.

Section 3 – Programmatic Capability and Past Performance

a. Past Performance and Reporting Requirements

Programmatic Capability and Past Performance: NWSA Grants				
Project title	Assistance agreement No.	Federal funding agency assist. listing No.	Brief description of the agreement	How we successfully managed the work
Terminal 5 Modernization Project: Investing in the region's future	Grant No. 693JF72344021	USDOT MARAD 20.823	$17,035,900 to fund work at Terminal 5	The agreement was executed in the fall of 2023 and the project is active. Reports have been submitted on time.
Electric Terminal Tractors at the	No. DE-01J83201-0	EPA CFDA No. 66.039	$782,482 to fund remanufacture of	The project was completed on time and on

NWSA South Intermodal Yard (SIM)			six privately owned terminal tractors from diesel to battery electric.	budget and all reporting was completed. The terminal tractors are currently in operation.
Domestic Terminals Truck Replacement Program	No. DE-01J98601	EPA CFDA No. 66.039	$719,957 to scrap and replace 36 pre-2007 diesel drayage trucks serving NWSA domestic terminals with 2015 or newer trucks.	This program has been highly successful, with all slots fully enrolled and truck drivers currently scrapping their trucks. The waitlist is full in case any of these enrolled truck owners drop out. The EPA granted a no-cost extension to this program.

b. Staff Expertise

The Air Quality & Sustainable Practices (AQSP) Team, which serves both the NWSA and PoT, will lead and coordinate implementation of the proposed Puget Sound Clean Ports Program, in close partnership with the PoS Maritime Environment & Sustainability Team as well as the engineering, community engagement, procurement, and financial management teams at both PoS and PoT. The AQSP Team has more than 60 years of combined experience designing, developing, and implementing innovative clean air and climate solutions, including many federally funded projects and programs. Specific roles and responsibilities are as follows:

AQSP Team Member	Role(s) and Responsibilities
Steve Nicholas, NWSA Senior Manager of Air Quality & Sustainable Practices	• Provide overarching strategic support and oversight • Supervise Clean Ports Program Coordinator • Support ZE Drayage program element
Graham VanderSchelden, NWSA Project Manager II	• Serve as Clean Ports Program Coordinator • Coordinate shore power program element • Support ZE CHE program element
Rose Arsers, NWSA Project Manager II	• Lead ZE CHE program element • Coordinate activities funded under PoT subaward
Nicola Graham, NWSA Project Manager I	• Lead ZE Drayage program element
Kate Nolan, NWSA Manager of Communications & Outreach	• Coordinate community engagement program elements
David Fujimoto, PoS Senior Environmental Program Manager	• Coordinate activities funded under PoS subaward

Section 4 – Environmental Justice and Disadvantaged Communities

Reducing pollution that contributes to environmental health disparities, especially diesel particulate matter (DPM) in disadvantaged near-port communities, is a foundational priority of the Northwest Ports Clean Air Strategy (NWPCAS). Since our first emissions inventory in 2005, seaport related DPM emissions have been reduced more than 80%, significantly reducing air toxics related health impacts in near-port communities. These reductions have played a critical role in keeping the region in attainment of ozone and $PM_{2.5}$ standards in the region.

a. Disadvantaged Communities: Nonattainment Areas

The proposed projects are critical for maintaining attainment status with the NAAQS in both Pierce and King County. Pierce County is a Maintenance Area for 24-hour $PM_{2.5}$ and the 2020-2022 design value was 32 µg/m³, 3 µg/m³ below the standard of 35. Continued work to reduce particulate emissions is imperative to ensure continued attainment given projected growth in the region. Furthermore, if the EPA were to lower the 24-hour standard in future years, the region would likely be pushed back into nonattainment without significant efforts to reduce emissions. King County would be in a comparable situation, as its 2020-2022 design value is 31 µg/m³.

While King County does not have any nonattainment areas, the design value for ozone was 70 ppb, equal to the standard. This indicates risk that the region could push into ozone nonattainment in the future if emissions of ozone precursors are not reduced. Given our proposal's focus on reducing diesel combustion, we project significant reductions in NO_x and VOC emissions, which will help keep the region in attainment for ozone.

b. Disadvantaged Communities: Areas with Air Toxics Concerns

The EPA identifies King and Pierce Counties as areas of air toxics concern. Both counties are listed on the EPA's 2024 Clean Ports Program Disadvantaged Communities list, which also identifies them as areas of high ambient diesel particulate matter (DPM) concentrations. DPM is known to be the largest driver of regional air toxics related health risk. According to the Puget Sound Clean Air Agency's 2021-2022 Air Toxics Monitoring Study, while air toxics-related cancer risks have been decreasing in the region, they remain significant and DPM accounts for more than 80% of the total. Black, Indigenous, and other people of color and lower income households have higher cancer risks due to their proximity to major freight corridors. Investments in reducing DPM emissions from port related sources will reduce environmental health disparities.

