

MARITIME ELECTRIFICATION AT THE PORT OF SEATTLE

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SEATTLE FREIGHT ADVISORY BOARD

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Overview of the Port of Seattle



**SEA INTERNATIONAL
AIRPORT**

*11th Busiest Airport
in North America*



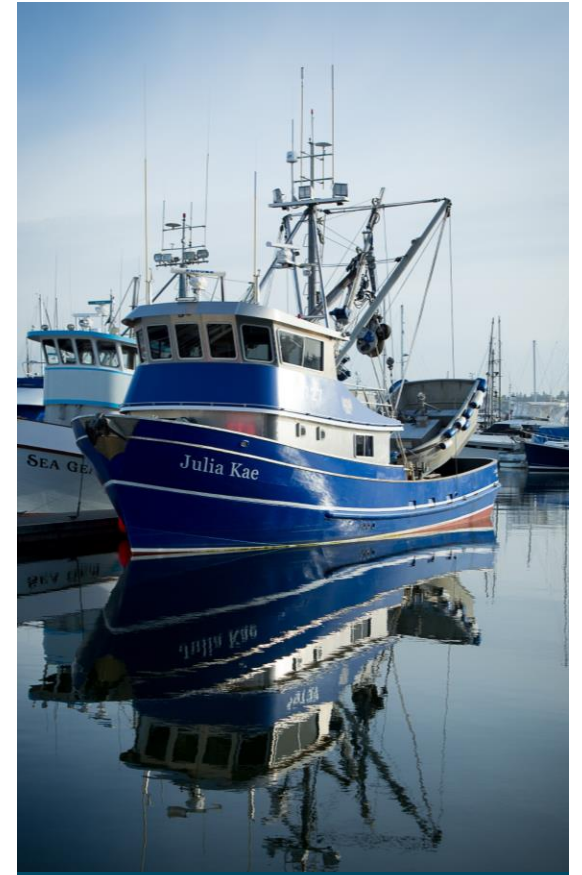
**INTERNATIONAL
CRUISE**

*Largest Cruise Port on
the U.S. West Coast*



**MARITIME CARGO,
CONTAINER, AND BULK**

*7th Largest Cargo Gateway
in North America (NWSA)*

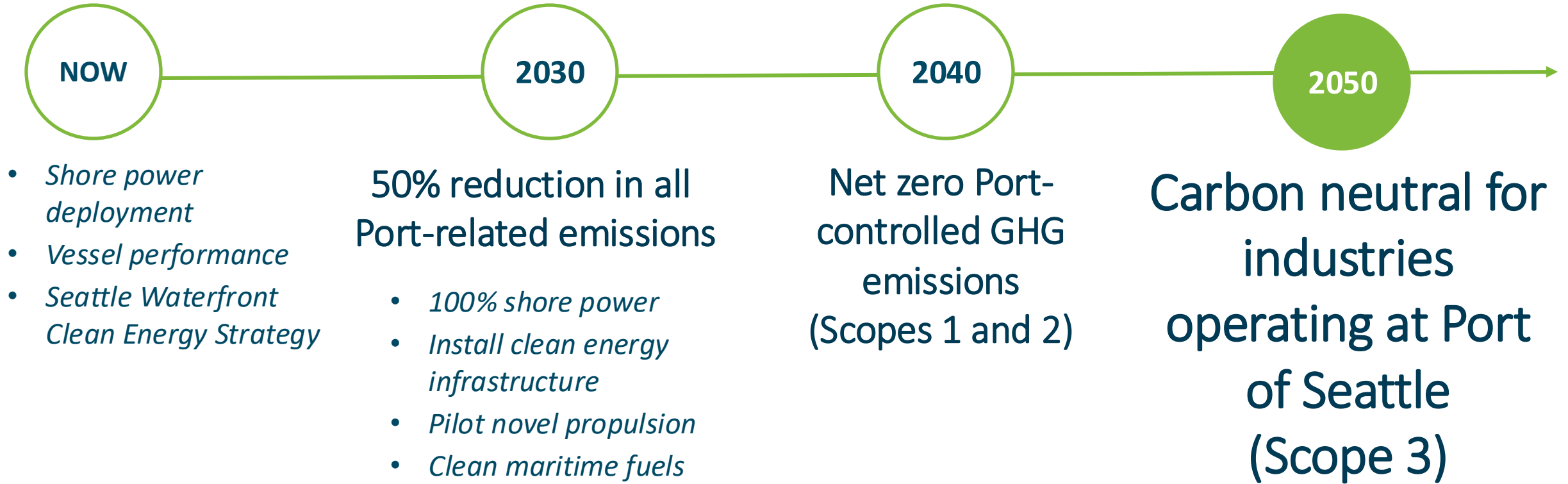


**FISHING, BOATING, AND
REAL ESTATE**

*Home of the U.S. North Pacific
Fishing Fleet*

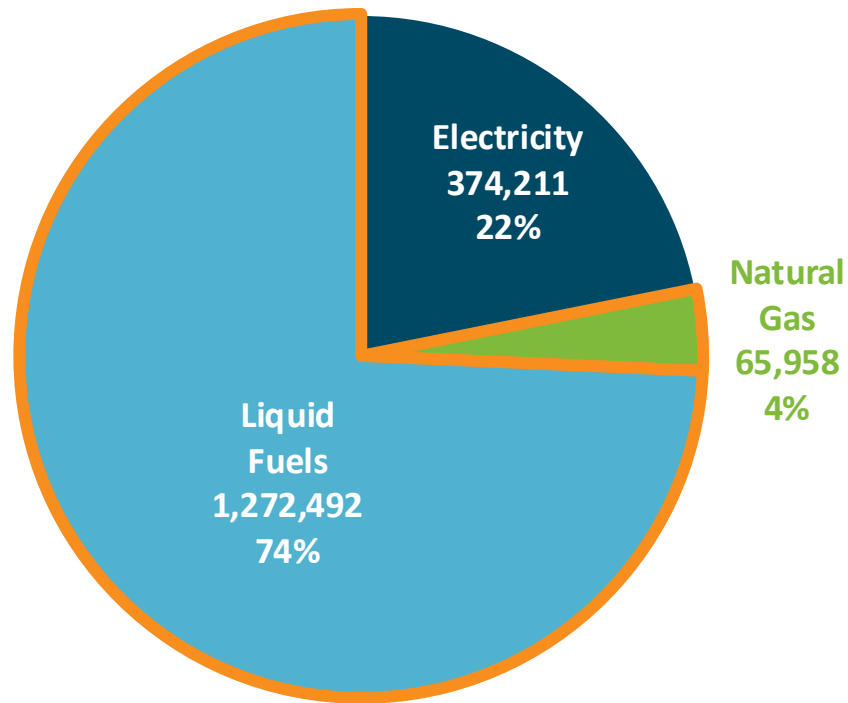
Charting our Course to Zero

Toward the Greenest Port in North America



On-Terminal Energy Usage by Fuel Type (2019 Baseline)

Total (MMBtu) and % of Energy Usage



Major Energy End Use Categories

Buildings	Cruise Vessels
Cargo Handling Equipment	Cargo Vessels
Medium/Heavy Duty Trucks	Harbor Vessels
Fleet Vehicles	Electric Vehicle Charging
Ground Transport	Other (Rail, Refrigeration Plugs)

- Liquid fossil fuels dominate Port's onsite energy use
- Vessels and cargo handling equipment account for nearly 90% of on-terminal energy use
- Electricity load shapes vary significantly by site
- A subset of Port sites are crucial to emissions reductions

Terminal 91



Pier 66



Reducing At-Berth Emissions with On-Shore Power

*100% of homeport cruise ships required to plug in to shore
power beginning in 2027*

