

PUBLIC PERFORMANCE REVIEW

Electrification of Ferries

September 27, 2023



WELCOME

PRESENTED BY:

- MANDEEP KAUNDAL, DIRECTOR, RESULTS WASHINGTON

Building Logistics

- **Emergency exits** are located through the conference room doors directly ahead
- **Restrooms** are located outside of the conference room next to the elevators
- Please take **side conversations** outside the room
- Attendees will find a QR code and a physical **survey** located on conference room tables
- **ASL interpretation** is being provided for today's meeting
- Our meeting is being **live-streamed** by TVW
- Meeting **materials** are located at www.results.wa.gov

Topic Selection

- Electrification of Ferries is tied to the Governor's goal 3: **Sustainable Energy and a Clean Environment**
- Recommended by leaders across the state to review progress on **electrification of state ferries** and innovation in **decarbonizing ferry transport**
- Progress and initiatives presented by:
 - Washington State Department of Transportation (WSDOT)
 - Department of Commerce



Governor's Opening Remarks

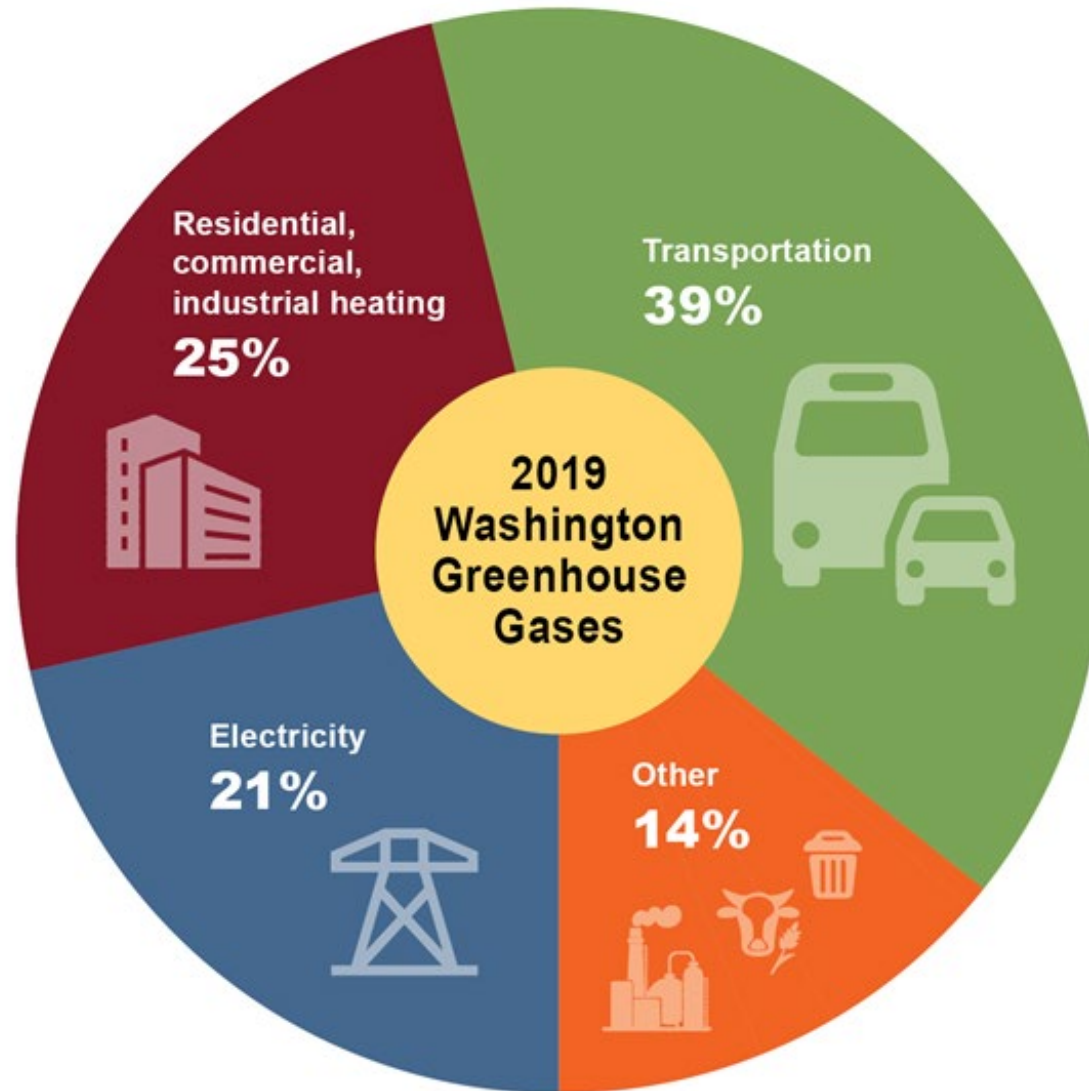


INTRODUCTION: OVERVIEW OF FERRY ELECTRIFICATION

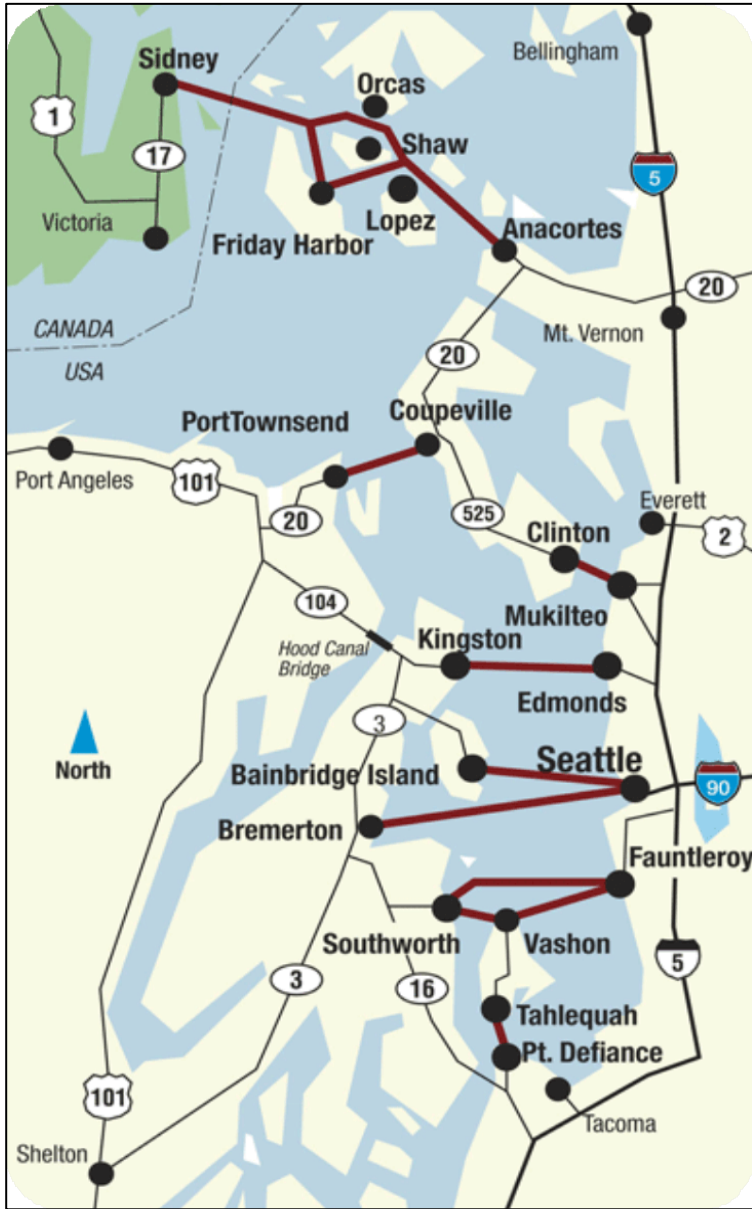
PRESENTED BY:

- AMY SCARTON, DEPUTY SECRETARY, WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT)

