IBPSA Project 2: BOPTEST
Task 3 Emulator development
Virtual Progress Meeting
03/28/2024
6:00 AM –7:00 AM U.S. Pacific Time

Participation

	Name	Affiliation
1	David Blum	LBNL
1	Ettore Zanetti	
1	Esther Borkowski	ETH Zurich
1	Davide Fop	Politecnico di Torino
1	Kun Zhang	École de Technologie Supérieure (ÉTS)
1	Alireza Yaghoubi	
1	Matthias Van Hove	Danmarks Tekniske Universitet
1	Rachid Kidari	Moulay Ismail University in Morocco

Minutes:

Current Emulator developments

- Multizone Hydronic Simple [Bart, Iago]

  Unit tests are passing. However as highlighted in issue465, problems were found with control behavior, with significant simultaneous heating and cooling every morning. Fancoil would open the cooling coil and heating coil at the same time. AHU supplying ventilation, problem with bypass and weird temperature. Waiting for input from Iago.

- Large Office [Yan, Xing] –

  Xing is addressing Kun's review comments and he is done with most of them. Xing was able to simulate a full year with no problems and not able to reproduce end of year simulation error. Kun will run simulation on windows instead of Linux to see if error persists.

- ADRENALIN Emulators and general update [Harald] – no update.
- DOPTEST [Javier]

  Lieve mentioned in Task 2 meeting that new PhD students are taking on the project

- Twozone Apartment Hydronic [Ettore]

  Laura sent updated BOPTEST model to Ettore, he will take care of updating the model

New emulators proposals
• **[Matthias Van Hove] Senior high school in Denmark**. L shape building 30x3 m on 3 levels for a total of 1500m2 37 zones (10 of which are classrooms). The HVAC is made up of radiators and air heating connected to a district system. Classrooms have radiators and an air system, while the other rooms have only radiators. No storage or renewable sources are present. There is a Modelica model implementation currently available that uses IDEAS library (it models all the 37 zones and runs 1 year simulation in a couple of hours)
• **[Matthias Van Hove] Single family house in Denmark**. 8x14 m with 12 rooms on 2 levels for a total of 256m2. Brick building with 3cm of insulation and double pane windows. HVAC currently consists of a boiler with radiators, to be refurbished using an air source heat pump and ventilation system. No storage or renewable sources are present. The model is currently implemented in Modelica using the IDEAS library.
• **[Kun Zhang] K-12 school in Canada.** Building data should be available from Canadian sources. If this is not the case archetype from DOE will be used and adapted to Cananadian building standard and HVAC. Electrical boilers/Heat pumps with radiators for external zones and VAV systems for internal zones. Novel brick storage system with electrical heating (up to 800C) will be tested. The model will be developed in SPAWN and has a total of 25 zones.

Discussion summary:
- Dave proposes to have a more detailed presentation for each potential new emulator. Matthias and Kun agreed to make a presentation for the emulators that will be carried out in one of the next meetings (timeline TBD)
- Question asked: what are the requirements for a new BOPTEST core emulator?
  Answer summary:
    - Novelty with respect to existing emulators (different building, climate, technology used)
    - Large community interest
    - Fidelity (envelope and HVAC control signals), no simplified building models
    - Storage and renewable integration
    - District level models