Terminal 5



Terminal 46



Terminal 30



Terminal 18



Currently Has Shore Power



Shore Power In Development



Future Shore Power Possibilities



Innovative Shore Power Project: Submarine Cable to Pier 66

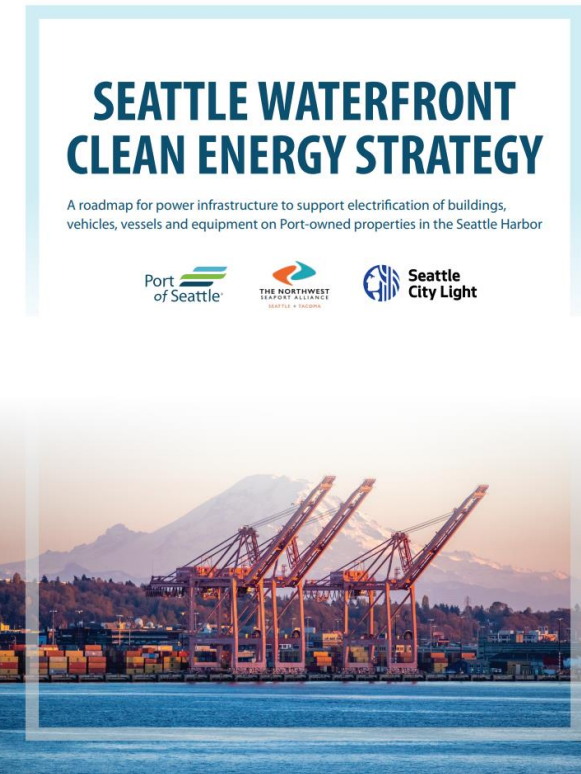
- **Goal:** Provide shore power for cruise ships at Pier 66
- **Challenge:** 17 MW power requirement exceeded the utility's Downtown Network distribution capacity
