

Model Template for Renewable Energy Supply Systems (MTRESS)

Schönfeldt, Patrik*; Maldonado, Diana; Upadhaya, Ajay; Ellermann, Julius; Schlüters, Sunke

German Aerospace Center (DLR), Institute of Networked Energy Systems, Oldenburg
*patrik.schoenfeldt@dlr.de

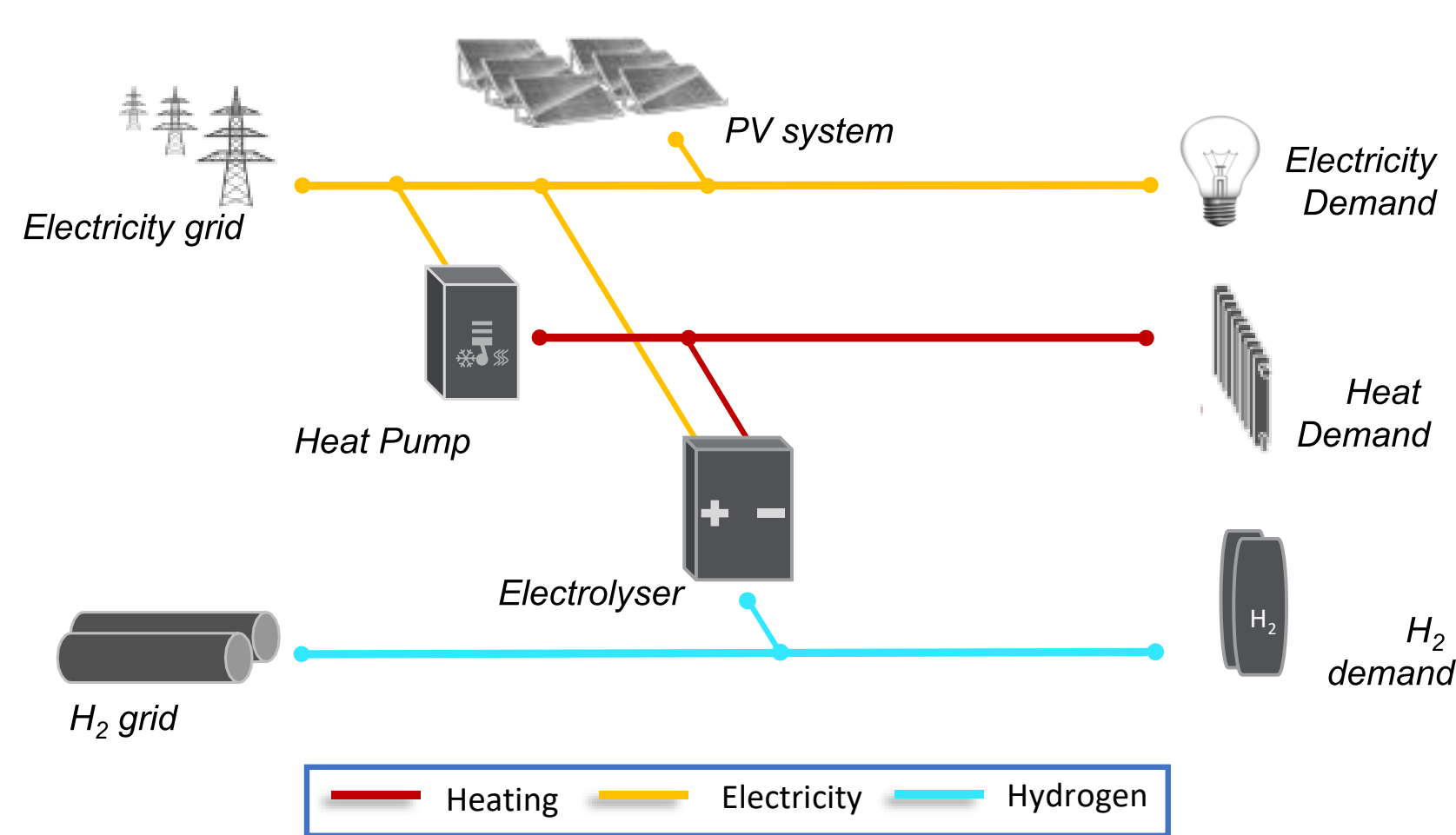


Definition

MTRESS is a specialised model template for simple formulation of complex models in order to enable researchers to optimise integrated energy systems.

