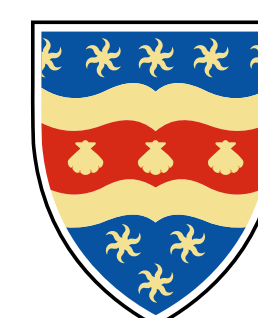




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INTRODUCTION

In 2019, the Department of Transport published the Clean Maritime Report ^[1] which stated the aim to reach zero emissions from shipping by 2050. One potential method to cut emissions is to convert sea-going vessels to battery-powered propulsion as with motor vehicles. The conversion of suitable vessels will naturally lead to an increase in the energy demand from the National Grid. In the interests of energy security, we need to understand when and where there will be an increase in demand and how great this will be.

[1] Department of Transport. Clean Maritime Plan, 2019.

Energy Demand for Electric Maritime Vessels

DATA

Historical port call data supplied by Fleetmon ^[2] was used to construct the predictions with the following constraints:

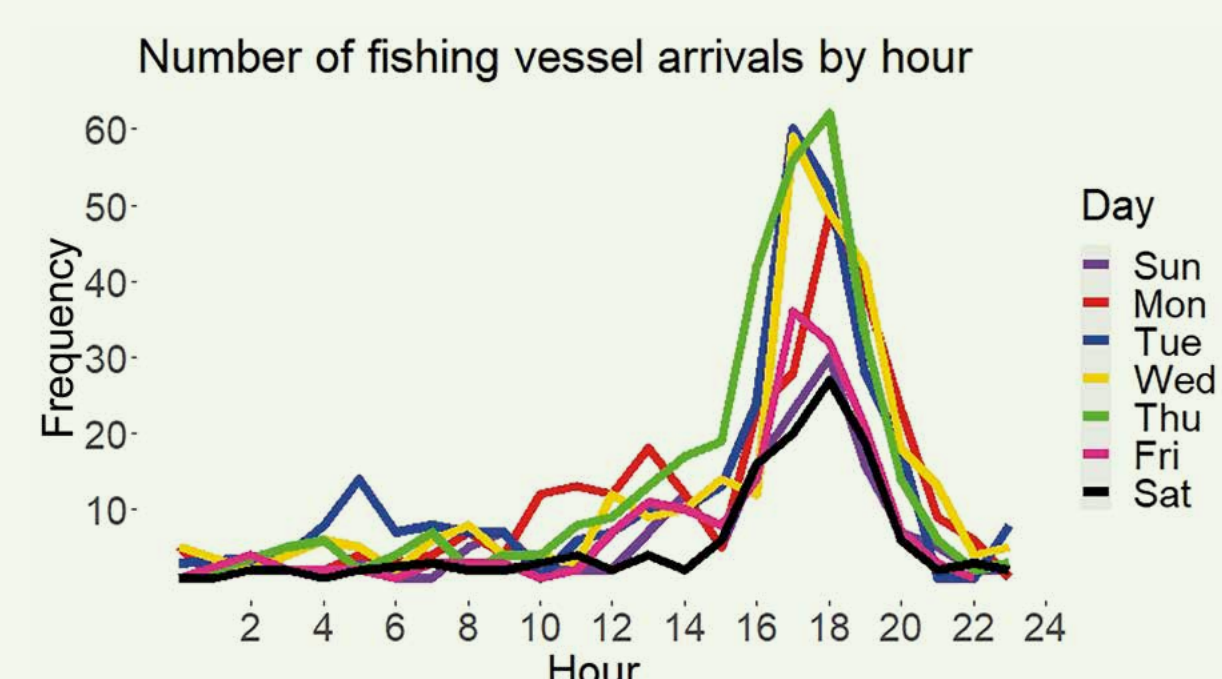
- Arrivals between 1st January 2019 and 31st December 2019.
- Vessels under 25 metres in length.

[2] JAKOTA Cruise Systems GmbH. www.fleetmon.com, 2022. Accessed on 2022-01-10.