c. Community Engagement Prior to Application and During Project

All projects and programs featured in this application emerge from the 2020 update of the Northwest Ports Clean Air Strategy (NWPCAS) and the associated implementation plans that all three port entities developed to establish and achieve near-term milestones. Both the NWPCAS and the associated implementation plans were guided by a 3-year stakeholder engagement process featuring work group meetings; webinars; online surveys; one-on-one consultations with drayage drivers and companies, marine terminal operators, other supply chain partners, local government agencies, tribes, labor unions, near-port residents and community-based organizations, and nonprofit organizations. During this process near-port residents expressed interest in more information, transparency, access to port decision-making, and support for community-led priorities and projects. The enhanced community engagement activities included in this application respond to these community priorities.

Meaningful community engagement is standard practice for the NWSA, PoS, and PoT who all have strong community engagement goals, processes, programs, and teams in place. In 2017 the PoS was one of three U.S. ports, working with EPA-designated Environmental Justice communities in Seattle's Duwamish Valley, selected to pilot the Community-Port Collaboration Toolkit. That work resulted in the formation of the Duwamish Valley Port Community Action Team (PCAT), which co-designed the Port's Resolution 3767 and Community Benefits Commitment to guide and foster community partnerships with three shared goals: 1) community and port capacity building for ongoing collaboration; 2) healthy environment and communities; and 3) economic prosperity in place. Similarly, the PoT communicates and engages with Tacoma-area residents and community-based organizations in many ways, such as: neighborhood council and chamber of commerce meetings; booths at farmers' markets and community festivals where information about port-related clean air and climate solutions is shared and input from garnered; and dozens of public port tours during which clean air and climate solutions are featured.

The NWSA and the PoS have actively participated in the Duwamish Valley Clean Air Program (DV-CAP) since its inception in 2020. This is a community-led, multistakeholder effort to reduce asthma in the low-income, disadvantaged communities of South Park and Georgetown. Reducing and eliminating diesel pollution from ships, drayage trucks and equipment serving the port is a priority of the program. In addition, working closely with PoS and PoT, the NWSA led the recent development of two additional mechanisms for enhancing community education and engagement specific to port-related clean air and climate solutions: the Clean Air Quarterly and www.nwcleanports.org. The Clean Air Quarterly, launched in April 2022, provides program updates; features profiles of community, government, and industry partners; and highlights upcoming engagement opportunities. The web portal, launching in September 2024, will offer a single comprehensive website for information on port-related clean air and climate solutions and related engagement opportunities. The NWSA also led the creation of the Puget Sound Zero Emission Truck Collaborative which convenes key stakeholders to develop a regional Decarbonizing Drayage Roadmap by the end of 2024.

During implementation of the proposed projects and programs, the NWSA, PoS, and PoT will continue and strengthen existing, proven community engagement strategies and activities, while adding program activities and capacity. The three ports will work jointly to:

- Continue the recently initiated *Clean Air Quarterly* and "clean ports" web portal (nwcleanports.org) and expand efforts to increase the readership/viewership of those resources.
- Continue to actively engage in the community-led Duwamish Valley Clean Air Program, neighborhood councils representing near-terminal communities and increase our presence and involvement in other community programs, meetings, and events in the Seattle-Tacoma region.
- Organize two community roundtables annually, specifically focused on Clean Ports and Northwest Ports Clean Air Strategy implementation and designed to share updates, garner input, celebrate successes, and work through challenges.
- Create a new fund to support community-led projects that advance the goals of Clean Ports and the Northwest Ports Clean Air Strategy. The fund will be managed by the NWSA in close partnership with the ports of Seattle and Tacoma.

Both the NWSA and PoS will increase their program capacity through additional staff and consulting support to effectively manage this expanded community engagement portfolio. NWSA will also:

- Continue to support third-party coordination and facilitation of the Puget Sound Zero Emission Truck Collaborative, an effective mechanism for engaging near-port community groups, NGOs, Tribes, unions, and the drayage trucking industry and others in forging a just and equitable transition to ZE drayage in our region.
- Significantly expand our Trucker Engagement & Support Program, including translation services at outreach events and of educational materials to ensure all of our drivers can be prepared and participate fully; reimbursement of drivers' time to contribute to the program; additional educational opportunities, such as workshops, driver panels, and ride and drive events; and financial counselling for drayage providers.

