

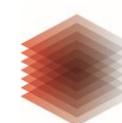
NFDI4Energy

A Digital Infrastructure for Interdisciplinary Energy System Research

Astrid Nieße, Stephan Ferez, Emilie Frost

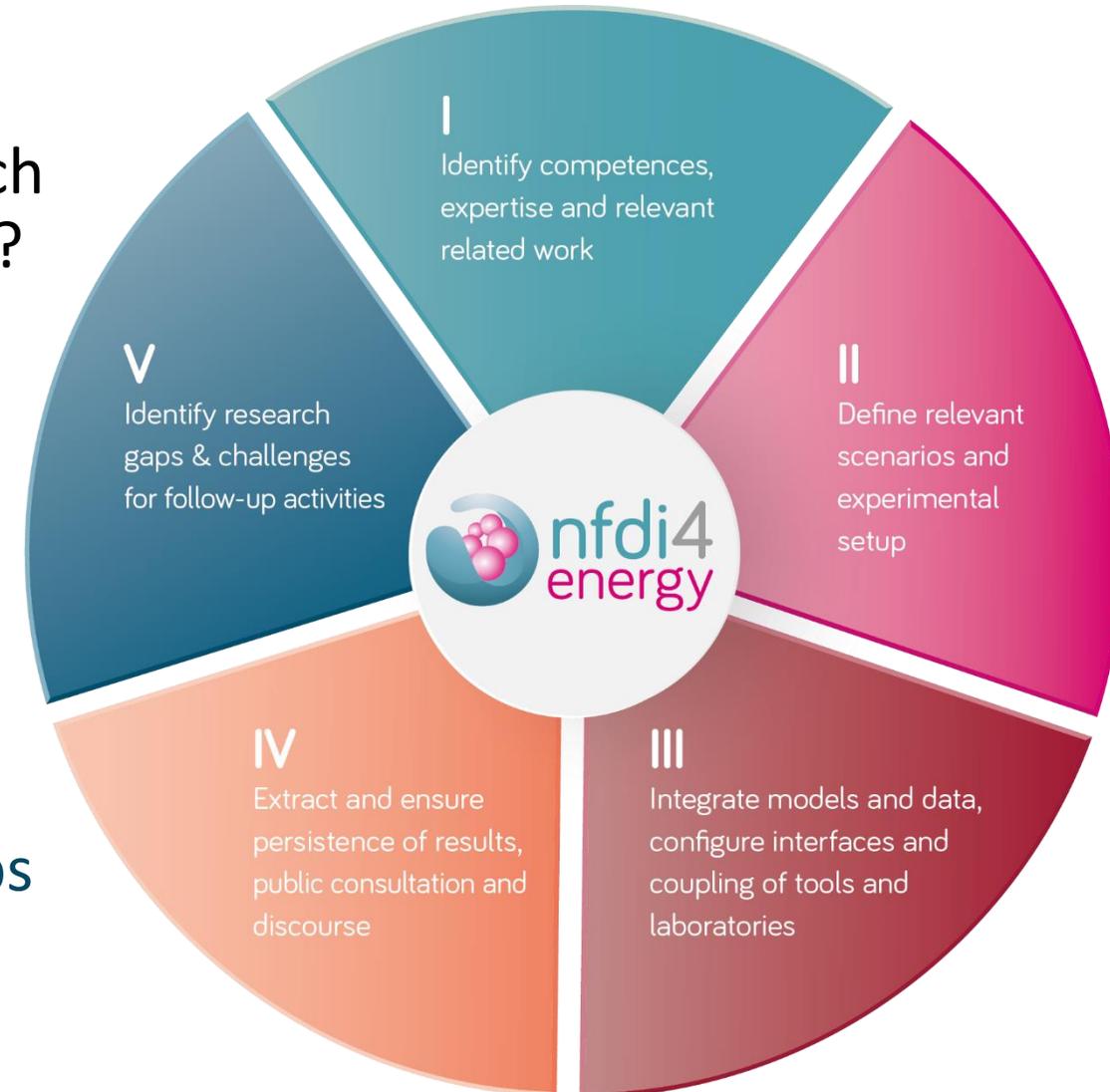


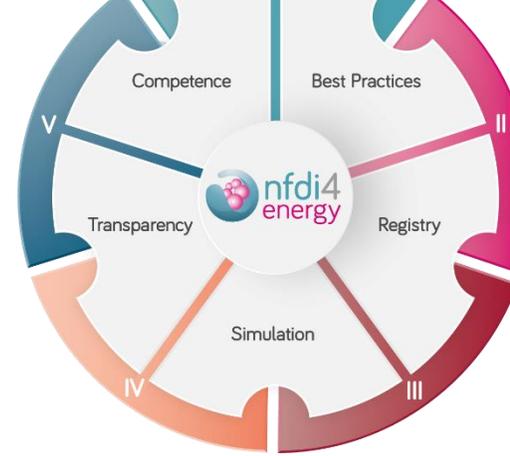
© University Oldenburg



Motivation: Research Project Life Cycle

- I What are the **right partners** for my research idea, and what are their results up to now?
- II What would be the **appropriate energy system scenario** and experimental setup?
- III How can we **find and integrate models, data & labs**?
- IV How can we discuss our **results with community, public & industry**?
- V What are our blind spots and **research gaps** for follow up activities?





How will the NFDI4Energy infrastructure help me with my research?

Exemplary problem: Coordinated Use of Flexibilities in the Electricity Grid



- Higher need for flexibility in the energy systems
- Market mechanisms can be used for flexibility
- Self-organization (SO) enable self-healing and adaptive systems
- Household and their acceptance for measures have to be considered from the start

Exemplary research question:

How to design a robust distributed SO-based system to coordinate flexibilities for the electricity grid (consider e.g. new redispatch concepts)?