Addressing State Emissions



Source: WA Department of Ecology



Our Ferry System

Largest ferry system in the United States



21 auto-passenger ferries



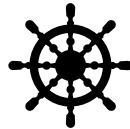
10 routes serving 20 terminals



17.3 million riders in 2022



8.6 million vehicles in 2022

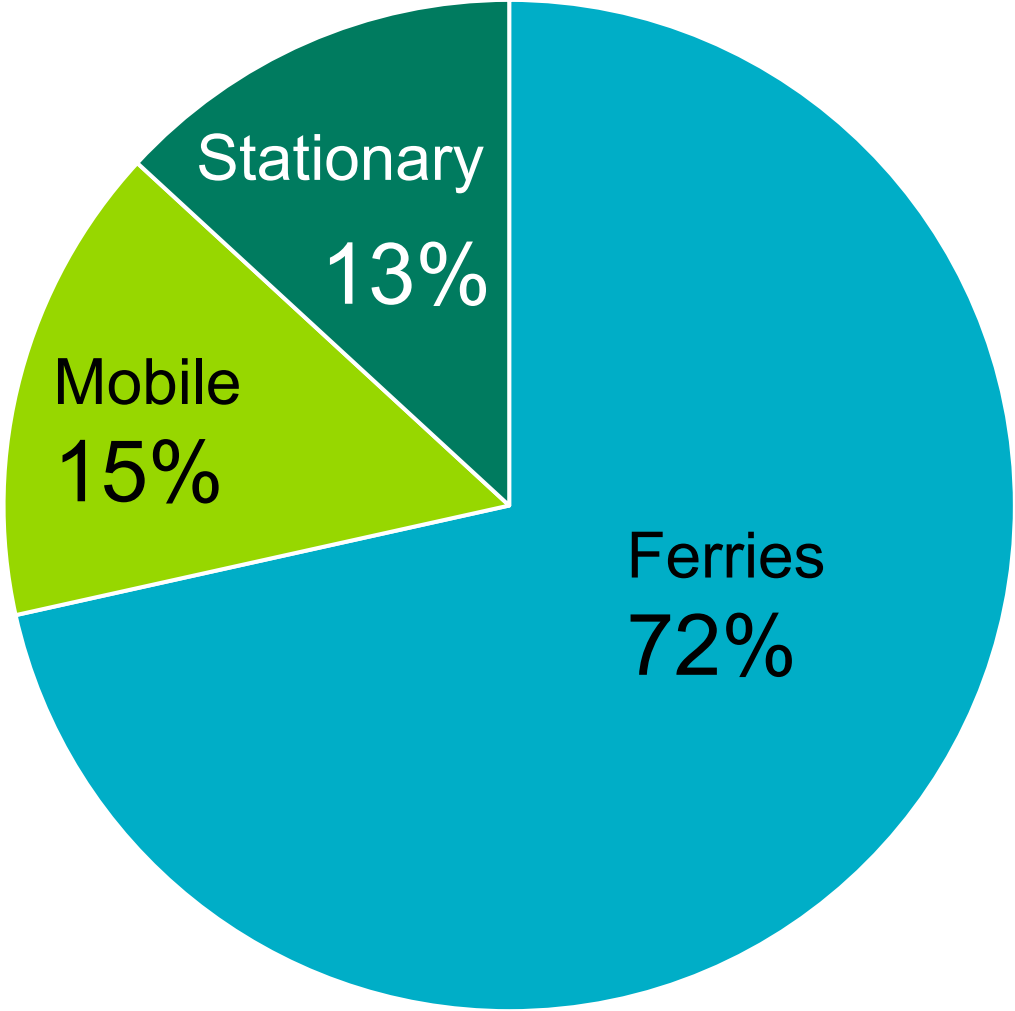


450 sailings per day



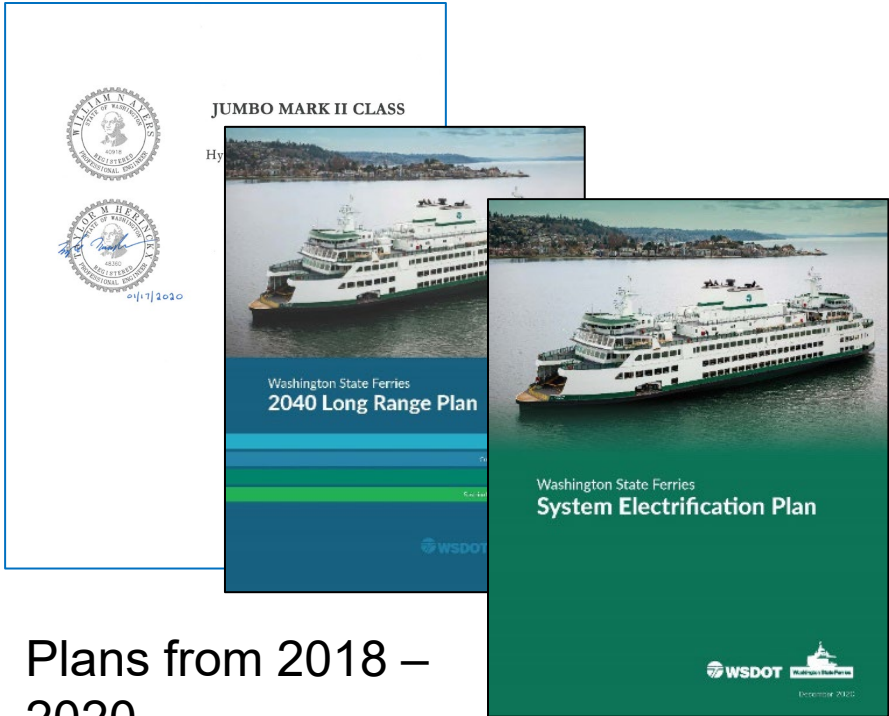
1,800 employees

Ferry System Tops WSDOT Emissions

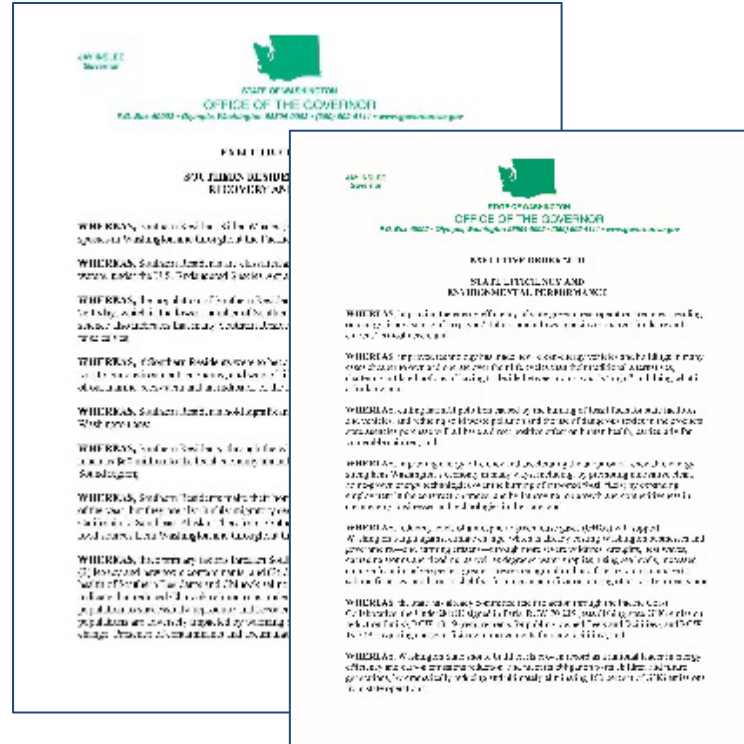


2021 WSDOT Greenhouse Gas Emissions; published Apr 2023

Washington State Ferries Electrification Program



Plans from 2018 – 2020



