

Concept design of a climate-friendly short-distance passenger ferry

(Scientific fields: Naval architecture, Energy systems)

Background and motivation

Kungälv Municipality is operating the ferry line called Marstrandsfärjan between Koön and Marstrand. Today's ferries are cable car ferries, and sailing across the strait one way takes approximately 2 minutes. During the summer and the tourist season, there is a crossing every 15 minutes.



The ferries are old and need to be substituted with new, modern ferries which are climate-friendly. The ferries operating the line today emitted around 318 and 365 tonnes of fossil emissions during 2018 and 2020, respectively.

Objectives and goals of the project

The thesis project will work together with Kungälv Municipality and experts and propose at least two alternatives to new ferries on the route. The project will emphasize the concept design and discussion of alternative propulsion and energy carrier concepts. The results will be presented to Kungälv Municipality as a pre-study of a new ferry solution between Koön and Marstrand that they may use in an upcoming procurement.

Methods and tools

Systems engineering will be used to go through alternative propulsion and energy carrier solutions for the concepts. Interviews and workshops will be important in the concept development and assessment phases. The thesis workers need to cooperate closely with Kungälv Municipality to consider demands and restrictions on the operation profile, e.g., the tight timetable schedule, the need for good maneuverability during the summer season, and the ice conditions during the winter.

New-building or retrofitting of the existing ferries can be discussed. It is crucial to find alternative solutions for climate-friendly propulsion and energy carrier concepts (probably an electrified concept). If electrified ferries may be of interest, charging technology and charging cycles need to be included in the study by developing a simplistic analysis tool.

The project should be carried out by two students working together.

The thesis should be written in Word using a template provided by the department.

The MSc thesis project should incorporate (at least) the following tasks:

- Literature study.
- Description of the design process, and how it resulted in several candidates of ferry concepts.
- Description of assessment criteria and process.
- Detailed description of at least two different new concepts.
- A comparison of the environmental impact (life-cycle impact) between the concepts.
- A simplistic cost analysis.
- Write a thesis report and present it on a public seminar.

Contact person (examiner and supervisor at Chalmers):

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