While developing this application we consulted with near-port communities, NGOs, labor unions, Tribes, and state and local government partners, including the following: Duwamish River Community Coalition; Communities for a Healthy Bay; Terminal 91 Neighborhood Advisory Committee; Climate Solutions; SeaTac Shipping Coalition; two local labor unions ILWU Local 19 and Local 23; the Muckleshoot Indian Tribe, Suquamish Tribe, and the Puyallup Tribe; the state departments of Commerce, Transportation, and Ecology; cities of Seattle and Tacoma; King and Pierce counties; and the Puget Sound Clean Air Agency. Several of the ideas emerging from these consultations are integrated into this application. All the organizations expressed strong support for the package of projects and programs embedded in this application, and most provided letters of support.

d. Long-Term Community Engagement

In addition to the ongoing engagement program described above, the ports will explore other mechanisms for strengthening our community engagement program, including the following:

- *Developing a digital communications/community engagement tool:* The ports are aware of several digital tools that facilitate increased information sharing, participation, and interaction. We will explore the idea of acquiring and customizing one of these tools to: facilitate on-going interaction on port-related clean air and climate solutions between port staff and external stakeholders; improve the sharing of information, priorities, and concerns; and actively promote engagement opportunities. This tool would be integrated with our web portal: nwcleanports.org.
- *Creating a Clean Air Community Liaison Program*: The ports would identify and support Community Clean Air Liaisons in both the Seattle and Tacoma harbors who would: advise and support port staff on community engagement and learning activities; promote educational events and engagement opportunities; recommend approaches and opportunities for relationship and partnership-building; and provide feedback to the ports on effectiveness and areas for improvement and innovation. The program would support deep engagement in the community based on equitable engagement best practices, including compensating the community liaisons and providing support to increase participation including language access, meals, transportation, and childcare services.

The ports believe that it is important that any new community engagement initiatives are thoughtfully designed, well-coordinated across the three port entities, and aligned with community goals and priorities. Therefore, the ports will actively explore these and other ideas – both internally and with the community groups and other stakeholders who are the intended audiences and beneficiaries of these new initiatives. By the end of the first year of the grant period, the ports will: decide which new community engagement initiatives to pursue; clarify roles and responsibilities; and implement the selected new initiatives in years two through four of the grant.

Section 5 – Project Sustainability

Emissions reduction planning and emission inventories are standard practice at the NWSA, Port of Seattle, and Port of Tacoma through the Northwest Ports Clean Air Strategy (NWPCAS) – a collaboration that dates to 2008 and also includes Vancouver Fraser Port Authority in British Columbia – and the Puget Sound Maritime Air Emissions Inventory (PSEI), first completed in 2005.

a. Baseline port mobile source inventory for greenhouse gases, $PM_{2.5}$ and/or NO_x

The PSEI quantifies air emissions from maritime-related sources operating in the greater Puget Sound region. It is a highly collaborative effort across regional ports, government agencies and industry partners, to provide a strong technical foundation for future environmental programs, initiatives, and policy decisions. The collaborative nature of the PSEI across such a diverse group of stakeholders enhances its accuracy and helps to create a sense of shared responsibility to help reduce emissions.

PSEI studies have been conducted for 2005 as the baseline year and approximately every five years after for calendar years 2011, 2016, and 2021. The PSEI produces emission estimates for the main maritime related sources of emissions (ocean-going vessels, harbor vessels, cargo-handling equipment, heavy duty vehicles (trucks and cruise busses), locomotives, and fleet vehicles). Emissions are calculated for all criteria air pollutants (excluding lead), greenhouse gases, and diesel particulate matter within an airshed boundary that spans from approximately the cascade mountains to the east, the Canadian border to the north, the Olympic mountains to the west, and Capital Peak to the south. The methodology is consistent with the EPA's Port Emissions Inventory Guidance. Results are made public through online reports.

In addition to the PSEI, the NWSA, PoT, and PoS conduct organizational GHG inventories annually to analyze their entire carbon footprints and capture stationary source and other administrative GHG

emissions not captured by the PSEI (e.g., building energy use). Results track progress toward GHG reduction targets.

b. Plan to reduce port mobile source emissions

The NWSA, Pos and PoT are founding partners of the NWPCAS, along with the Vancouver Fraser Port Authority. In 2021, the ports renewed the NWPCAS with a new vision: "*Phase out emissions from seaport-related activities by 2050, supporting cleaner air for our local communities and fulfilling our responsibility to help limit global temperature rise to 1.5 degrees Celsius*" and established objectives for ports to facilitate zero-emission operations in each sector. This focus on decarbonizing port operations aligns with the goals of the CPP. CPP funding will accelerate implementation of the NWPCAS vision.

The NWSA, PoS, and PoT each adopted detailed implementation plans for the NWPCAS, which lay out the critical actions for the next 5+ years. These plans identify significant funding gaps that need to be filled to enable key projects and programs that will start the transition to zero emission technologies. CPP funding helps fill these funding gaps and will advance transformational projects.

We report out on progress towards NWPCAS jointly annually through public progress reports. We also highlight key accomplishments via our community targeted newsletter, the "Ports Clean Air Quarterly" and will be launching a web portal this year which will include a semi real time progress dashboard. The ports have committed to revisiting and updating their implementation plans every five years.

