

# Update on Washington State Ferries Fleet Electrification

**Washington State Transportation Commission**

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# Call to Action and Strategic Roadmap



- Governor's Executive Order 18-001
- State GHG Reduction Goals (RCW 70A.45.050)
- Long Range Plan submitted to legislature in January 2019
  - Reliable service
  - Customer experience
  - Manage growth
  - **Sustainability and resilience**



# WSF System-Wide Electrification Plan

## Addendum to 2040 Long Range Plan

Legislative Proviso  
20 Year Planning Horizon  
Final Report Delivery January 2021

- Technology Assessment
- Vessel Requirements & Feasibility Analysis
- Terminal Requirements & Feasibility Analysis
- Construction Project Schedule
- Workforce Assessment
- Financial Model
- Emissions Impact Estimate



# Meeting Emission Reduction Regulations

Two scenarios evaluated:

## With Shore Charging

CO<sub>2</sub>e reductions:

53% by 2030

76% by 2040

Meets requirements of RCW 70A.45.050.

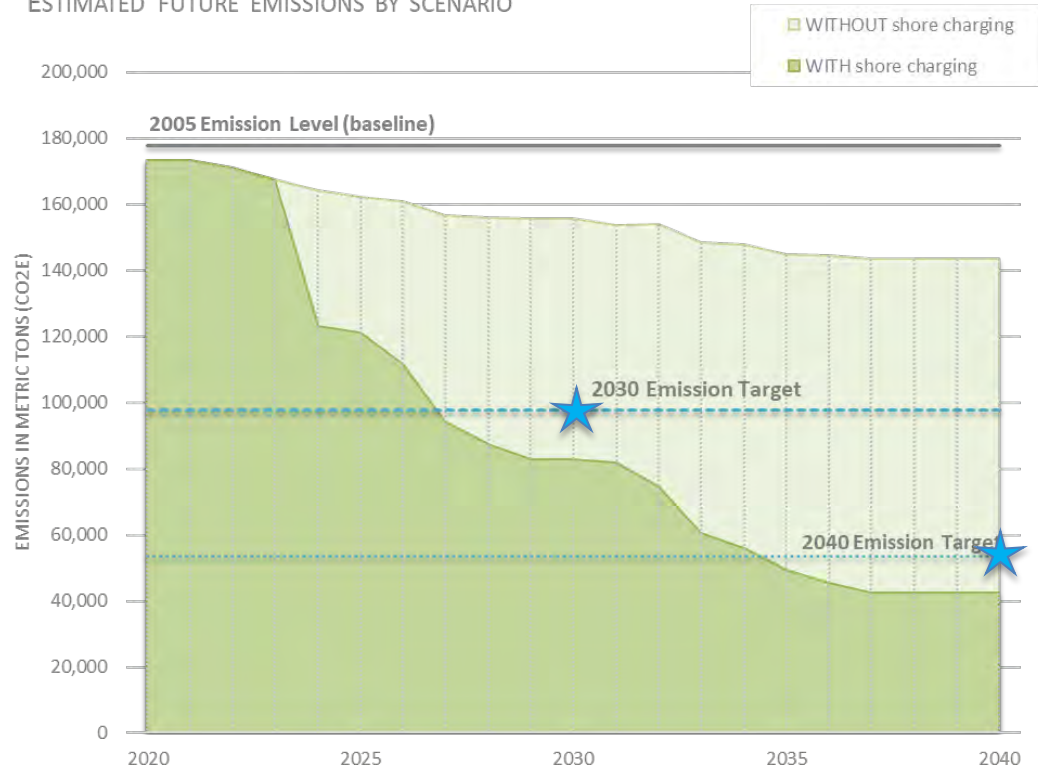
## Without Shore Charging

CO<sub>2</sub>e reductions:

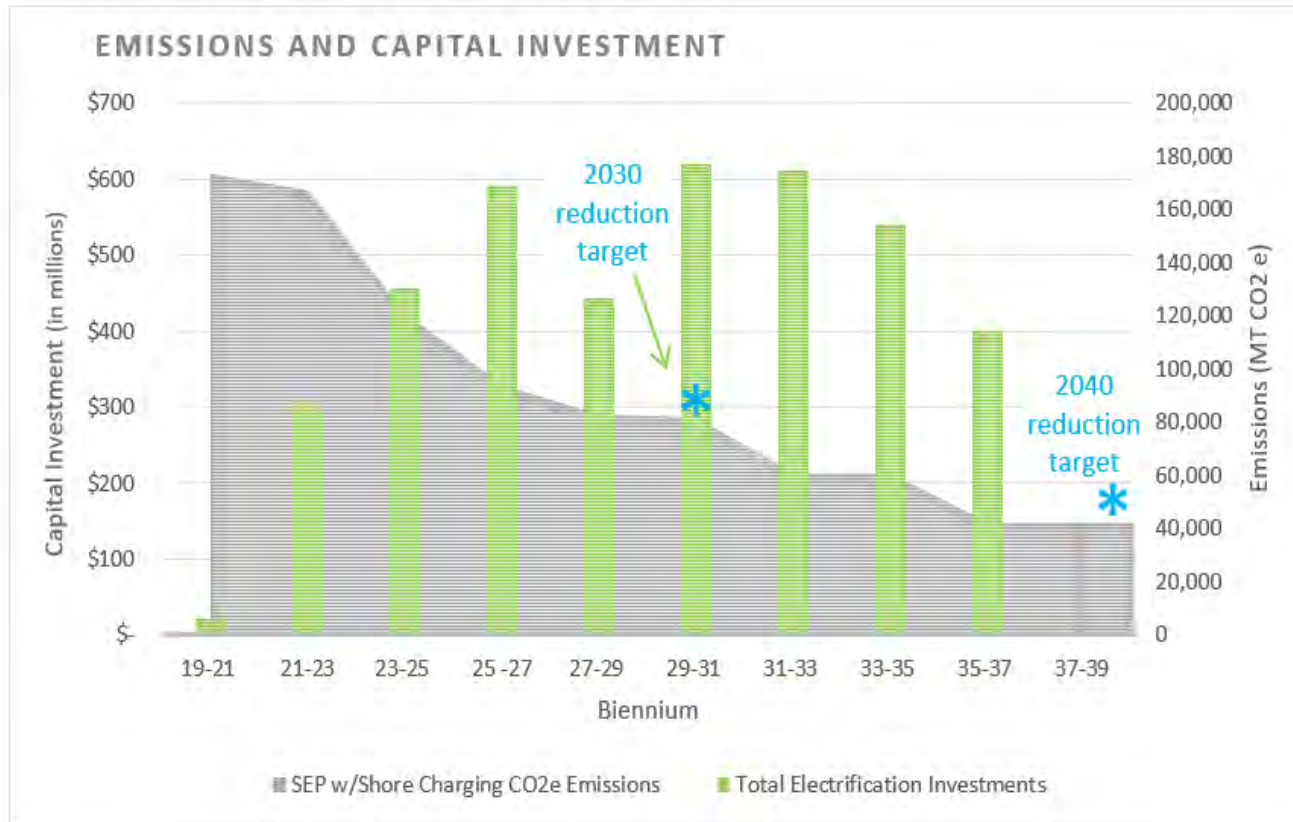
20% by 2040

Not compliant with RCW 70A.45.050.

ESTIMATED FUTURE EMISSIONS BY SCENARIO



# Capital Investment and Emissions



# Designs in Progress



## Jumbo MKII Conversion

- 460 ft long, 202 Vehicle capacity
- 3 vessels, 2 routes
- 2 of 4 Diesel Engines Removed
- 5.7 MW-Hr of Energy Storage
- 5 Million Gallons/yr Fuel Savings



