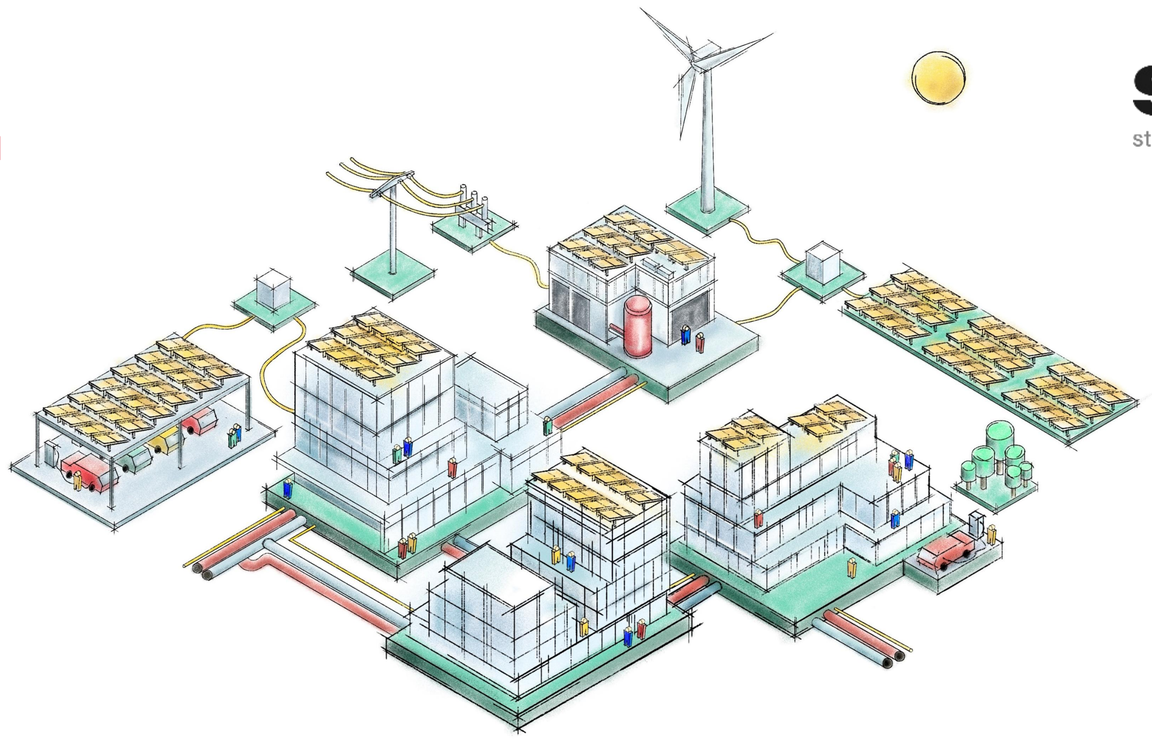
QUASI

QUARTIER SIMULATION

siz energieplus

steinbeis innovations zentrum

Digital Building INDUSTRIES



GitHub

OUR PROJECT IS OPEN-SOURCE!

FEEL FREE TO CONTACT US:

Web: **www.quasi-software.org**

Mail: info@quasi-software.org

OPEN-SOURCE TOOLBOX FOR THE SIMULATION OF ENERGY SYSTEMS

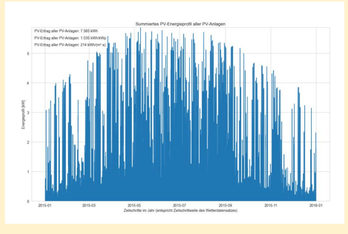
livingloads



- Objective: Realistic profiles for domestic hot water, user electricity, and e-mobility based on an AI model trained with data from the established tool LoadProfileGenerator
- Extensive validation and practical application with numerous partner organizations

Sodele

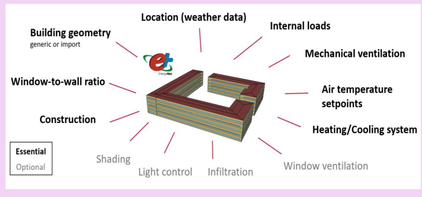
Solarsimulation denkbar leicht



- Creation of PV yield profiles using a simple or advanced interface, including a database of modules and inverters
- Validated through comparison with PV*SOL and PVGIS
- Simple import of EPW and TRY DAT weather datasets from the German Weather Service
- Based on Python-pvlib
- Excel-GUI or via CLI

GenSim

GENERISCHE GEBÄUDESIMULATION



- Thermal building simulation based on EnergyPlus™ for heating, cooling and electricity demands
- Comprehensive building typologies, including non-residential buildings
- Fast determination of energy demands through smart defaults and generic building geometry
- Excel-GUI or via CLI

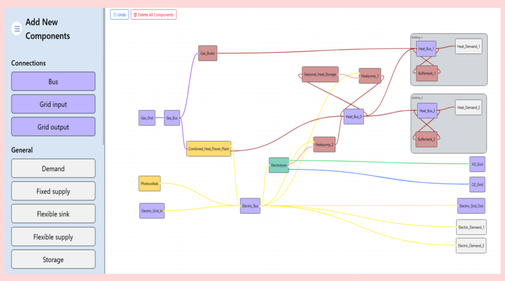
Domestic hot water
User electricity
E-Mobility

Active development!
News on http://livingloads.org

PV generation

Heating energy
Cooling energy
(User electricity)