In addition, the NWSA, PoT, and PoS have set GHG reduction targets. In addition to the NWPCAS vision to phase out all emissions by 2050 or sooner, all three port entities have established the goal of achieving net zero GHG emissions for scope 1 and 2 activities by 2040 (i.e., emissions from assets directly owned and operated by the ports). The NWSA and PoT have established these targets through separate resolutions and the PoS has established these targets through their Century Agenda.

Section 6 – Job Quality and Equitable Workforce Development

a. Supporting high quality jobs

The NWSA and the ports of Seattle and Tacoma have a longstanding commitment to supporting high-quality jobs and expanding access to training and employment, especially for people in low-income and disadvantaged near-port communities. The seaports play a central role in the economic vitality of the Puget Sound region and the State of Washington; combined they support about 125,000 jobs and more than $12 billion dollars in business activity. The seaports have supported high-quality union jobs for many years. All labor on NWSA cargo terminals is unionized, for example. These well-paying jobs include union mechanics earning an average of $113,000 annually and union dock workers earning an average of $172,400 annually.

This suite of projects and programs will preserve and improve existing jobs and create new ones, while at the same time helping to sustain and enhance our seaports' long-term capacity to support high-quality jobs and economic opportunities in our region and state as the global maritime industry pursues decarbonization with increasing urgency. The overall project will deliver cleaner, healthier air to the thousands of people who work on port facilities loading and unloading ships while at-berth, operating cargo-handling equipment, and interacting with drayage trucks.

The shore power and ZE CHE elements will create new high-quality jobs associated with the manufacture, sale, operation, and maintenance of the new equipment and charging/fueling infrastructure. These investments help our operating partners affordably upgrade their equipment fleets, advancing their own sustainability goals and enhance their long-term competitiveness.

The ZE drayage truck element of our proposal will preserve and improve existing jobs in two ways. It provides affordable access to cleaner, healthier, quieter, and safer vehicles to participating truckers. It will provide financial assistance to some of the owners and operators of the 5,000 trucks that provide cargo-hauling services at NWSA terminals – with a strong focus on independent owner/operators and

small trucking companies that might otherwise be forced out of the drayage business by the increased costs and complexities associated with the imminent transition to ZE trucks. The ZE Drayage Program will create dozens of new, high-quality jobs associated with the design, construction, operation, and maintenance of ZE truck charging/fueling infrastructure throughout our region.

As we implement these program elements, the ports will work with appropriate partners – equipment manufacturers and dealers, charging and fueling infrastructure developers, marine terminal operators, drayage trucking companies, labor unions, and other job training partners and workforce development entities – to ensure that workers have the necessary skills to safely install, operate, and maintain the vehicles, equipment, and infrastructure supported by this Clean Ports grant. For example, the marine terminal operators receiving financial assistance to purchase ZE CHE and install associated charging/fueling infrastructure will be required, as part of their funding agreement with the NWSA, to sign an operating agreement and submit a training and safety plan.

b. Expanding access to high-quality jobs, including for people in low-income and disadvantaged near-port communities.

The ports of Tacoma and Seattle have strong, multifaceted workforce development strategies and programs in place. For example, the Port of Seattle has goals to create more access to construction trade jobs for individuals from economically distressed communities; to build capacity from those historically underrepresented in the construction industry such as women and people of color; and to grow a skilled workforce to support current and upcoming construction needs in our region. To achieve these goals, the Port has implemented priority hire and construction apprenticeship programs to create more access to quality, family-wage careers in construction. The Port's Workforce Development Strategic Plan features other strategies for advancing its goals, including: the Youth Maritime Career Launch (a partnership with the Urban League of Metropolitan Seattle and Maritime Blue through which young people receive training and certification for entry-level roles in the maritime industry); and the Maritime High School, a collaborative project of Highline Public Schools, Northwest Maritime Center, Port of Seattle, and the Duwamish River Community Coalition that prepares high school students for careers in the maritime industry through classroom learning, hands-on field experience, and internships.

Similarly, the Port of Tacoma's Workforce Development Strategic Plan advances the job training and workforce development needs of the port and its supply chain partners by facilitating connections between organizations, providing technical or financial assistance to organizations, and encouraging the development of new programs. Examples include a partnership with Workforce Central to expand career pathways through paid work experiences and internships for BIPOC and people farthest from opportunity; and a new collaboration with Tacoma Public Schools to develop a Port Maritime Center where administrative offices for the Port of Tacoma and a new Maritime Skills Center will be co-located. The Maritime Skills Center will provide career and technical education for high school students across south Puget Sound, with a focus on the technical trades, transportation, logistics, and sustainability.

