



IBPSA Project 1

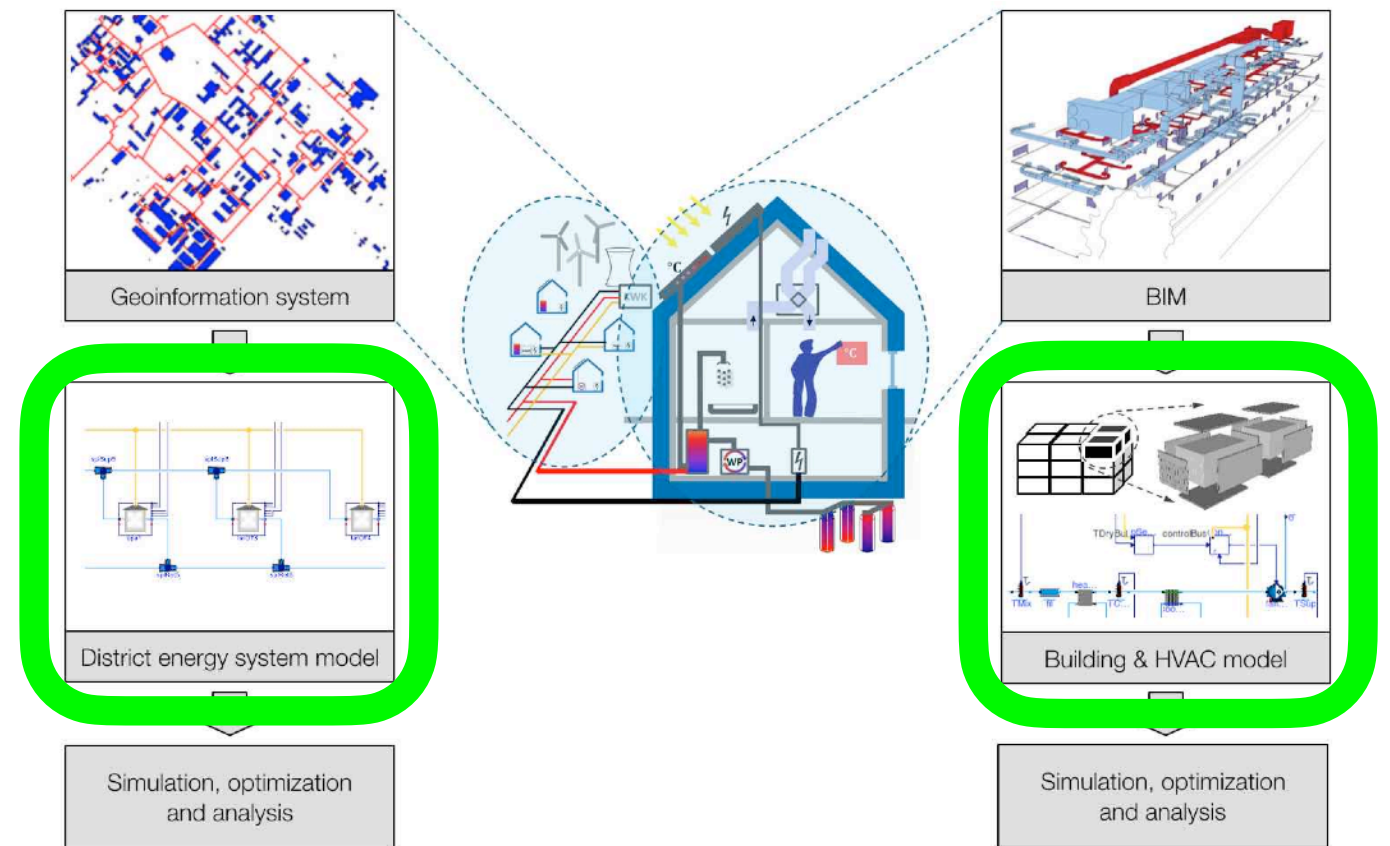
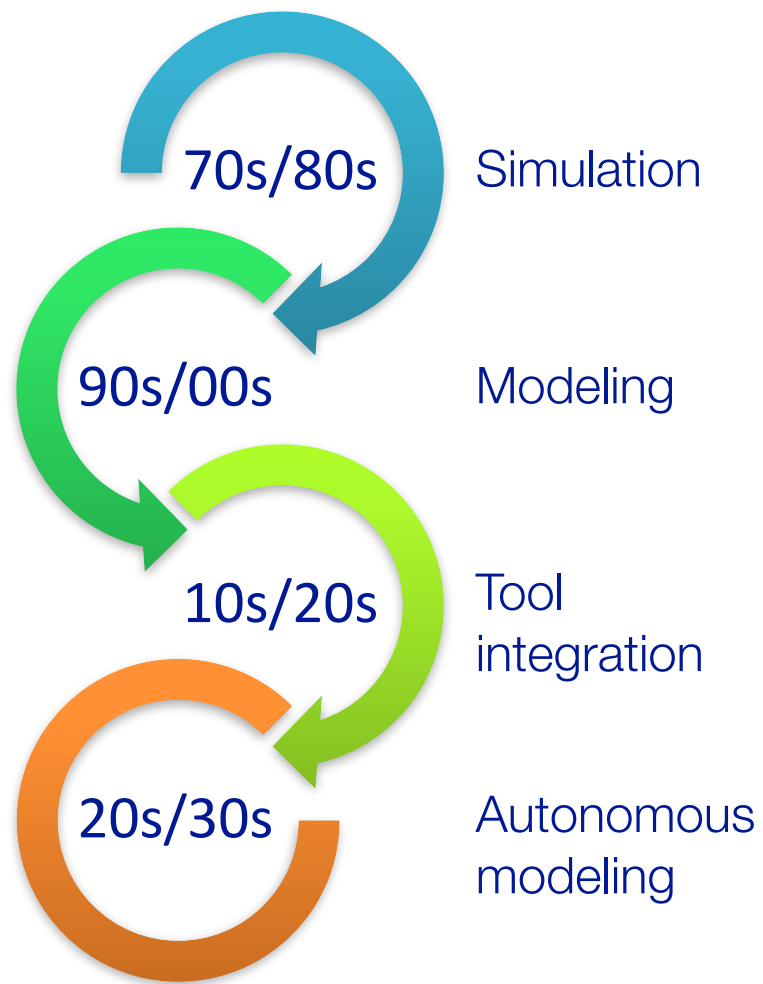
BIM/GIS and Modelica Framework
for
building and community energy system
design and operation

