



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!

As demand for hydrogen grows across sectors, the need for efficient transportation methods becomes paramount. While pipelines have traditionally been favored for transporting high-purity hydrogen, alternative methods present compelling options, particularly for regions where pipeline infrastructure is lacking or economically unfeasible. This thesis explores chemical hydrogen carriers, specifically dimethyl ether (DME), ammonia, and methanol, targeting scenarios where high purity is not a strict requirement. By examining the potential of different transportation chains alongside conventional pipeline systems, this study seeks to identify the most promising options for hydrogen transportation in Germany, focusing primarily on environmental impacts. This work builds upon a previous master thesis that defined a case study in Germany for hydrogen transportation with low purity requirements (e.g., for steel production) and conducted a cost analysis of different hydrogen supply chains.

We offer you to the next possible date an exiting

Master Thesis - Comparative LCA of hydrogen transport with DME, Ammonia, and Methanol for securing Germany's steel industry

Your Job:

The primary objective of this thesis is to assess the environmental impacts of DME, ammonia, and methanol as hydrogen carriers compared to a non-chemical reference system for transporting hydrogen within Germany, focusing on scenarios where high purity is not essential. Specific research objectives include:

- Conducting a comprehensive literature review to understand the current state of research on hydrogen transportation methods, with a focus on chemical carriers
- Gathering information from other projects at Forschungszentrum Jülich with similar focus to inform and refine the scope of the Life Cycle Assessment (LCA)

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

- Performing an LCA to quantify and compare the environmental impacts of DME, ammonia, methanol, and selected other hydrogen transportation methods, considering factors such as greenhouse gas emissions, resource depletion, and human toxicity

By addressing these objectives, this research aims to contribute to the ongoing discourse on hydrogen transportation and facilitate informed decision-making towards achieving Germany's energy transition goals. The findings will provide valuable insights into the environmental trade-offs associated with different hydrogen transportation methods, supporting the development of sustainable energy systems in Germany and beyond.

Your Profile:

- Technical master studies (mechanical engineering, electrical engineering, construction engineering) or information technology study background with high interest in technical applications (computer science, computational linguistics)
- Experience in LCA
- Fluent written and spoken English

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:

- An interesting and relevant topic for your thesis with a future-oriented focus
- Ideal conditions for practical experience alongside your studies
- Interdisciplinary collaboration on projects in an international, committed and collegial team
- Qualified supervision by academic colleagues
- Independent preparation and implementation of assigned tasks
- Flexible working hours and appropriate remuneration
- The opportunity to work flexibly (in terms of location),
- Very good technical equipment for successful home office work
- A large research campus in the countryside, which offers the best opportunities for networking with colleagues and for a sporting balance alongside work

The position is for a fixed term of 6 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>

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>