At the Institute of Energy and Climate Research - Energy Systems Engineering (IEK-10) we focus on the optimal design and operation of integrated, decentralized energy systems with a high share of renewable energy. Computer simulation and numerical optimization are our essential tools to arrive at efficient, reliable and cost-effective solutions. We contribute both to the development of mathematical models and to the development of improved simulation methods and optimization algorithms. Our methods and software-tools are validated against operating data of real systems. Furthermore, we conduct comprehensive case studies in order to test and further improve the scalability and the performance of our models and algorithms. Specially adapted methods and codes enable us to exploit the potential of high performance computing with the aim of solving particularly large and complex problems.

We are looking to recruit a

**Master Thesis – Simulation-based analysis of coupled gas and heat grids**

**Your Job:**
Due to the increase of renewable energy share in the electrical network, the decarbonization focus has also been extended to other energy sectors. Sector coupling refers to the concept of interconnecting different energy sectors like the gas and the heating sector with the power sector. This can on the one hand offer flexibility to the power sector and on the other hand influence e.g. the heating sector, as technologies like Power-to-Gas generate high amounts of waste heat. Therefore, this master theses aims to investigate the potential of sector coupling on a small examplary district with one gas and one heating gird.

Your main tasks for this position are:
- Create a simple test network for gas and heating grids
- Implement coupling components (e.g. electrolysis)
- Create scenarios using different coupling component combinations / operational
strategy
• Analyse results

Your Profile:
• Very good bachelor degree in Mathematics, Physics, Computer Science, Electrical Engineering, Mechanical Engineering or a comparable subject
• Basic understanding of energy system modeling and simulation is preferable
• Basic knowledge of and some experience in Python and packages, e.g. NumPy, scipy, pandas, etc.
• Fluent in English (spoken and written)

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:
• Highly motivated scientists of different subject areas working together
• An interesting and socially relevant topic for your thesis with future-oriented themes
• Interdisciplinary work combining physics, mathematics, computer science, and engineering
• Intensive supervision by one or more experienced and helpful colleague(s)
• Friendly and welcoming work environment
• Ideal conditions for gaining practical experience alongside your studies
• The chance to independently prepare and work on your tasks
• A large research campus with green spaces, offering the best possible means for networking with colleagues and pursuing sports alongside work
• A contract for the period of between 3-9 months is possible

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

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.