TUM School of Management
Chair of Corporate Sustainability

Master/Bachelor Thesis
"Community-based Mini-Grids: Challenges and Impacts"

Background

The Kenyan government has set an ambitious target of achieving universal electricity access for all its citizens by 2026. To realize this goal, they are exploring the potential of off-grid or decentralized renewable energy solutions, particularly in rural areas with lower electricity demand (KNES, 2018). Mini-grids, which provide electricity to rural communities, have gained recognition as a crucial intermediary between individual household solutions and large-scale grid extensions, facilitating widespread electricity access. Compared to individual household solutions, mini-grids are believed to offer more significant development benefits due to their capacity to support productive uses of electricity (Chaurey et al. 2004). However, introducing new technologies into communities often overlooks the intricate web of social relationships within them (Hertel et al., 2021). These dynamics can significantly influence the ability of community members to realize the expected benefits of electrification, subsequently impacting adoption rates and overall outcomes (Saeed et al., 2021). While numerous studies delve into the business models and economic outcomes of providing energy through mini-grids in rural areas, there is a growing interest in understanding how informal community institutions interact with and are influenced by the establishment of mini-grids (Ambole et al., 2021). This aspect warrants further investigation to ensure that electrification efforts align with the social fabric of these communities, ultimately leading to more inclusive and sustainable outcomes. The thesis will focus on the challenges connected to CB mini-grids (from the supplier perspective) or the outcomes of CB mini-grids (from the demand perspective).

Introductory Readings

- Bloem, S., Swilling, M., & Koranteng, K. (2021). Taking energy democracy to the streets: Socio-technical learning, institutional dynamism, and integration in South African community energy projects. Energy Research & Social Science, 72, 101906.
- Saeed, M. H., Fangzong, W., Kalwar, B. A., & Iqbal, S. (2021). A review on microgrids' challenges & perspectives. *IEEE Access*, 9, 166502-166517.
- Gill-Wiehl, A., Miles, S., Wu, J., & Kammen, D. M. (2022). Beyond customer acquisition: A comprehensive review of community participation in mini grid projects. Renewable and Sustainable Energy Reviews, 153, 111778.

Tasks and Goals

This thesis is closely related to the current research of the chair and implies close collaboration with the research team. The main tasks involve: 1) conducting a literature review relating mini-grids and community enterprises; 2) conducting field research in the form of semi-structured interviews and field visits to at least two rural communities in Kenya identified by the supervisor(s); 3) organizing, coding, and analyzing the semi-structured interviews.

Requirements

- Excellent English skills and interest in entrepreneurship, development, and sustainable energies.
- Independent, reliable, and diligent working style with the ability to work in multi-cultural settings.
- Eagerness to travel to Kenya to collect data.
- Advanced Seminar *Sustainable Entrepreneurship* with a minimum grade of 2.0 (for Master Thesis)
- Course *Corporate Sustainability* with a minimum grade of 2.0 (for Bachelor Thesis)

Details

- Supervisors: Prof. Dr. Frank-Martin Belz and Dr. Alessia Argiolas
- Start: Flexible / As of now.
- Working time: 6 months, with 4 weeks of fully funded research stay in Kenya.

Contact

If you are interested in writing your thesis at our chair or have questions about this topic, please contact Dr. Alessia Argiolas (alessia.argiolas@tum.de). To apply, send an email including your CV, and the current transcript of records (as one PDF file). We are looking forward to working together with you!