Presentations for Dec. 7, 2023 Board of Directors Meeting
Item 5a(ii): International Electric Ferry Innovations
Auckland’s Better Ferry Future.

Presentation to WETA Board Meeting, San Francisco
7 December 2023
“A developed country is not a place where the poor have cars. It's where the rich use public transportation”

Gustavo Petro, as Mayor of Bogotá (now President of Colombia)
Auckland, New Zealand
Commuter Ferry Service

1.8M population
6M passenger ferry journeys
27 fast passenger ferries
12 urban ferry destinations
Auckland, New Zealand
Commuter Ferry Service

1.8M population
6M passenger ferry journeys
27 fast passenger ferries
12 urban ferry destinations
3.4M gallons of diesel burned
6% public transport trip share
21% public transport emission share
EVM200 Electric Fast Ferry

2 vessels in build for Auckland Transport, launching 2024

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>80' / 24 m</td>
</tr>
<tr>
<td>Form</td>
<td>Catamaran</td>
</tr>
<tr>
<td>Capacity</td>
<td>200 pax</td>
</tr>
<tr>
<td></td>
<td>up to 24 bikes</td>
</tr>
<tr>
<td>Speed</td>
<td>25 knots</td>
</tr>
<tr>
<td>Range</td>
<td>20 nautical miles</td>
</tr>
<tr>
<td>Power</td>
<td>Battery electric</td>
</tr>
<tr>
<td>Batteries</td>
<td>1100 kWh Li-Ion</td>
</tr>
<tr>
<td>Recharge</td>
<td>2 x 1 MW MCS plugs</td>
</tr>
<tr>
<td>Propulsion</td>
<td>4 x HamiltonJet LTX</td>
</tr>
</tbody>
</table>

0% emissions    100% capable
EVM200 Platform
First two NZ vessels delivering 2024

Enhanced operational reliability through dual redundant ships' systems to eliminate single point failure

Extensive PLC alarms, monitoring and control with live ship/shore link and remote data intelligence

Carbon fibre construction for light weight strength & longevity

Optimised low wash semi-displacement catamaran hull form

4 x HamiltonJet LTX36 Waterjets for efficiency, reliability and manoeuvrability

Flexible power electronics package

Long range battery pack options up to 1500 kWh

Displacement reducing active hydrofoil option
Carbon Fibre Construction

**Stronger, stiffer, lighter**
40% structural weight reduction

**Formable to complex shapes**
Build more optimised hull shapes

**Reduced internal structure**
Reduced hull width for given interior space

**Eliminates corrosion and fatigue**
Up to double the life span, or more

**Enhanced Sustainability**
Lower emissions (-20% embedded, -30% lifecycle)
Molds are suitable for multiple vessels
Auckland - ferries overview

<table>
<thead>
<tr>
<th>Route Description</th>
<th>Sailings Share</th>
<th>GHG Share vs Road</th>
<th>Dist. vs Road</th>
<th>GHG vs Bus</th>
<th>Charge Mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inner harbour (0-2 nm)</td>
<td>63%</td>
<td>16%</td>
<td>18%</td>
<td>&lt; 1</td>
<td>1-2</td>
</tr>
<tr>
<td>3 mid harbour (2-8 nm)</td>
<td>21%</td>
<td>33%</td>
<td>58%</td>
<td>x 3</td>
<td>4-10</td>
</tr>
<tr>
<td>2 outer harbour (12-15 nm)</td>
<td>16%</td>
<td>51%</td>
<td>60%</td>
<td>x 4</td>
<td>18-25</td>
</tr>
</tbody>
</table>

Emissions dominated by long, fast routes

Full electric vessels are viable for all routes

Outer harbour has schedule challenges, requiring more boats

Economic benefits strongest for mid harbour routes
**Auckland, New Zealand**

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance</th>
<th>Duration</th>
<th>Max Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayswater</td>
<td>1.2 nm</td>
<td>10 mins</td>
<td>10 knots</td>
</tr>
<tr>
<td>Devonport</td>
<td>1.9</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Birkenhead</td>
<td>2.3</td>
<td>11</td>
<td>23</td>
</tr>
</tbody>
</table>

