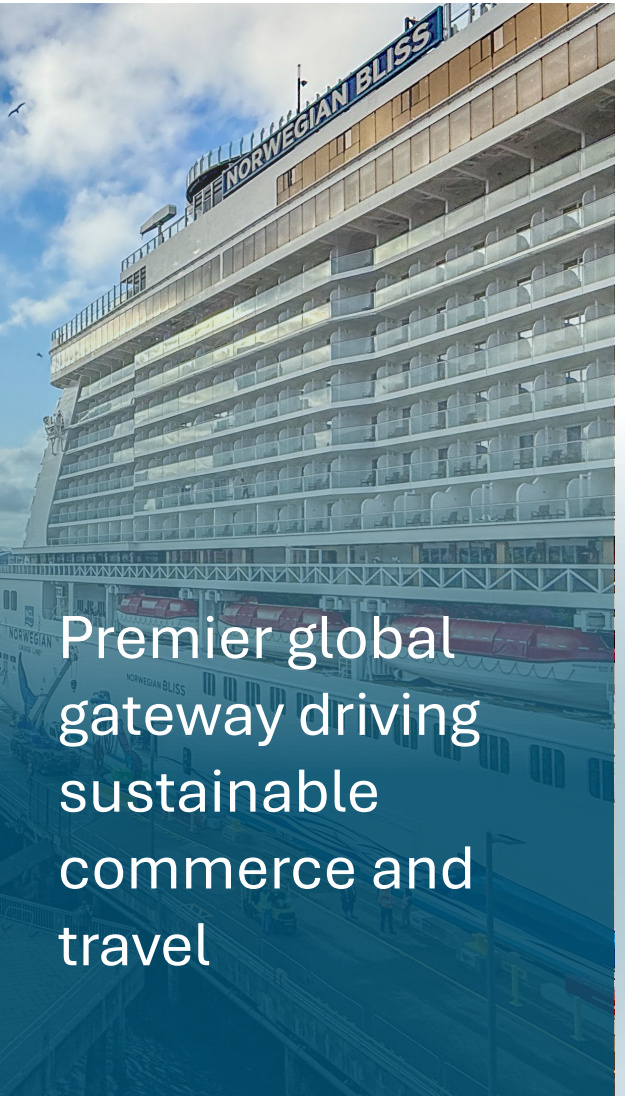
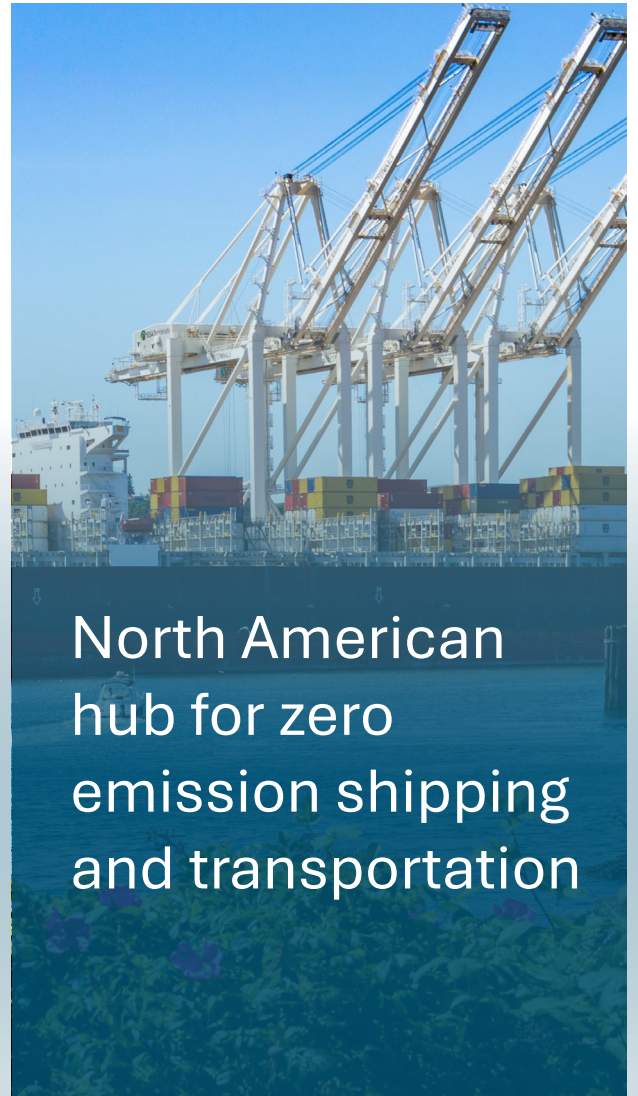
Alex Adams
Sr. Manager, Maritime Sustainability
Port of Seattle