With support from the CPP, the NWSA and the ports of Seattle and Tacoma will collaborate with their workforce development partners to explore, prioritize, and pursue opportunities to build on existing investments, programs, and partnerships and expand job training and workforce development initiatives specifically designed to support the transition to ZE technologies at our seaports. As noted, there are many related job training and workforce development initiatives already underway or under development – not just at the ports but throughout the region and state. For example, Workforce Central has worked with more than 30 organizations throughout Pierce County to establish a regional vision for job and career pathways in the growing green economy sector.

The ports will be strategic about where and how we can add value, fill gaps, and complement these ongoing efforts. In year one of the grant period, the ports will hire (through a competitive procurement process) a local workforce development entity to: 1) compile an inventory of relevant job training and

workforce development initiatives that are underway or under development; 2) assess the job training and workforce development needs associated with the transition to fully zero-emission technologies at our seaports and across the broader freight sector in our region and state; 3) identify key gaps between what is already in motion and what is needed; and 4) recommend an Zero Emission Technology Deployment Workforce Development Action Plan for the ports. The ports will work together and with key partners to implement the Action Plan in years 2 through 4 of the grant award.

Section 7 – Project Resilience to Climate Impacts

The NWSA launched the Resilient Gateway Program with a Vulnerability Assessment and Response Framework in 2023 to assess climate-related risks, both on-terminal and off-terminal. The Response Framework guides program and policy development, project prioritization and design, and asset management. The NWSA will lead development of an implementation plans in 2025 for itself, the PoT, and PoS for alliance licensed facilities.

As reported by the Washington Coastal Hazards Resilience Network, Tacoma's sea level is predicted to rise approximately 11 inches by 2050. Influenced by this sea level rise, Tacoma's mean higher high water (MHHW) level in 2050 is predicted to be +12.7, with a maximum tide predicted at +15.8. While these sea levels by themselves do not reach the elevation of our lowest-elevation terminal (Husky Terminal at 17-feet), a storm event may expose vulnerability to terminal infrastructure.

Combined with the 11-inch sea level rise by 2050, a storm event in Tacoma, for example, that brings the potential for waves at a height of 3-feet and storm surges at a height of 2-feet-10-inches will introduce a total water level at elevation +18.5 during an average tide and +21.6 during a high tide. Total water levels at these heights would exceed the elevation of most Port terminals during an average tide and all terminals during a high tide. Despite these water levels, Port electrical infrastructure, such as shore power, is designed to withstand inundation.

All projects in this proposal will include design for durability of the systems to provide for longevity in a marine environment. Durable products will be selected for the exact purpose of being resilient to corrosive natural elements. Depending on the installation method, appropriate protections will be installed to protect against wind and wave energy, salt water, and structural forces from dock and pier operations. Robust maintenance protocols are always a part of these projects to ensure that we achieve the full lifespan of the electrical system.

The NWSA has prioritized the development of Resilient Gateway implementation planning, considering it a Key Initiative for 2025. Our proposed suite of elements will be subject to the Resilient Gateway Program Implementation Plans and will include designs that anticipate infrastructure improvements or adaptation techniques to minimize damage to infrastructure or disruption to services related to future sea level rise. Maintaining safe, functional infrastructure is critical to successful Port operations; considering this, staff recommends integration of protection options during future development to avoid the most considerable impacts of climate change at the Port. Potential actions to mitigate risk of increased flooding on terminals include elevating all on-terminal electrical substations to 12-inches above grade and upgrading and maintaining stormwater tide gates.

Facilities at the PoT are also included in the Pierce County Region 5 All Hazard Mitigation Plan, adopted by Resolution 2020-13 PT, which includes a related section, Planning for Potential Sea Level Rise. Other related hazards, such as flooding and liquefaction, are also covered in the Plan.