Governor Inslee's Executive Orders 2018-01 and 2020-01

“Ensure that the Washington State Ferry system begins the transition to a zero-carbon-emission ferry fleet, including the accelerated adoption of both ferry electrification and operational improvements that will conserve energy and cut fuel use”

Investment in Action

\$1.34 billion from:




Puget Sound Regional Council



2022 Move Ahead Washington transportation package signing



Governor Q&A

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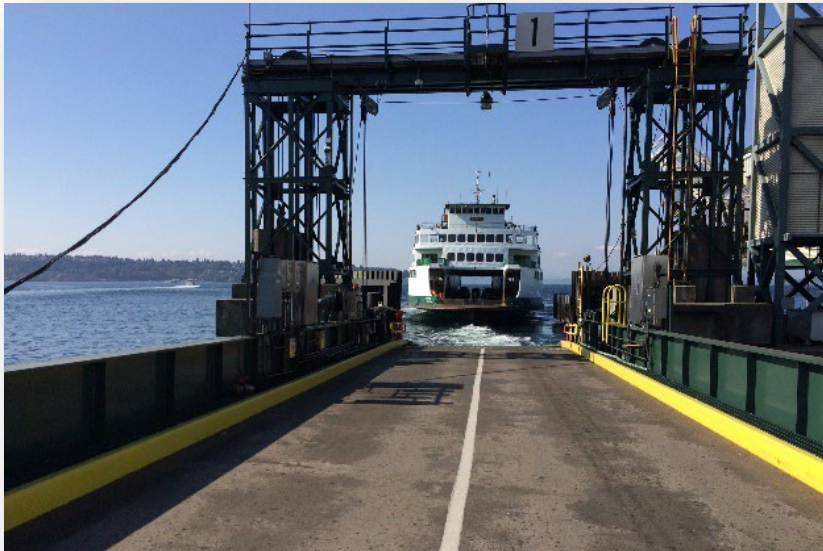
PROGRESS AND INITIATIVES: STATE FERRY SYSTEM ELECTRIFICATION