OUR VISION

ZERO EMISSION PORT BY 2050



Premier global gateway driving sustainable commerce and travel



North American hub for zero emission shipping and transportation

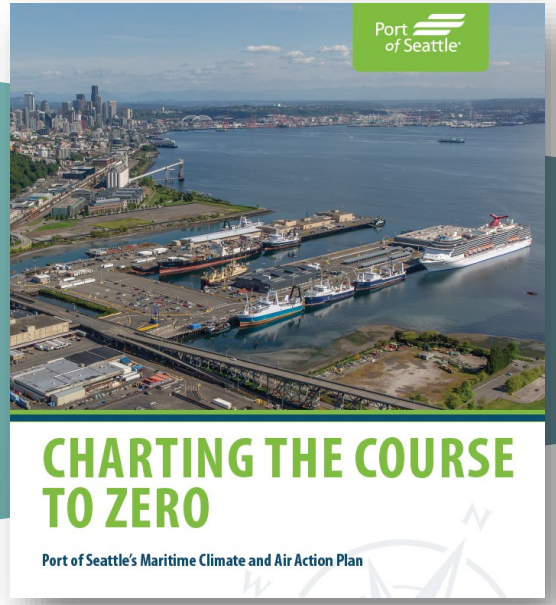
Future-ready for sustainable, resilient operations and infrastructure

Health and prosperity for near-port communities

CHARTING THE COURSE TO ZERO

Strategy → ***Implementation***

Sets shared, long-term vision between four ports



Port of Seattle's near-term decarbonization plan

Decarbonization Programs

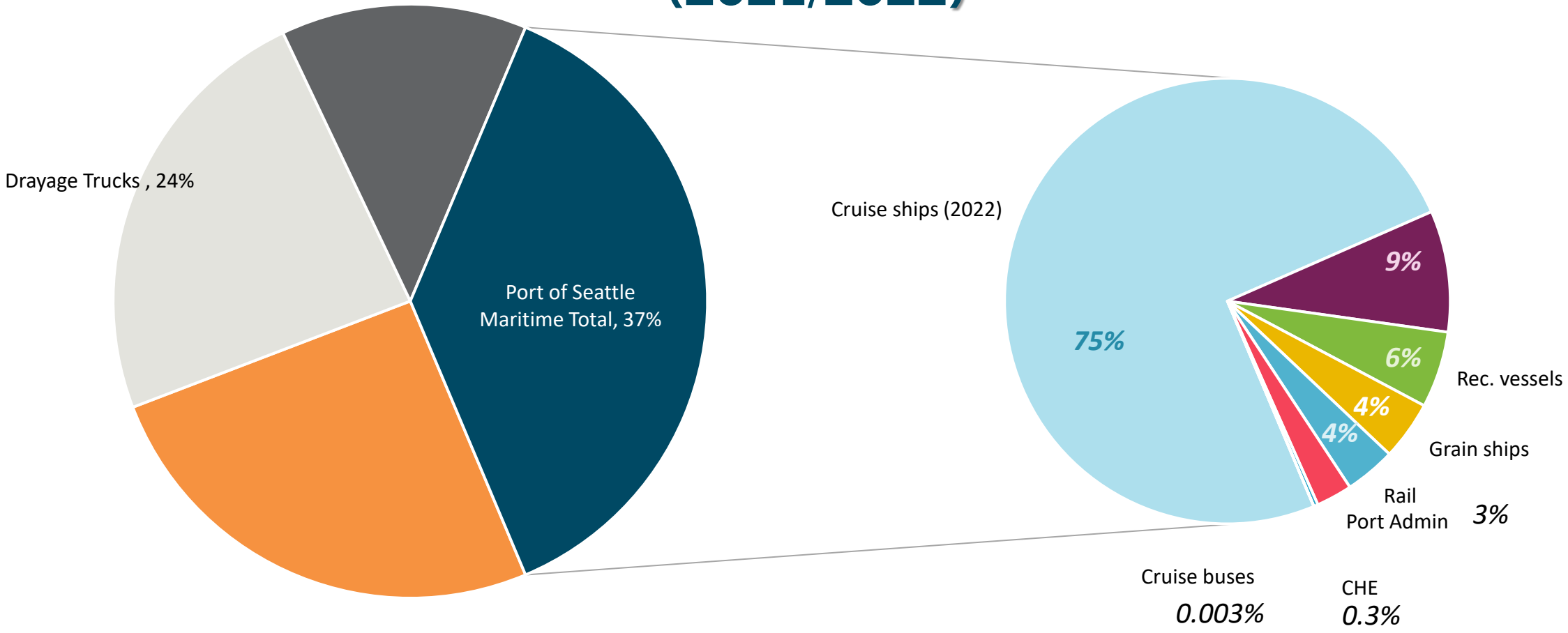
Seattle Waterfront Clean Energy Strategy

