



IBPSA Project 1

Modelica Buildings library

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Current activities



Spawn of EnergyPlus

- First release in Spring 2021 (as part of Modelica Buildings Library)
- Full installation package expected for fall 2021



District heating and cooling

- Template models for URBANopt (Modelica edition)



OpenBuildingControl

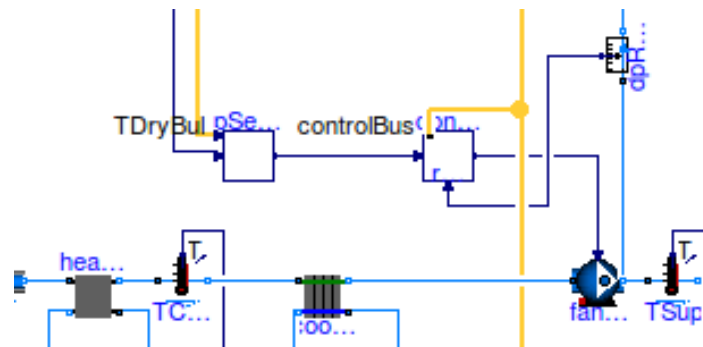
- Control description language CDL
 - Reviewed thorough ASHRAE Standard 231P (CDL)
- Ongoing
 - Update ASHRAE Guideline 36 to official guideline
 - Implement chiller plant sequences from ASHRAE RP 1711



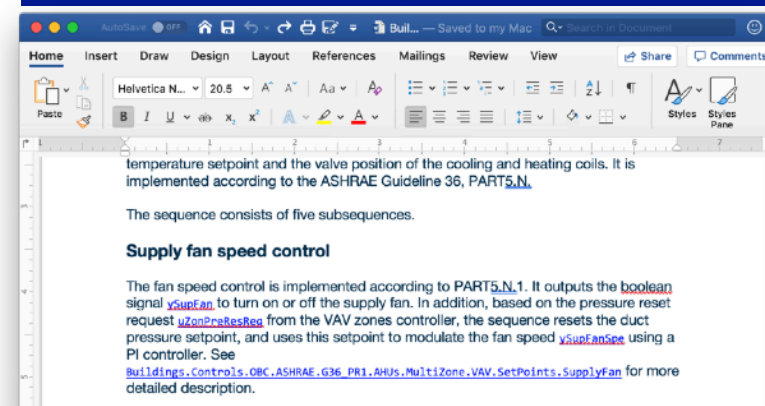
Export to BRICK prototyped through modelica-json

