RESILIENT – Resilient Energy System Infrastructure Layouts for Industry, E-Fuels and Network Transitions

Tom Brown, Fabian Neumann, Iegor Riepin

f.neumann@tu-berlin.de
Department of Digital Transformation in Energy Systems
Technical University of Berlin, Germany

CETP TRI1 2022 Project Leaders, online

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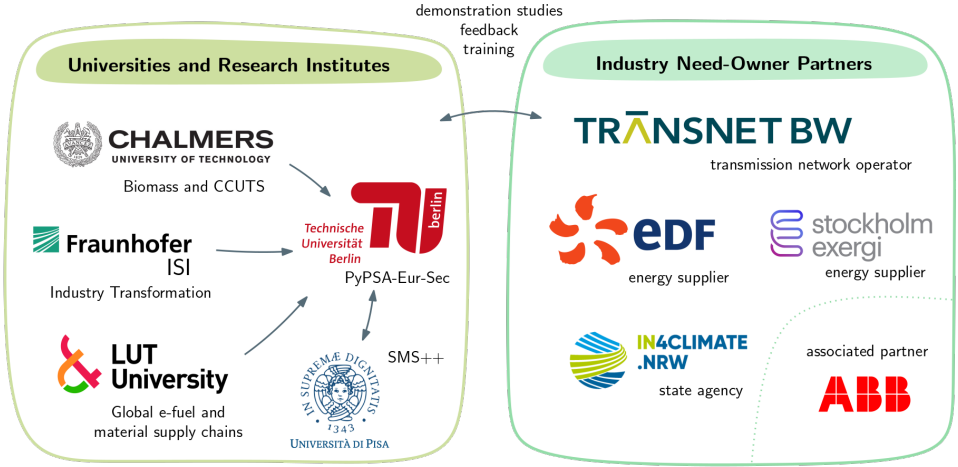
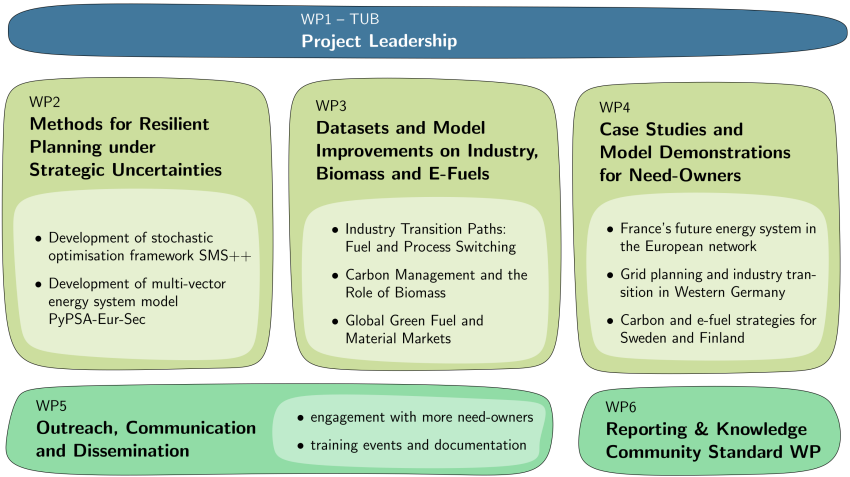
Technische Universität Berlin

Partners


demonstration studies
feedback
training
Universities and Research Institutes
CHALMERS
UNIVERSITY OF TECHNOLOGY
Biomass and CCUTS
Fraunhofer
ISI
Industry Transformation
Technische
Universität
Berlin
PyPSA-Eur-Sec
LUT
University
Global e-fuel and
material supply chains
SMS++
IN SUPREMÆ DIGNITATIS
1343
UNIVERSITÀ DI PISA
Industry Need-Owner Partners
TRANSNET BW
transmission network operator
eDF
energy supplier
stockholm
exergi
energy supplier
IN4CLIMATE
.NRW
state agency
associated partner
ABB

Work Plan


WP1 – TUB
Project Leadership
WP2
Methods for Resilient Planning under Strategic Uncertainties
• Development of stochastic optimisation framework SMS++
• Development of multi-vector energy system model PyPSA-Eur-Sec
WP3
Datasets and Model Improvements on Industry, Biomass and E-Fuels
• Industry Transition Paths: Fuel and Process Switching
• Carbon Management and the Role of Biomass
• Global Green Fuel and Material Markets
WP4
Case Studies and Model Demonstrations for Need-Owners
• France's future energy system in the European network
• Grid planning and industry transition in Western Germany
• Carbon and e-fuel strategies for Sweden and Finland
WP5
Outreach, Communication and Dissemination
• engagement with more need-owners
• training events and documentation
WP6
Reporting & Knowledge Community Standard WP

Selection of Planned Model Developments

Computational Methods for Uncertainties

- decomposition techniques
- large-scale stochastic optimisation
- test robustness of system
- using SMS++ framework

Carbon Management and Biomass Usage

- CO_2 network
- CO_2 sequestration potentials
- circular carbon economy and recycling
- biomass usage options

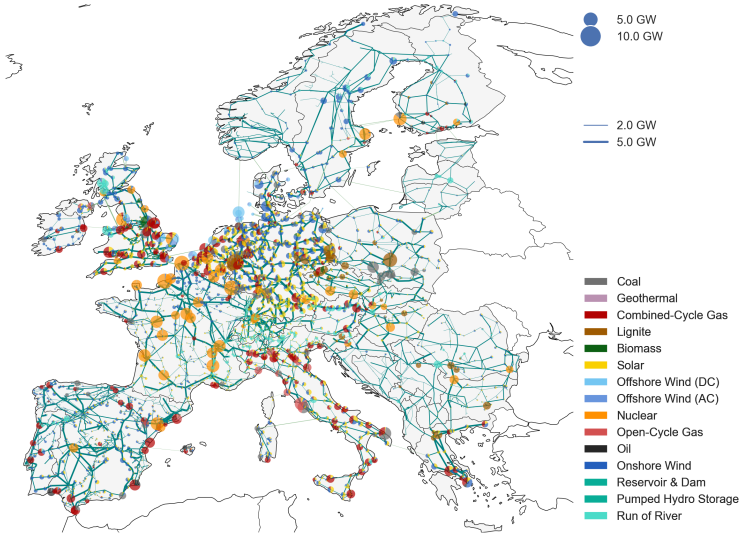
Industry Transformation (FORECAST)

- fuel and process switching
- industry relocation
- carbon sources and feedstocks
- data on stock & investment cycles
- new technologies (oxyfuel cement, etc.)

Global Green Fuel and Material Markets

- imports of green energy and materials
- effects on European infrastructure
- restructuring of value chains
- risks (geopolitical, technological, etc.)

PyPSA-Eur: Sector-coupled open model of European energy system



- energy infrastructure planning tool
- co-optimisation of generation, storage, transmission, conversion
- all sectors: power, heat, transport, industry
- high spatial and temporal resolution and scope
- computationally performant
- only open tools and data
- users in academia, industry, NGOs, government

Source: https://github.com/pypsa/pypsa-eur; https://pypsa-eur.readthedocs.io/en/latest/

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Prototype: Interactive Scenario Exploration

Source: https://doi.org/10.1016/j.joule.2023.06.016; https://h2-network.streamlit.app

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Contact

Find the slides:
https://neumann.fyi/files/neumann-cetp.pdf

Find out more about PyPSA:
https://pypsa.org

Find the open energy system model:
https://github.com/pypsa/pypsa-eur

Send an email:
mailto:f.neumann@tu-berlin.de

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