Green Corridors

Fuels Collaborative

Example actions toward zero

SOURCES OF SEAPORT-RELATED GHG IN SEATTLE (2021/2022)



Total GHG: 351,507 metric tons CO2e

Mix of 2022 and 2021 GHG data

NWSA: 2021 Puget Sound Maritime Emissions Inventory (PSEI)

POS total: 2021 PSEI, 2022 Cruise Emissions Inventory, 2022 POS Maritime GHG Inventory

Total GHG: 131,189 metric tons CO2e

Mix of 2022 and 2021 GHG data

Cruise : 2022 Cruise Emissions Inventory

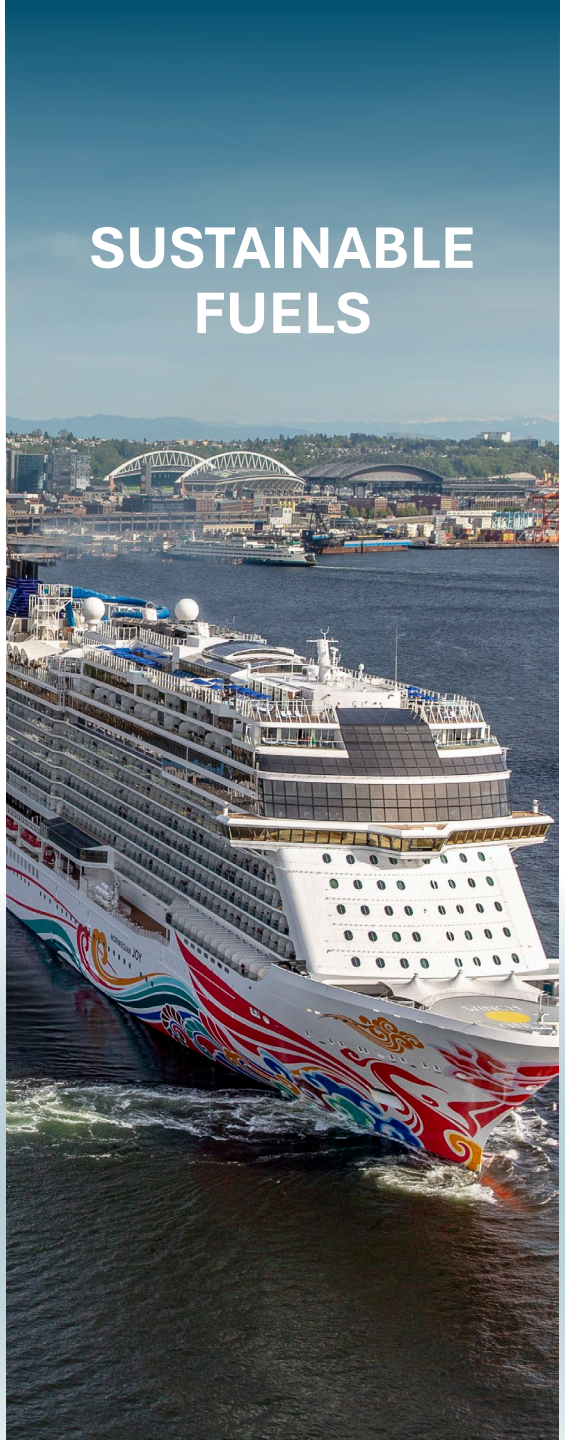
Harbor vessels, grain ships, rec. vessels, rail, CHE: 2021 PSEI