CDL control sequence

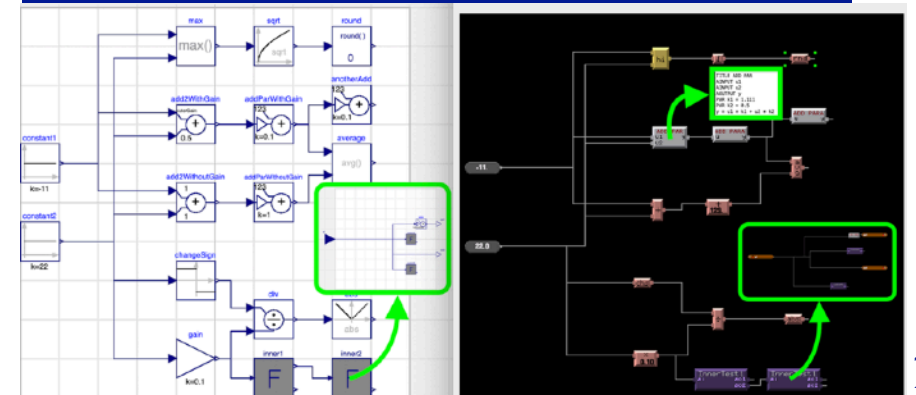
Energy simulation



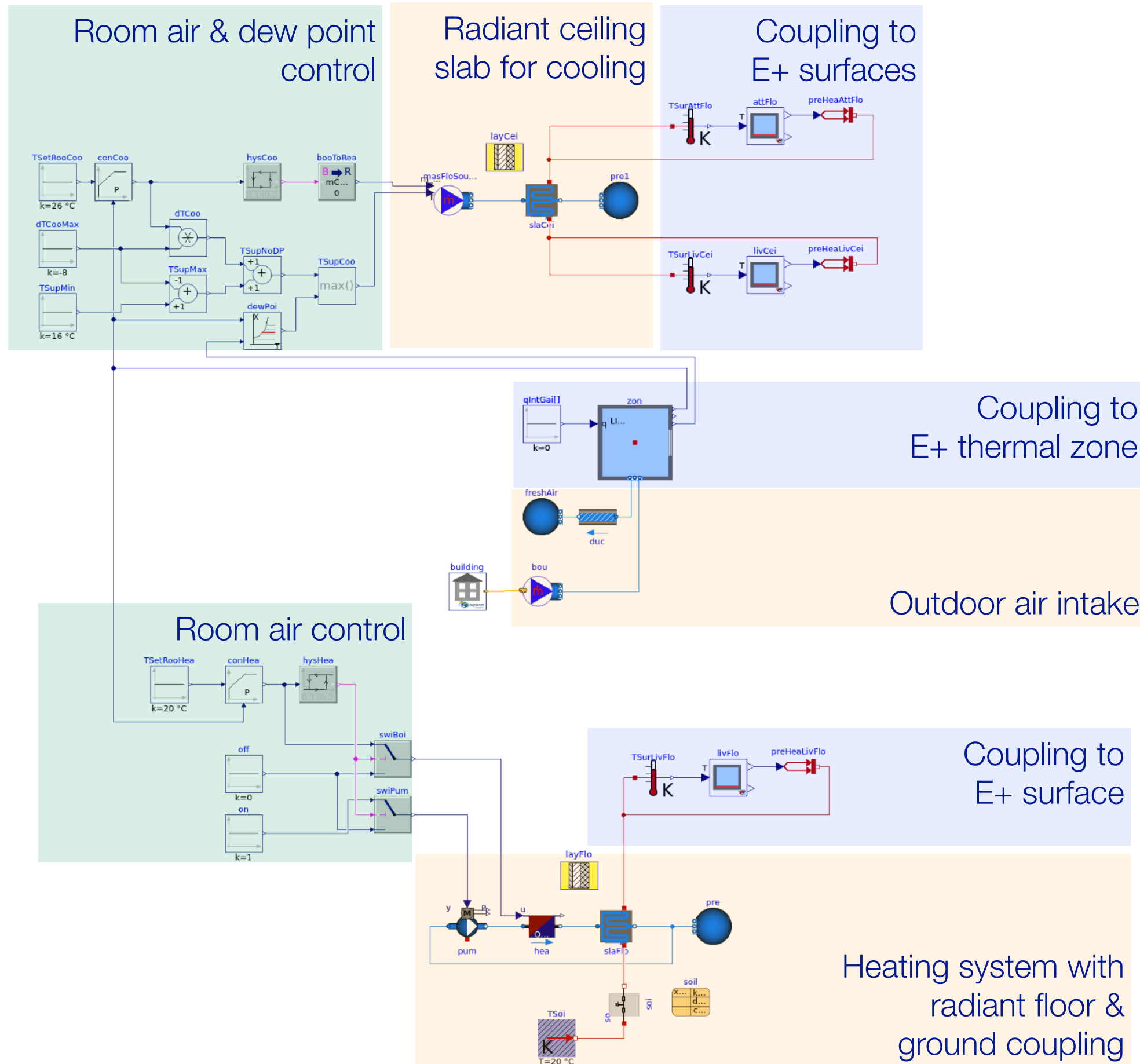
Documentation



