Important information

- Choose the topic most relevant to you from the topics listed above.
- Contact the supervisors of your chosen topics and arrange a short video call. Please send your CV, transcript of grades and a short mail explaining your interest in the topic.
- The supervisors will make the final decision regarding seminar enrollment.
- By Monday, 20 October 2025 at the latest, you will be informed whether, and if so, with which topic you can complete the project internship.

Integrated Sustainable Energy Systems for Marginalized Communities

Project Overview

Access to reliable, affordable, and sustainable energy remains a critical challenge for billions worldwide, particularly in marginalized communities. These communities, whether geographically isolated or socio-economically disadvantaged, often face unique energy deficits that directly impede their livelihood and development potential.

This project delves into the complex interplay between energy access, community empowerment, and sustainable development by focusing on two distinct underserved contexts: a rural agricultural community and an urban informal settlement.

Students will engage in an interdisciplinary analysis for an overview about the socio-economic, environmental, and policy dimensions of energy systems. The project aims to give a first glance into the process of designing, optimizing, and evaluating local energy solutions that are not only technically viable and cost-effective but also responsive to the specific needs and aspirations of marginalized populations.

Project Objectives

- Assessment of livelihood challenges and energy demands within both archetypical rural agricultural community (e.g., for water pumping, crop processing) and an archetypical urban slum (e.g., for lighting, small businesses, sanitation)
- Development conceptual designs for decentralized renewable energy systems considering local resource availability and existing infrastructure.
- Design of cost-optimal system sizing to determine the most cost-effective configuration for the proposed energy system
- Development of a system dynamics model to explore the sensitivity of the designed energy systems to selected energy policies, market fluctuations, and socio-economic changes, understanding their broader implications.

Student Team Requirements

- Background knowledge of energy systems**.**

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- Familiarity with quantitative methods, data analysis, and critical thinking. Students interested in the design and optimization aspects should have an understanding with mathematical modeling and optimization principles.
- Willingness to learn and apply relevant modeling and software tools.
- Strong collaborative skills for group work and effective communication of findings through reports and presentations.
- Ability to conduct independent literature reviews, critically evaluate existing studies, and synthesize information from academic papers

Contact:
If you are interested, please contact Dr. Sissi Bazan Santos (sissi.bazan@siemens.com)

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