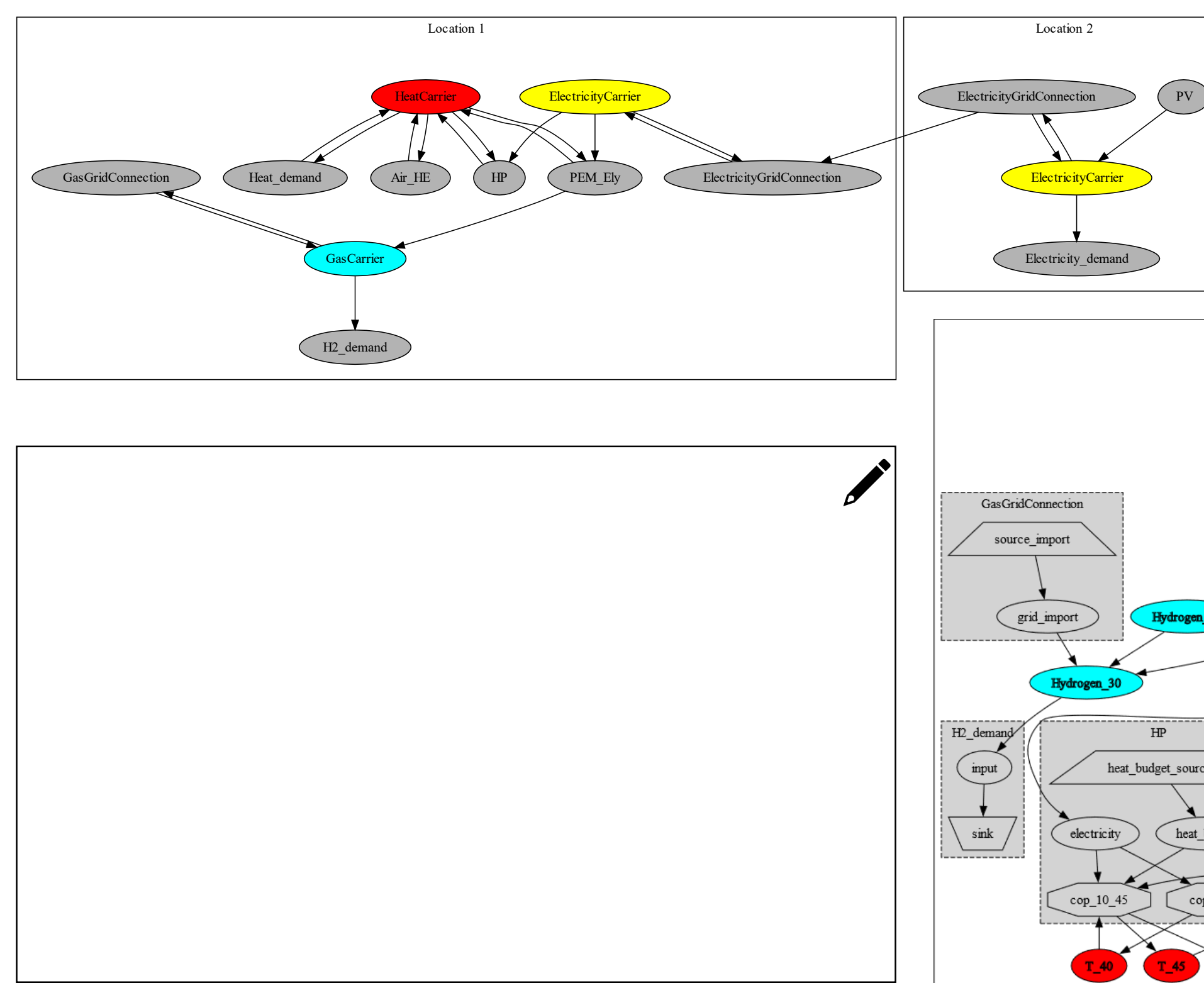
Scope

- Currently implements the sectors (*EnergyCarriers*)
 - **electricity** (energy balance)
 - **heat** (including cooling), and
 - **gases** (e.g. hydrogen, natural gas, biomethane)
- Validated models of concrete and relevant technologies for these sectors.
- Technologies can be easily instantiated using datasheet values.



