Solar Thermal Energy Intern

Are you ready to be part of a startup that is driving the future of sustainable energy? Suncom Energy is seeking a results-oriented Solar Thermal Energy Intern to join our mission to decarbonize the worlds energy supply. If you are passionate about solar energy, possess an entrepreneurial spirit, and thrive in a collaborative environment, this position is tailor-made for you! Join us in Houten, where we are developing small scale Concentrated Solar Power (CSP) solutions to provide 24/7 renewable heat.

Summary

We are looking for an entrepreneurial and enthusiastic MSc student who has interests in modelling, experimental work, combined with a strong conceptual understanding of thermal flow and material behaviour.

In this project you are expected to:

- Find a suitable modelling approach to the thermal ratcheting problem
- Conduct thermomechanical model simulations to quantify stresses and locate positions of risk over multiple thermal cycles
- Conduct a parametric study to determine the optimal storage configuration to prevent failure
- If time allows it: Conduct validation experiments and suggest/implement potential design improvements

Goals

- Validated quantification of the issue of thermal ratcheting, filling the current gap in research.
- Conceptual improvement of the storage design.

What We Offer

- Experience to work in a mission-driven start-up and help tackle climate change
- A flexible and vibrant work environment with a lot of responsibility and ownership
- A well reachable office location (Houten Castellum)
- An internship compensation of €500,- per month
- A possibility to join the company after successful completion of your internship, with the opportunity to become co-owner of the company

Introduction

Thermomechanical analysis and optimization of a packed-bed thermal energy storage for a CSP plant

Concentrated Solar Power (CSP) uses parabolic reflectors to concentrate sunlight onto heat receivers. A transfer fluid at over 300°C carries the heat, which is then used directly or for electricity generation. CSP is increasingly competitive with fossil fuels, especially when paired with cost-effective Thermal Energy Storage (TES).

Suncom Energy specializes in small-scale CSP plants and is working to develop an economically viable TES at a relatively small scale. Previous research[a)] has identified a packed-bed thermocline as the most cost-effective and efficient storage method. To model the TES (dis)charging process over time, a numerical FVM model was developed in Python and experimentally validated at TU/e[a)].

In the next development stage, the main challenge for commercializing the packed-bed solution is thermal ratcheting. Thermal ratcheting occurs when the solid filler (rock) and the storage tank's wall expand at different rates, causing the rock to settle in the tank over the course of multiple (dis)charging cycles. The residual stresses of the settled rock on the tank wall can lead to tank rupture. Suncom is focused on resolving this issue to integrate its first commercial packed-bed TES into their CSP-plants by the end of 2025.

For more info, contact the recruitment team at:

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References

a) Willemsz (2023), *Development of an Economically Viable Thermal Energy Storage for a High Temperature CSP-plant.*