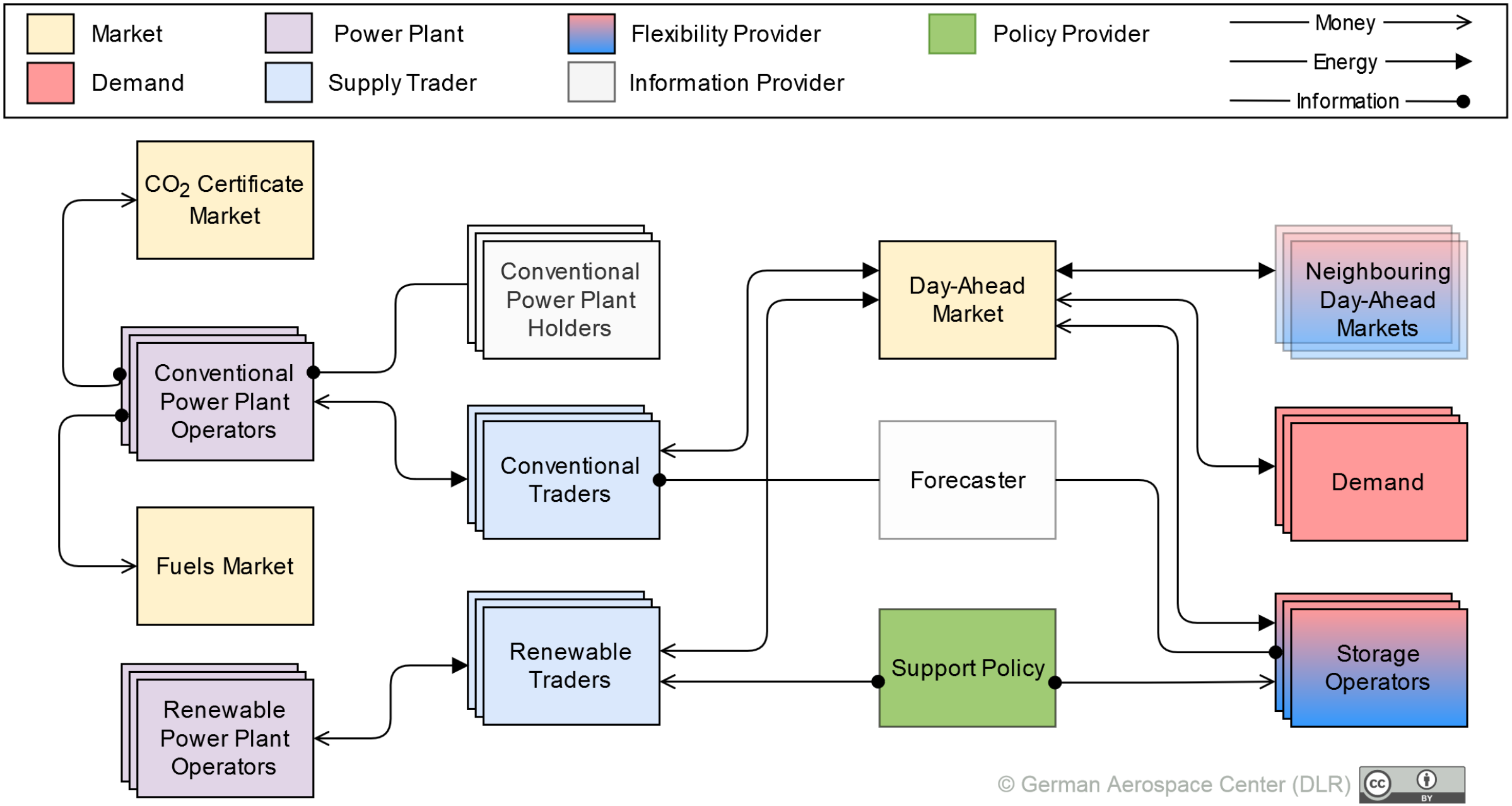
Painting of energy system modelers working with a computer (Nitsch and DALL·E, 2023).

