



Glosten



## GUEMES ISLAND FERRY REPLACEMENT

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### Technical Question and Answer No. 01

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TO: Rachel Rowe, Skagit County Public Works  
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#### Question 1

It would have been better if the first all-electric ferry had been introduced (in Norway) in 2005, not 2015. Less than two years is too little time to judge whether a technology is ready for prime time, in my view.

- Electric propulsion of ships in general is not a new technology. Using batteries for propulsion on ships dates back to the early submarines. What is changing is the battery technologies that allows for higher power densities and rapid recharging rates. For vessels like ferries with short, well defined routes, this allows for consideration of replacing the onboard diesel engines with a battery bank and a “plug in” connection for charging the battery bank from shore.

#### Question 2

All new technologies have start-up problems. What have been the problems with the Norwegian experience?

- New hybrid propulsion technologies use batteries and power conversion technologies similar to the Norwegian vessel. Expanding the answer beyond the Norwegian experience, most problems have been with the battery banks themselves and the power conversion equipment failures.

#### Question 3

I expect that maintenance of all-electric is cheaper than diesel. Is that true?

- Limiting the answer to the propulsion equipment itself, the answer is expected to be “yes”, until the battery bank needs replacing. Only once the size and type of battery is selected (during the propulsion system study) will the overall maintenance cost difference be known. The rest of the ferry will still need a similar amount of maintenance regardless of the propulsion system selected.

#### Question 4

I believe that it is incorrect to consider electric ferries as being especially green, at least as far as CO2 emissions are concerned. About 60% of the energy for the electricity sold by PSE comes from fossil fuels. Consequently, while the ferries may not be emitting themselves, at least 60%

of the power is coming from plants that do emit. (See <https://pse.com/aboutpse/EnergySupply/Pages/Electric-Supply.aspx>.)

- Your comments about PSE's source of power are noted. The large fossil fuel power generation plants of PSE are expected to have higher overall efficiency and be considerably cleaner burning than the diesel engines on the ferry. Consequently, while not eliminating emissions altogether, there should still be a net reduction in overall emissions from an all electric ferry. Locally, the elimination of diesel exhaust emissions from the ferry will be a significant benefit to ferry riders, the ferry crew and the citizens in the immediately surrounding areas in terms of reduced CO, NOx, THC and PM emissions

#### **Question 5**

Recently I heard Commissioner Dahlstedt discuss the ferry on KNKX radio. In that interview, he seemed to emphasize the reduction in noise from the use of an all-electric ferry. He commented that such noise reduction would benefit fish and marine mammals. I think that he may have over-emphasized the benefits of all-electric. Two web sources from the Port of Vancouver suggest that the means of propulsion plays a very minor role in "vessel quieting." Those two web sources also suggest that noise produced by small vessels such as ours plays only a minor role in the noise problem writ large. (See <https://www.portvancouver.com/wp-content/uploads/2017/01/Regional-Ocean-Noise-Contributors.pdf> and <https://www.portvancouver.com/wp-content/uploads/2017/01/Vessel-Quieting.pdf>.)

- Most of the noise reduction benefits of an all electric ferry will be air borne noise from the elimination of the diesel engines. This will benefit the crew and passengers on the ferry and people in the vicinity of the ferry. Your other observations about the underwater noise produced from the means of propulsion and from small vessels (relative to large vessels) are generally correct.

#### **Question 6**

It is my understanding that the current ferry has the capability of providing electrical power to the ferry docking platforms (on both sides of the channel) in the event that there is a PSE electrical power outage. Will the proposed, new all-electric ferry have this capability?

- We are aware that the current vessel can power the dock ramps. Further development of the design will determine if this feature is maintained in the event of a power failure.

#### **Question 7**

There are fire-related problems with lithium batteries. Will the batteries to be used by the ferry be made of lithium? More generally, are there fire-related problems with the proposed batteries?

- Several years ago, there were a number of well publicized lithium-ion battery fires in marine vessels. Lithium battery technologies and safety features have advanced since that time and are continuing to advance. National and international regulations now require improved design features and monitoring systems for marine lithium battery installations. A specific battery system has not been selected for the ferry at this time, but will be recommended by the propulsion system study