AixLib

Aix-la-Chapelle
For compound building energy systems
from component to district level
With automated quality management

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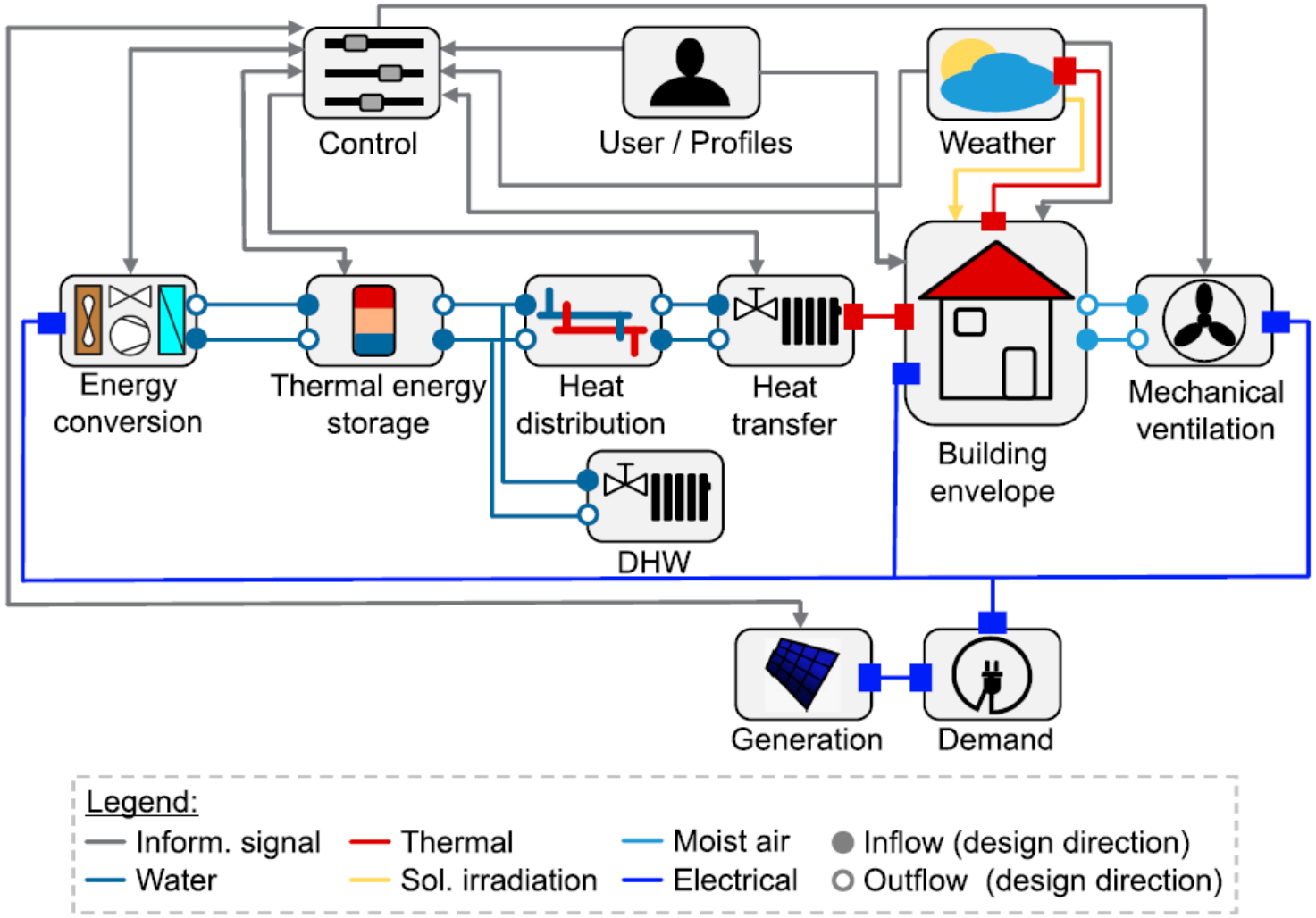
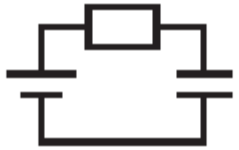
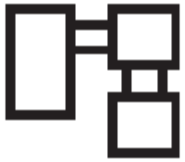
E.ON Energy Research Center
RWTH AACHEN UNIVERSITY