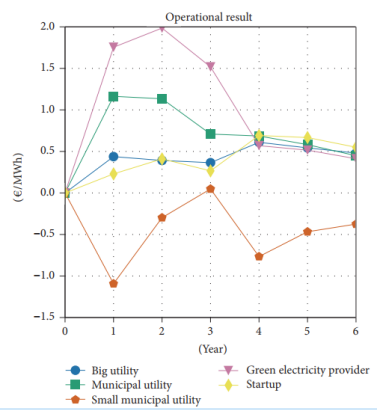
AMIRIS

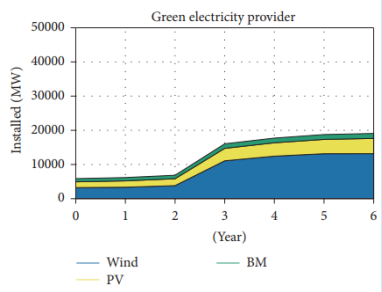
The open agent-based electricity market model


Market
Demand
Power Plant
Supply Trader
Flexibility Provider
Information Provider
Policy Provider
Money
Energy
Information
CO_2 Certificate Market
Conventional Power Plant Holders
Conventional Power Plant Operators
Day-Ahead Market
Neighbouring Day-Ahead Markets
Conventional Traders
Forecaster
Demand
Fuels Market
Renewable Traders
Support Policy
Storage Operators
Renewable Power Plant Operators
© German Aerospace Center (DLR)
CC BY

Deissenroth et al. (2017)

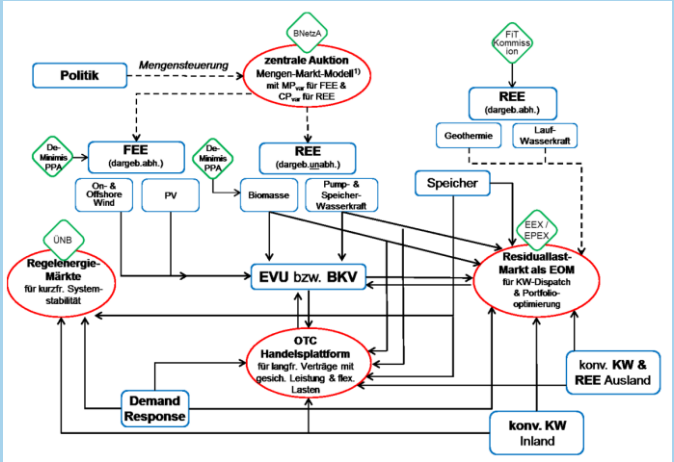
- Analyzed competition effects & regulatory changes in a market premium scheme
- Found concentration tendencies largely depending on management premia





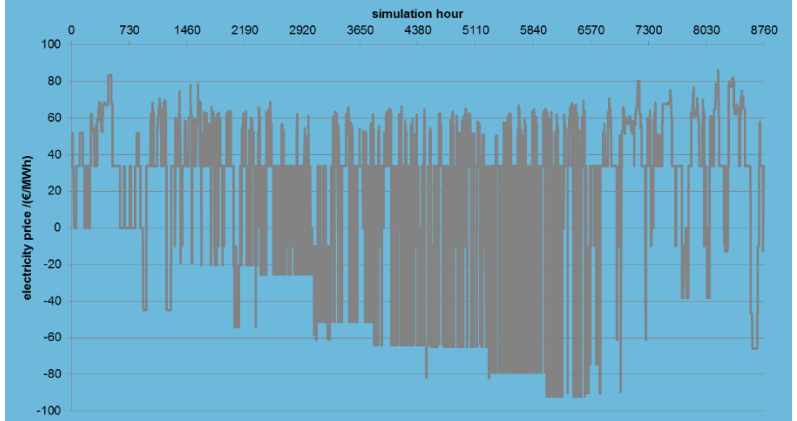
Reeg (2019)

