TOP TEN

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Pure Electric Ferry Design in Bosporus Strait

Cities of the future are integrated with technology, the environment and urban mobility. Istanbul is a great example due to its current problems with congestion, emission levels and its dynamic potential towards being a future smart city. As Istanbul is one of the most populous cities globally and attracts many tourists, it has major traffic problems with the Bosporus Strait being the centre of them. On the other hand, the increased shipping industry environmental pressures has urged the development of new technologies based on renewable sources to lower emissions, with the most promising being electric power systems. Hence, this research designed a new propulsion system to retrofit the current Bosporus Strait ferry and to investigate how emission reductions can be achieved, while also tackling congestion problems. The vessel's machinery is replaced with battery systems for propulsion and auxiliary power. This is achieved by matching the battery system with operational requirements. A fast-charging method also reduces on board battery weight, which results in higher weight and space efficiency to accommodate more passengers. The proposed system delivers the same power output as the current system by using an appropriate motor and the battery characteristics. Hence, the model ferry's fuel consumption is reduced to zero, and as the electric power available onshore is generated from renewable sources, the ferry's emissions are reduced to zero. Consequently, the ferry can not only carry more passengers, but also operate using a fully renewable propulsion system, thus both congestion and emission issues are tackled.