 - Difficult and expensive trenching
 - Moratorium on additional waterfront construction
- **Solution:** \$44m investment in approximately 1-mile subsea cable in Elliott Bay with landside infrastructure at Terminal 46; became operational in Sept. 2024



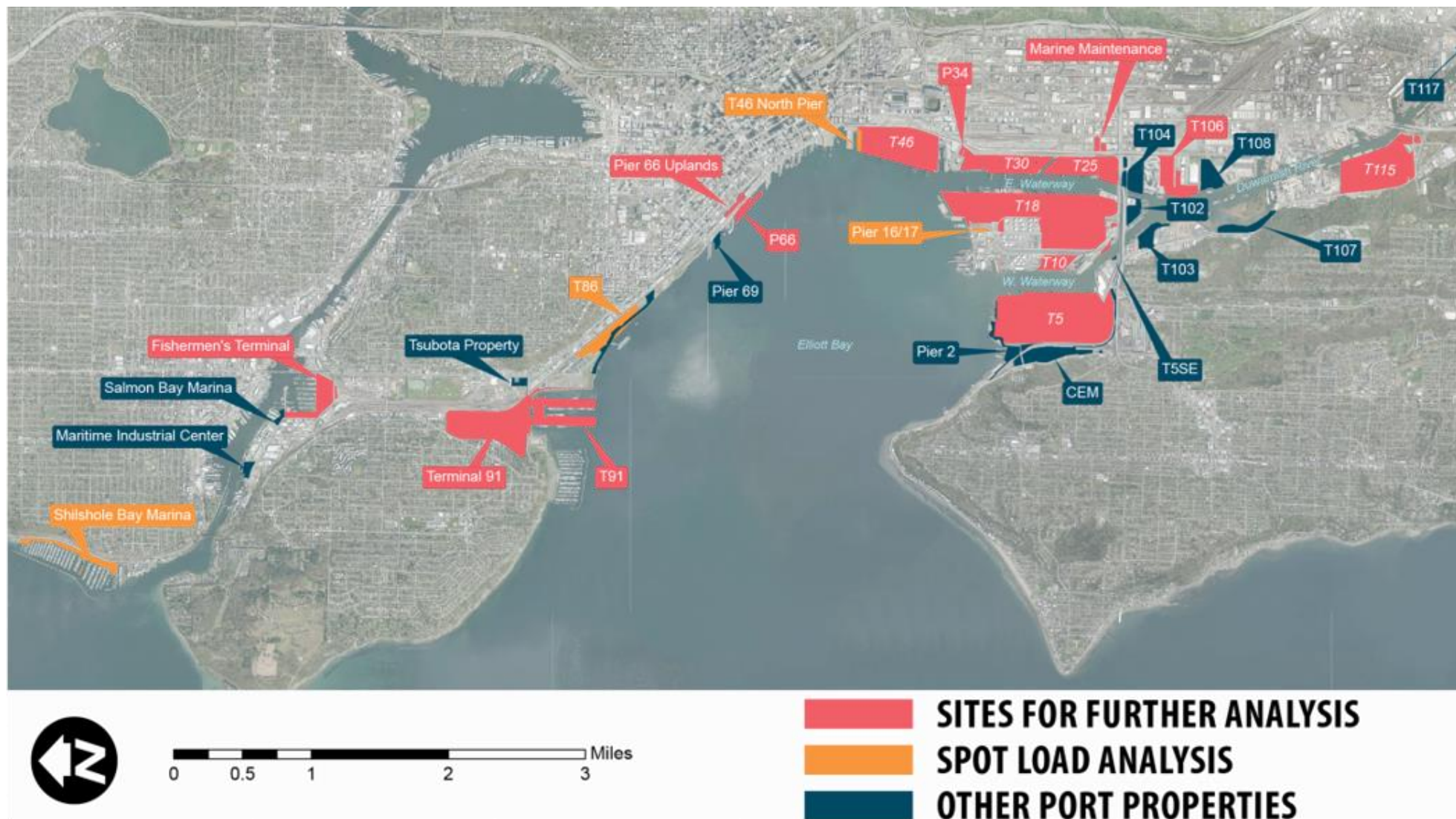
Roadmap to Electrification: Seattle Waterfront Clean Energy Strategy

