Copenhagen
2018 - 2020
Five electric ferries

2018 In July 2018, Damen Shipyards Group signed a contract with leading multinational public transport company Arriva Danmark for seven fully-electric ferries for use in Copenhagen Harbour.

Arriva would operate these ferries for its client, Danish public transport agency Movia. One crucial requirement was that the new vessels be able to fit into the existing framework – including use of current timetables and infrastructure, as well as capacity to carry at least 60 passengers.

Propulsion was a major factor in the design of the vessels. Movia requested a cleaner, greener use of energy from its ferry service, and Damen had a number of options available. Engineers considered biodiesel engines, hybrid vessels with generators on board, and full electric solutions, ultimately deciding full

This is the fast charger fro the ferry in Copenhagen.

electric was the optimal choice for the twelve year operation of the ferries, based on several factors.

This zero emissions, fully electric solution is quiet in operation and is much more maintenance-friendly than a diesel option. Combustion engines contain a lot more mechanical parts that can fail, and the oil used for lubrication of these moving parts makes the system very dirty in comparison with an electric motor.

The next decision to make was how often the vessels could charge their power supply – how could the ferries operate all day on a minimal battery pack and recharge without disrupting their schedule?

To answer this question, Damen Civil – another branch of Damen's complete service provision – investigated full civil solutions such as accessibility to the local grid, the regulations surrounding civil power supply, and the practical limitations of the jetties as potential charging points. The ferry route takes one hour to complete, and at each end there is a small window in which to prepare for the beginning of another route. Damen saw this as a window of opportunity to take advantage of a fast-charging system.

To fulfil this, Echandia Marine of Stockholm (with its DNV-GL certified LTO battery systems), Eekels, Heliox and Staubli, together with Damen developed their 23.3 meter x 5.6 meter, *E-Ferry 2306* design with a capacity for 50 passengers, tailored so that the vessels can auto-dock – bow first – at the existing jetties and fast recharge in only seven minutes.

Copenhagen • 2018 - 2020 • Five electric ferries and shore chargers

Commuter Ferries • Rapid Charging

Existing floating jetties?

The first 5 yellow ferries were delivered in July 2020 in the presence of Copenhagen's Lord Mayor Frank Jensen. The remaining 2 followed in the autumn.

According to Damen, the ferries reduce Copenhagen's public transport NOX emissions by 2.5%, CO2 emissions by 10% and particulate emissions by 66%. As well as a positive environmental impact, there will be a noticeable improvement in efficiency and experience. The ferries are silent, making for a beautiful ride - and need to be charged for just 7-minutes after each journey – negating the need for longer charging periods which take the ferries out of service.

Given the demands of its operation, each ferry carries two drivetrains to provide a good level of redundancy should any unexpected problems occur.

The ferries cover passenger routes in the central metropolitan area of Copenhagen as well as to the port area and serve as a blueprint for future sustainability projects in cities around the world.