Emulators - Candidates for BOP-TEST Benchmarks

Please add columns when needed.

We only consider Modelica models here.

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| **N°** | **Short description (building type, size, …)** | **number of zones**  **number of states**  **level of detail** | **energy system** | **control** | **proposed by**  **(name and affiliation)** |
| 1 | Office building 10000m2, Luxembourg, measurement data available,  extremely well insulated, triple glazing | 32 zones | solar collector, pellet furnace, CCA, advanced AHU, heat pumps, borefield, thermal storage, frequency controlled pumps and fans | RBC | Filip Jorissen - KU Leuven |
| 2 | One floor of a DOE prototypical office building in Chicago. Typical US insulation standard. See <http://simulationresearch.lbl.gov/modelica/releases/v5.0.0/help/Buildings_Examples_VAVReheat.html> | 5 zones. | VAV system, currently with ideal heating and cooling plant. | Conventional control, two variants, one based on ASHRAE Guideline 36, and one based on an earlier ASHRAE publication. | Michael Wetter - LBNL |
| 3 | Individual house 100 m2 (scalable with a single parameter) for different construction periods (4 construction periods modeled, major differences consist in the variation of the walls insulation and heating system characteristics: setpoints/schedules, radiators inertia, size and nominal water temperature, control system) | 8 zones (1 zone for each room with T/dp driven airflow between them (doors) + 2 zones for non-heated zones : attic + garage)  Schedules for occupancy, temperature setpoints, ventilation and gains for each zone | Hydronic system : gas heating boiler + pipes + radiators | One heating controller (PI) in one zone of the building, which is driving the heating boiler. The control of zones’ radiators is done with thermostatic valves (except the zone where the heating controller is installed) | Valentin Gavan – ENGIE Lab |
| 4 | Idem 3 | Idem 3 | Hydronic system : gas heating boiler + pipes + radiators + **VRV** (split system for cooling and heating with performance map)) for the main zone of the house | Idem 3 | Valentin Gavan – ENGIE Lab |
| 5 | Idem 3 | Idem 3 | Hydronic system : gas heating boiler + pipes + radiators + **gas stove** (ideal heating system with performance map) for the main zone of the house | Idem 3 | Valentin Gavan – ENGIE Lab |
| 6 | Idem 3 | Idem 3 | Hydronic system : gas heating boiler + pipes + **radiant ceiling** (radiant slab model was adapted) | Idem 3 | Valentin Gavan – ENGIE Lab |
| 7 | Idem 3 | Idem 3 | Electric heaters | Idem 3 | Valentin Gavan – ENGIE Lab |
| 8 | Idem 3 | 1 zone |  | Idem 3 | Valentin Gavan – ENGIE Lab |
| 9 | Individual house 70, 110, 145 m2 for 4 different construction periods | 1 zone | Hydronic system : gas heating boiler (with performance map) + pipes + radiators (high/low temperature f° of the construction period): Tankless gas DHW boiler (same as for heating – control integrated for DHW priority) or DHW + storage tank (different volumes) | Idem 3 +  DHW priority if heating and hot water demand | Valentin Gavan – ENGIE Lab |
| 10 | 1 Apartment 40, 65, 90 m2 in a collective building for 4 different construction periods | 1 zone | Hydronic system : gas heating boiler (with performance map) + pipes + radiators (high/low temperature f° of the construction period)  Tankless gas DHW boiler (same as for heating – control integrated for DHW priority) | Idem 3 +  DHW priority if heating and hot water demand | Valentin Gavan – ENGIE Lab |
| 11 | Office building 3500 m2 (scalable with a single parameter) for different construction periods (4 construction periods modeled, major differences consist in the variation of the walls insulation and heating system characteristics: setpoints/schedules, radiators inertia, size and nominal water temperature, control system)  <https://www.conftool.pro/bs2017/index.php/BS2017_HVAC_07_3_2067_Leo_2017-04-19_06-35_a.pdf?page=downloadPaper&filename=BS2017_HVAC_07_3_2067_Leo_2017-04-19_06-35_a.pdf&form_id=2067&form_version=final> | 8 zones (5 floors)  Schedules for occupancy, temperature setpoints, ventilation and gains for each zone | Hydronic system : gas micro-CHP (base) + gas heating boiler (peak) + hot water storage + pipes + radiators | Heating controller (PI) in every zone of the building. The plant is turned ON if one zone needs heating. The control of zones’ radiators is done with thermostatic valves. | Valentin Gavan – ENGIE Lab |
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