

Carbon footprint of Seatwirl's vertical-axis wind turbine & recyclability of its components

Background and motivation

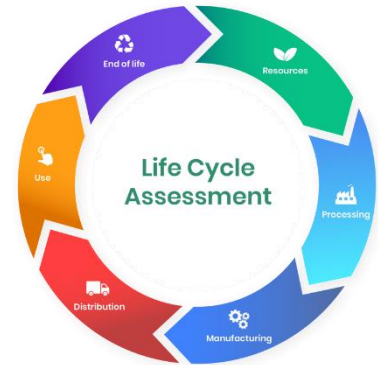
SeaTwirl uses an innovative vertical-axis wind turbine with a tower connected to the sub-sea structure (consisting of a floating element and a keel) to produce power in offshore conditions.



Today's wind turbine foundations are mainly made of steel or concrete, which are highly CO₂ emissive at their construction. The material used for the tower, the blades, and the mooring lines can vary from one project to another, depending on the design loads encountered in the studied site.

Furthermore, construction is only the first step of a component's life cycle emissions.

Seatwirl would like to evaluate the complete carbon footprint of its full system and dig into the recyclability of each part. As a prototype has already been built, the materials used for its construction could be a starting point before scaling up to bigger units.



Objectives and goals of the project

The goal of this study is to make an estimation of Seatwirl's wind turbine carbon footprint and summarize how its components could be recycled. The methodology & tools chosen should be a consequent part of the study. Main questions that need to be answered would be:

- How long does Seatwirl's VAWT need to operate in order to pay back its emissions?
- How does Seatwirl's VAWT compare to equivalent HAWT regarding CO₂ emissions (with same power or energy production)?

Methods and tools

Utilize literature and existing tools to establish carbon footprint of Seatwirl's VAWTs (vertical-axis wind turbine). The work will be done at the company's office so that SeaTwirl can provide support as appropriate.

Tools:

- To be defined

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 on the topic: carbon footprint calculation methodology, recyclability of wind turbine components
- Write a thesis report and present it on a public seminar.

Contact person (SeaTwirl):

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Contact person (examiner and supervisor at Chalmers):

To be decided