

Thermal energy storage for vacuum vehicles

Short Description

Hyperloop is the next evolution of rail-based transportation, combining the speed of aircraft and the efficiency of the railway industry. The hyperloop concept uses a partial vacuum environment to reduce air drag in addition to a contactless support and guidance system and an electrical linear drive propulsion. The fact that the vehicle is intrinsically insulated from the environment by the vacuum in the tube requires a new approach in how to get rid of the heat dissipated in the vehicle. One approach is to store the heat in a compact cold storage during run and release it at the station. The aim of this work is to conduct a study on latent and chemical thermal storage technologies and to design physically or virtually such a device.

Type	Master or bachelor thesis
Timeframe	Q3 2023 - Q2 2024
Partner	HSLU and EuroTube Foundation
Internal supervisor	Manuel Häusler, manuel.haeusler@eurotube.org
External supervisor	

Work packages

- Literature review on thermal energy storages (TES) especially latent and chemical storages
- High level design of a hyperloop vehicle and its components
- Energy flow and thermal modeling of a hyperloop vehicle
- Optimization studies on thermal management
- Thermal management concept for hyperloop vehicle
- Design of a cooling system including TES

Requirements

- High motivation and interest in the topic
- Able to work independently and be creative
- Methodological and goal-oriented working behavior
- Heat source network modeling
- Knowledge in thermodynamics and thermal energy storages
- Likes programming and modeling
- Knowledge about hyperloop technologies is beneficial

Application

Please email your CV and transcript to manuel.haeusler@eurotube.org

