

Puget Sound Zero Emission Truck Collaborative and Decarbonizing Drayage: Roadmap 2050 Scoping Document

The transition to zero-emission vehicles serving ports in the Pacific Northwest is a key step to meet zero emission trucking targets adopted in the Northwest Ports Clean Air Strategy while also contributing to city, regional, and state decarbonization goals. As a region, we have a window of opportunity to harness momentum toward zero-emission trucking, which is growing rapidly. Responding to industry trends, green supply chain initiatives, and new policies like the Advanced Clean Truck Rule, truck manufacturers are ramping up their manufacturing and marketing of zero-emission trucks. There is a growing awareness of the need for zero-emission truck charging and fueling infrastructure, and several local utilities and fuel providers are exploring investments. An increasing number of retailers are committing to decarbonize their supply chains. State and federal funding opportunities are on the rise. At the same time, there are significant challenges to be overcome including social equity considerations, high capital equipment and infrastructure costs, and more.

To initially frame the opportunities and challenges, an ad hoc stakeholder group (the Convening Group) has been meeting since December 2022 to scope the development of a long-term strategy for drayage decarbonization and a stakeholder-based process for developing it. This work builds on analysis prepared for the Northwest Seaport Alliance (NWSA) in the paper “Making and Managing the Transition to Zero-Emission Drayage Trucking in the Puget Sound Region.” The decarbonization strategy—*Decarbonizing Drayage: Roadmap to 2050* (the Roadmap)—will identify and analyze key opportunities and challenges for decarbonization of drayage at the Ports of Seattle and Tacoma and lay out collaborative strategies for overcoming them. It will be developed and supported by a multi-stakeholder Puget Sound Ports Zero-Emission Trucks Collaborative (the Collaborative). This document describes the concepts for the Roadmap and Collaborative in more detail based on the discussions of the Convening Group.

Decarbonizing Drayage: Roadmap to 2050

There is a huge gap between the vision of zero emissions by 2050 and the status quo. Full success will require a carefully crafted, long-term strategy rooted in the best available data, multistakeholder collaboration, and lessons from pilot projects and related efforts throughout the country. The Decarbonizing Drayage Roadmap will put forward recommendations for improving zero-emission truck availability and affordability in the Puget Sound region; develop a robust network of accessible and timely charging and fueling stations; and support the drayage trucking community – from trucking fleet operators and independent owner/operators to repair and maintenance technicians and shops – with technical and financial assistance. The Roadmap will be developed in parallel with demonstration and pilot projects that are taking shape in the region now.

The Roadmap should emphasize voluntary, non-regulatory, and partnership-based solutions that can achieve reductions at the scale and pace needed to meet port, local, and state decarbonization goals while also ensuring

the continued economic vitality of the Northwest ports gateway and region. It should embrace multiple technology pathways, including electricity, hydrogen, and retrofits.

The Roadmap should emphasize facilitating a just and equitable transition to zero-emission trucking, with an emphasis on solutions that make zero-emission trucks affordable and available for a range of operators, large and small. These solutions may include investments, incentives, financing, and/or new business models. The Roadmap should assess the potential role of secondary vehicle markets to provide an affordable option for used trucks and bolster the business case for new vehicles by enhancing their resale value. In addition, identifying and providing collaboration and support for development of necessary infrastructure by utilities, charging providers and sales and servicing entities will be necessary.

The Roadmap should be developed through a stakeholder-driven process based on collective action and mutual interest. This process must be informed by consultation with near-port communities experiencing environmental health disparities and small, lower income trucking companies and independent owner/operators. The process will draw on input from truck manufacturers, trucking associations, trucking companies, and truckers who will use these vehicles and whose patterns of use will inform issues like the most appropriate locations and processes for zero-emission charging/fueling infrastructure. External consultation should include an education component on the opportunities provided by zero-emission drayage. Compensation should be provided where appropriate.

Given related ongoing work in the region, Roadmap development must be data-driven and use a learning-by-doing process, informed by regional pilots and related efforts. While focused on port drayage, the work should retain a regional/state-wide perspective, recognizing that ports can be catalysts for accelerating a broader transition to zero-emission medium and heavy-duty transportation in other sectors.

A draft conceptual outline of the Roadmap is included as Attachment A.