- Studied different sorts of RES support (FIT, variable + fixed market / capacity premia)
- Found variable market premia best-suited for variable RES
- Developed power system design vision



Frey et al. (2019)

- Studied electricity prices with market premium scheme
- Found self-reinforcing downward price dynamics



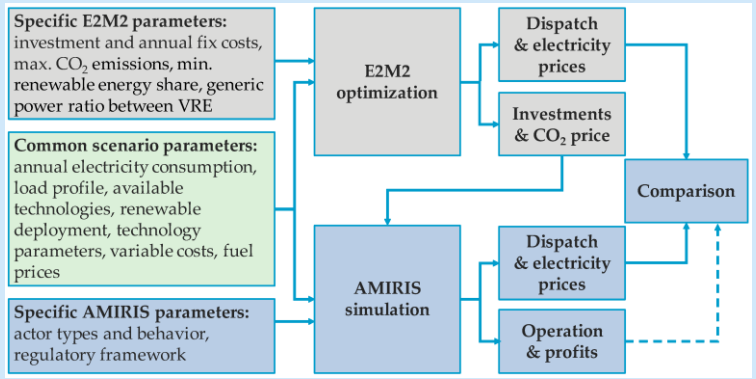
Deissenroth, Marc und Klein, Martin und Nienhaus, Kristina und Reeg, Matthias (2017) Assessing the Plurality of Actors and Policy Interactions: Agent-Based Modelling of Renewable Energy Market Integration. Complexity, 2017. Wiley, Hindawi. doi: 10.1155/2017/7494313. ISSN 1076-2787.

Frey, Ulrich J und Klein, Martin und Nienhaus, Kristina und Schimeczek, Christoph (2020) Self-Reinforcing Electricity Price Dynamics under the Variable Market Premium Scheme. Energies. Multidisciplinary Digital Publishing Institute (MDPI). doi: 10.3390/en13205350. ISSN 1996-1073.

Reeg, Matthias (2019) AMIRIS - ein agentenbasiertes Simulationsmodell zur akteursspezifischen Analyse techno-ökonomischer und soziotechnischer Effekte bei der Strommarktintegration und Refinanzierung erneuerbarer Energien. Dissertation, Deutsches Zentrum für Luft- und Raumfahrt, Institut für Technische Thermodynamik, Stuttgart.

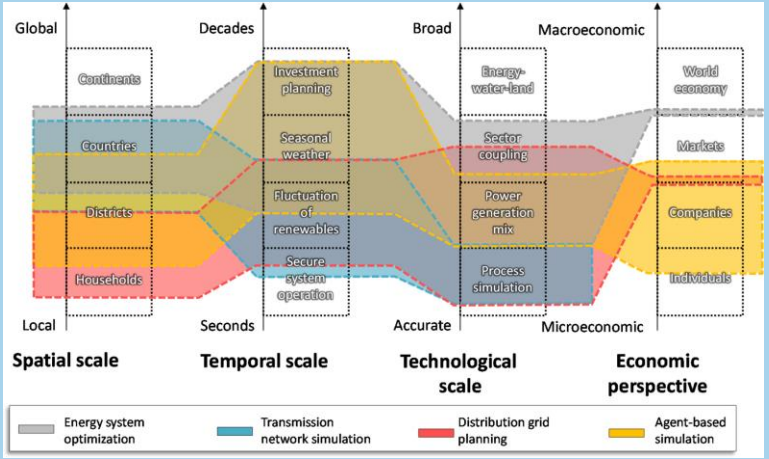
Torralba-Díaz et al. (2020)

- Coupled AMIRIS (agent-based) with fundamental optimizing electricity market model
- Found an „efficiency gap“, i.e. higher system costs for the business-oriented system (AMIRIS)
- Efficiency gap is higher for higher RES shares and associated (storage) flexibility