PRESENTED BY (IN ORDER OF PRESENTATION):

- MATT VON RUDEN, SYSTEM ELECTRIFICATION PROGRAM ADMINISTRATOR, WSDOT
- DEVON BAXTER, OILER, WASHINGTON STATE FERRIES

Electrification Program Elements

Electrify 16 terminals

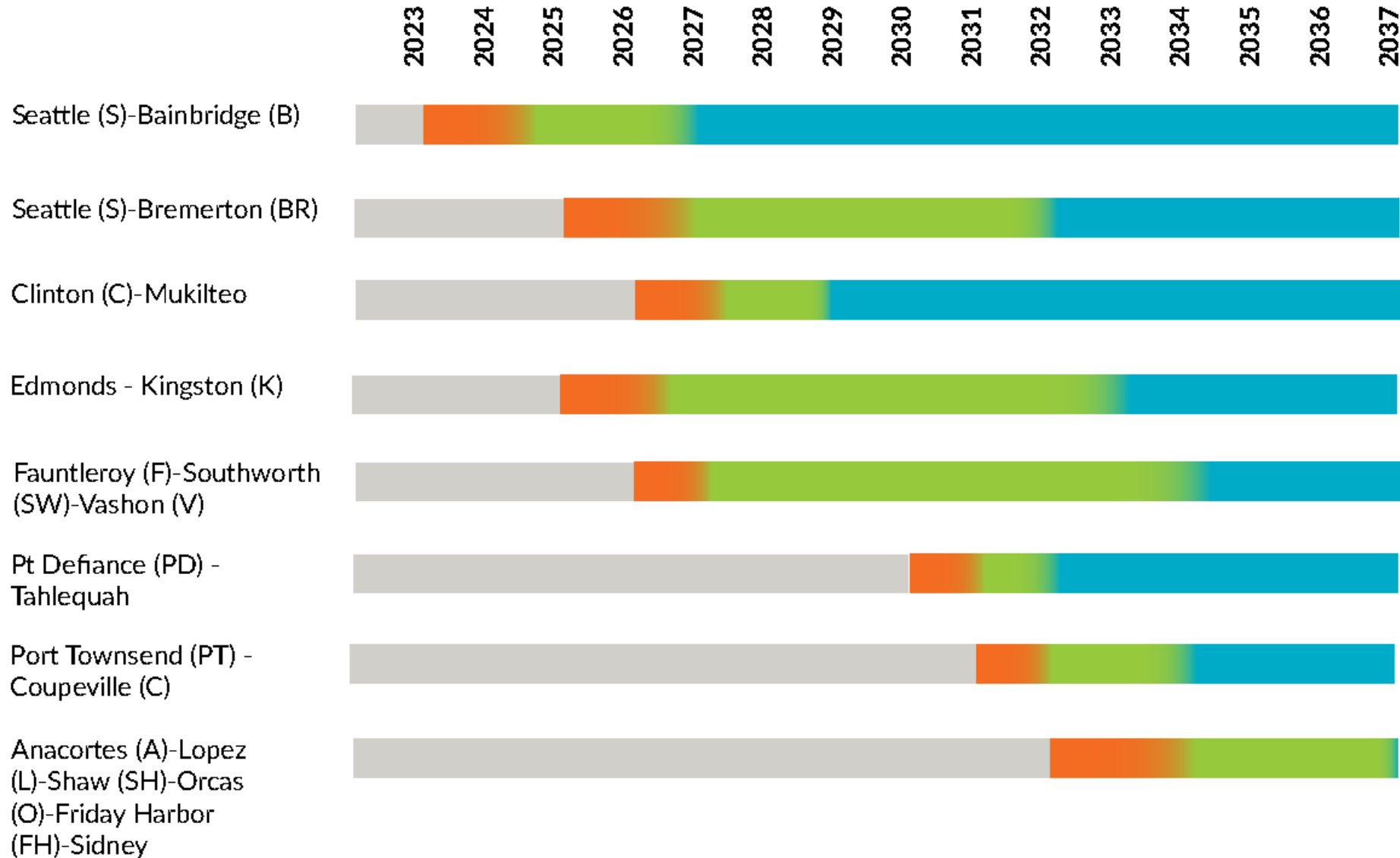


Convert 6 existing vessels

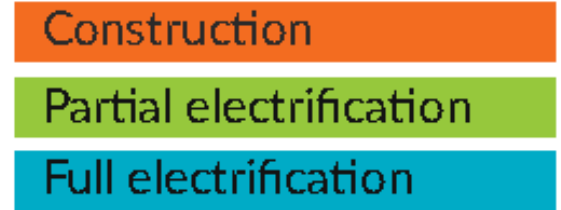
Build 16 new vessels



Implementation Schedule



Key



Electrification Program Delivery

Blended team of Washington State Ferries staff and consultants

Key elements of work include:

- ✓ Program Management
- ✓ Program Controls
- ✓ Design Engineering: Utilities, Mechanical, Marine, Electrical
- ✓ Communications
- ✓ Inclusion



Jumbo Mark II Conversions



3 vessels, 2 routes (Seattle to Bainbridge, Edmonds to Kingston)



Will reduce total Ferries' fuel consumption by 26% (5 million gallons/year)