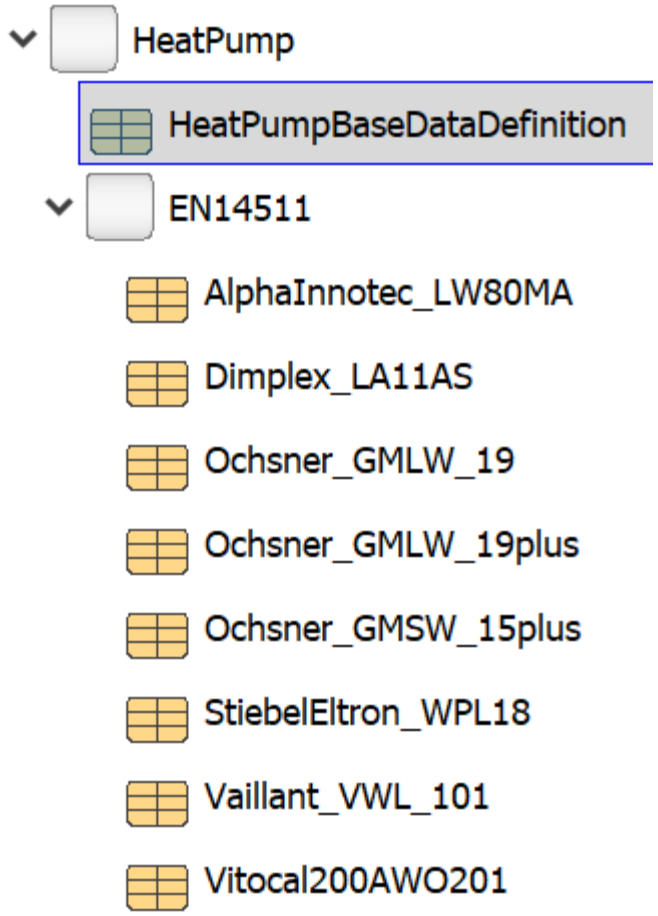
Modeling scheme: Coupled building energy systems



Detailed package structure

Airflow  • AirCurtain • AHU • MultiZone • • •	Boundary Conditions  • InternalGains • SolarGeometry • WeatherData • • •	Controls  • Discrete • HeatPump • SetPoints • • •	DataBase  • Boiler • Pipes • Pumps • • •	Electrical  • Machines • PVSystem	Fluid  • Chillers • Delays • Solar • • •
Media  • Air • Steam • Water • • •	Systems  • ModularAHU • TABS • • •	Thermal Zones  • High Order • ReducedOrder • • •	Utilities  • IO • Math • Time • • •	Types  • Azimut • Tilt • Reset	Obsolete • Year2021 • Year2022 • BaseClasses • • •