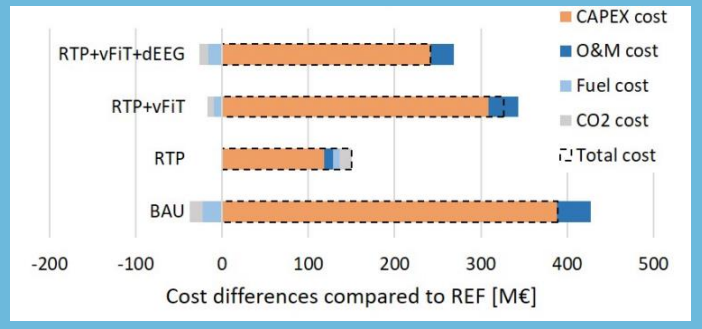
Cao et al. (2021)

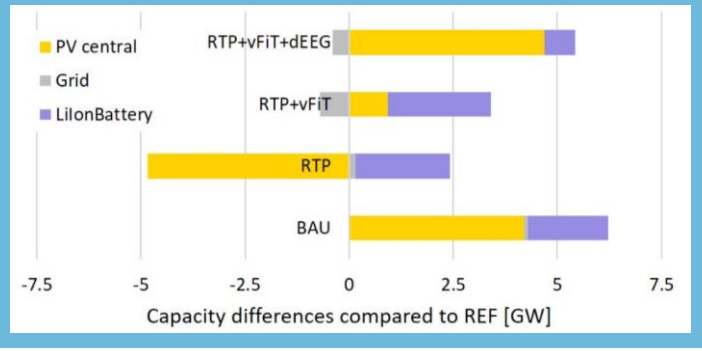
- Developed a concept to address shortcomings in model granularity in different aspects
- Suggested automated and reproduceable coupling workflows
- Highlighted ABM's capabilities of addressing individual economic considerations



Sarfarazi et al. (2022)

- Studied economic granularity gap for prosumer self-consumption with PV and batteries
- Found higher system costs and capacity needs as well as a large impact of tariff schemes





Cao, Karl-Kien und Haas, Jannik und Sperber, Evelyn und Sasanpour, Shima und Sarfarazi, Seyedfarzad und Pregger, Thomas und Alaya, Oussama und Lens, Hendrik und Drauz, Simon R. und Kneiske, Tanja (2021) Bridging granularity gaps to decarbonize large-scale energy systems - The case of power system planning. Energy Science and Engineering. Wiley. doi: 10.1002/ese3.891. ISSN 2050-0505.

Sarfarazi, Seyedfarzad und Sasanpour, Shima und Cao, Karl-Kien (2023) Improving energy system design with optimization models by quantifying the economic granularity gap: The case of prosumer self-consumption in Germany. Energy Reports. Elsevier. doi: 10.2139/ssrn.4151361. ISSN 2352-4847. (handed in)

Torralba-Díaz, Laura und Schimeczek, Christoph und Reeg, Matthias und Savvidis, Georgios und Deissenroth-Uhrig, Marc und Guthoff, Felix und Fleischer, Benjamin und Hufendiek, Kai (2020) Identification of the Efficiency Gap by Coupling a Fundamental Electricity Market Model and an Agent-Based Simulation Model. Energies. Multidisciplinary Digital Publishing Institute (MDPI). doi: 10.3390/en13153920. ISSN 1996-1073.

Get started!

pip install amirispy

Ensure you have a Java>=8 installation ready

amiris install

```
amiris run -f scenario.yaml
```

Painting of energy system modelers working with a computer applying the agent-based market model AMIRIS (Nitsch and DALL·E, 2023).

Imprint

Topic: AMIRIS: The open agent-based electricity market model

Date: 23.03.2023

Authors: Christoph Schimeczek, Kristina Nienhaus, Ulrich Frey, Evelyn Sperber, Seyedfarzad Sarfarazi, Felix Nitsch*, Johannes Kochems, A. Achraf El Ghazi

Institute: Institute of Networked Energy Systems

Credits: DLR (CC BY-NC-ND 3.0)