

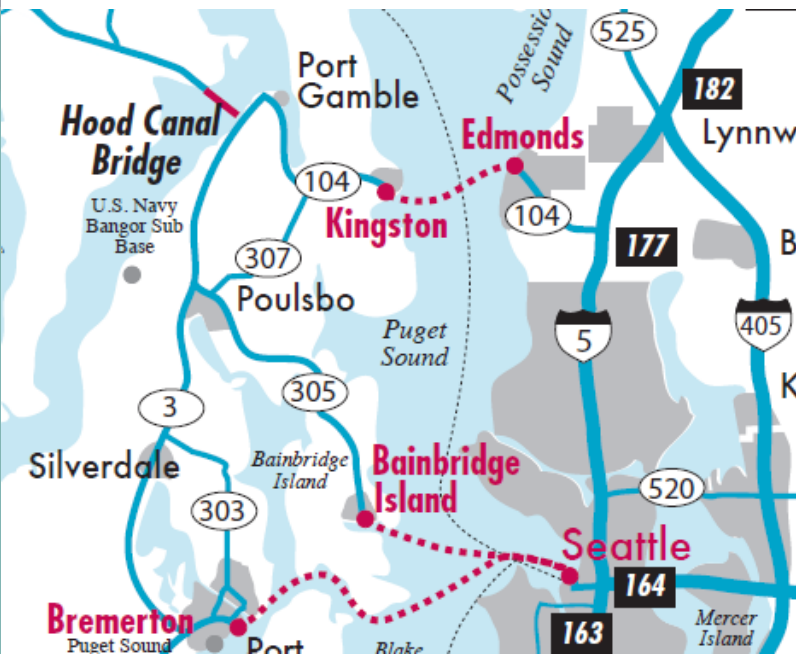
better to build · better to operate

# Electric Ferries

Presented to:  
Worldwide Ferry Safety Association Conference 2018

March 23, 2018

# Opportunity



## Vessel Characteristics

Length Overall:	460 ft
Vehicle Capacity:	218
Passenger Capacity:	2,200
Design Speed (kts):	18
Year Built:	1997

### Leave Seattle (Monday through Friday)

5:30 1	11:25 2	5:45 1
6:10 2	12:25 1	6:30 2
7:05 1	1:10 2	7:30 1
7:55 2	2:05 1	8:15 2
8:45 1	3:00 2	9:15 1
9:35 2	3:50 1	10:05 2
10:40 1	4:45 2	10:55 1

### Leave Bainbridge Island (Monday through Friday)

4:45 1	10:25 2	4:45 1
5:20 2	11:30 1	5:35 2
6:20 1	12:20 2	6:40 1
7:05 2	1:15 1	7:20 2
7:55 1	2:05 2	8:20 1
8:45 2	2:55 1	9:00 2
9:40 1	3:50 2	9:55 1