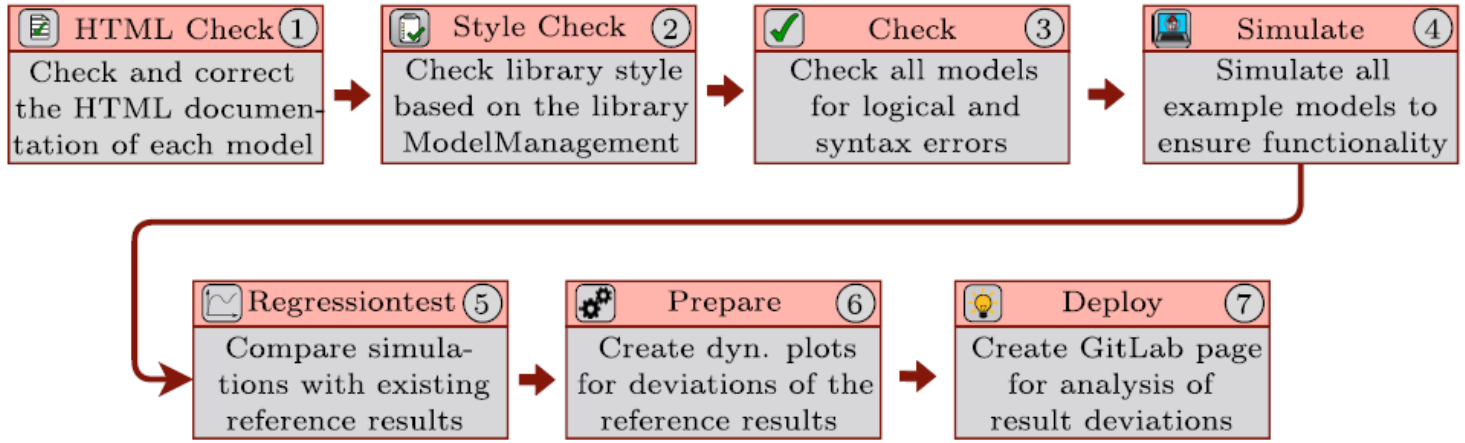
Intuitive parameterization based on manufacturer data



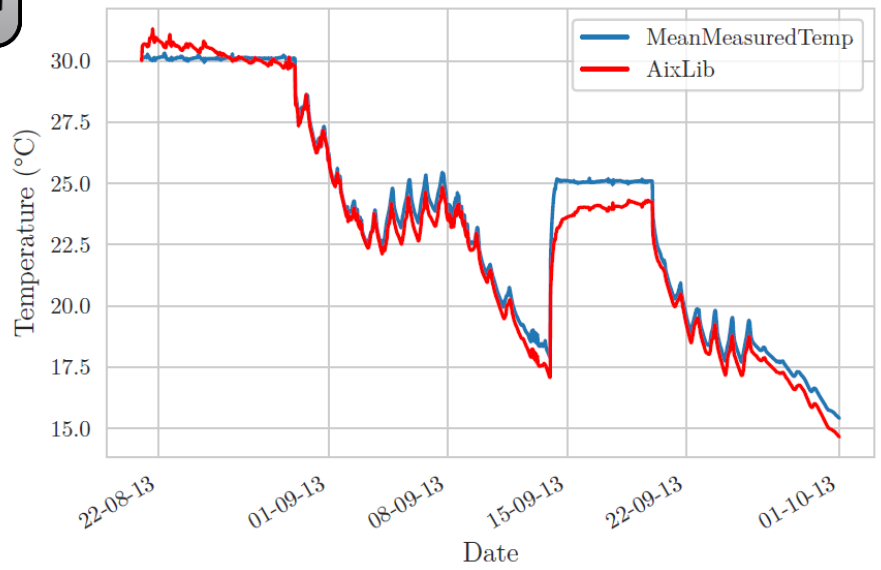

```
record HeatPumpBaseDataDefinition "Basic heat pump data"
    extends Modelica.Icons.Record;
  parameter Real tableQdot_con[:,:]
  "Heating power table; T in degC; Q_flow in W";
  parameter Real tableP_ele[:,:]
  "Electrical power table; T in degC; Q_flow in W";
  parameter Modelica.Units.SI.MassFlowRate mFlow_conNom
    "Nominal mass flow rate in condenser";
  parameter Modelica.Units.SI.MassFlowRate mFlow_evaNom
    "Nominal mass flow rate in evaporator";
  parameter Real tableUppBou[:,2]
  "Points to define upper boundary for sink temperature";
```

Output parameters[7]					
	Air temperature	Flow temperature	Output [kW]	Power input [kW]	COP [–]
RPS 120 Hz	12 °C	35 °C	24.47	6.98	3.51
		45 °C	23.79	8.23	2.89
		55 °C	23.11	9.47	2.44
	7 °C	35 °C	18.51	6.35	2.92
		45 °C	19.43	7.81	2.49
		55 °C	20.35	9.26	2.20
	2 °C	35 °C	15.39	5.91	2.60
		45 °C	15.66	7.05	2.22
		55 °C	15.92	8.18	1.95
	–7 °C	35 °C	13.99	6.03	2.32
		45 °C	14.23	7.25	1.96
		55 °C	14.47	8.46	1.71
	–15 °C	35 °C	12.05	5.99	2.01
		45 °C	11.91	7.10	1.68
		55 °C	11.76	8.20	1.43