Section 8 – Budget

a. Budget Detail

NWSA Budget Summary Line Item & Itemized Cost	EPA Funding	Non-Federal Cost Share
Personnel		
T-18 Shore Power Engineering PM 81,907 hours @ $73/hour	$3,826,705	$2,152,522
T-18 Shore Power Env./Permitting PM 33,667 hours @ $54/hour	$1,163,520	$654,480
T-18 Shore Power Contract Administrator 13,341 hours @ $63/hour	$537,916	$302,578
Environmental PM 16,640 hours @ $56/hour	$745,472	$186,368
Engineering PM 27,289 hours @ $58/hour	$1,266,212	$316,553
Grant Administrator 8,320 hours @ $42/hour	$279,552	$69,888
Financial Manager 8,320 hours @ $70/hour	$465,920	$116,480
Contracts Administrator 8,320 hours @ $50/hour	$332,800	$83,200
Community Engagement Specialist 16,640 hrs. @ $49/hour	$652,288	$163,072
TOTAL PERSONNEL	$9,270,385	$4,045,141
Fringe Benefits		
T-18 Shore Power Engineering PM 81,907 hours @ $24/hour	$1,258,095	$707,678
T-18 Shore Power Env./Permitting PM 33,667 hours @ $21/hour	$452,480	$254,520
T-18 Shore Power Contract Administrator 13,341 hours @ $22/hour	$187,844	$105,662
Environmental PM 16,640 hours @ $25.65/hour	$341,426	$85,357
Engineering PM 27,289 hours @ $26.60/hour	$579,925	$144,981
Grant Administrator 8,320 hours @ $19.24/hour	$128,035	$32,009
Financial Manager 8,320 hours @ $32.06/hour	$213,391	$53,348
Contracts Administrator 8,320 hours @ $22.90/hour	$152,422	$38,106
Community Engagement Specialist 16,640 hours @ $22.44/hour	$298,748	$74,687
TOTAL FRINGE	$3,612,366	$1,496,348
Equipment		
Purchase 98 telematics units for ZE trucks	$248,000	$62,000
NWSA ZE CHE and charger purchases	$5,289,053	$1,322,263
TOTAL EQUIPMENT	$5,537,053	$1,384,263
Contractual		
Terminal 18 shore power design and construction contracts	$42,629,289	$23,668,205
WUT shore power design and construction contracts	$30,520,606	$7,630,151
PCT shore power design and construction contracts	$32,505,818	$8,126,454
NWSA owned electric CHE charging installations	$864,000	$216,000
ZE Drayage program third party administrator (4 years)	$3,000,000	$750,000
Puget Sound Zero Emission Truck Collaborative contract (4 years)	$480,000	$120,000
Trucker Engagement, translation, ZE truck education (4 years)	$480,000	$120,000
Workforce development support contract	$300,000	$100,000
TOTAL CONTRACTUAL	$110,779,713	$40,730,810
Other		
Participant Support Costs, Husky Terminal ZE CHE Project	$200,334,400	$50,083,600
Participant Support Costs, Washington United Terminal ZE CHE	$23,824,800	$5,956,200
Participant Support Costs, Ports America/WWL	$8,796,000	$2,199,000
Participant Support Costs, ZE CHE Incentive Program	$30,000,000	$7,500,000
Participant Support Costs, ZE Drayage Incentive Program	$47,000,000	$11,750,000

NWSA Budget Summary Line Item & Itemized Cost	EPA Funding	Non-Federal Cost Share
Participant Support Costs, Community led projects	$300,000	$100,000
Subaward to Port of Seattle	$59,012,290	$14,663,072
Subaward to Port of Tacoma	$1,515,535	$378,884
TOTAL OTHER	$370,783,025	$92,630,756
TOTAL FUNDING	**$499,982,542**	**$140,287,318**
NWSA TOTAL PROJECT COST	**$640,269,860**	

NWSA Prime Award Budget Summary: The budget tables summarize costs for the NWSA and the two sub-recipients (Port of Seattle and Port of Tacoma) discretely, combining all sub-projects that will be led by each entity. The NWSA's table includes the subawards as single line items, which are expanded upon in the subaward specific tables.

Personnel and Fringe: NWSA Environmental Project Manager (PM) time is required to manage all aspects of the Clean Ports funded projects and programs and perform all performance monitoring and output and outcome tracking. Environmental PMs will directly manage the ZE CHE Incentive Program and oversee the third-party administrator that will manage the ZE drayage incentive program. Engineering PM time is to manage construction projects that the NWSA will directly implement, specifically the container ship shore power projects and charging for electric CHE owned by the NWSA. Staff time for the Financial Manager, Grants Administrator, and Contracts administrator will manage the Clean Ports grant and ensure that all terms and conditions are met. The Community Engagement Specialists will manage community engagement and trucking community support activities. The Terminal 18 shore power project has separate project management lines because construction projects at NWSA's facilities in the Seattle harbor are managed by Port of Seattle staff, per the NWSA's master policy, and have different wage and fringe rates.

Equipment: This category includes electric CHE and chargers that the NWSA will directly purchase.

Contractual: The contractual category includes all outside contractors that the NWSA will hire to implement projects and programs the NWSA will directly manage, following competitive procurement processes. This includes design and construction of the shore power projects, third party program administration for the ZE Drayage Incentive program, management of the Puget Sound Zero Emission Truck Collaborative and trucker support programs (i.e., translation services, trucker financial counseling) and installation of charging infrastructure for NWSA owned CHE.

Other: The other category includes all participant support costs for grant funded activities managed by others.