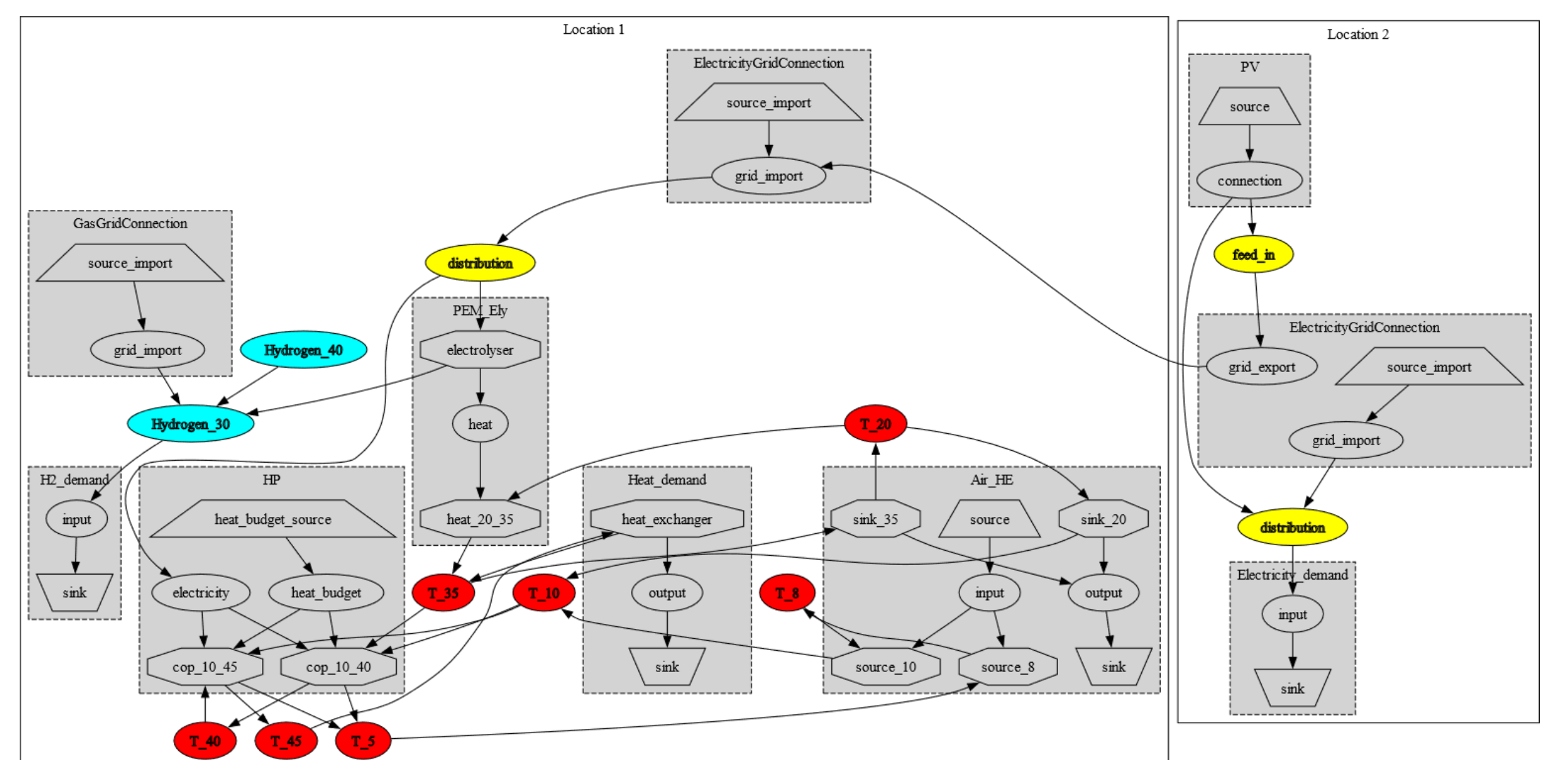
Locations and technologies

- Location as containers for components
- Represents logical units like houses
- Components connected automatically based on sector specific definitions
- Manual connections between locations
- Possibility to ignore inner structure of technologies and *EnergyCarriers*



