JÜLICH
Forschungszentrum

Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,600 employees in one of Europe's biggest research centers and help us to shape change!

At the Institute of Energy and Climate Research – Juelich Systems Analysis (ICE-2), the ICE-2 team "Integrated Infrastructure – Distribution Infrastructure" develops synthetic, geo-referenced distribution grids for electricity, gas, and hydrogen. These efforts support the planning of robust, climate-neutral infrastructure systems by analyzing load profiles, technology placement, and sector integration. By joining us, you'll contribute to Germany's energy transition and digital transformation through cutting-edge research.

We offer you at the earliest possible date an exciting

Master Thesis – AI-Based Extraction and Load Estimation of Industrial and Commercial Buildings in Germany

Your Job:

- Researching and extracting industrial and commercial buildings across Germany using open-source geospatial data (e.g., OpenStreetMap, CORINE Land Cover, Sentinel, etc.)
- Applying machine learning / AI and/or statistical algorithms to classify building and land-use types relevant to electrical consumption
- Labeling and preparing training data for AI models; developing automated pipelines for classification
- Integrating findings into the existing package synthetic grid tool for generating realistic medium-voltage distribution grids
- Collaborating with domain experts from energy modeling, geoinformatics, and data science
- Preparing scientific documentation of your methodology and results
- Contributing to writing scientific papers for internal reporting and possible publication

Your Profile:

Required qualifications:

- Very good performance in your master's studies in electrical engineering, computer science, geoinformatics, energy systems, or a related field
- Solid programming skills in Python and familiarity with machine learning libraries (e.g., scikit-learn, TensorFlow, and PyTorch)
- Experience in working with geospatial data (e.g., GeoPandas, Rasterio, and Shapely)
- Interest in AI and energy systems modeling
- Ability to communicate and document research results clearly in English (B2)

Desirable qualifications:

- GIS experience (QGIS, GDAL), basic understanding of distribution grid concepts and tools, like PyPSA
- Experience with academic writing or contributions to scientific papers
- High level of independence, motivation, and a structured, reliable work approach
- Good team skills and willingness to engage in interdisciplinary collaboration

Please feel free to apply for the position even if you do not have all the required and desirable skills and knowledge.

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We support you in your work with:

- **Meaningful tasks:** Your thesis deals with a future-oriented, socially relevant topic with direct practical relevance in an international environment.
- **Practical relevance:** With us, you will gain valuable practical experience alongside your studies and actively participate in interdisciplinary projects.
- **Scientific environment:** You can expect excellent scientific equipment, modern technologies, and qualified support from experienced colleagues.
- **Onboarding and teamwork:** You can look forward to working in a dedicated, international, and collegial team. It is important to us that you quickly settle into the team and are given structured training for your tasks. We also support you from the very beginning and make your start easier with our Welcome Days and Welcome Guide: **https://go.fzj.de/welcome**.
- **Work-life balance:** We offer flexible working hours, the possibility of 100% home office, to help you balance your professional and personal life. You also have the option of flexible working (in terms of location).
- **Flexibility:** Flexible working hours make it easier for you to balance work and study.
- **Fair remuneration:** We will pay you a reasonable remuneration for your thesis.
- **Fixed term:** The position is initially for a fixed term of six months.

In addition to exciting tasks and a collaborative working atmosphere at Jülich, we have a lot more to offer: **https://go.fzj.de/benefits**.

Further information on the project is available at **https://www.fz-juelich.de/de/ice/ice-2/ice2-forschung/integrierte-infrastruktur/verteilnetze**.

We welcome applications from people with diverse backgrounds, e.g., in terms of age, gender, disability, sexual orientation / identity, and social, ethnic, and religious origin. A diverse and inclusive working environment with equal opportunities, in which everyone can realize their potential, is important to us.

Further information on diversity and equal opportunities can be found at **https://go.fzj.de/equality** and on specific support options at **https://go.fzj.de/womens-job-journey**.

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our **Online Recruitment System**!

Contact Form:
If your questions have not yet been answered via our **FAQs**, please send us a message via our **contact form**.

Please note that for technical reasons we cannot accept applications by e-mail.

www.fz-juelich.de

WE HAVE BEEN AWARDED