Port Admin : 2022 POS Maritime GHG Inventory

PILLARS TO ZERO

A Strategic Approach Applied across:

- Port Operations
- Vessels and Ships



SUSTAINABLE FLEET STRATEGIES

The Port has over 1,500 vehicles and a plan to get to zero emissions by 2040

1. Right-sizing vehicles and fleets
2. Standardizing vehicle models
3. Purchasing more efficient vehicles and electric vehicles
4. Using drop-in renewable fuels
5. Investing in data collection
6. Improving sustainable driver education

MARITIME INNOVATION CENTER: A LIVING BUILDING

- Transforms a building from 1918 to meet one of world's highest performance standards:
  - High performance envelope
  - Salvaged materials
  - Net Positive Energy with Solar
  - Reduced GHG emissions
  - Natural ventilation and lighting
  - Rainwater capture and stormwater treatment
  - Wastewater treatment on site
  - Geothermal heating
  - Red list-free materials
  - Mural by Shogo Ota
- Drives innovation and supports maritime industry collaboration

SHORE POWER

100% of homeport cruise ships connecting by 2027 or sooner.

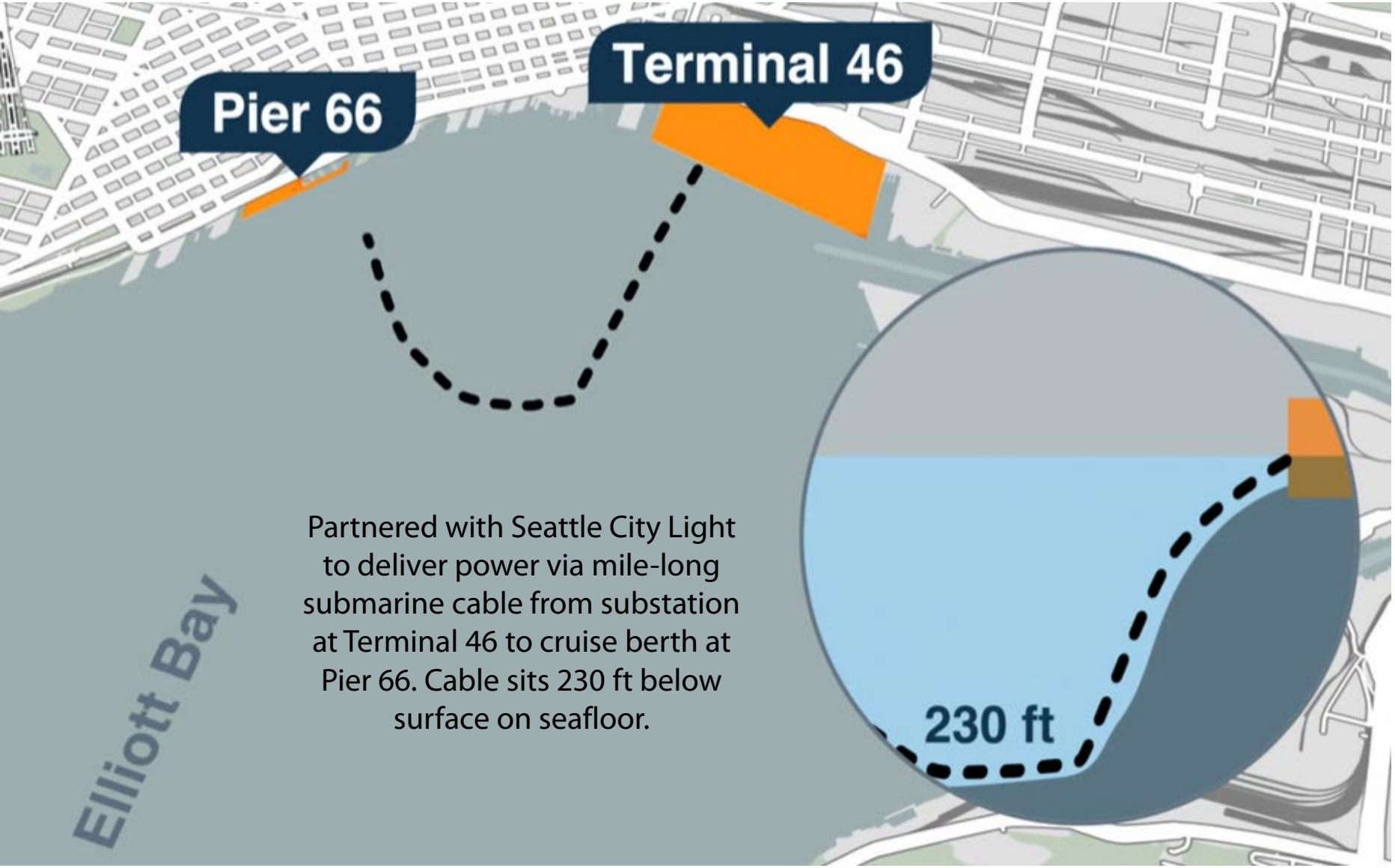
Each cruise shore power connection avoids 30 $MTCO_2e$