## Rapid Charging System

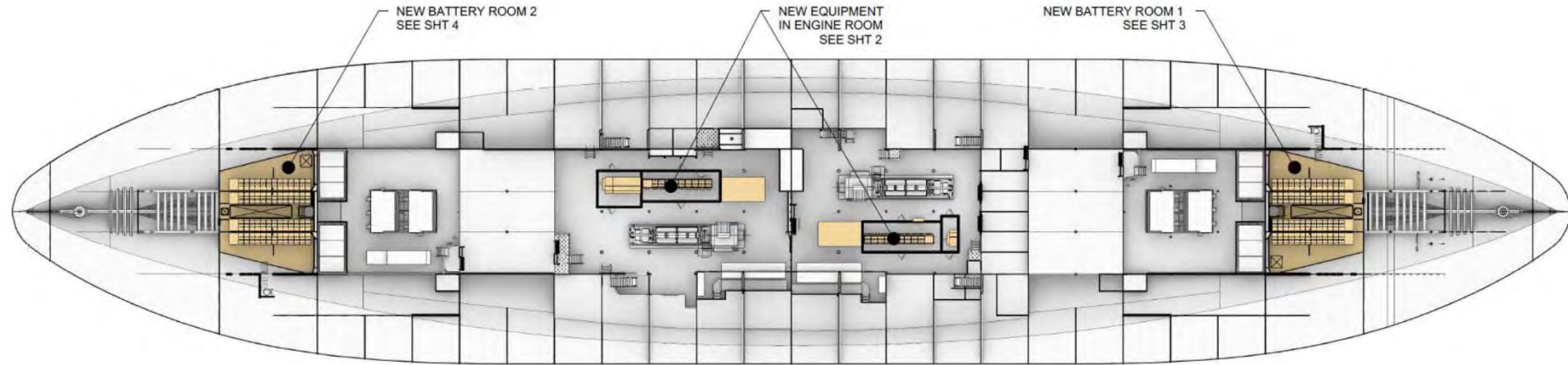
- 12.4 KV
- 15 MW Maximum Charging Power
- 20 Minutes Charging Time
- 20 ft Tidal Range
- Minimal Over-Water Construction



## Hybrid Electric Olympic

- 5 vessels, 2 routes
- New Propulsion Design
- 9.9 MW-Hr of Energy Storage
- 5 Million Gallons/yr Fuel Savings

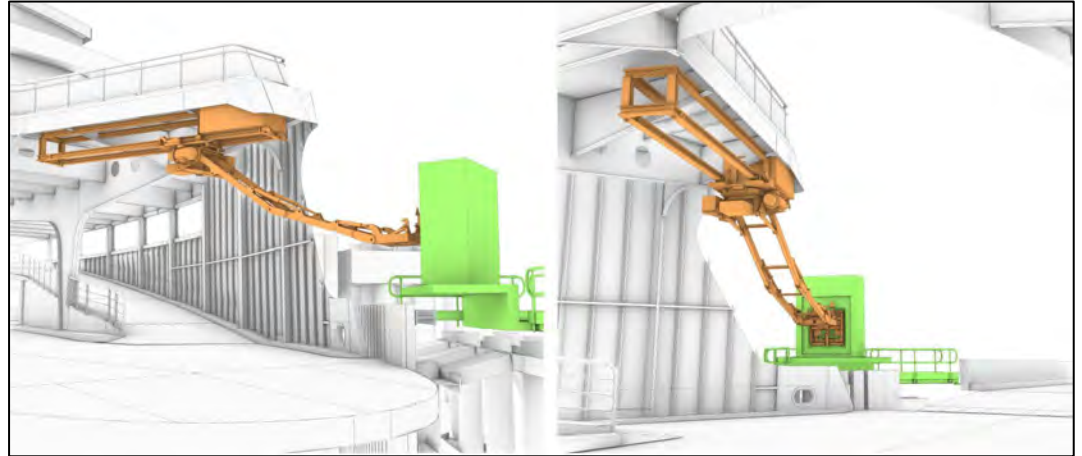
# Jumbo MKII Conversion



- Siemens Design complete pending US Coast Guard Approval
- Vessel #1 funded by VW Mitigation Fund, CMAQ, and MARAD
- Construction scheduled for October 2021-April 2022
- Two remaining vessels and terminal construction yet to be funded

# Rapid Charging System

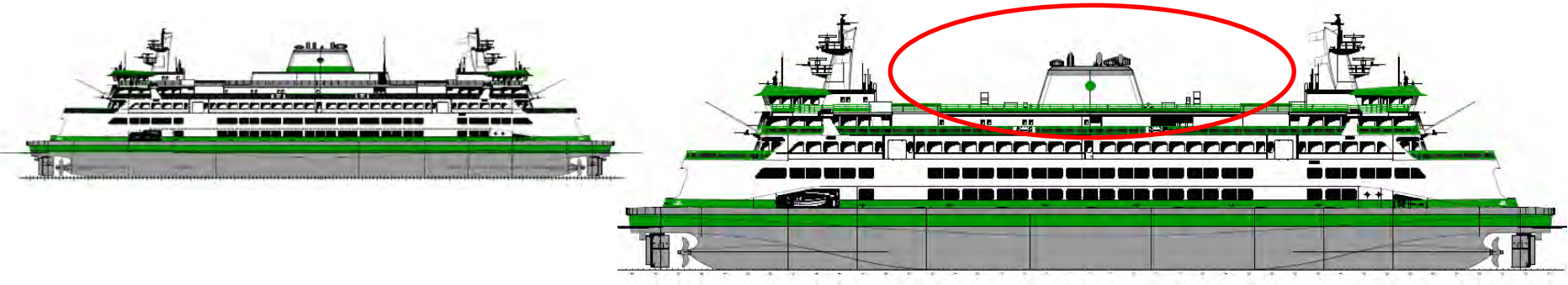
- Developed under Jumbo MKII contract
- WSF fleet standard
- Integrated into Hybrid Electric Olympic design
- Automated Connection
- Accommodates vessel motions and tides
- Minimizes Over-Water Construction
- Adaptation of successful European designs



