# Life Cycle Sustainability Assessment of Hydrogen Production by using Polymer Electrolyte Water Electrolysis

*Bachelor / Master thesis*

## Motivation

Life cycle sustainability assessment (LCSA) has been receiving increased attention over the years and is a tool to assess the overall sustainability from a life cycle perspective, including the analysis of environmental, economic and social aspects. Despite the growing interest in LCSA, its application within the context of hydrogen production exhibits several challenges. This includes inconsistent methodologies and incomplete perspectives on overall sustainability, as the majority of LCSA studies pertaining to hydrogen production technologies have primarily emphasised environmental impacts only, while social and economic impacts LCSA studies have rarely been included. However, equal consideration of environmental, economic, and social impacts is essential for a holistic sustainability assessment of hydrogen production technologies.

## Key Objectives

The main objective of your thesis is to gain a more nuanced and holistic understanding of environmental, economic, and social sustainability in hydrogen production. Your first task is to identify barriers hindering the effective application of LCSA in the hydrogen production sector. This involves a comprehensive analysis of main methods and a systematic review of existing LCSA studies on hydrogen production technologies. Subsequently, you conduct a detailed LCSA, focusing on Polymer Electrolyte Water Electrolysis as a representative example in the field of hydrogen production technologies. Based on the assessment results, you identify central trade-offs between environmental, social and economic aspects and derive areas for improvement for future development of sustainable hydrogen production technologies.

## Requirements

- Specialisation in Environmental Engineering, Mechanical Engineering, Electrical Engineering, Energy Engineering etc.
- Basic understanding of LCSA methodology is desirable.
- The thesis can be written in **English or German.**

The content and scope of the thesis can be adapted depending on your desired focus and type of thesis.

For further information or any questions please contact

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