~6,300 $MTCO_2e$ and 1.74 MT DPM avoided by shore power in 2025

All homeport ships plugging in can reduce cruise emissions 12% across the airshed

Project Highlight: Shore Power at Pier 66

First cruise ship connected in September 2024



Partnered with Seattle City Light to deliver power via mile-long submarine cable from substation at Terminal 46 to cruise berth at Pier 66. Cable sits 230 ft below surface on seafloor.

Submarine cable upon delivery

Laying the cable

First connection of the Norwegian Bliss, Sept 21, 2024

CLEAN ENERGY INFRASTRUCTURE

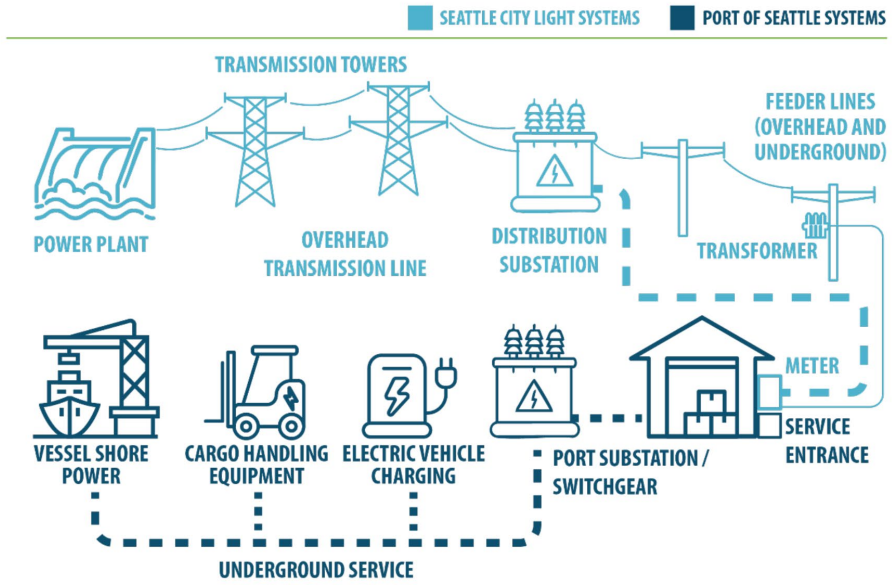
Seattle Waterfront Clean Energy Strategy

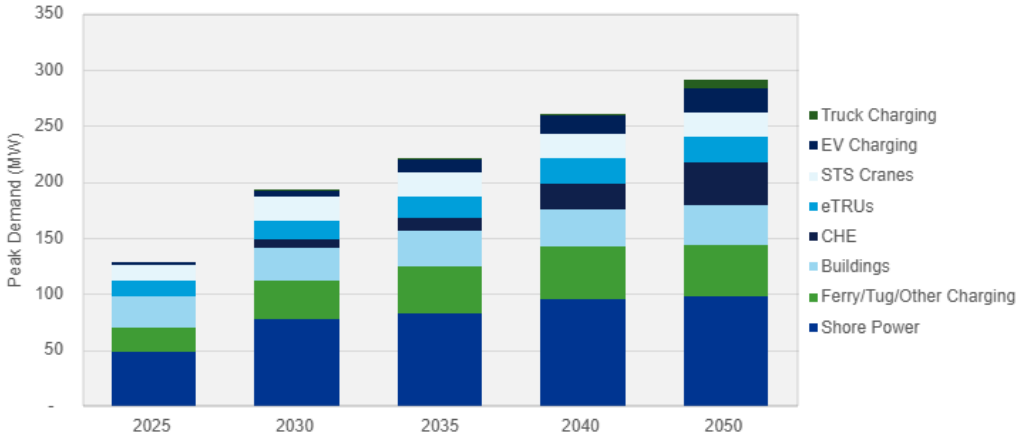
- **A roadmap for power infrastructure to support electrification** of buildings, vehicles, vessels and equipment on Port-owned properties in the Seattle Harbor

