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 Pan

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$_2$e reductions:
53% by 2030
76% by 2040
Meets requirements of RCW 70A.45.050.

**Without Shore Charging**
CO$_2$e reductions:
20% by 2040
Not compliant with RCW 70A.45.050.
Capital Investment and Emissions

[Graph showing emissions and capital investment over time with specific targets and reductions indicated.]
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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