

## UiO:Energy Call for summer research projects 2021

**Student research project title:** “Electrification of Construction – zero emission building sites”

**Project description:** The climate crisis demands strategies for rapid and deep decarbonization. Electrification is a key such strategy in Norway. The principal idea is to substitute fossil fuels with electricity from renewable sources. Direct and indirect electrification of energy-consuming sectors that rely on fossil fuels includes industry, buildings and transport. Norway is one of the most electrified countries in the world. The electricity sector is nearly fully decarbonized through a large share of hydroelectric power generation. Furthermore, there is widespread diffusion of electric technologies in transport (electric cars), buildings and households use electricity for heating and cooling, and there is already a high share of electric power used in industry. Despite the advantageous starting point Norway’s climate goals imply that this process must speed up significantly towards 2030.

In the research project that the student will be a part of, we study the technologies through the drivers and barriers that help or hinder electrification. We look at three key sectors; transport, building and industry. We assess development stage and feasibility of key technologies and sectors for rapid electrification, in order to ultimately analyze and understand the complex process of society wide electrification.

In 2019 the world’s *first zero emission building* site was in operation in downtown Oslo. The project was awarded prizes for being world leading and unique. There is currently policy pressure building in municipalities like Oslo and Bergen, we want to explore how zero emission building sites will become the norm, rather than unique demonstration projects in the near future.

The student tasks is to collect qualitative data about the barriers and drivers for electrification of construction projects. Construction of infrastructure and buildings is responsible for significant co2 emissions, from heavy transport, diesel generators, heating of building sites, and heavy machinery like excavators.

**Available projects:** 1

### **1. Electrification building sites**

The case study explores the technical, social and political barriers and drivers for zero emission construction sites. How can the construction industry increase the degree of electrification? What are the main barriers to fully electric construction sites? Can we identify drivers from policy measures, or pressure from contractors? We expect technical barriers such as unavailability of heavy machinery, small market for electric machinery, battery and charging capacity. What is the status of the market for electric heavy machinery? Are the organizational barriers, such as tendering and contract practices?

Key tasks 1) Create a database of written material such as strategy reports, technical reports, and media interest on the subject. 2) Conduct Interviews with relevant industry actors such as major developers, contractors, as well as producers of heavy machinery and relevant industry and policy actors.

Key deliverables: Database of findings from structured media archive search and publicly available documents. 2) A report including transcribed interviews and key findings.

**Preferred project period:**

Spring /summer semester 2021

**Supervision:**

Allan Dahl Andersen (assist. Prof. at TIK, NTRANS and INTRANSIT centres) and Hilde Nykamp (Postdoctor at TIK) will supervise the students. The students will be part of an active research team and work closely with the supervisors to design the details of the project.

The student project will be integrated in the ongoing sustainability research at the TIK and the student will work closely with researchers. In this sense, the student will gain hands-on experience with qualitative sustainability research. The scope data collection in each case is suitable for a master thesis.

**Preferred background of students:**

Student with social science or technical background with knowledge of innovation studies and interest in sustainability issues. Students. Since the work includes document studies and interviews, we prefer someone with good command of Norwegian,

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