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ELECTRIFICATION OF TRADITIONAL “MOLICEIROS” BOATS USED FOR TOURISTIC VISITS IN THE URBAN WATER CANALS OF AVEIRO CITY

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Short Description

This paper presents the technical and governance challenges and actions carried out to plan and test in real operation the implementation of 10 electrical charging stations for 27 traditional wood moliceiros boats that operate in the water urban canals of Aveiro City and are currently powered by fossil fuel engines.

Main part

Once used by agriculture and salt industries, there are 27 boats operating daily in the urban canals of Aveiro in touristic and sightseeing tours. These traditional boats built in wood using ancient techniques operate 8 hours/day and transport up to 35 people in a 45 minutes ride, which annually represents the transportation of over 1.1 million tourists over 50 thousand trips per year. Nowadays, the engines are either petrol or diesel, emitting to the atmosphere approximately 400 tonnes of CO₂ every year.

Aveiro is implementing an integrated strategy to promote electric transportation investing in the acquisition of electric buses and is preparing a public procurement for acquisition of an electric Ferry boat to connect a remote area of the municipality through ria de Aveiro. Aligned with this strategy, the Municipality is leading the implementation of the project Aveiro STEAM City from Urban Innovative Actions, funded by the European Regional Development Fund. It includes an Energy use case, an investment of 10 charging stations in the existing marine docks, which will add to the private investment from the 10 private touristic companies in the replacement of combustion engines to electric ones with batteries for a full day of continuous operation.

The municipality of Aveiro holds the authority of licensing Moliceiros tourist operators in the urban canals which are awarded by public auction every 5 years. This was an opportunity for the Municipality to disrupt current operation model based on carbon emissions and absence of data gathering procedures by the boat operators.

This paper presents the technical and governance challenges and its correspondent actions carried out in order to plan the implementation of the electrical charging stations able to insure simultaneous full charge of up to 27 moliceiros batteries. The actions included the technical design of two models of boat motors and battery packs and communications systems to the urban data platform of the municipality. It also included the design of technical requirement of the charging station based on the standards from the automobile industry and the execution of a pilot in real tourist operation conditions to validate the technical designs. Finally, the paper describes the set of governance and regulations measures carried out to insure successful implementation of electrical conversion by the boat operators and effective connection of real time operational data from the daily.

What is new?

The innovation in this project comes from the conversion of combustion engines in traditional wood-based boats used in recreational tours in Aveiro water canals. The other innovation aspect is the transformation of the customer experience (eco-friendly, quieter, more pleasant rides for the tourists). Finally, the municipality innovates in the implementation of real time data collection of charging stations data, boat electricity consumption and CO₂ emissions savings with the possibility to share this data over the municipal urban data platform.

What is transferable to other cities and regions?

Every city with tourist marine activity has the potential to benefit from this project. The electrification of boats is an ongoing process with leading examples coming from Amsterdam and other locations. This project also contributes with a systemic approach to the building blocks of electrical propulsion inside the boat that insure a stable flow of real time data from boat variables to a central authority's data aggregation platform. This data is critical to analyse the real footprint of this economic activity in the territory and to shape and improve the perceived quality of this tourist service to the visitors.

What are outcomes and conclusions?

The moliceiros a landmark of Aveiro history and there is high pressure of tourism over the 27 boats with an operation that cannot be subject to failures in propulsion due to lack of energy. So, we devoted an extensive amount of time in planning, prototyping and testing a reliable charging solution to the 10 docks. The main conclusions were (1) we can use standard chargers from the electric auto industry with advantages in operation safety and monitoring, (2) we can have a reliable solution inside the boat that charge at night and have enough autonomy in daily continuous operation.

Who are the main target groups?

The main target groups are three: The visitors of Aveiro that buy tickets for the moliceiros boat tours. They will experience smoother, cleaner and environmentally friendly ride. The other target group are the boat operators since they benefit by providing higher quality tours with reduced operational costs and maintenance because electrical propulsion has less cost per kw, the engine has a higher torque efficiency per kw consumed and maintenance operations are negligible. Finally, the third target group are the citizens of Aveiro since they benefit from cleaner air and quiet boats in the streets around the canals.

And what now? - what will change? - what is the relevance for the future?

The global pandemic has disrupted mobility services. It will impose a profound transformation in all transport areas and leisure travel is one of the sectors that was severely affected by this situation, since it depends on the tourism and from trust and welfare among people. During the emergency period, the Municipality of Aveiro agreed with the boat operators that it was mandatory to suspend tourist tours to avoid contagion.

Now that we are gradually restarting economical activities there is one major question to be answered: What will be the economic rationale for the tourist boat operators to maintain the activity if it is required to respect social distancing of 2 meters inside a traditional boat that carries up to 30 people right next to each other? The maximum number of tourists will dramatically decrease and in consequence, the profitability of the operation will reduce drastically.

The new phase we are entering forces the local authorities and economical agents to converge in the search for the most adequate solutions to minimize contagion but maintain a delicate balance by avoiding extinction of business models that in this particular case are a landmark of the traditions of Aveiro region.

Link to the project

uia-initiative.eu/en/news/aveiro-steam-city-energy-use-case-electric-moliceiros