Chair of Renewable and Sustainable Energy Systems
TUM School of Engineering and Design
Technical University of Munich

Winter semester 2024/25

Project Lab Renewable and Sustainable Energy Systems

Notes on registration

If you are interested in participating in this project internship, please proceed as follows:

1. Select the topic relevant to you for the project internship in the topics listed below. Also consider which other topics would be suitable for you.

2. Get in touch with the supervisors of the topics of your choice and make an appointment for a short video call.

   Procedure of the video call:

   a. First, the supervisors will give you a brief overview of their topic.

   b. Afterwards you can speak with the supervisors for 3-5 minutes to get an impression of whether the topic is suitable for you.

1. If you would like to apply for one or more topics after the interview with the supervisor, please register for the corresponding groups in TUMonline by Wednesday, October 16, 2024, at the latest and please make it clear how you prioritize the topics.

3. By Tuesday, October 22, 2024, at the latest, we will inform you whether and, if so, in which topic you can work on the project internship.

If you have questions concerning the organization of the lab course, please contact Dr. Kuhn (propens.ens@ed.tum.de).

If you have any questions about the content of the different topics, please contact the supervisor directly.

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Please be sure to pay attention!

In order to participate in the project internship, it is essential that you

1. had a **short video-call with the supervisor** of the topic **AND**

2. register **in TUMonline for the course**.

If you do not meet one of the three requirements, you will not be included in the selection for participation.

Organizational matters

Weekly attendance times are mandatory for the project internship.

The language (German or English) depends on the composition of the group.

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Topics

No.	Topic	Students	Brief description	Supervisor (email)	Time slots for meetings
1	**Design and comparison of home energy management control strategies**	4-7	Home energy management systems (HEMS) will play a crucial role in the energy transition. With households turning from consumer via prosumer to flexumer, the power flows need to be carefully managed as they would otherwise overload the grid and in worst-case-scenarios lead to blackouts. However, on the other hand, a well-managed home can also be a great asset as it alleviates the burden on the grid. Some examples of HEMS software are evcc, clever-pv und OpenEMS. While the goal is clear, the means to get there much less so. In principal, they are three different approach to control the HEMS: rule-based, mpc-based, RL-based (reinforcement learning). The question is how they compare against each other and what strengths and weaknesses they have. To investigate these questions, we want to create various control strategies and test them using our tool HAMLET, which was developed at the chair. Afterwards, we will put them to the test with various test cases and evaluate how they compare in categories such as grid compliance, energy costs, computational costs and speed. For more information, please see the chair's website.	Doepfert, M.; Ludolfinger, U.	Thursday 14-16h

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2	**Utilizing Next-Generation Geothermal Technologies**	5	Geothermal energy plays a crucial role in the energy transition, particularly in Germany's heating sector. However, the development of conventional geothermal fields often faces challenges, such as low flow rates in exploration wells, which can stall progress and even lead to project termination In this project, we explore next-generation multistage stimulation technologies that have the potential to turn these failures into success stories. Using a real-life case from Bavaria, we will transform a failed geothermal project into an innovative and sustainable solution. We will guide you through the entire project cycle, from geological assessments and reservoir modeling to heat demand analysis and heating network planning for nearby communities. In addition, we will analyze project economics and address the potential challenges and risks, brainstorming solutions for overcoming them. For more information, please see the chair's website.	Anastasia Sidorova Nora Medgyesi	Tuesday 14:00 – 17:00
3	**Business models for the NEED platform**	4	The NEED research project is developing a data platform. This data transfer platform is intended to provide access to data necessary for planning the energy transformation in the most standardized and simple way possible. The data is conventional and synthetic. Synthetic data is used to close data gaps from conventional data due to simply missing data or data protection. Not all data is publicly available and requires business models for platform operation to enable access for heterogeneous user groups. Within the framework of this project internship, ideas and concepts for business models for data provision for different actors and data types are to be developed.	Patrick Buchenberg Philipp Kuhn	Wednesday 13:00 – 16:00

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