Possible theses at the USYS TdLab

Prof. Dr. Michael Stauffacher, USYS TdLab, ETH Zürich

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Introduction

We are offering several Master theses in different areas – some of the topics can as well be addressed as BSc theses. The theses generally are of the following character:

- Theses should be at the *interface* of different disciplines and/or science-society
- Theses should be part of *on-going research projects* (see below for a tentative list)
- Supervision at the USYS TdLab is known for being (i) engaged and supportive; (ii) critical, feedback-oriented; and (iii) allowing for flexibility/self-directed learning by the student (balanced with the requirements set by the research project the theses is embedded in)

If you are interested in any of the topics listed below, just send an Email detailing your interests to michael.stauffacher@usys.ethz.ch

Net zero - trade-offs between energy/climate policies and biodiversity

Within a new ETH Joint Initiative project (Speed2Zero), we are interested in the perception of tradeoffs and synergies between climate/energy policies (e.g. to accelerate solar PV, scale-up of CDR) and biodiversity, landscape values and land-use (e.g. food production). We explore i) the societal discourses around the proposed climate/energy policies and ii) the perceptions of trade-offs and synergies as mentioned above.

One case example, we are currently looking at, is the public vote on the "Mantelerlass" (new federal act on a secure electricity supply).

For Speed2Zero, see: https://speed2zero.ethz.ch/en/

We are open to students' own ideas, but can also offer some ideas as a starting point!

Supervisors
Michael Stauffacher, and others from TdLab

UNESCO Biosphere Entlebuch

In Spring 2024, the TdLab organized a transdisciplinary case study (Masters course, see <u>Transdisciplinary Case Study – USYS TdLab | ETH Zurich</u>) together with the UNESCO Biosphere Entlebuch (<u>UNESCO Biosphere Entlebuch (biosphaere.ch</u>)) on the topic of "cultures and environment" (<u>CS 2022 "Biosphere Entlebuch – Culture and Environment" – USYS TdLab | ETH Zurich</u>).

A second case study 2024 will soon start (<u>Current Case Study – USYS TdLab | ETH Zurich</u>). Broad topics were already defined together with an advisory board from the UNESO Biosphere Entlebuch. Some will be taken up our tdCS, other topics will be offered as MSc theses.

In parallel to these two teaching case studies, we are offering several master theses addressing questions in the context of sustainable development, the conflicts and trade-offs between protection and use of nature, etc.

One area of research could as well be "net zero" and here especially the perception of trade-offs and synergies between climate/energy policies (e.g. to accelerate solar PV, scale-up of CDR) and biodiversity, landscape values and land-use (e.g. food production).

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Supervisors

Michael Stauffacher, Florian Knaus (Biosphere Entlebuch)

Net zero – the role of CDR/NET

In the context of the Swiss Energy Transition and the Net Zero goal, we are studying decisions processes, perception and acceptance of carbon removal/ negative emission technologies (CDR/NET) like soil management incl. biochar, a/reforestation, DACCS, BECCS, etc.

For Swiss policies on NET/CDR, see:

Climate change: Federal Council adopts report on negative CO2 emissions (admin.ch)

<u>Klimawandel: Bundesrat heisst Bericht zum Ausbau von Negativemissionstechnologien gut</u> (admin.ch)

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Supervisors

Michael Stauffacher, Juanita von Rothkirch (doctoral student, TdLab)

Net zero at ETH Zurich – reducing academic air travel

ETH Zurich has set itself the goal of reducing greenhouse gas emissions from its own operation to <u>net</u> <u>zero by 2030</u>. A large share of ETH's indirect emissions stems from professional travel, of which more than 90% are attributable to air travel. Thus, in 2017, ETH launched its <u>air travel project</u>, which aims to reduce greenhouse gas emissions generated by academic air travel to be in line with the net zero goal without jeopardizing the success of ETH's researchers.

Within the scope of ETH's air travel project, we are offering three master thesis topics:

- 1. Assessing the post COVID-19 state of universities in terms of their practices and strategies employed to reduce academic air travel.
- 2. Conducting a systematic comparison and evaluation of different conference formats (inperson, hybrid, virtual) with regard to various criteria such as CO₂ emissions, costs, technical feasibility, and acceptance.
- 3. Exploring the future of conferences by examining how conference associations/organizers envisage the future development of conferences given the recent shift to virtual conferences and the introduction of various hybrid conference formats.

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Supervisors

Michael Stauffacher, Ariane Wenger (doctoral student, TdLab)

Project support

Giuliana Turi (senior project manager, ETH Sustainability)

Net zero - community/collective energy initiatives

Within a European research project <u>Home | ENCLUDE (encludeproject.eu)</u>, we are offering several Masters' theses, on the following topics

- The role of government policies and incentives in promoting net zero energy buildings in Switzerland
- 2. Drivers and barriers to the adoption of net zero energy practices among homeowners and businesses in Switzerland
- 3. Social and cultural factors influencing energy consumption, conservation behavior and renewable energy uptake in different types of households in Switzerland
- 4. The role of community-based initiatives in promoting and supporting net zero energy practices and technologies in Switzerland
- The impact of energy prices and cost on the adoption of net zero energy practices and technologies among different types of households and different types of businesses in Switzerland
- 6. Understanding the public perception of net-zero energy buildings in Switzerland
- 7. Exploring the impact of Swiss net-zero energy policies on social equity and energy justice

- 8. Assessing the role of public-private partnerships in promoting and implementation of net-zero energy practices and technologies in Switzerland
- 9. Investigating the challenges and opportunities of retrofitting existing buildings to net-zero energy in Switzerland
- 10. Examining the role and public's perception of energy storage technologies in achieving net-zero energy in Switzerland
- 11. Understanding the factors that influence the adoption of net-zero heating technologies in residential buildings in Switzerland
- 12. Examining the social and environmental impact of different net-zero heating technologies and their uptake according to the type of household in Switzerland
- 13. Analyzing the role of policy instruments and government incentives in promoting the adoption of net-zero heating technologies among households and businesses in Switzerland
- 14. Investigating the social and economic implications of community-level net-zero heating systems and their ability to deliver sustainable heating solutions in Switzerland
- 15. Assessing the barriers and enablers to the adoption of net-zero heating systems in multi-family buildings including the role of building occupants and landlords in decision-making processes in Switzerland

Supervisors

Michael Stauffacher, Vanja Djinlev (doctoral student, TdLab)