A roadmap of clean energy infrastructure investments to deploy zero emissions port technologies and increase energy resilience in Seattle

- Leverage Seattle City Light's clean, cheap energy mix (over 90% carbon-free)
- Facilitate Port and Maritime Industry clean energy transition
- Optimize city power grid resources
- Identify financial strategies, business models & policies to support implementation
- Identify innovation and non-wires opportunities
- Reduce climate/air impacts to near-port communities
- 10-year Partnering Agreement to support implementation

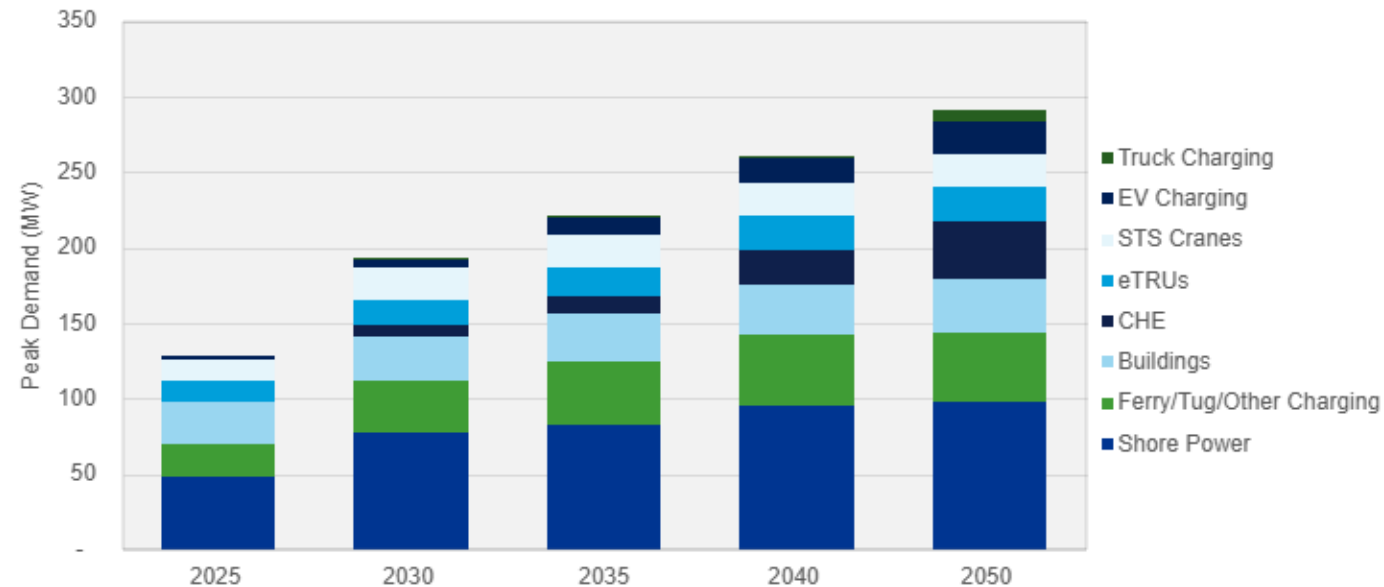


Map of Sites Analyzed



SWCES Findings: Substantial Increases in Forecasted Power Demand and Power Needs Vary Significantly by Site

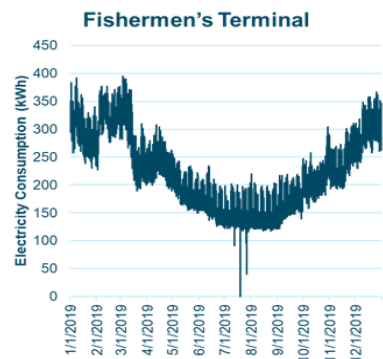
Power Demand by End-use, 2025-2050 (MW)



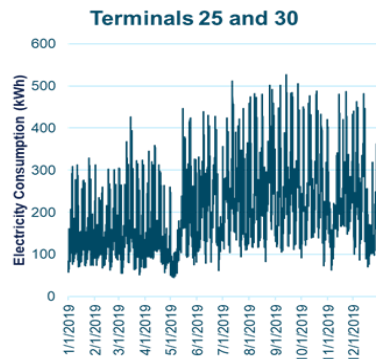
Estimated 4x increase in peak power by 2050

Key Drivers:

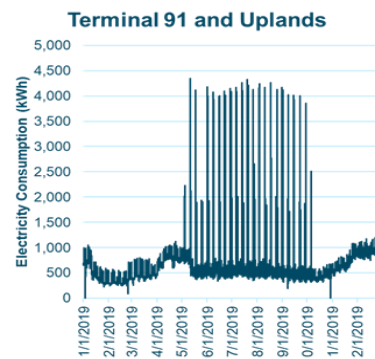
- Shore power additions
- Cargo handling equipment and fleet electrification
- Vessel charging
- Heavy duty vehicle electrification
- Increased industrial activity
- Building development and redevelopment
- Building electrification / natural gas conversion



Commercial fishing



Cargo terminal



Cruise terminal

EPA Clean Ports Grant: Vessel Electrification



Vessel Activity & Fuel Characterization

Harbor Vessel Modernization Study

Aggregated Fuel Infrastructure & Supply
Strategy, Fuels Roundtable

Methanol Bunkering Assessment

Industry Engagement

Community Engagement

Workforce Development

Maritime Fuels Roadmap



- \$3m EPA grant awarded in 2025; 4 subrecipients
- Detailed data logging and heat mapping of harbor vessel activity with industry partners
- Harbor vessel technology and infrastructure assessment
- Harbor vessel decarbonization strategy



Near-Term Priorities for Marine Electrification

- Continue to support shore power deployment and usage
 - Upgrades to support larger power needs for fishing, research vessels
- Support electric/hybrid vessel demonstrations
 - Understand priority vessel types and charging locations through Clean Ports grant study
 - Determine specifications for shared-use charging infrastructure; coordination with terminal electrification (CHE, buildings)
 - Identify business models to support industry adoption of vessels



Thank You

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