- **Vision:** A lasting partnership deploying clean energy infrastructure and driving equitable economic development for a zero-emissions working waterfront by 2050

- **Key findings: 4x increase in power demand by 2050**, Ports and utility will face future constraints, traditional infrastructure solutions are currently most cost-effective

- **Recommendations:** Power infrastructure investments, Strategic implementation actions, a joint strategy implementation framework, address resiliency





Port of Seattle

THE NORTHWEST SEAPORT ALLIANCE
SEATTLE + TACOMA

Seattle City Light

FUTURE FUELS | PORT OF SEATTLE AREAS OF FOCUS

Less Focus ⟷ More Focus

NUCLEAR	AMMONIA	HYDROGEN	LNG / RNG / eLNG	BIOFUELS	GREEN METHANOL
• Light tracking • Early technology • Highly technical • Long time horizon	• Tracking • Not a focus for passenger vessels • Interest by some cargo lines • Developing PNW export market	• Large volume storage risk assessment • Primary interest in fuel feedstock deployment • Tracking regional, national and international	• Commercially available • Developed LNG paper • Coordinating on cruise deployment • RNG market assessment • PNW export market	• Cruise biofuel demonstration • Harbor Vessel biofuel landscape assessment	• Feasibility study • Bunkering study • Conversation with USCG and Harbor Safety Committee • Track regional, national, international

The Port's Role

RESEARCH | Lead and support critical research, apply findings to advance policy, partnerships and demonstration projects

PARTNERSHIPS | Convene stakeholders, educate the public and turn regional priorities into action toward a just transition for our region

POLICY | Leverage lease and berthing agreements, build coalitions, advocate and justify policy changes that support the triple-bottom line and maritime decarbonization

FUTURE FUELS | PORT OF SEATTLE KEY PROJECTS

Sustainable Maritime Fuels Collaborative

Understand supply chain gaps and inform state/regional policy

Aggregated Fuel Infrastructure & Supply, Fuel Buyer's Roundtable

Forecast future demand and infrastructure requirements

Convene Fuel Buyers Roundtable

Methanol Bunkering Assessment

Review regulatory gaps and operational requirements

Conduct a risk assessment, stakeholder workshops

Harbor Vessel Biofuels & Modernization

Understand harbor craft activity and decarbonization pathways, identify charging infrastructure locations, opportunities for biofuels

Green Corridors

Three projects out of Seattle-Tacoma evaluating green methanol in cruise to Alaska and RoRo/Container cargo to Korea

Cruise Biofuel Demonstration

Holland America Lines bunkered renewable diesel on MS Eurodam in 3 calls in 2025.