Each conversion will reduce emissions by nearly 50,000 metric tons/year



Shipyard contract award issued to Vigor Marine Aug. 2023



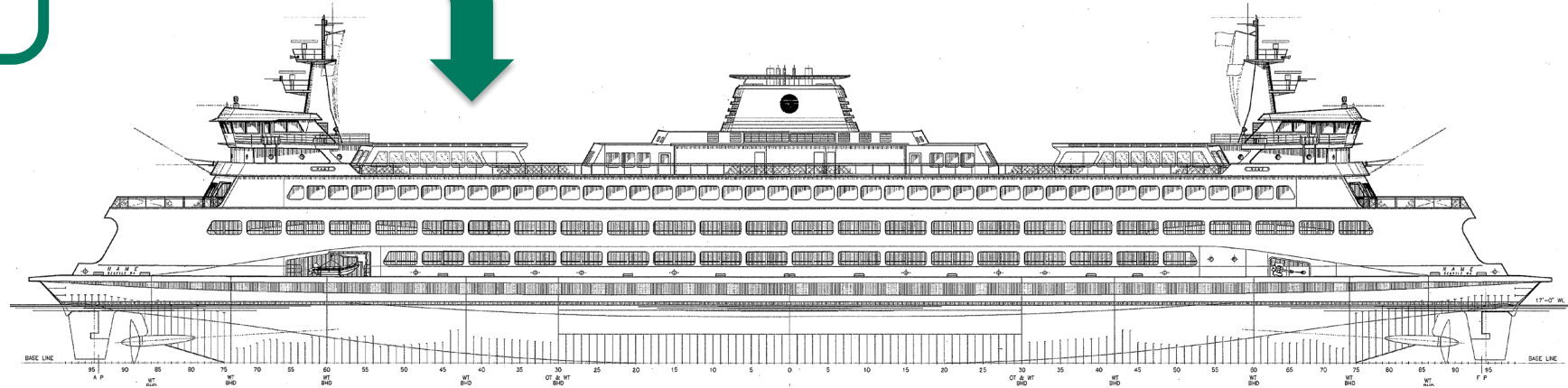
Wenatchee conversion begins fall 2023; *Tacoma* work begins 2024; option for the *Puyallup* in 2025



Jumbo Mark II Conversion

Going in (Reliability)

- Propulsion control upgrades



Going in (Hybrid Conversion)

- 5.7 MW-Hours of energy storage (batteries)
- 12.47kV Switchboard
- Power conversion equipment
- Power Management System
- Fire suppression system
- Battery room cooling and ventilation system

Coming out:

- 2 locomotive-size diesel engines
- 2 engine-driven generators

Hybrid Electric Olympic Class Builds



5 vessels, 2 routes (Clinton to Mukilteo, Seattle to Bremerton)