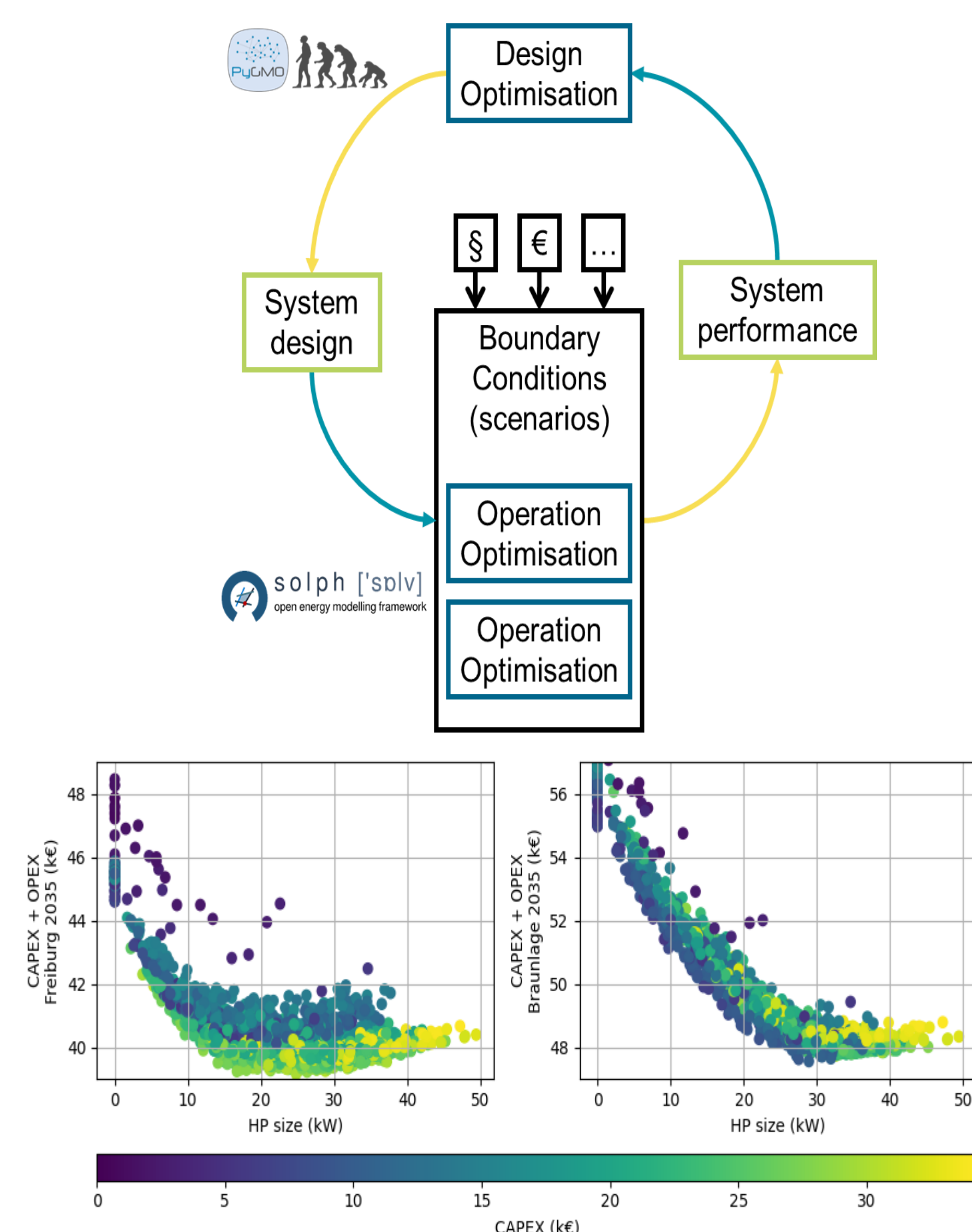
Technical Details

- Based on and compatible to *oemof.solph*
- Mixed-integer linear optimisation
- Integrable into toolchains via Python interface
- Abstract *base* classes allow for fast and modular development of new MTRESS technologies
- Upstream parts to *oemof.network*?
→ Brainstorm