WP 1.1- Modelica Library for Design and Operation

May 7, 2021

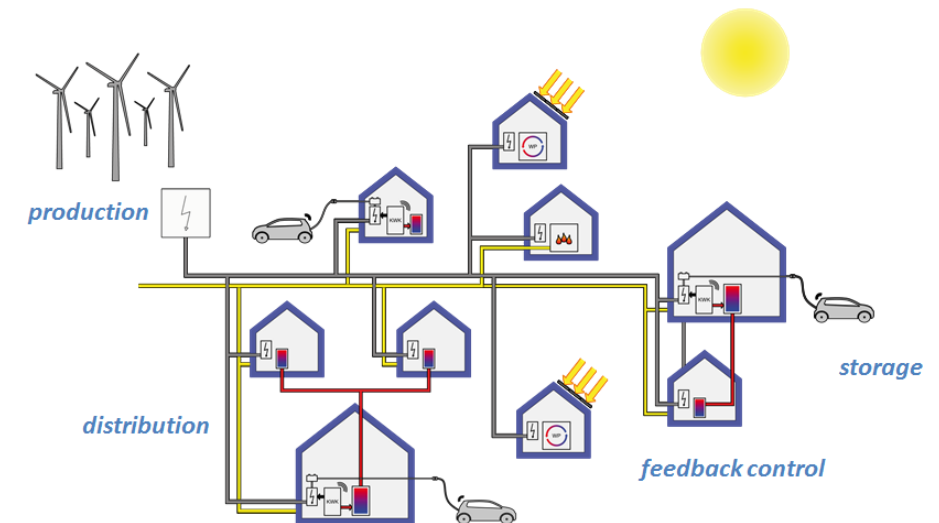
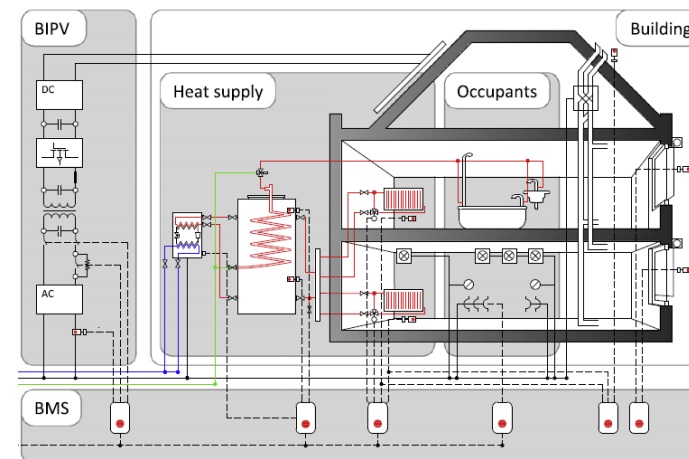
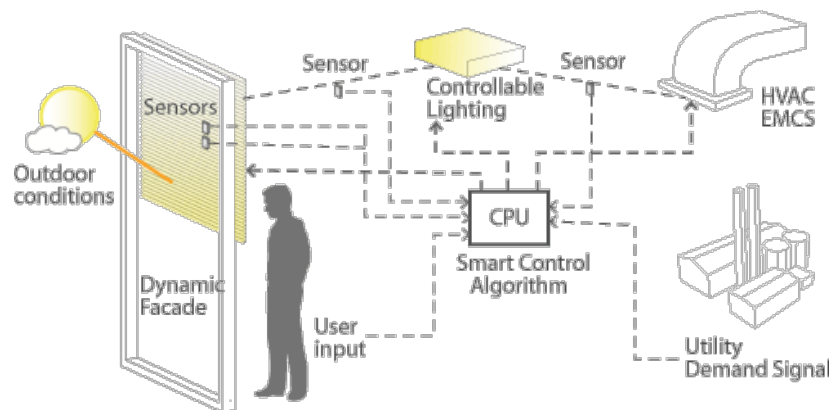
Michael Wetter

Work Package 1.1 Goal



Develop Modelica library applicable for system-level autonomous modeling.

- validated
- well documented
- state-of-the-art physics and dynamics



From controls to buildings and communities 2

Progress in last half year - Modelica IBPSA Library

Around 30 pull requests have been merged to the master

Airflow

- Implemented more efficient model for bi-directional flow through open doors, Multizone.Door{OpenOpen,DoorOperable}.
About 15% faster simulation of large system models.
<https://github.com/ibpsa/modelica-ibpsa/issues/1353>

BoundaryConditions

- Added BESTEST for weather data processing
<https://github.com/ibpsa/modelica-ibpsa/issues/1314>
and participating in validation tests organized through ASHRAE 140
- Corrected segmentation fault on Windows when reading weather files with long lines in file header
<https://github.com/ibpsa/modelica-ibpsa/issues/1432>