300 million gallons of diesel fuel saved over 60 years



\$55 million lifecycle cost savings for five new vessels



Plan to award 1 or 2 contracts in 2024; vessel delivery spring 2027



Refining design for authorized procurement; draft bidding documents this fall

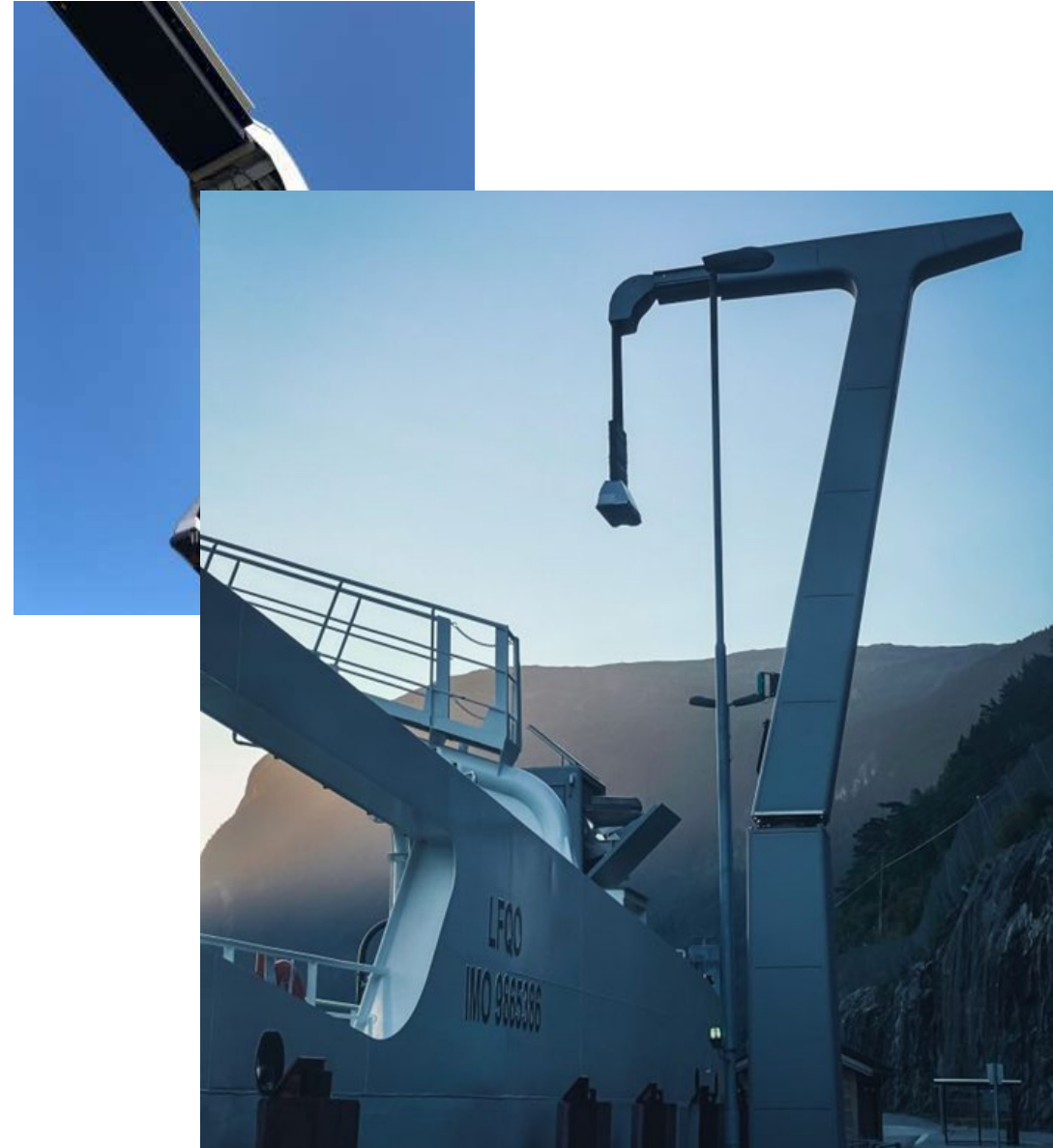


Terminal Electrification Updates

- Utility MOUs
 - Seattle City Light (9/28/22)
 - Puget Sound Energy (5/4/23)
- Initial Terminals: Bainbridge Island, Seattle, Clinton, Bremerton, Kingston
- Directly supports Jumbo Mark II conversions and Hybrid Electric Olympic Class builds



Charging Solutions



Workforce of the Future

Training

- User Input to Design
- Fundamentals Training
- Factory Training
- Follow-On Training

Maintenance

- Organizational Level
- Intermediate Level
- Depot Level

DC Motor Schematic

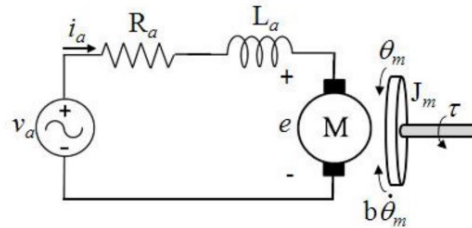


Figure 1: DC Motor Modeled in Electrical and Mechanical Components



HxGN EAM BY  HEXAGON



CALHOON M.E.B.A.
ENGINEERING SCHOOL



Crewmember Perspective

Devon Baxter, Oiler
Washington State Ferries





Governor Q&A

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PROGRESS AND INITIATIVES: INNOVATION IN DECARBONIZING FERRIES

PRESENTED BY (IN ORDER OF PRESENTATION):

- STEPHANIE BOWMAN, MARITIME SECTOR LEAD,
DEPARTMENT OF COMMERCE
- MORGAN FANBERG, PE, CHIEF EXECUTIVE OFFICER,
GLOSTEN



**THE NEXT STEP IN
DE-CARBONIZING FERRIES:
FOIL TECHNOLOGY**

FOIL FERRY.

High-speed,
zero-emission passenger
transportation



30 ALL ELECTRIC

NEGLIGIBLE WAKE

LOW NOISE

SUPERIOR RIDE QUALITY

WHY HYDROFOILING NOW?

- Not a new technology.
- Boeing built 30 vessels in the 70s to increase speed and passenger comfort.
- Required a large amount of power and fuel consumption.



- Advancements in high strength & light weight materials.
- Advancements in the efficiency of hydrofoils.
- Increase in energy density of batteries.

FOIL FERRY.

- Requires $\frac{1}{3}$ the energy of conventional fast ferries.
- Battery powered.
- Zero emissions.
- Safe and reliable.
- Ultra-low wake.
- Quiet and comfortable.
- Scalable.
- Designed and built in Washington State.



Passengers	150
Takeoff Speed	20 kts
Cruising Speed	30 kts
Power	2 x 500 kW
Range	30 nm

A TRUE WASHINGTON PROJECT.

- Leverages Washington's leadership in maritime, aerospace, and clean, inexpensive energy.
- Maritime Blue Joint Innovation Program.
- FTA Accelerating Innovative Mobility Grant.
 - \$611,000 raised
 - Pilot Route Selection
 - Preliminary Vessel Design
 - Preliminary Shoreside Design
 - Environmental and Economic Benefits
- Kitsap Transit now seeking federal funding for Hull #1.



OPPORTUNITY.

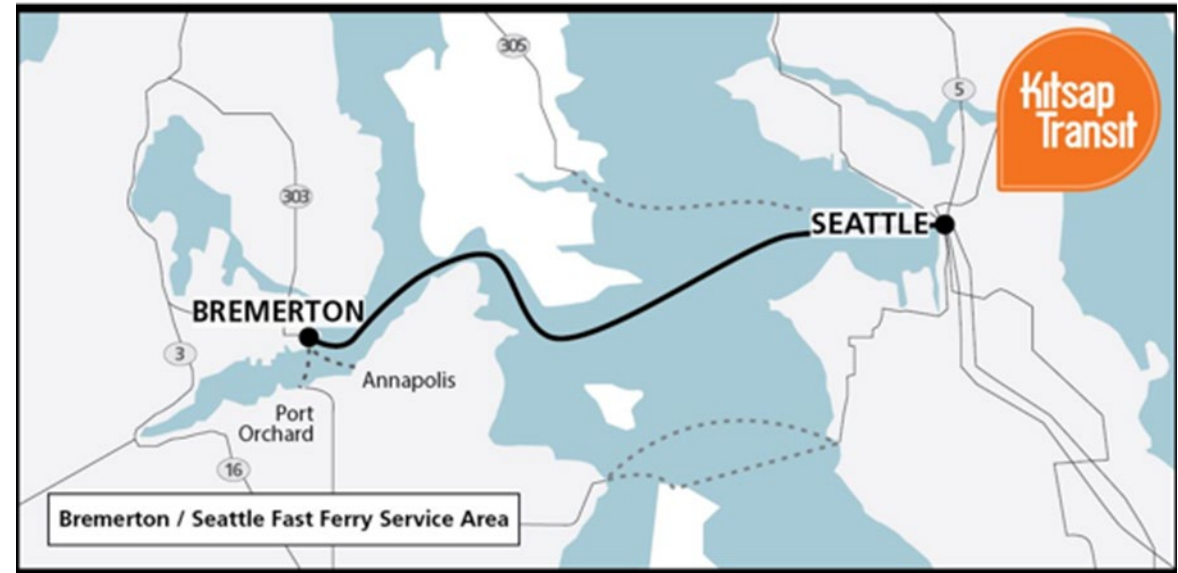
Environmental

- Zero stack emissions.
- Leverages Washington's clean electricity.
- Ready to leverage Seattle waterfront electrification.
- Protects our sensitive shorelines.