Port of Tacoma Sub-award Budget Summary Line Item & Itemized Cost	EPA Funding	Non-Federal Cost Share
Personnel		
Engineering PM 710 hours@ $58/hour	$32,922	$8,230
Grant Administrator 2080 hours@ $42/hour	$69,888	$17,472
TOTAL PERSONNEL	$102,810	$25,702
Fringe Benefits		
Engineering PM 710 hours@ $26.56/hour	$15,078	$3,770
Grant Administrator 2080 hours@ $19.24/hour	$32,009	$8,002
TOTAL FRINGE	$47,087	$11,772
Equipment		
Purchase one ZE Workboat	$540,000	$135,000

Purchase one electric yard tractor & Charger	$244,319	$61,080
Purchase two 8,000 lb. cap Forklifts & Chargers	$149,319	$37,330
TOTAL EQUIPMENT	$933,638	$233,410
Contractual		
Install charging for ZE CHE	$216,000	$54,000
Install Charging for ZE Workboat	$216,000	$54,000
TOTAL CONTRACTUAL	$432,000	$108,000
TOTAL FUNDING	**$1,515,535**	**$378,884**
PoT Subaward TOTAL PROJECT COST	**$1,894,419**	

Personnel and Fringe: Environmental Project Manager (PM) and Senior Environmental PM time is to manage all aspects of the Clean Ports funded projects and programs and perform all performance monitoring and output and outcome tracking. Environmental PMs also support construction project activities. Staff time for the Financial Manager, Grants Administrator, and Contracts administrator will be to manage the Clean Ports grant and ensure that all terms and conditions are met. Engineering Pm and Sr. Engineering PM time is to manage installation of the ZE CHE chargers.
Equipment: The category includes electric CHE and chargers that the PoT will directly purchase.
Contractual: The contractual category includes contractor(s) that will install ZE CHE chargers.

Port of Seattle Subaward Budget Summary Line Item & Itemized Cost	EPA Funding	Non-Federal Cost Share
Personnel		
Program Administrator @ $83/hour x 40 hours/week for 208 weeks	$552,448	$138,112
TOTAL PERSONNEL	$552,448	$138,112
Contractual		
Pier 66 shore power design and construction contracts	$6,000,000	$1,500,000
T-91 west shore power design and construction contracts	$5,200,000	$1,300,000
T-91 east shore power design and construction contracts	$6,400,000	$1,300,000
T-91 commercial fishing shore power design & construction contracts	$21,460,800	$5,365,200
Shoreside ZE Harbor Craft charging design & construction contracts	$960,000	$240,000
Community Capacity Building Consultant (4 years)	$480,000	$120,000
Community Liaison Program Consultant (3 years)	$92,160	$23,040
TOTAL CONTRACTUAL	$40,592,960	$10,148,240
Other		
Community Engagement Digital Communications Tool	$320,000	$80,000
Participant Support Costs – Community Engagement	$356,864	$89,216
Subaward for 2 ZE Electric Harbor Craft	$17,190,018	$4,207,504
TOTAL OTHER	$17,866,882	$ 4,376,720
TOTAL FUNDING	**$59,012,290**	**$14,663,072**
PoS Subaward TOTAL PROJECT COST	**$73,675,362**	

Personnel: Support for grant administration over the award period.
Contractual: Outside contractors hired through a competitive procurement process to implement the projects and programs the Port will directly manage. This includes design and construction of the

additional shore power connection points at Pier 66 and both the east and west berths at Terminal 91, Terminal 91 commercial fishing modernization, and shoreside charging for ZE electric harbor craft. The contractual budget also includes hiring contractor support to increase capacity for community engagement in support of these projects.
Other: Community engagement program participant support costs—including wrap-around services, stipends for community-led projects and event hosting—and purchase of a digital communications tool for enhanced community engagement activities. This category also includes a subaward for scrapping and replacing two unregulated diesel-powered workboats with two ZE electric pilot vessels.

b. Expenditure of Awarded Funds

The NWSA has the requisite experience and understanding of federal grants management to ensure that the proposed projects and programs are delivered on time and within budget and comply with all requirements. In 2023, the Port of Tacoma hired a full-time Grants Administrator to support post-award management activities and ensure compliance for Port of Tacoma and NWSA grants. Funding for an additional FTE to support that position and function is included in this proposal.

The shore power installations are capital projects that the NWSA and Port of Seattle will manage directly. The ZE CHE deployments at NWSA and PoT facilities will be managed by NWSA/PoT staff. Regarding the ZE CHE deployments at Husky Terminal, Washington United Terminal, and WWL/Ports America, NWSA staff will facilitate the pass-through of funds (budgeted as participant support costs) to those operating partners following finalization of the grant agreement. The ZE CHE incentive Program will be managed by NWSA staff; incentive funding (budgeted as participant support costs) will be disbursed to operating partners through a competitive application process. The NWSA ZE Truck Incentive Program will be managed by a third-party administrator supervised by NWSA staff. Incentive funds (budgeted as participant support costs) will be disbursed to trucking companies and charging/fueling infrastructure developers through a competitive application process. The Puget Sound Zero Emission Truck Collaborative (PS-ZETC) is managed by a contractor (Ross Strategic). Funding to extend and augment that contract is included in this application. Deployment of the ZE Pilot Boats will be managed to PoS staff, while deployment of the ZE Workboat will be managed by PoT staff.