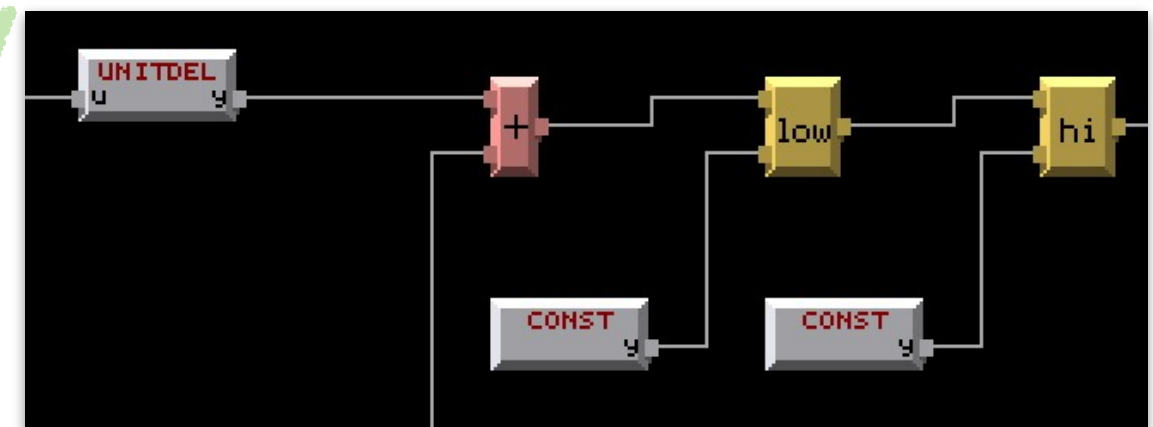
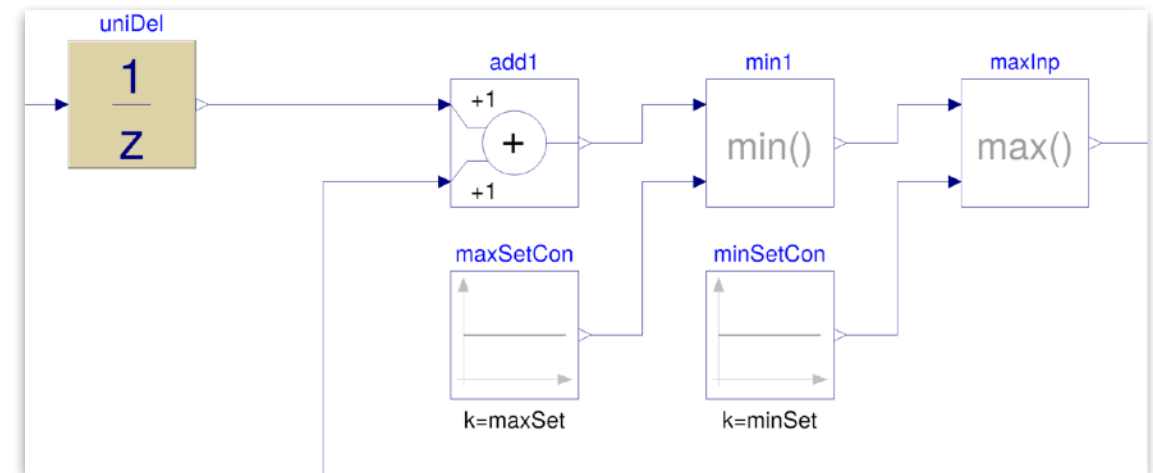
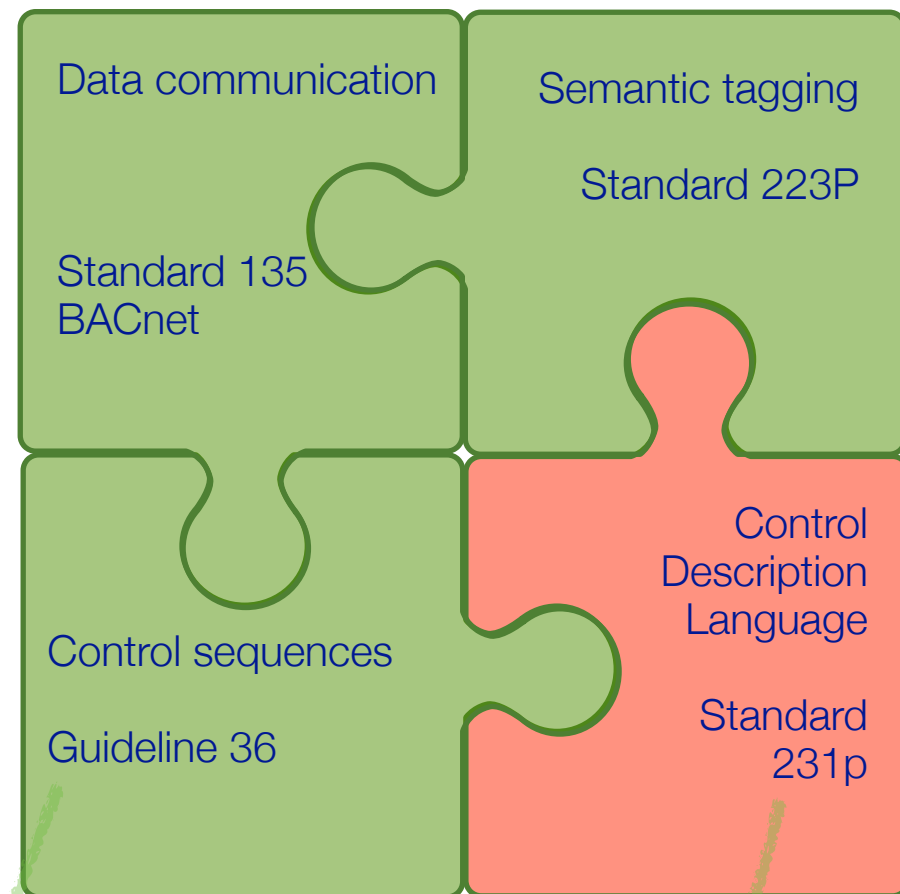
Physical execution