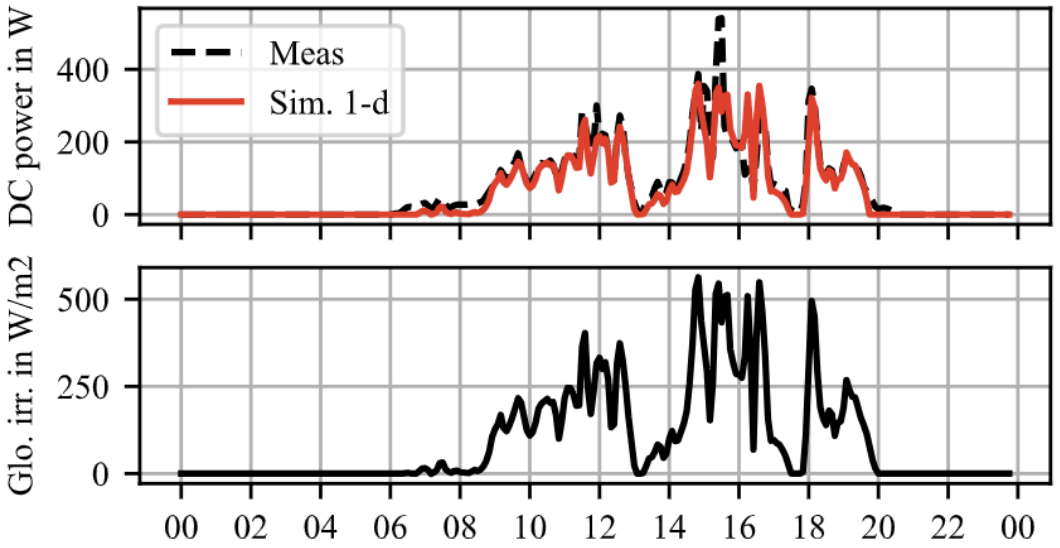
Automated quality management using CI based on validation data



Empirical validation of HOM building envelope



Empirical validation of the PV model



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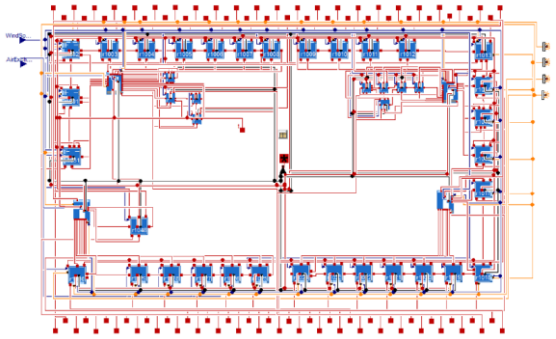
Associated open-source tools facilitating your daily life

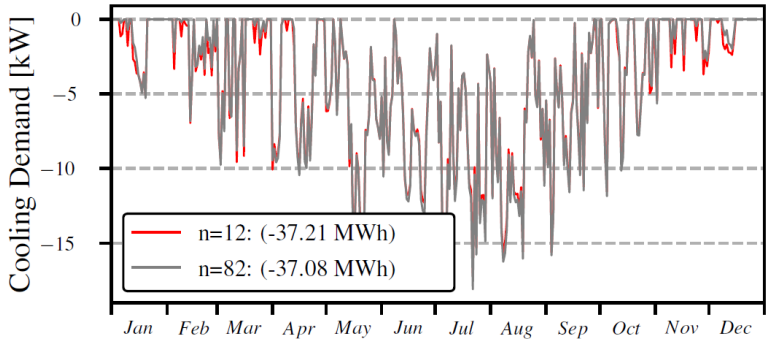
Table 1. Associated tools using or based on the *AixLib* library.