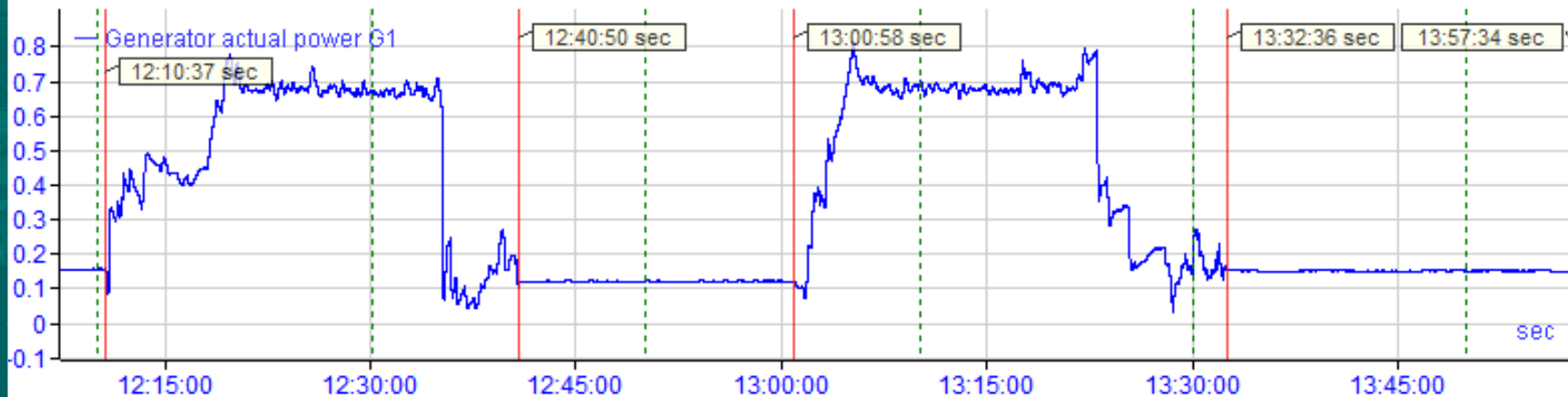
# Operation

50 minutes between departures, 33 minutes underway

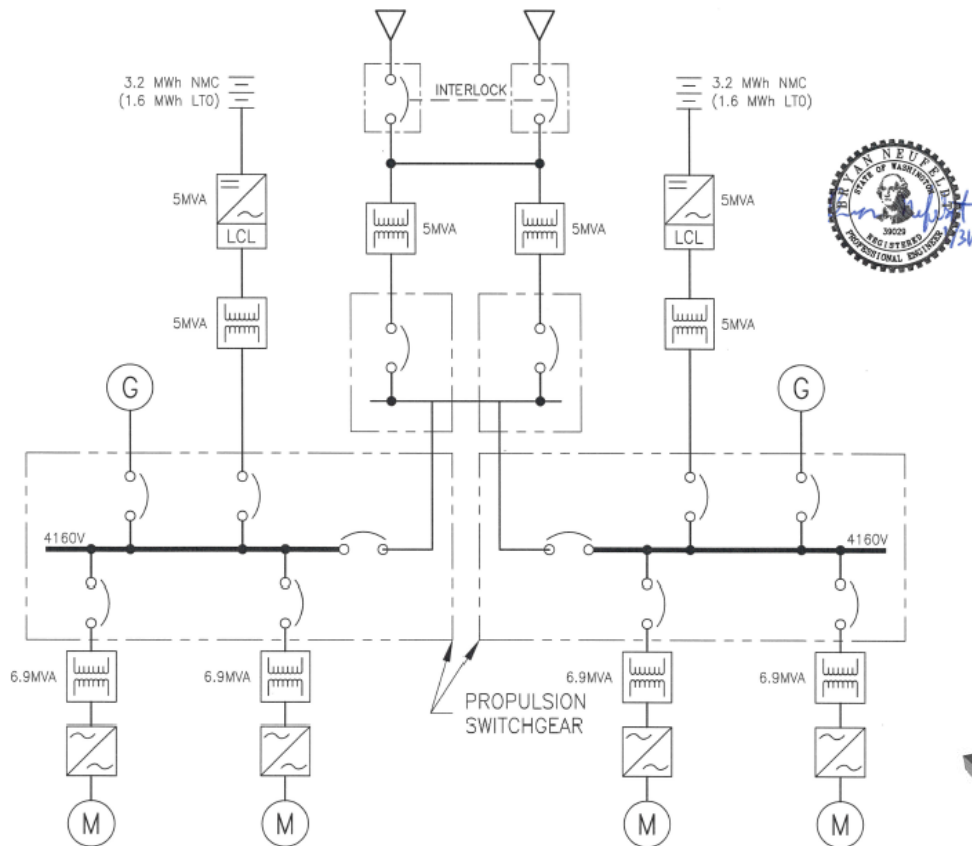
Table 1: Average Transit Energy and Power – Seattle to Bainbridge

Date	Energy (kWh)	Power (kW)	Date	Energy (kWh)	Power (kW)
Thursday, 4/13	2,310	7,065	Friday, 6/30 <sup>3</sup>	2,250	7,520
Friday, 4/14	2,345	6,590	Thursday, 7/13	2,150	7,110
Friday, 5/5 <sup>1</sup>	2,230	6,970	Wednesday, 7/19	2,170	6,930
Friday, 5/26 <sup>2</sup>	2,200	6,725	Monday, 8/21	2,180	7,090
Monday, 5/29 <sup>2</sup>	2,200	6,790	Thursday, 8/31 <sup>4</sup>	2,190	6,770
Wednesday, 6/7	2,200	7,020	Tuesday, 9/12	2,240	6,440
Thursday, 6/15	2,150	7,075	Sunday, 9/17 <sup>5</sup>	2,290	7,135
Wednesday, 6/28	2,150	7,250	Thursday, 10/5	2,230	6,600
Thursday, 6/29 <sup>3</sup>	2,180	7,340	Friday 10/6 <sup>1</sup>	2,400	7,540

1. Windy Days 2. Memorial Day Weekend 3. Fourth of July Weekend 4. Labor Day Weekend 5. Seahawks Home Game



# Results



- 6.286 MW-h Batteries (NMC Type)
- Battery life of 4 years or 28,800 cycles
- 35% depth-of-discharge

## LCCA Results – Two Vessels, Two Docks

	Diesel Price Projections	
	EIA Reference Case	Conservative Case
Hybridizing	\$166,392,784	\$166,392,784
Not Hybridizing	\$224,493,460	\$185,304,172
Savings	\$58,100,676	\$18,911,388
Savings, %	25.9%	10.2%

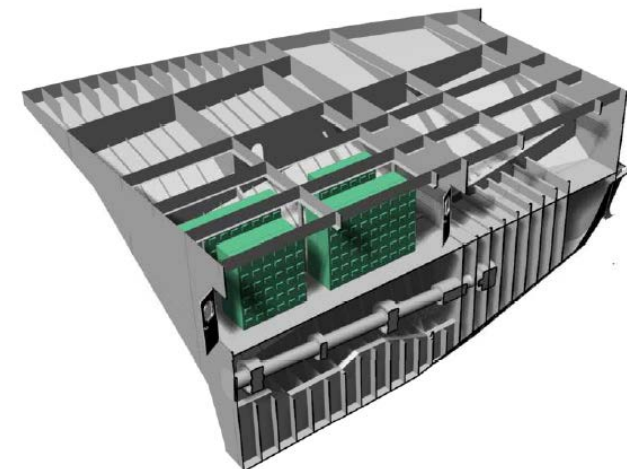


Figure 32: Battery Room Arrangement Profile View – Spear SMAR-3T