Arm extending during charging operations  
(Cabling and covering not shown)



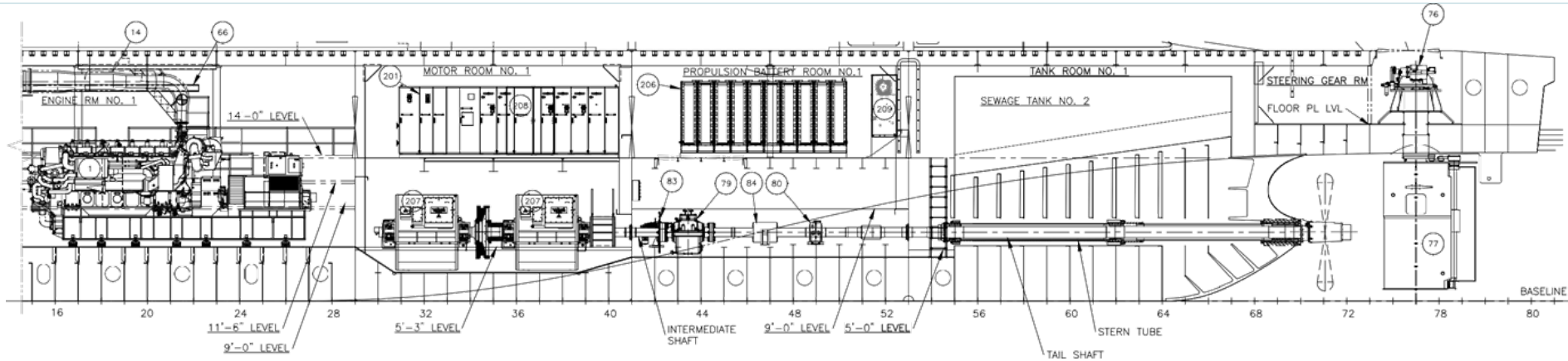
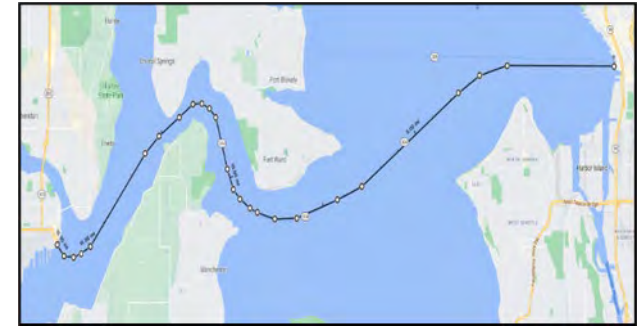
# Hybrid Electric Olympic Class



- Extension of successful Olympic Class contract – up to five additional vessels
- New propulsion system designed by ABB (industry leader)
- Design update also includes improvements requested by crew and customers
- Functional design update 70% complete
- Vessel #1 construction scheduled to start December 2021
- Revised build strategy to maximize partnership opportunities

# Propulsion Design Highlights

- Designed for Seattle-Bremerton route (14 miles)
- 3 modes of operation
- 2 smaller diesel engines
- 4 permanent magnet motors
- 10 MW-Hr of batteries
- Fixed pitch propeller
- Rapid Charging System Common to Jumbo MKII



# Hybrid Electric Olympic Vessel #5 Name Assignment

## Name Selected by WSTC

- Desired date October 2021
- Used for USCG Registration
- Ceremonial Keel Laying



# THANK YOU!

For more information on the WSF Fleet Electrification,  
please contact

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