All expenditures, including all contracts and disbursements of participant support costs, will be monitored and managed by experienced Finance and Contracts staff at the NWSA, PoS, and PoT.

c. Reasonableness of Costs

Matching funds presented in this proposal will be a combination of public and private funding. EPA grant funding will elicit $82 million in private funded investment in ZE technologies that would not otherwise occur, including the three terminal CHE deployments ($58M), ZE CHE Incentive Program ($8M), ZE Drayage Incentive Program ($12M), and ZE Harbor Vessels deployment ($4M). The remaining match will be funded by the NWSA - $48M, PoS - $10.5M, and PoT - $380,000 with their own funds and/or other state or local grants secured to support these projects.

Given the high cost of ZE technologies and lack of regulatory requirements in WA State that force purchase of ZE port technologies, we believe 80% funding from EPA for each of the project components proposed is reasonable to bridge the cost gap between diesel and ZE models, and to encourage early movers to participate by reducing their financial risk. For ZE CHE deployments, the total costs of purchasing the equipment and installing charging infrastructure can be greater than four times the cost of purchasing a diesel equivalent. For example, a battery electric yard tractor costs about $400,000 and typical charging infrastructure installation is about $100,000. A conventional diesel yard tractor costs about $125,000 to purchase. If additional infrastructure upgrades are needed for onsite distribution,

grid-side distribution, and/or onsite energy storage, the total costs of electrification can be even higher. Similarly, a ZE drayage truck and associated charging infrastructure totals approximately $600,000, while a new conventional diesel truck costs about $175,000 and a used diesel truck (which are often the trucks doing drayage work) is typically less than $100,000. Shore power projects are extremely expensive and complex infrastructure projects that have not been part of the conventional business model for ports. As such, existing lease agreements do not have cost recovery mechanisms built in to recoup installation costs and may be difficult to negotiate in regions without regulatory requirements for shore power use. Therefore, shore power projects are very difficult for ports to fully fund on their own; external grant funding is crucial for making these projects happen. Given the substantial public benefits and challenging business model, shore power should be a high priority for government investment.

The cost estimates for the proposed projects are primarily based on project specific engineering analyses, direct quotes from original equipment manufacturers, and data from other reputable sources.

Container Terminal Shore Power: The Terminal 18 project achieved the 60% design milestone in spring of 2024, the Washington United Terminal shore power project achieved the 30% design milestone in early 2024 and preliminary design was completed for the Pierce County Terminal project in spring of 2024. The contracts section of the budget table includes all design and construction costs associated with these shore power projects, and project management costs are included in personnel.

CHE Deployment Projects: Cost estimates for equipment purchases are based on quotes from vendors. Charging infrastructure costs for Husky Terminal are based on an engineering analysis that included an analysis of available power at the facility and includes 10% sales tax, 10% for design, engineering, and administrative costs, and 20% for escalation and contingency. Charging infrastructure cost estimates for NWSA and PoT owned CHE are based on unit costs from previous installations, which we believe to be reasonable given the much lower power demands of those installations.

ZE CHE Incentive Program: The costs of a yard tractor and associated charging infrastructure were taken from available industry data and quotes received during development of this proposal. While the Incentive Program will be open to a variety of battery electric and hydrogen powered CHE, yard tractors were used as proxies in the cost estimate because they are the most readily deployable.

ZE Drayage Incentive Program: The cost of a ZE drayage truck and associated charging infrastructure was sourced from research undertaken for the Puget Sound Zero Emission Truck Collaborative. In 2023 the NWSA published a Request for Information (RFI) seeking input from trucking companies, OEMs and infrastructure providers, including costs and level of funding needed to accelerate the deployment of ZE trucks. Infrastructure cost estimates have been based on input from Charging-as-a-Service (CaaS) and Trucking-as-a-Service (TaaS) firms consulted with as part of the NWSA's Charging and Fueling Infrastructure (CFI) grant application. The cost of telemetric units is based on existing port programs, from two providers (Geotab and Verizon Connect). Trucking engagement costs are based on existing diesel truck engagement work conducted by the NWSA and our external engagement partners.

ZE Technology Deployment Support Activities: Cost estimates for community engagement support and activities are based on current rates for similar successful programs at the Port and market research.

Port of Seattle Shore Power: Cost estimates are based on existing quotes from equipment manufacturers and recent public works bid data for comparable work adjusted to the specific scope of the proposed projects. The costs provided are reasonable as they incorporate the large amount of uncertainty that is inherent to projects at this stage of the project life cycle. Cruise shore power projects are informed by analyses of vessel design configurations to maximize connections and investment.

Section 9 – Attachments

This application and all attachments, including letters of support, will be available on the NWSA website: nwseaportalliance.com/2024CleanPorts