Economic

- Leverages the local aerospace industry.
- Builds upon Washington as a center of maritime excellence.
- Lowers lifecycle cost for operators.
- Exportable.

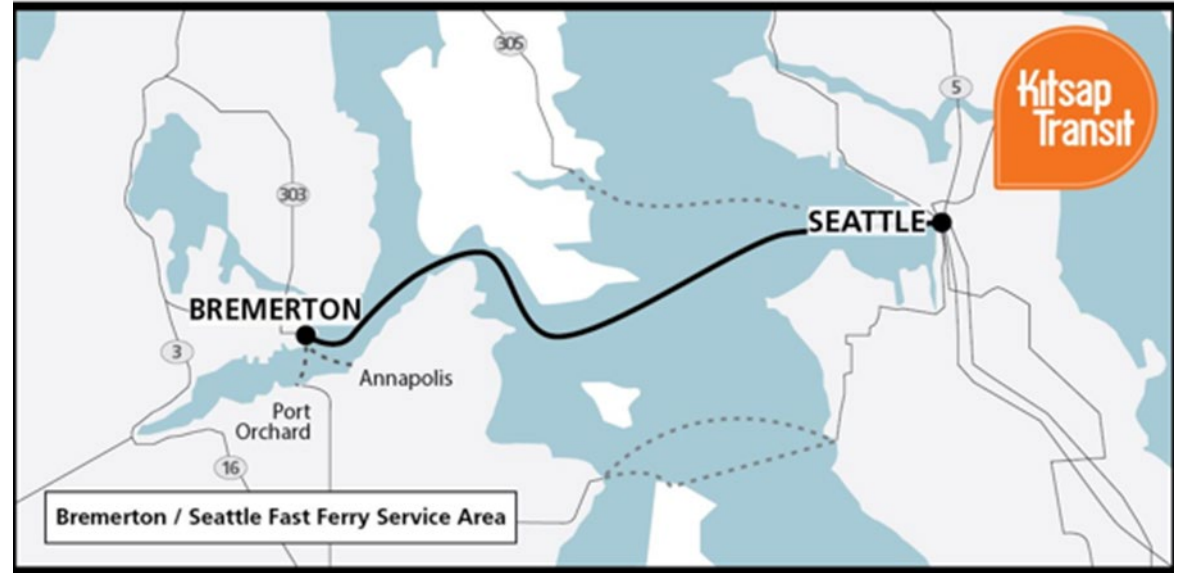
Supplement WSF system with direct passenger-only service



OPPORTUNITY.

Seattle-Bremerton route compared to existing Kitsap Transit 118-passenger fast ferries:

- 27% greater passenger capacity.
- One third the power.
- 35% lower operating costs.
- 83% less CO2 emissions.
- 95% less PM emissions.
- 99% less NOx emissions.



FIT FOR CCA.

- Foil Ferry is a zero-emission passenger ferry.
- The existing Bremerton to Seattle route cannot keep up with peak demand.
- Vision: platform to launch the modern mosquito fleet

Carbon Emissions Reduction Account

For projects that reduce emissions from the transportation industry and increase access to public and alternative transportation.

Subject to appropriation by the Legislature.

NEXT STEPS.

1. Shovel-Ready Design

Prototype Program - \$1.0 million

Production Design - \$2.7 million

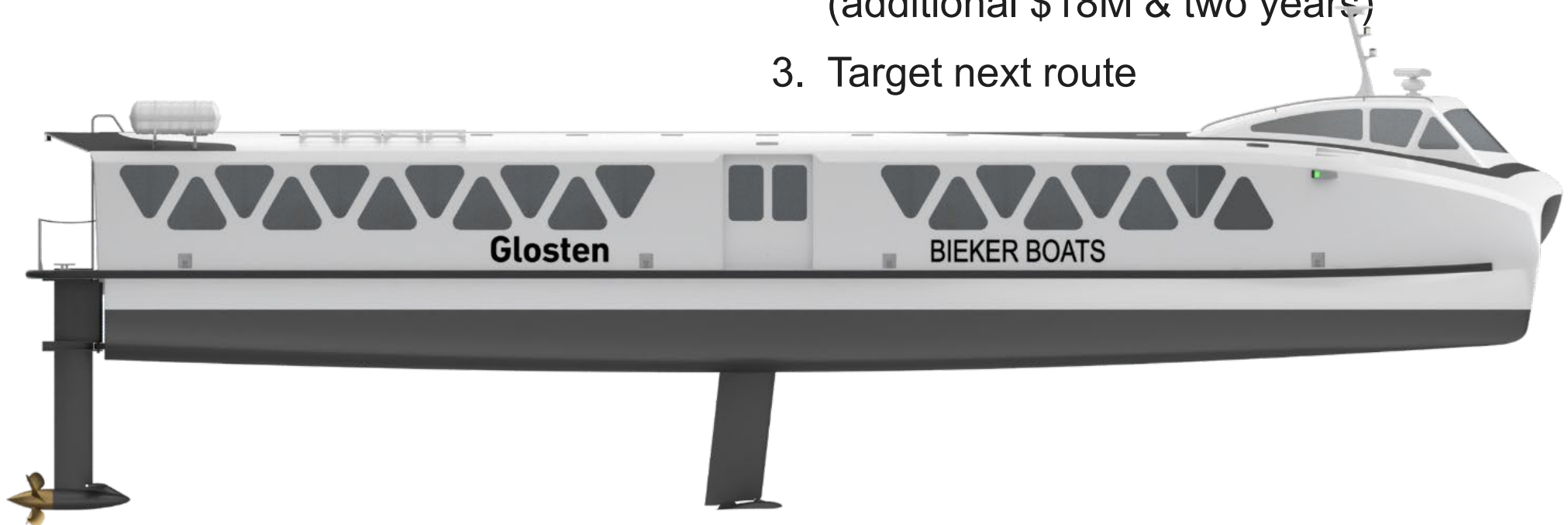
Shoreside Design - \$0.3 million

Total = \$4.0 million

2. Full-scale construction, trials, and deployment

(additional \$18M & two years)

3. Target next route





Governor Q&A

The seal of the State of Washington is visible in the background on the left side of the slide. It features a portrait of George Washington in the center, surrounded by the text "THE STATE OF WASHINGTON" and the year "1889".