ARRIVAL PATTERNS

From the data, the day and hour of arrival of suitable vessels was extracted, an example of which can be seen in Fig.1

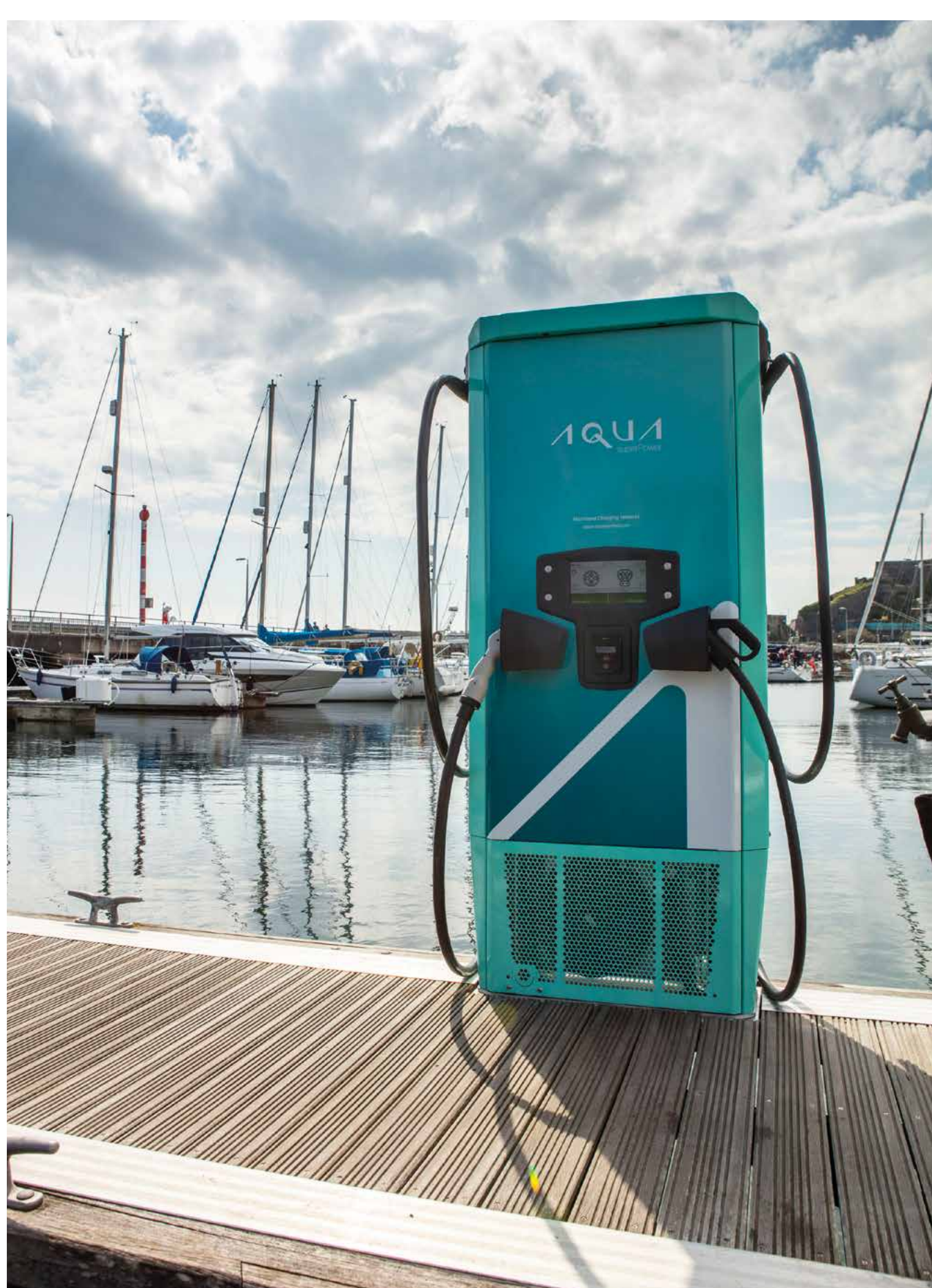
Fig. 1: Arrival times of fishing vessels



RESULTS

The distribution of arrivals provided the basis of the model for energy demand for each hour of the day. Our model takes account of the percentage of vessels converted to electric. The following results were obtained:

- The peak time for demand from charging coincides with that from other sources.
- The effect of e-vessel demand is predicted to create a surge for power in a short space of time.
- There is no time within a 24 hour period when power is not being demanded due to the volatile nature of vessel arrivals.
- Should all vessels convert to full electric, their potential peak demand of power in the evening would be over 18 MW, the same power required for 150 UK homes.



IMPACT

Battery-powered propulsion is an emerging technology for maritime vessels. As more vessels adopt electric motors, the data gathered can be used to refine the model parameters. In 2023, this will be extended to other ports and harbours along the south coast to allow an electric enabled maritime network.