**San Francisco, USA**

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance</th>
<th>Duration</th>
<th>Max Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasure Island</td>
<td>1.5 nm</td>
<td>13 mins</td>
<td>10 knots</td>
</tr>
</tbody>
</table>

Recharge 2MW: <4 min per one-way trip
Auckland, New Zealand

Route
- Bayswater
- Devonport
- Birkenhead
- Hobsonville
- Half Moon Bay

Distance
- 1.2 nm
- 1.9
- 2.3
- 7.9
- 8.5

Duration
- 10 mins
- 15
- 11
- 30
- 35

Max Speed
- 10 knots
- 12
- 23
- 23
- 23

San Francisco, USA

Route
- Treasure Island
- Mission Bay
- Seaplane
- Alameda/Oakland
- Harbor Bay

Distance
- 1.5 nm
- 2.1
- 4.9
- 6.2
- 7.4

Duration
- 13 mins
- 17
- 20
- 35
- 25

Max Speed
- 10 knots
- 23
- 23
- 23
- 23

Recharge 2MW: 6-12 min per one-way trip
Recharge 2MW: 12-18 min per one-way trip
**Auckland, New Zealand**

- **Route**
  - Bayswater
  - Devonport
  - Birkenhead
  - Hobsonville
  - Half Moon Bay
  - Pine Harbor
  - Gulf Harbour

- **Distance**
  - 1.2 nm
  - 1.9
  - 2.3
  - 7.9
  - 8.5
  - 12
  - 16.5

- **Duration**
  - 10 mins
  - 15
  - 11
  - 30
  - 35
  - 35
  - 53

- **Max Speed**
  - 10 knots
  - 12
  - 23
  - 23
  - 23
  - 30

**San Francisco, USA**

- **Route**
  - Treasure Island
  - Mission Bay
  - Seaplane
  - Alameda/Oakland
  - Harbor Bay
  - Richmond
  - Larkspur
  - Vallejo

- **Distance**
  - 1.5 nm
  - 2.1
  - 4.9
  - 6.2
  - 7.4
  - 9.5
  - 10
  - 25

- **Duration**
  - 13 mins
  - 17
  - 20
  - 35
  - 25
  - 35
  - 30
  - 60

- **Max Speed**
  - 10 knots
  - 23
  - 23
  - 23
  - 23
  - 23
  - 30

**Recharge 2MW:** 25-30 min per one-way trip
**Route Comparison: Energy Demand**
(if delivered by EVM200 platform vessels)
Energy Consumption

Route Comparison: Energy Demand
(if delivered by EVM200 platform vessels)

Back to back option

Cross functional for schedule flexibility and service resilience
Decarbonizing the harbour cities of the world.

Project initiation
Consultancy
Design
Naval Architecture

Analysis
Data Intelligence
Electrical Integration
Systems Engineering

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International Electric Ferry Innovations

Green Maritime - Market Visit to Norway

October 2023

WETA Board of Directors Update

December 7, 2023
Bastø Electric

Operator: Basto Fosen
Type: Roll on/Roll Off
Capacity: 600 passengers and 200 cars or 24 trucks
Speed: 13 knots

Route Profile: 10km route between Horton and Moss
Trip time: ~30 minutes
Daily Trips: 20 to 24
HYKE SHUTTLE

Type: Passenger
Capacity: 50 passengers
Speed: 15 knots (max)

Potential Route Profile: Local routes in protected waterways

4 Hyke Shuttles will be deployed at the 2024 Paris Olympics
MS MEDSTRAUM

Owner/Operator: Kolumbus
Integrator: Wärtsilä
Type: Passenger
Capacity: 150 passengers
Speed: 23 to 27 knots
Cost: $11 million

Route Profile: Fixed route with multiples stops (up to 12)
Infrastructure
Infrastructure
Item 5a(iii): Main St. Alameda Construction Update
Construction Update:

Alameda Main Street Ferry Terminal Refurbishment Project

WETA Board of Directors

December 7, 2023
Waterside Pile Driving
Landside Pile Driving
Landside Pile Driving
Donut Fender Installation
New Bridge Support Structure
New Bridge and Gangway Outfitting
Passenger Float Fabrication