FUTURE COMMITMENTS AND NEXT STEPS

PRESENTED BY (IN ORDER OF PRESENTATION):

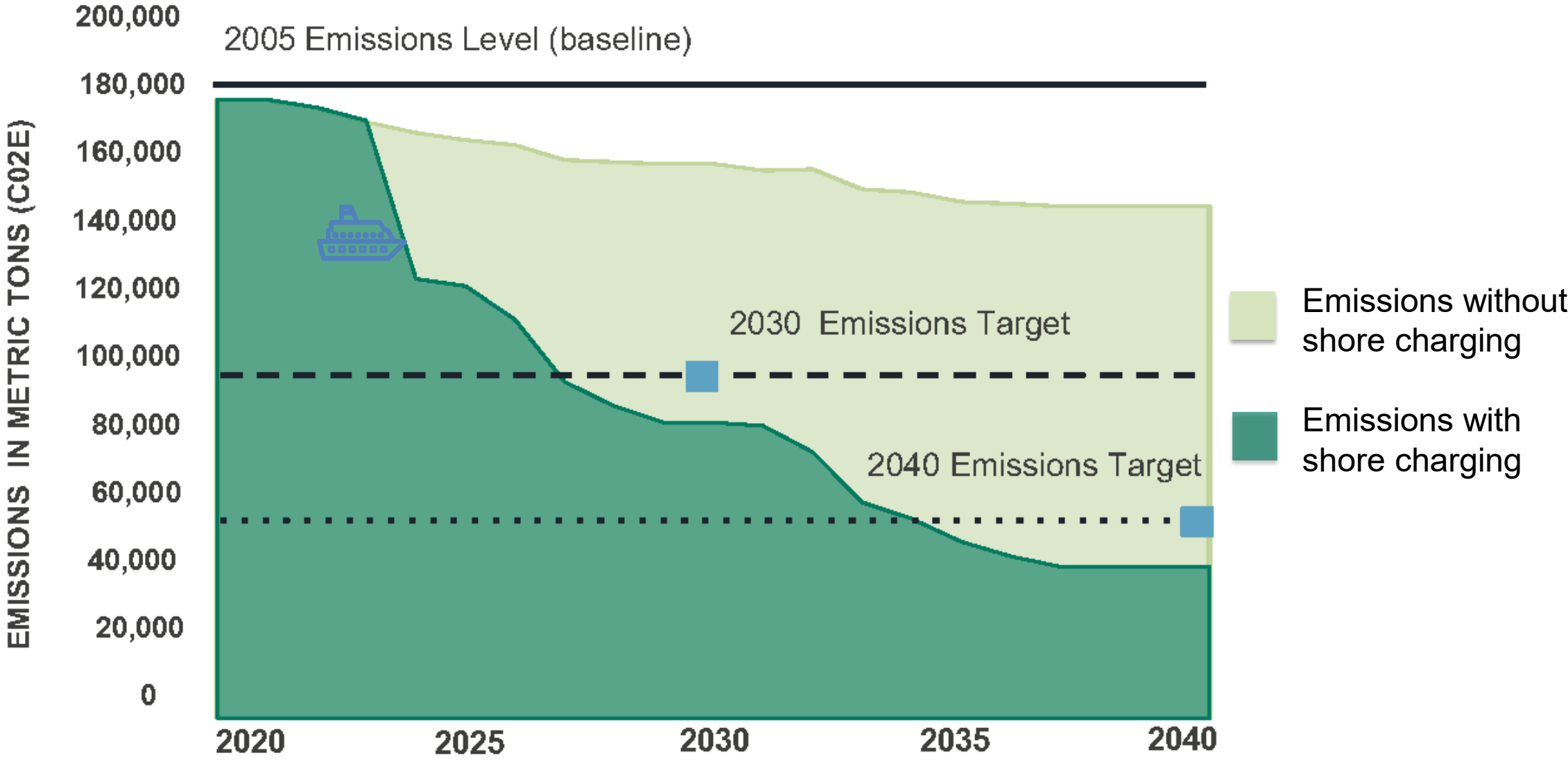
- AMY SCARTON, DEPUTY SECRETARY, WSDOT

Results to Watch

- 76% reduction in vessel emissions by 2040
- 30% reduction in Ferries' energy costs by 2040 and decreased reliance on fossil fuels
- Increased reliability and resiliency
- Happier and healthier employees, riders, communities and marine ecosystems



Course to Compliance





Join us
October 11th
10:30 a.m. – 11:45 a.m.

Topic:
Behavioral Health

THANK YOU FOR ATTENDING TODAY!

**PLEASE TAKE A MOMENT TO COMPLETE
OUR BRIEF SURVEY USING THE QR CODE
BELOW:**



**YOU CAN VIEW THE RECORDING OF
TODAY'S MEETING
AT: [HTTPS://RESULTS.WA.GOV/MEASURING-
PROGRESS/PUBLIC-PERFORMANCE-REVIEWS](https://results.wa.gov/measuring-progress/public-performance-reviews)**



Governor Q&A

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Governor's Closing Remarks