Find the Right Partners



What do we want?

- Industry knowledge on the flexible use of energy storages
- Research Partners with knowledge on flexibility from other domains, e.g., mobility
- Communication experts
- Social scientists to support with acceptance questions

How can the NFDI4Energy services help?

- *Competence* will provide an overview on research partners to find the right ones

Find the Right Models & Data

What do we want?

- Source code for a unified flexibility model
- Example scenario with an electrical grid and data for demand and supply
- An agent framework to model distributed control strategies
- A model for the communication network

How can the NFDI4Energy services help?

- *Repository* will provide a database of relevant source code and data which is easily searchable

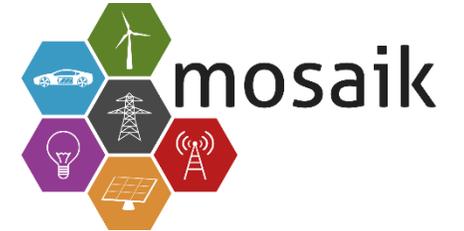


Combine the Models & Data to a Simulation Scenario



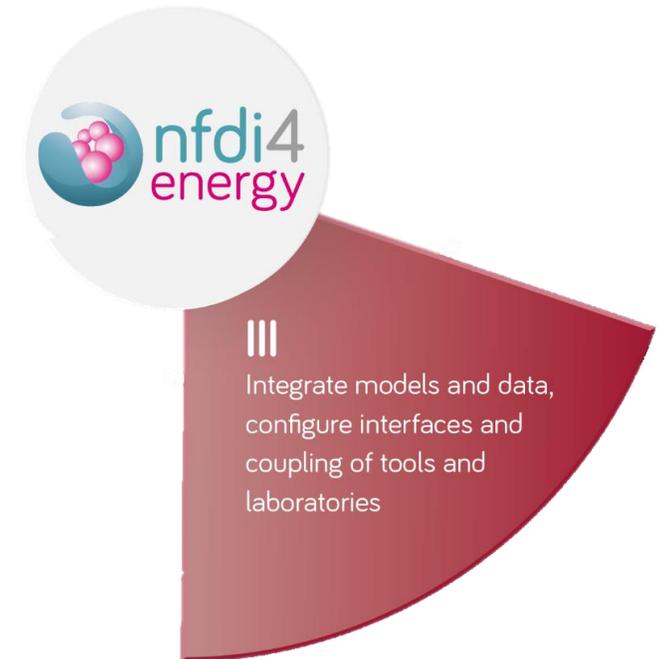
What do we want?

- Couple the different models and data to one simulation scenario 



How can the NFDI4Energy services help?

- *Best Practices* will provide an overview on different methodologies to couple simulation models
- *Simulation* will
 - provide access to different co-simulation tools like mosaik or villasnode
 - allow to run simple co-simulation online as simulation-as-a-service



Why NFDI?

- NFDI: German National Research Data Infrastructure
- Vision: All research data is FAIR. For all. Forever.
 - FAIR = Findable, Accessible, Interoperable, Reusable
- Goals:
 - Establish and develop comprehensive research data management in Germany
 - Increase the efficiency of the entire German science system
 - Develop a long time solution for research data management infrastructure
- Funded by German state and federal governments with up to 90 million € per year

1 NFDI e.V.

- Association
- Central coordination
- 225 member institutions

27 consortia

- from different domains
- covering all research areas
- all funded for 5+ years

Our partners



Power grids, automation systems, energy informatics

- **Spokesperson:** Prof. Astrid Nieße – Digitalisierte Energiesysteme, UOL
- Prof. Veit Hagenmeyer – Institute for Automation and Applied Informatics, KIT
- Prof. Reinhard German – Rechnernetze und Kommunikationssysteme, FAU
- Prof. Sebastian Lehnhoff – Energieinformatik, OFFIS
- Prof. Antonello Monti – Automation of Complex Power Systems, RWTH + FhFIT



Long-term energy scenarios

- Prof. Anke Weidlich – Institut für Nachhaltige Technische Systeme, Uni Freiburg
- Ludwig Hülk – Transformation von Energiesystemen, RLI



Energy policy and societal aspects

- Prof. Christof Weinhardt – Institute of Information Systems and Marketing, KIT
- Prof. Johan Lilliestam – Energy Transition Dynamics, RIFS
- Prof. Berthold Vogel – SOFI



Infrastructure and domain-invariant service provider

- Prof. Sören Auer – TIB



Summary

- You are the “customers” ;-)
 - Meta-project with focus on research data and research software
 - Goal: Building a FAIR & Open Research Ecosystem for Energy Systems
- We want to improve **your life** as researchers!



Follow us for more updates!

Website: nfdi4energy.de

Newsletter: nfdi4energy@uol.de

Twitter: [@nfdi4energy](https://twitter.com/nfdi4energy)

LinkedIn: [NFDI4Energy](https://www.linkedin.com/company/NFDI4Energy)

Contact

Astrid Nieße

astrid.niesse@uol.de

Stephan Ferenz

stephan.ferenz@uol.de

Emilie Frost

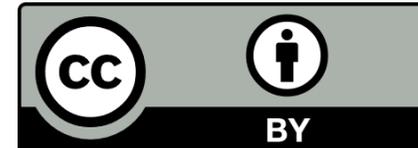
emilie.frost@uol.de

Please cite as:

„A digital Infrastructure for Interdisciplinary Energy System Research” (2023-04-20)

© University Oldenburg | CC BY 4.0

License



© University
Oldenburg

Except logos and where otherwise noted, this work and its content (text and illustrations) are licensed under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

See license text for further information