Puget Sound Zero Emission Truck Collaborative

A Zero Emission Truck Collaborative consisting of representatives from key stakeholder groups should lead the development of the Roadmap and help implement its recommendations. A successful transition to zero-emission trucking will require well-coordinated and aligned actions and investments by a wide range of stakeholders that should be represented on the Collaborative, including truck manufacturers, trucking companies and drivers, retailers, ports, marine terminal operators, local and state government agencies, utilities, charging and fueling companies, near-port communities, environmental and EJ advocates and others. To help ensure diversity, compensation should be available for participants where needed so that financial considerations are not a barrier to participation.

The primary purpose of the Collaborative is to develop and build support for the Roadmap as a long-term strategy for decarbonizing drayage through scaled adoption of zero-emission trucks at Northwest port gateways. Members will collaborate to identify and contribute to strategies for overcoming market, logistical, and other barriers related to drayage fleet adoption of zero-emission vehicles. To inform this work, Collaborative members will observe and draw lessons from zero emission drayage pilots from the vantage point of the sectoral interests

that members represent. They will also provide insights into related regional efforts with which they are familiar, identify opportunities for alignment with these other efforts, and share lessons learned.

The Collaborative's process will provide a platform for broader communication and stakeholder engagement about adoption of zero-emission trucks to build visibility and support in the region. Members will assist in attracting state, federal, and private sector funding and investment to allow large-scale markets for zero-emission trucks to develop.

The Collaborative will have approximately 25-30 members—large enough to be representative while also small enough to be nimble. The Collaborative will develop and approve its own charter and ground rules, including decision-making processes. It will establish its own milestones and duration.

To maximize effectiveness, the Collaborative will be facilitated and coordinated by a neutral, third-party with demonstrated expertise designing and facilitating complex, multistakeholder strategies and bringing technical knowledge to the process. This support for a backbone organization will be provided by NWSA with funding from a Washington Department of Transportation grant. The backbone organization will select the initial members of the Collaborative based on recommendations from the Convening Group. The organization will then support the collaborative as it begins its work and determines its own operating procedures, including procedures for changing or adding members.

Individually, Collaborative members should be:

- Committed to the success of the project and the long-term goal of decarbonizing drayage at regional ports
- Committed to working together to advance collaborative solutions
- Positioned to act as sounding boards for, and liaisons to, the sectors they represent
- Knowledgeable about key barriers and potential solutions
- In a position to build visibility and support for this work in the region

Collectively, the membership of the Collaborative should:

- Be connected to other regional efforts and positioned to learn from and make connections to related efforts
- Reflect the diversity of stakeholders and able to generate solutions that are equitable for drivers and communities that are underserved
- Be in a position to attract state, federal, and private sector funding and investments to help enable markets, infrastructure, and incentives to develop

The anticipated start date for the Collaborative is May 2023, with the group meeting regularly throughout 2023 and 2024 and the Roadmap completed by December 2024. The Collaborative may continue to work on implementing the Roadmap beyond 2024.

Attachment A: Decarbonizing Drayage Roadmap: DRAFT Conceptual Outline

Section	Topics/Questions Addressed in this Section	Potential Research/Data Needed to Inform this Section
Introduction & Context	<ul style="list-style-type: none"> • What is the genesis and purpose of the Roadmap? • Who developed it, and how? • Who is the Roadmap for and how do we envision it being used? • What is the implementation timeline? 	<ul style="list-style-type: none"> • Input from Collaborative
Driving questions addressed in Roadmap	<ul style="list-style-type: none"> • How can the transition to zero emission trucking be accelerated to achieve climate and air quality targets as early as possible while making it economically viable? • How can initial capital cost barriers for vehicle and charging/fueling infrastructure be overcome? • How can we ensure that vehicles and charging/fueling infrastructure are available, accessible, and affordable at the same time? 	<ul style="list-style-type: none"> • Input from Collaborative
Zero-emission truck availability and affordability	<ul style="list-style-type: none"> • What are the existing challenges and opportunities re: availability and affordability of zero-emission trucks in the Puget Sound region and WA state? • What is the strategy for making zero-emission trucks more available and affordable? • What mix of policies and programs already are in place to increase the availability and/or affordability of these trucks (e.g., Advanced Clean Truck Rule)? • What additional policies and programs are needed? • What role can/should a secondary market play? How do we go about establishing a secondary market? • Are there different business models for drayage service delivery that should be explored? 	<ul style="list-style-type: none"> • Scan of existing drayage companies' truck operating/purchasing models • Current and projected future availability, access, and affordability (assessment of total cost of ownership and drayage operator access to capital and ability to handle higher purchase price). • Additional analysis of barriers and opportunities? • Scan of existing policies and programs to increase availability/affordability, plus gaps analysis • Analysis of "best practices" in secondary market creation • Survey of: <ul style="list-style-type: none"> ○ OEMs ○ utilities, charging/fueling companies ○ truckers/trucking companies?
Zero-emission truck charging and fueling infrastructure	<ul style="list-style-type: none"> • What are the existing challenges and opportunities re: zero emission truck charging and fueling infrastructure? • What network of charging and fueling infrastructure is going to be necessary to enable the transition to zero-emission trucks? Where should charging and fueling stations be located? • How should charging/fueling infrastructure in the Puget Sound link up 	<ul style="list-style-type: none"> • Analysis of current and potential future drayage trucking patterns (i.e., where trips start and finish, major routes, where trucks are parked overnight, etc.) • Assessment of future charging/fueling needs (amounts and locations of electricity, clean hydrogen, etc.) • Analysis of cost to install charging/hydrogen fueling infrastructure, including analysis of

