

Million-dollar battery could help charge Casco Bay hybrid ferry

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A \$1 million battery next to the Casco Bay Lines terminal in Portland could help charge a new hybrid diesel-electric ferry when it goes into service next year, if state utility regulators approve the pilot project.

The vessel is expected to be one of the first fast-charging hybrid electric ferries in the United States, according to the Casco Bay Island Transit District.

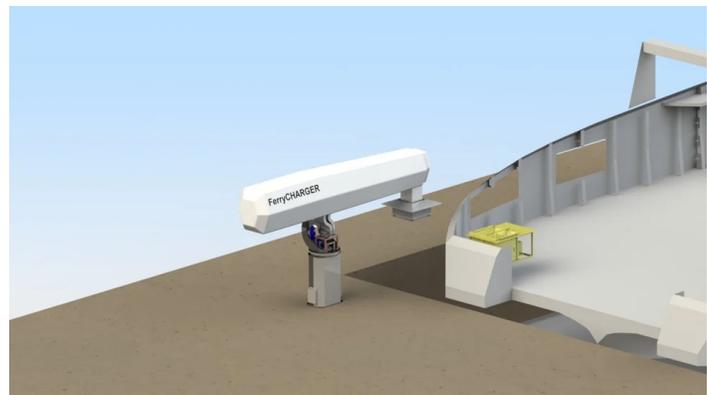
Adding energy storage could make it unique in the country. Longfellow Communications, a consultant working with the district, said it's not aware of a similar vessel that uses storage for shoreside rapid charging.

The battery is roughly the size of a shipping storage container. The smart charging system would detect the approaching ferry and prepare to connect, saving valuable minutes of charging time.

The pilot project also could demonstrate how scaling the technology to other public transit fleets, such as electric buses, could help avoid costly distribution system upgrades, according to Central Maine Power, which is partnering with the district. It also could help the state meet its ambitious carbon-cutting climate goals, which will depend in part on electrifying transportation.

CMP and the transit district set out their vision Tuesday during a proceeding at the Maine Public Utilities Commission. But as is often the case with innovative energy proposals, it's complicated.

CMP has applied to the federal Department of Energy for a grant to defray the battery's \$1 million expense. If it can't offset at least half the cost, the company said, it will try to recover the rest through higher electric rates.



A specially designed battery charger, located by the ramp at Casco Bay Lines in Portland, would be connected to a large storage battery near the parking garage. This system would top off the onboard battery in the new hybrid diesel-electric ferry, expected to be in service in 2022. *Image courtesy of Longfellow Communications and Central Maine Power*

Questions also came up about CMP's plan to own the energy storage system, whether the possible subsidy by electric customers could set a precedent for other public transportation systems, and whether the overall plan runs afoul of state utility statutes.

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These and other concerns drew participants that typically don't follow ferry service matters, including the state Office of Public Advocate, the Conservation Law Foundation, Efficiency Maine Trust and the Maine Renewable Energy Association.

The PUC decided to explore the threshold legal issues first in the coming weeks, then dig in to the technical facts of the case.

HYBRIDS ON THE WATER

In maritime circles, interest is growing worldwide to green up fleets long dependent on polluting petroleum.

Hybrid electric ferries have begun operating in Washington state and San Francisco. In Norway, the Basto Electric, billed as the world's largest all-electric ferry, went into service this year across the Oslo Fjord. At Niagara Falls, the Maid of the Mist boat tour service runs two fully electric passenger vessels.

The Casco Bay Island Transit District serves six islands and carries 1.1 million passengers a year, plus freight and cars, according to Hank Berg, the general manager. It owns five vessels with an average age of 24 years. The car ferry serving Peaks Island, which will be replaced by the new boat, is 34 years old.

The transit district's board last March authorized construction of the \$16 million ferry, which will replace the aging Machigonne II, built in 1987. It's designed to eliminate up to 800 metric tons of carbon dioxide emissions annually.

As part of its calculus for the new ferry, the transit district has been figuring the most cost-effective way to top up the vessel's onboard battery. That's because big commercial energy users are subject to what's called a demand charge, a fee on electric bills based on the highest amount of power drawn during a 15-minute period.

The district wanted to operate in full electric mode both in docking and while underway, to minimize noise and diesel pollution. But that approach would incur a very high demand charge, because the ferry would need to be plugged in for 10 minutes every hour during docking periods in Portland – up to 17 daily trips in the summer.

Installing a bigger marine battery system on the vessel was ruled out as too heavy and costly. So the district decided to use the battery only when docking during peak demand periods, relying on the diesel engine when underway, and using electric power and charging during off-peak periods.

Running the ferry in that manner would require \$70,000 a year in diesel costs, the district estimates, and fail to maximize the hybrid potential.

That's how the energy storage idea came about.

The transit district asked CMP for ways to reduce demand costs. The company came up with a plan to locate a 1,300 kilowatt-hour, lithium-ion storage battery near the ferry charging station. If the PUC approves, CMP will design, build and maintain the storage system. The transit district will operate it as part of the electric charging operation.

“The Casco Bay Lines pilot offers CMP a unique opportunity to help a traditional Maine industry work toward its electrification goals and learn how this technology can be more broadly applied in the state as we work steadily to support Maine’s climate goals,” said Jason Rauch, CMP’s manager of sustainability.

The battery will be sized so it can recharge the ferry’s batteries during a four-hour window that coincides with peak demand. Taking advantage of a discounted electric rate for fast-charging stations, the district could save between \$55,000 and \$170,000 a year compared with using diesel at peak charging times, CMP estimated.

LEGAL QUESTIONS REMAIN

But technical issues took a backseat Tuesday to policy and legal questions during the PUC case conference.

Noting the possible financial exposure to ratepayers, Liz Wyman, a senior staff attorney at the PUC, pressed CMP officials about what could be learned from the pilot.

CMP officials said the operational lessons could help speed up electrification in Maine, for the state’s other ferries as well as for bus service. Demand charges present significant barriers to electrifying fleets, they said, and energy storage can be a solution. The pilot also is consistent with the state’s Smart Grid Infrastructure policies to improve overall reliability and efficiency, it added.

The two-year pilot “presents an opportunity to explore how a co-located battery storage facility can operate to address demand charge costs and how such ‘make-ready’ battery storage investment for public transit can help achieve the state’s greenhouse gas reduction goals,” CMP said in a document filed in the case.

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