

## **Master 2021**

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### **Concept for Emission-Free River Cruises Simulation of a Purely Electrical Source, Load and Storage Network.**

#### ***ABSTRACT - Masterthesis***

This master's thesis examines concepts for emission free river cruises through electrical propulsion and energy storage in the form of batteries and hydrogen. Different renewable energy sources are compared and their impact is reviewed. For the comparison of different designs a Simulink model is used to calculate the energy budget. The creation of an energy model of the whole ship is a main part of the thesis. For the model, existing technologies have been evaluated and implemented to find realistic concepts supporting an ongoing rebuild project in 2021 / 2022. Data for the simulation has been collected during a measurement on the MS Patria, the river cruise ship which will be rebuilt during the project, as well as different supplier data sheets and databases. Within the thesis, a basic concept with three different hardware configurations is presented. All configurations are tested in different typical usage scenarios of the ship to evaluate the practicability for an operational cruise ship. Due to the parametric design of the model and the connected toolbox, further configurations can be reviewed without effort. The simulation results and their comparison are used to advise the ship owner and the involved project partners regarding the optimal setup for the rebuild project.