



MSc Thesis Opportunities in SETA Project

[Sustainable Energy Transformation in Aviation \(SETA\)](#) is an ongoing research collaboration between KTH Royal Institute of Technology and Linköping University and aims to support Sweden's transition to fossil-free aviation by 2045. The project focuses on new fuels and technologies to decarbonise aircraft, such as advanced biofuels, electro-fuels, hydrogen-propulsion systems and electric aircraft.

The unit of [Sustainability, Industrial Dynamics and Entrepreneurship](#) at INDEK is looking for MSc students to engage in 30 ECTS thesis projects (January – June 2024). The thesis projects will directly contribute to the ongoing research of the SETA project with the possibility for future publication in academic journals and/or as policy briefs.

Proposed projects

We are looking for motivated MSc students with a range of disciplinary backgrounds, research interests and competences. The projects proposed are open to development by students in line with their own interests. As the projects will contribute to ongoing research at INDEK, there are opportunities for close collaboration with industrial actors and organisations involved in aviation in Sweden (and beyond).

Projects proposed include:

1. Business models for sustainable aviation

Possible methods: case studies, interviews, cost-benefit analysis, emission-energy-economy modelling

Project: Today air passenger can already purchase sustainable aviation fuels (SAF) when they fly, whereas electric aviation is likely to become commercially available from about 2028 and hydrogen-powered flights from about 2035.

This project would analyse different business models for fossil-free aviation. This could include the following:

- comparing different pricing strategies that airlines in Sweden, Europe and world-wide are using for pricing SAF
- analysing and developing business models for electric flights (including drones for good transportation)
- analysing and developing business models for hydrogen-based flights.

The project could either focus on one of these technologies, or compare different technologies. However this is an emerging area where new business models have to be developed from scratch, hence a part of this research would be focussing on what could potentially be developed rather than what is already available.

Conceptually the research could use theories from business models as well as socio-technical transitions (e.g. the multi-level perspective TIS or the triple embeddedness framework TEF)



and technological innovation systems (TIS). One or maximum two theories should be chosen for the conceptual framework of the project.

2. Mapping the role of airports in driving forward the transition to fossil-free aviation

Possible methods: case studies, interviews, focus group discussions, policy analysis, scenario development

Project:

Airports have a crucial role to play for driving forward transitions towards fossil-free aviation and increasingly airports are becoming energy hubs. Various airports have positioned themselves as pioneers of fossil-free aviation, including Karlstad, Skellefteå, Visby and others.

This project would map the progress of the different airports towards fossil-free aviation and analyse the role of airports in driving this transition.

This could include the following:

- mapping which airports are having what kind of plans for fossil-free aviation (including use and production of SAF, electric aviation and hydrogen, as well as fossil-free ground operations)
- analysing the progress these airports are making
- investigating the role these airports are playing and the collaboration they have with industry, government authorities (including municipalities and regions), financiers, research organisations etc
- developing scenarios for future development of these airports, with regards to use and production of SAF, electric aviation and hydrogen

Conceptually the research could use theories from socio-technical transitions (e.g. the multi-level perspective TIS or the triple embeddedness framework TEF), technological innovation systems (TIS) and the diffusion of innovation. One or maximum two theories should be chosen for the conceptual framework of the project.

3. Regulations for electric drone development

Possible methods: case studies, interviews, policy analysis

Project:

Research is currently ongoing for using electric drones both for passenger transport and for goods transport. While the technological development is advancing, adequate regulatory frameworks are lacking behind. This project would analyse policies and regulations for electric drone development, at the national, regional (EU) and international level. This could include the following:



- Analysing what kind of rules currently apply for the use of drones in urban and rural areas
- Analysing the role of international regulators versus the role of national and local regulators
- Reality-checking with airports, municipalities and drone developers what their needs are and how to develop regulation that is fit for purpose

Conceptually the research could use theories from socio-technical transitions (e.g. the multi-level perspective TIS or the triple embeddedness framework TEF), technological innovation systems (TIS) and the diffusion of innovation, as well as applying approaches from policy analysis. One or maximum two theories should be chosen for the conceptual framework of the project.

Interested students should contact Frauke Urban (fraukey@kth.se), Johan Nordensvärd (johan.nordensvard@indek.kth.se) and Emily Christley (emilych@kth.se) and to discuss MSc thesis opportunities further. Students should indicate their research and methods of interest. All ideas for the development of thesis projects are encouraged and welcomed.

More information about the SETA project can be found [here](#). Research publications from the project so far:

Kulanovic, A., Nordensvärd, J. 2021. Exploring the political discursive lock-ins on sustainable aviation in Sweden. *Energies*. 14 (21), 7401. <https://doi.org/10.3390/en14217401>

Lai, Y.Y., Christley, E., Kulanovic, A., Teng, C.C., Björklund, A., Nordensvärd, J., Karakaya, E., Urban, F., 2022. Analysing the opportunities and challenges for mitigating the climate impact of aviation: A narrative review. *Renew. Sustain. Energy Rev.* 156, 111972. <https://doi.org/10.1016/J.RSER.2021.111972>

Lai, Y.Y., Karakaya, E., Björklund, A. 2022. Employing a Socio-Technical System Approach in Prospective Life Cycle Assessment: A Case of Large-Scale Swedish Sustainable Aviation Fuels. *Front. Sustain.* <https://doi.org/10.3389/frsus.2022.912676>