Community Engagement

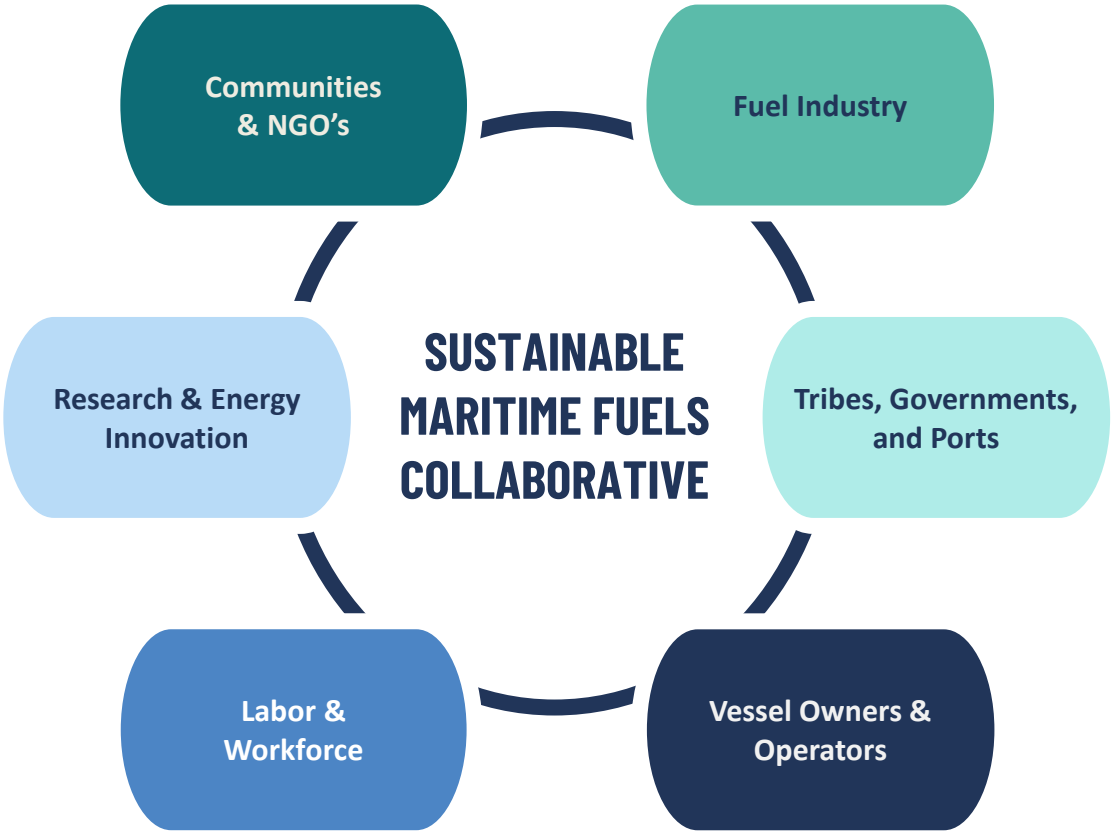
Education on alternative fuels, Community Liaison Program

Workforce Impact Assessment

Understand impacts of vessel decarbonization investments on jobs and regional economy

SUSTAINABLE MARITIME FUELS COLLABORATIVE

- Shipping is WA's largest source of maritime-related climate and air emissions,
- Shipping provides $46b impact, 170,000 jobs
- No coordinated fuel strategies in the Pacific Northwest
- Policy noticeably absent for Maritime Fuels; Maritime is about 10 years behind Sustainable Aviation Fuels in development
- Success involves restructuring fuel supply chain, locally and globally
- Our region's history of maritime innovation and leadership affords a unique capacity to lead the clean energy transition.



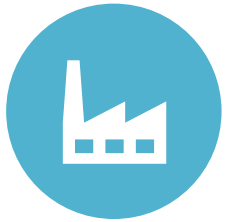
Washington Maritime blue
Port of Seattle
The Northwest Seaport Alliance
CH2ARGE Consortium for Hydrogen and Renewably Generated E-Fuels
Washington State Department of Commerce

PACIFIC NORTHWEST TO ALASKA GREEN CORRIDOR

- **Two Homeports:** Seattle and Vancouver (BC)
- **5 Ports of Call:** Victoria (BC), Juneau, Sitka, Skagway, Haines
- **Major cruise lines** participating
- **Seasonal:** April-October
- **Average duration:** 7-day round-trip
- **~900 nautical miles** Seattle-Juneau via Inside Passage
- Exploring the feasibility of **4 green methanol-fueled cruise ships** in the Alaska market by 2032

FUTURE FUELS IN SEATTLE

CONDITIONS FOR SUCCESS



Demand

Clear, committed demand at scale supports production and supply investment.

Fuel Supply Chain Development

Reliable production, transport, storage, and bunkering facilities in place to serve the ports.

Market Economics

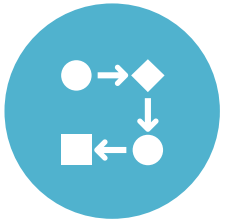
Stable regulations and incentives enable investment and narrow the cost gap between conventional and alternative fuels.

Safety & Regulatory

Established and tested bunkering, storage, and fuel handling practices and emergency procedures ensure safety and community confidence.

Community and Tribal Awareness and Involvement

Future fuel risks and benefits are understood, with broad regional support for next-generation fuels.



Innovation & Early Deployments

Visible projects and partnerships actively remove barriers, build support, and create solutions toward long-term targets.

Workforce and Economic Development

Investments drive economic growth, jobs, and include training for future maritime fuels and technologies.

Thank You

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