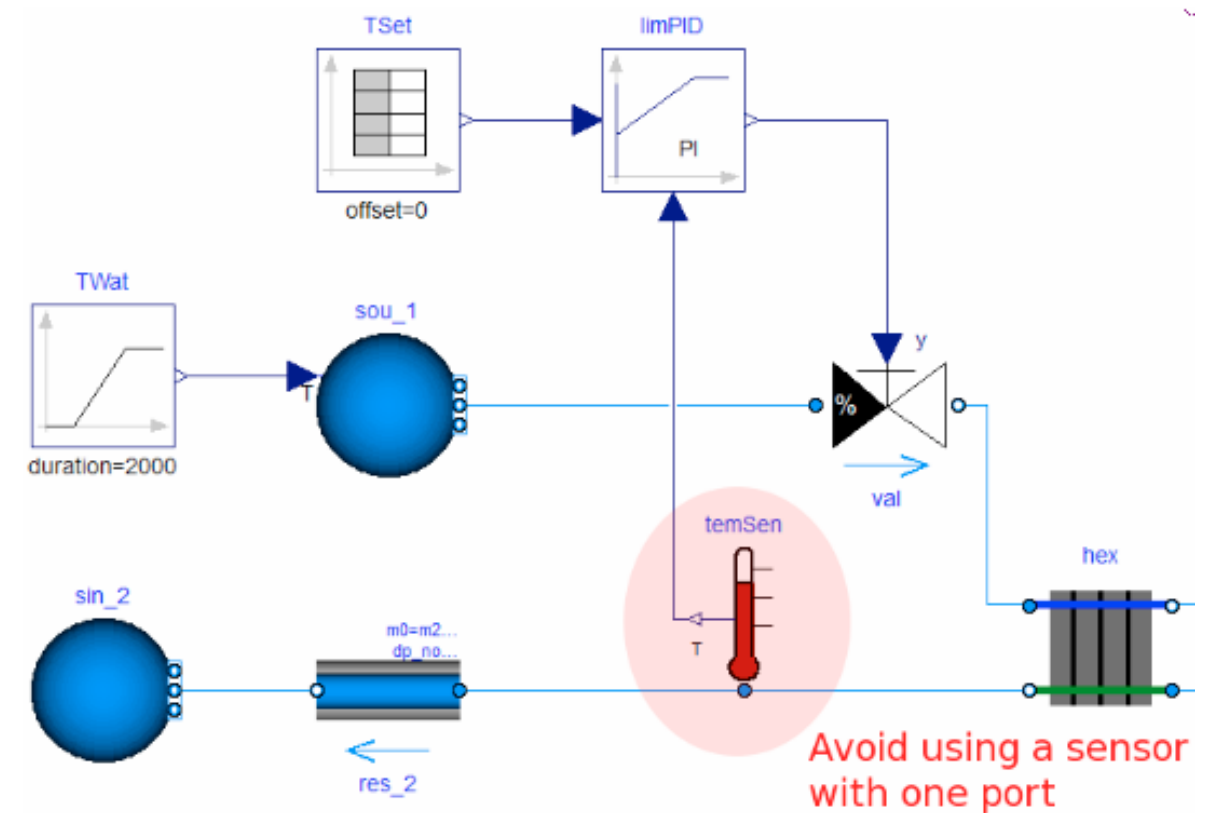
Fluid

- Added new model Valves.TwoWayButterfly
<https://github.com/ibpsa/modelica-ibpsa/pull/1441>
- In progress: Partially wet coil
<https://github.com/ibpsa/modelica-ibpsa/issues/1109>

Media

- Added new media model Antifreeze.PropyleneGlycolWater
<https://github.com/ibpsa/modelica-ibpsa/issues/1410>

Numerous smaller changes.



Progress in last half year - Modelica IBPSA Library

Testing

- CI testing
 - Updated travis — thanks to ENGIE Lab whose sponsorship allows paying for travis CI
 - Moved some tests to GitHub actions
- Tested with MSL 4.0.0, with Dymola 2021 and Dymola 2021x beta
- Other tests occur as part of our CI testing with JModelica and Optimica

OpenModelica

- LBNL and OpenModelica development team collaborate
- All models of Buildings 7.0.x, and through this likely all of IBPSA, will translate with OpenModelica by next February

Progress in last half year - BuildingsPy

14 pull requests have been merged to the master

Version 2.1.0 released on May 28, 2020

Mainly improvements for

- robustness of CI testing,
- improvements to merging and refactoring libraries and
- upcoming release that adds Optimica as a simulator.

Check for proper use of replaceable classes to be added (for Optimica).

```
from buildingspy.simulate.Optimica import Simulator
s=Simulator("IBPSA.Fluid.Sensors.Examples.TemperatureDryBulb")
s.addParameters({'TDryBul.height': 20})
s.setResultFilter(['*T'])
s.generateHtmlDiagnostics()
s.simulate()
```

Ongoing

Cooling coil

Media

- Implementation of R134a, R290, R410A, R744, and R32
<https://github.com/ibpsa/modelica-ibpsa/issues/1093>
- Implementation of steam
<https://github.com/ibpsa/modelica-ibpsa/issues/1389>

Improved fan efficiency model for low volume flow rates