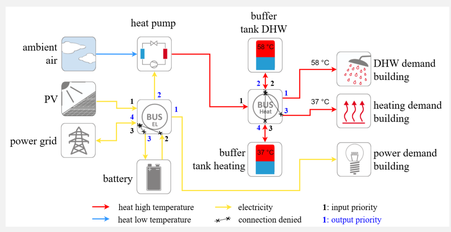
SUSI



- Web-based UI for generating of input data for ReSiE
- Co-developed with ReSiE with the goal of making all features available in both tools
- Implemented in React Flow
- Live available on: http://quasi-susi.dbi-cloud.com (**Laptop only!**)

ReSiE

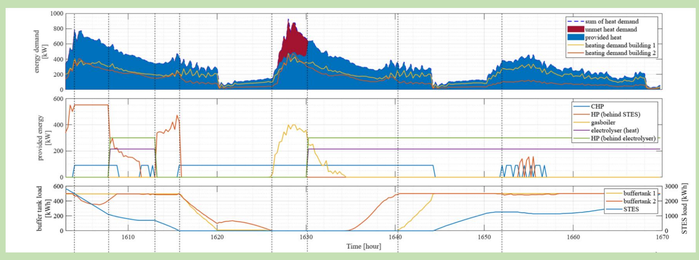
RECHENKERN FÜR DIE SIMULATION VON ENERGIESYSTEMEN

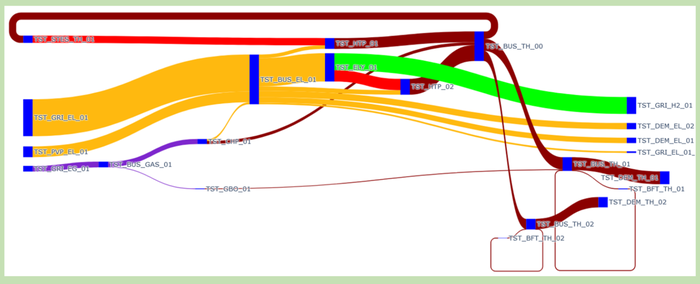


- Dynamic **nonlinear simulation of freely definable energy supply systems**
- Dynamic **control- and state-based operating strategies** enable the simulation of complex energy systems
- Included are, among others, models for heat pumps, gas boilers, combined heat and power units, electrolysers, electrode boilers, reheaters, thermal buffer storage tanks, ground-coupled thermal storage systems, batteries, geothermal probes, ground collectors, solar thermal systems
- Components have been validated against measured data and/or established simulation models
- An innovative algorithm enables **closed-form calculations without iterations** or restrictions on the complexity of component models, e.g., 2D FVM for ground-tank heat storage systems and thermal ground collectors
- Flexible time step size, including profile aggregation and segmentation
- Includes economic feasibility and GHG balance assessments, optimization calculations and sensitivity analyses (see below)
- Implementation in the high-performance programming language Julia enables fast computation

Energy flows

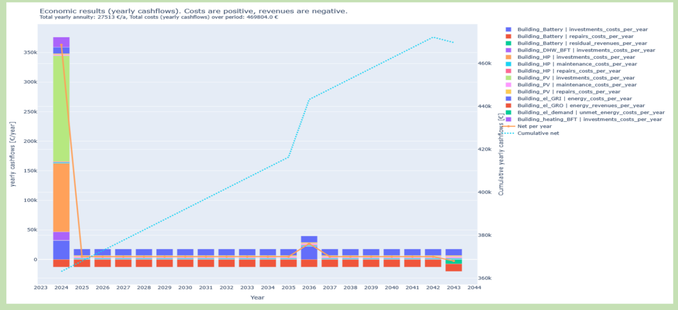
- Output of all energy flows between components and across buses as time series or aggregated as an energy flow diagram
- Output of dynamic temperatures for heat flows
- Additional component-specific outputs such as COP, part-load factor, cell voltage, thermal stratification in the storage tank, and heat propagation in the ground, etc.
- Output to CSV files and visualization in plots suitable for both rapid iteration and in-depth analysis





Costs & emissions

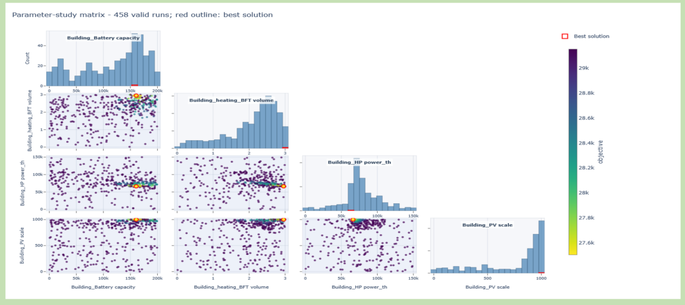
- Calculation of costs using **annuity method according to VDI 2067**
- Consideration of specific or absolute investment costs, replacement purchases, residual values, maintenance, repairs, etc., as well as dynamic costs and revenues for energy flows
- **GHG emissions balance including grey energy** initial and replacement purchases and optional credits; choice scope is flexibly configured
- Separate pricing and GHG factors for uncovered or not consumed energy quantities





Optimization & Sensitivities

- Black-Box optimization with parallel execution using a variety of algorithms, divided into global search and local refinement
- Multi-Objective optimization of any combination of parameters
- Global and local sensitivity analysis enables evaluation of found solutions
- Enables the **optimal sizing of components** regarding freely selectable objective functions, e.g., lowest cost, lowest emissions, lowest power grid consumption, etc.





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