**Lehrstuhl für Wirtschaftliche Staatswissenschaften,
insbesondere Energiewirtschaftslehre**

Bachelor Thesis

What is the economic potential of microbial fuel cells for the German energy transition?

Due to global efforts to reduce greenhouse gas emissions, electricity generation shifts from fossil fuels to renewable energies and alternative energy sources. One such alternative energy source is bio-based energy generation from wastewater through microbial fuels. Microbial fuel cells use wastewater and other organic waste to produce electricity and clean water as co-products. Compared to conventional wastewater treatment processes, this allows otherwise unused energy in the wastewater to be used and clean water to be produced at the same time.

Key tasks and objectives of the thesis

In your thesis, you should make a case study for Germany that analyzes microbial fuel cells' economic potential and contribution to clean electricity production. To that end, you should calculate how much energy can be produced from wastewater. You should compare the electricity generation costs of microbial fuel cells with other renewable electricity generation. Further, you should compare the cost of clean water generation from microbial fuel cells with conventional wastewater treatment. Lastly, you should identify practical and techno-economic hurdles in adopting the technology and discuss applicability in Germany.

Your profile

Student of economics, best with a focus on energy

Literature

Khan, Saad Saleem; Amjad, Mohsin; Shareef, Hussain; Larkin, Stephen (2024): Review of microbial fuel cell from a techno-economic perspective. In Energy Exploration & Exploitation 42 (1), pp. 373–398. DOI: 10.1177/01445987231208510.

Xu, Fei; Yuan, Qing; Zhou, Lu-lu; Zhu, Ya-jie; Li, Yu-ming; Du, Yuan-da et al. (2018): Economic benefit analysis of typical microbial fuel cells based on a cost–benefit analysis model. In Desalination and Water Treatment 135, pp. 59–93. DOI: 10.5004/dwt.2018.23149.

Contact

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Topics

- Bio-Energy
- Microbial fuel cells

Methods

- Literature review
- Case-study