Simple Spawn example: Radiant system



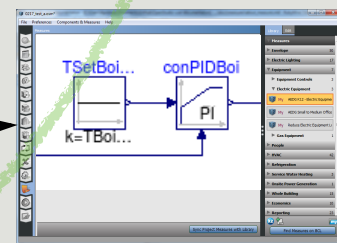
OpenBuildingControl: Digitize the control delivery process and bridging BEM and controls



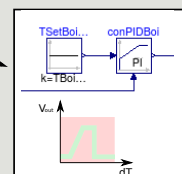
import sequence from a library, configure and test it, connected to an energy model

- ASHRAE
- G36_PR1
 - AHUs
 - Generic
 - TerminalUnits
 - Types
 - CDL

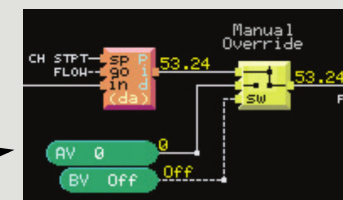
Designer



export specification & verification tests

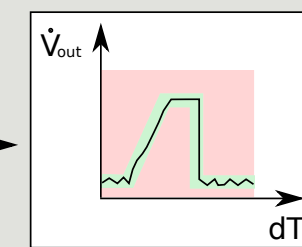
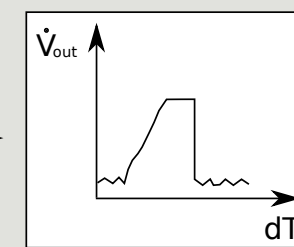