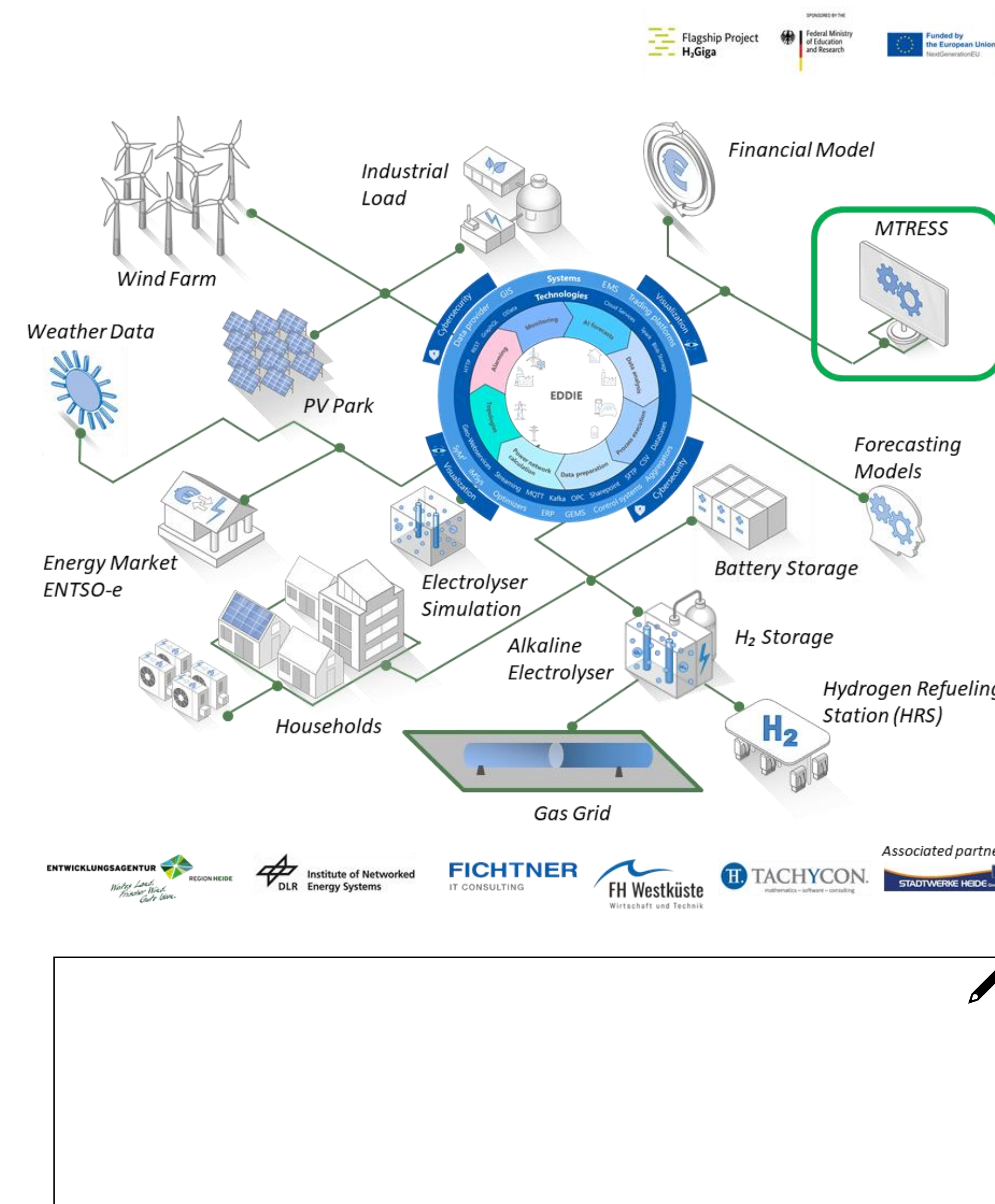
Example Toolchain

- Optimal sizing of components (Design Optimisation)
- Use a *pygmo* user defined problem to wrap MTRESS model
- Optimize for Key Performance Indicators (KPIs)
- Set (feasible) boundary conditions



Case Study

- *SYSTOGEN100* project aims to orchestrate complex hydrogen based energy systems
- Integration platform “*EDDIE*” connecting various models and data
- Schedule the operation of several components considering KPIs using MTRESS.



Brainstorm with us!

