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 7,500 employees in one of Europe's biggest research centres and help us to shape change!

Join us in shaping the energy future – as part of the Sector Coupling team at the Institute of Climate and Energy Systems - Juelich Systems Analysis (ICE-2)! How can we build a robust, cost-efficient, and greenhouse gas-neutral energy system that is also prepared for crises? That is precisely what we are researching – with scientific depth, social relevance, and a multidisciplinary approach. Our focus is on the techno-economic modeling of electricity, gas, hydrogen, and heat infrastructure and their coupled systems design. Become part of our dedicated, diverse team that works together as equals and gives ideas room to grow. Contribute your scientific excellence, creativity, and curiosity—and join us in developing concrete strategies for the energy supply of tomorrow.

We offer you to the next possible date an exiting

PhD Position - European energy transition – Modeling and analysis of challenges for successful implementation

Your Job:

The transformation of the European energy system towards greenhouse gas neutrality is fundamentally changing our energy landscape. In the future, wind and solar power plants are expected to provide most of our electricity. Hydrogen and its derivatives are becoming increasingly important - and even during periods of low wind and sun, new, emission-free technologies and strategies are necessary to ensure a stable supply. For the European energy transition to succeed, key infrastructure measures must be implemented in a timely manner. These measures include retrofitting existing power plants and transport networks to other energy sources and expanding new infrastructure. Planners and policymakers face several challenges, including long construction and retrofitting lead times, which can be several years, and requirements for suitable locations, such as availability of cooling water or adequate space. In this thesis, you will

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!**

Questions about the vacancy?

Get in touch with us by using **our contact form.**

Please note that for technical reasons we cannot accept applications via email.

www.fz-juelich.de

systematically evaluate the challenges of the energy transition and derive scenarios and strategies for its successful implementation. Using existing ICE-2 energy system models, you will address questions such as: How do installation and retrofitting times impact the restructuring of energy infrastructures? What conditions regarding locations apply to different technologies, and how will the energy landscape change on the pathway to greenhouse gas neutrality? What regional effects will occur, and how can the overloading of individual regions be counteracted? Your contribution to scientific analysis:

- Further develop existing energy system models in Python to accurately map and analyze the challenges of implementing the energy transition in terms of infrastructure
- Identify and systematize challenges for the implementation of the European energy transition
- Expand existing energy system models to systematically map retrofitting measures as well as planning and construction times as time constraints in the transformation pathway
- Analyze the space requirements and other location-related prerequisites of central energy infrastructures, including storage facilities, power plants, and transport networks
- Analyze, based on scenarios, how key implementation challenges will affect the design of future energy infrastructures, focusing on regional impacts and implementation challenges
- Position your research in the professional community through publications in renowned journals, conference contributions, and active scientific exchange at the national and international level

Your Profile:

- You have successfully completed a master's degree in natural or (industrial) engineering, computer science, or a related field
- You have very good knowledge of energy technology, energy economics, and energy policy
- You have already gained initial experience in energy system modeling
- You are confident in object-oriented programming, preferably in Python
- You work independently, strategically, and solution-oriented, and demonstrate a high degree of independence and willingness to show great commitment
- High degree of independence and willingness to show great commitment
- Fluent written and spoken English; German skills are an advantage

Our Offer:

We work on highly topical, socially-relevant issues and offer you the opportunity to actively shape change! We offer you optimal conditions for the successful completion of your doctorate:

- The opportunity to complete a doctoral thesis within 3 years through professional supervision and internal support services
- A highly motivated working group as well as an international and interdisciplinary working environment in one of the largest research institutions in Europe
- Active further development of a comprehensive energy system model in order to support energy policy decision-makers in a scientifically sound manner
- Excellent scientific and technical infrastructure
- Opportunity to participate in (international) conferences and project meetings
- Best conditions for successful work in a home office (moving to the Aachen-Düsseldorf-Cologne region is not absolutely necessary)
- 30 days of annual leave and provision for days off between public holidays and

weekends (e.g. between Christmas and New Year)
- Further development of your personal strengths, e.g. through an extensive range of training courses; a structured program of continuing education and networking opportunities specifically for doctoral researchers via JuDocS, the Jülich Center for Doctoral Researchers and Supervisors: https://www.fz-juelich.de/en/judocs
- Targeted services for international employees, e.g. through our International Advisory Service

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

The position is initially for a fixed term of 3 years. Pay in line with 75% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund) and additionally 60 % of a monthly salary as special payment („Christmas bonus“). The monthly salaries in euros can be found on page 66 of the PDF download: https://go.fzj.de/bmi.tvoed Further information on doctoral degrees at Forschungszentrum Jülich including our other locations is available at: https://www.fz-juelich.de/gp/Careers_Docs

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: https://go.fzj.de/equality