Toolname	Generative	Automation & Postprocessing
TEASER[a]	X	
uesgraphs[b]	X	
bim2sim[c]	X	
ebcpy[d]		X
AixCaliBuHa[e]		X

https://github.com/RWTH-EBC/TEASER
https://github.com/RWTH-EBC/uesgraphs
https://github.com/BIM2SIM
https://github.com/RWTH-EBC/ebcpy
https://github.com/RWTH-EBC/AixCaliBuHA

bim2sim
Automating Simulations for Better Buildings





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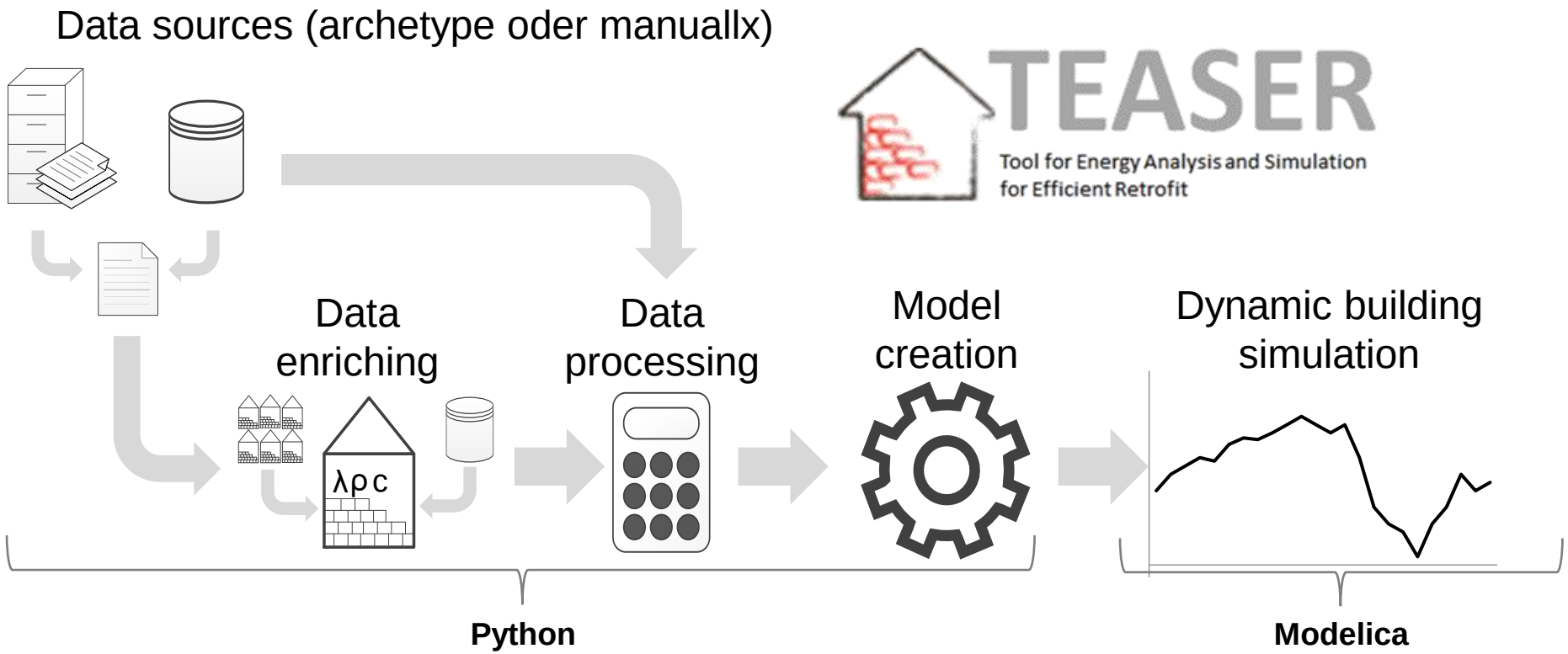

We invite you to contribute to AixLib ☺
https://github.com/RWTH-EBC/AixLib

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