First Hydrogen Powered Carbon Neutral Ferry to Be Developed

The world's first hydrogen fuel cell ferry is planned to be developed in Scotland. Hydrogen fuel cells will drive ferries planed by Caledonian Maritime Assets or CMal, Scotland’s main ferry operator.

CMal will probably succeed in this endeavor. It designed the world's first seaworthy diesel–electric ferry. This hybrid ferry entered service in 2012 and was launched from Port Glasgow.

Ferries typically burn several thousand liters of fuel per trip. Moving people, vehicles and cargo is essential to the support of coastal communities. The rising cost of fuel is crippling the ferry industry while sustainability initiatives are targeting the use of fuel for all forms of transportation. When the world's first carbon neutral ferry is built CMal will enjoy significant fuel savings and give Scotland new bragging rights in the push for sustainable development.

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Until now, fuel cells and battery powered cars have traditionally been charged from the carbon–based power grid with energy from coal fire plants, natural gas and occasionally nuclear power plants. The world's first carbon neutral ferry will charge its fuel cells using wind power exclusively. If there is not enough wind power generated the prior night, such as when it gets too cold for turbines to operate or if there was little wind, the ferries can run on gasoline.

The only waste product these fuel cells generate is water vapor. The hydrogen fuel cells will not release any exhaust, nor will the wind power used to generate the energy stored in the fuel cells release carbon dioxide as the coal burned to charge previous hydrogen fuel cells. By using only fuel cells for regular operations, there is also no risk of oil spills.

The hydrogen itself will also be green. It will be produced by running electricity generated by wind farms through water to separate the hydrogen from the oxygen. Previous hydrogen production tended to rely on the breakdown of natural gas into hydrogen and carbon. Converting water into hydrogen using wind power is more than a matter of sustainability. Prior hydrogen based fuel cells required hydrogen to be brought in via port for use by vehicles and crafts. By using water and wind power, hydrogen generating facilities can be located anywhere along the ferry's routes without requiring additional tanker or ship traffic in.

Planned Project Timeline

Caledonian Maritime Assets has already received funding from the Scottish government to begin development of diesel electric ferries. CMal is a partner in the Low Emission Hybrid Ferries Project, and it intends to build a hydrogen powered ferry next.

The idea for a hydrogen powered ferry was planted when CMal executives saw London's hydrogen powered buses. Several major stakeholders have contributed to this idea, with groups like the Scottish Hydrogen Fuel Cell Association and Logan Energy contributing. These ferries will carry up to 150 passengers and two dozen vehicles. Alternatively, they could carry two heavy goods vehicles.

Guy Platten of CMal is seeking L500,000 in funds to build the first prototype. They need to build the supporting infrastructure for fuel cells in addition to the first ship, such as installing hydrogen storage facilities in the ferry ports. Further infrastructure like additional wind turbines, wave power generators or solar cells may need to be built near the ports that will house these ferries. A prototype vessel is expected to cost about L15 million, and the first craft could be built within a few years.

Construction of these green ferries also brings new jobs to Scotland's idling shipyards. Construction of the Hallaig in Ferguson's yard created at least a hundred jobs. The Hallaig was the first ship built and launched from the port in five years. It now operated by Clyde and Hebrides Ferry Services.

When the first hydrogen powered, carbon-neutral ferries start to be built, these ferries will prove yet again Scotland's leadership in the green transportation industry, the latest innovation in its ship building tradition. Scottish Enterprise and Deputy First Minister Nicola Sturgeon have expressed support for the project. The development of the world's first diesel-hybrid and carbon neutral ferries will bring Scotland to the forefront in sustainability engineering while renewing its ship yards as well.

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