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	<p>with and interact with more regional and national networks?</p> <ul style="list-style-type: none"> • Who is responsible for planning and developing truck charging and fueling infrastructure? Assuming a mix of private (“behind-the-fence”) and public charging and fueling stations; how will infrastructure development efforts be coordinated? • What efforts are already underway to plan and develop this network? What more action is needed? • What policies/funding is needed to help build out the charging/fueling network? What financial incentives are needed to motivate private entities to invest in the necessary infrastructure? 	<p>business case for operators and/or other providers to install charging/fueling.</p> <ul style="list-style-type: none"> • Scan of existing efforts to plan and develop truck charging/fueling infrastructure. • Survey of: <ul style="list-style-type: none"> ○ Appropriate local, state, and federal agencies ○ Charging/fueling companies ○ Truckers/trucking companies?
Supporting the trucking industry through the transition	<ul style="list-style-type: none"> • What support will truckers and trucking companies need to navigate this transition, and what are key strategies for providing that support? • What support will other aspects of the trucking industry – e.g., truck maintenance and repair – need to navigate this transition, and what are key strategies for providing that support? 	<ul style="list-style-type: none"> • Financial analyses of owning and operating zero emission trucks across the spectrum of owner-operators to large fleets. • Scan of best practices by other ports? • Survey of: <ul style="list-style-type: none"> ○ Drayage truckers/companies ○ Truck maintenance and repair businesses
Ensuring a just and equitable transition	<ul style="list-style-type: none"> • The goal is to phase out emissions from drayage trucks as early as possible, but no later than by 2050 (especially in communities experiencing environmental health disparities) while at the same time preserving the economic well-being of drayage truck drivers/companies, many of whom are small, minority-owned businesses and/or low-income people-of-color. What is our strategy for doing that? 	<ul style="list-style-type: none"> • More refined analysis of: <ul style="list-style-type: none"> ○ Truck emissions in EHD communities ○ Demographics of drayage truckers/companies serving the NWSA gateway (e.g., race, ethnicity, annual income, etc.)
Funding and financing the transition	<ul style="list-style-type: none"> • How much is the transition likely to cost, all things considered (total cost of ownership of trucks, infrastructure, etc.)? • Where is that funding going to come from? Who pays for what? • Should the Collaborative have a fund-raising strategy? If so, what should it be? 	<ul style="list-style-type: none"> • Cost projections • Scan and prioritization of funding opportunities • Scan and prioritization of potential financing mechanisms • Survey of: <ul style="list-style-type: none"> ○ Relevant state and federal agencies ○ Financial institutions ○ Drayage truckers/companies

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	<ul style="list-style-type: none"> • What kind of financing support will truckers/trucking companies need? 	
Management and accountability	<ul style="list-style-type: none"> • Who is responsible for overseeing implementation of this Roadmap? Should the Zero Emission Truck Collaborative continue to exist to play that role? • If so, where should the Collaborative be housed over time, and how should it be funded? • How will progress be tracked and reported? What are the key indicators of success? 	<ul style="list-style-type: none"> • Decision by the Collaborative