Suggestion for a Master Thesis Work

**Project:** Simulation-assisted design of solid oxide fuel cell (SOFC) stack design for sub-watt range with internal reformation.

**Background:** Low (or no) emissions and noise makes fuel cells promising power generators in small UPS (uninterrupted power systems) and portable markets. SOFC systems of power range between 100 and 500 W, when coupled as battery chargers, can offer lower cost and better fuel flexibility compared to other fuel cell systems in these segments. SOFCs work at elevated temperature and once the stack is heated up, the electrochemical reactions occurring in the stack generate heat making the process sustainable. In sub-watt systems, however, the heat balance may not be sufficient and may lead to a gradual drop in the temperature of the stack.

**Your challenge:** Working with teams of at LU (Department of Energy Sciences) and SaanEnergi, you will employ modeling and simulation tools on the SOFC stack of Saan Energi

- Predict heat generation and dissipation in 100 to 250 W SOFC stack operating with internal methane reformation under defined operating parameters.
- Recommend changes in design to mitigate thermal losses and gradients in the stacks
- Validate the models experimentally by tests on single segmented-cells and/or stack

**Your profile:** We are seeking a highly motivated and driven candidate for a master thesis (also two students working together is possible). To accomplish the challenge, we expect you to have:

- a background in Mechanical or Chemical Engineering with interest in modeling thermal and related processes
- excellent skill level with engineering design and drawing tools including software such as CAD, Solidworks, CATIA or similar. Knowledge in computational heat transfer and fluid mechanics is appropriate
- earlier experience with gas flow and heat flux modeling and simulation
- excellent level of oral and written English

**Who are we:** SaanEnergi AB is a dynamic technology company providing reliable energy solutions through continuous innovation. We are committed to decreasing energy costs and reducing the environmental impact of power supply. We are developing forward solutions for fuel cells in diversified energy segments. Our proprietary fuel cells and auxiliary components are pushing low carbon technologies as mainstream power generators.

**Supervisors:**

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