



Master's Thesis Opportunity

Title: Comparing Land-Use Efficiency, Energy Output, and Local Land-Use Changes: Solar vs. Wind Farms

Description: As renewable energy infrastructure expands, understanding its land-use footprint becomes critical. This thesis investigates and compares the **land-use efficiency, energy output, and regional land-use changes** associated with solar and wind farms. Using satellite imagery and renewable energy capacity and location data, the study will quantify land conversion, assess energy yield per unit area, and analyse land-use transformation within a 2 km radius of selected sites.

Key Research Questions:

- How do solar and wind farms differ in land-use efficiency?
- What land transformations occur in their surroundings?
- What are the economic implications of land conversion?

Methods: The research will involve remote sensing analysis (Sentinel-2 data, 2017–2023), land-use classification, and integration of energy output data. Economic land-use efficiency will be evaluated by considering opportunity costs.

Expected Outcomes: The study will generate comparative metrics on land-use and energy efficiency, along with spatial insights into how renewable projects reshape surrounding landscapes.

Required Skills:

- Experience with GIS software (e.g. QGIS or ArcGIS)
- Basic remote sensing knowledge (e.g. Satellite Imagery and Land cover classification)
- Knowledge in energy systems or energy economics (plus)
- Optional: Python or Stata or R

Start: Flexible

Language: English or German

Supervision: Prof. Dr. Felix Müsgens and Shanmukha Srinivas B G, MSc.