Control provider



submit and deliver controls through code generation

Commissioning agent



verify against design specification

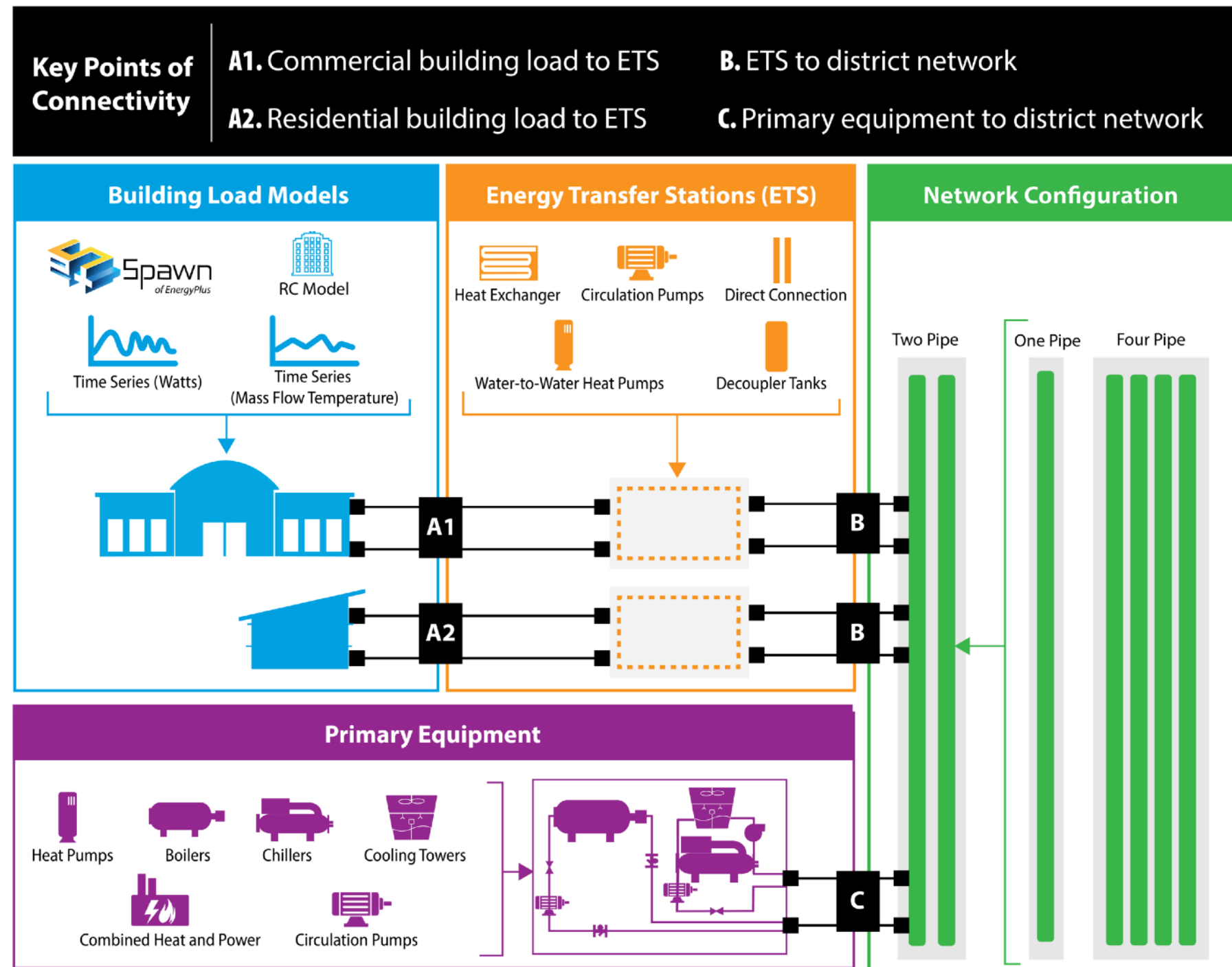
- failed
- untested
- passed

URBANopt - Modelica edition

Modeling infrastructure for district heating and cooling systems, based on:

- Modelica Buildings Library (DHC package):
Supports a growing range of systems, from legacy steam systems to modern ambient loop networks with distributed heat pumps.
- URBANopt GeoJSON schema:
Augments the standard GeoJSON schema with non-geometric properties to parameterize building and HVAC system models.
- GeoJSON Modelica Translator:
Generates a Modelica model ready to simulate, based on GeoJSON.

Provides the means to interface with GIS systems and third-party user-facing modeling tools.



Note that the location of the primary equipment can be centralized or distributed, and that not all primary equipment component models or network configurations are represented in the diagram.

See <https://github.com/urbanopt/geojson-modelica-translator>

Major new models (other than those that were added in IBPSA)

- Cooling coil (Buildings.Fluid.HeatExchangers.WetCoilEffectivenessNTU)
- Buildings.Experimental.DHC
- Buildings.ThermalZones.EnergyPlus

Current activities

Modeling

- Templates for HVAC systems (buildings and districts, including controls)
- Heat pump model similar to EnergyPlus (in development)

Solver

- QSS

Tools

- Linkage - control sequence selection and configuration tool
- Work on coverage with OpenModelica

<https://github.com/lbl-srg/funnel>

<https://github.com/lbl-srg/modelica-json>