

IBPSA Project 2: BOPTEST

Expert Meeting

October 12, 2023
Aachen, Germany
8:30 – 11:00 AM Local Time

Location (in-person only)

Energy Research Center, Mathieustraße 10, 50274 Aachen, Germany:
<https://goo.gl/maps/5kYKHy5eD4xbqoA87>

Rooms 00.17 up to 00.21.

Participation

Name	Organization
Bart Merema	DeltaQ
David Blum	LBNL
Davide Fop	Politecnico di Torino
Ettore Zanetti	LBNL
Fabian Wüllhorst	RWTH Aachen University
Filip Jorissen	Builtwins bv
Harald Taxt Walnum	SINTEF AS
Iago Cupeiro	DeltaQ, Cupeiro Sinte
Javier Arroyo	KU Leuven
Jelger Jansen	KU Leuven
Konstantin Filonenko	DTU
Lieve Helsen	KU Leuven - EnergyVille
Luis Mariano de Alejandro	LTX Simulation
Matthias Van Hove	DTU
Michael Wetter	LBNL
Patrick Henkel	RWTH Aachen University
Rossella Alesci	Politecnico di Milano

Total: 17

Agenda and Notes

Introductions (8:30 - 8:45, 15 min)

- See participant list

Project Introduction and Status (8:45-9:00, 15 min)

- See presentation by Dave
- Advise to use IBPSA Project 2 as a leverage for other projects.

Test Case Development Status (9:00-9:45, 45 min)

- Multizone Hydronic Simple [Bart Merema, Iago Cupeiro]
 - Iago overviewed the model
 - Javier already reviewed
 - Needs before merge:
 - Update to latest IDEAS version. Need to fix problem with expandable connector for weather bus. But also wait for IDEAS updates and release happening soon:
 - Internal airflow – should be simple to “turn on” in test case model
 - Merge latest IBPSA Modelica Library
 - Change heat plant to heat pump or add heat pump in addition to boiler?
 - Yes, since will be common in future. Explore adding in addition to boiler.
 - Considering also version 2 of model with variable airflow, but better not to wait for release and also want to guard against too many updates.
 - Other notes:
 - Would be good to update all test case models to latest Modelica libraries. Should be done but will take some time do.
 - Can change PID parameters in test cases? Not now. Could write own PID. Consider for future.
- ADRENALIN Emulators [Harald Walnum]
 - Two emulators based on existing emulators but redesigned a bit
 - Single zone commercial hydronic – addressing issues with infiltration, valves, etc which were identified before too, which would be good to update test case in repository once competition is over.
 - Boost BOPTEST trials by competitions (cfr CityLearn)
 - Is the test case review process good enough? How to improve such that issues are corrected upfront?
 - Do a better job of stress-testing models with external controllers: As MPC (or advanced) controllers? Or as stress-tests which are rule-based and in some way procedural. MPC for every test case during review is high overhead on review process. Procedural stress test might be more practical. Further discussion warranted to improve process.

- Large Office and FRP [David Blum]
 - Multizone Office Air Simple [PNNL]:
 - BOPTTEST-ready and been tested: PR #569
 - Currently under review by Kun Zhang and ongoing.
 - Flexible Research Platform [ORNL]
 - 10-zone commercial building research facility on ORNL campus.
 - Highly instrumented and model being calibrated to envelope and system measurements.
 - Plan is to continue calibration, make BOPTTEST ready, and for IBPSA review by Dec 31, 2023.
 - DOPTTEST [Javier Arroyo]
 - Javier overviewed DOPTTEST development and issues related to extension of BOPTTEST. See slides.
 - CityLearn has no detailed emulators, linear pricing and Gym interface, rather urban scale, RL algorithms, OpenAI-Gym
 - KPI needed warranted for social welfare?
 - See a bottleneck is compiler - using OM, but currently having FMUs with OpenModelica is difficult.
 - Simulation in BOPTTEST took $\sim < 3$ min for about 10 days
 - Events come from e.g. pricing changes, DHW – suggestion for using discrete time samplers which may help.
 - Use openIPSL? Probably don't need to with physics in IBPSA Modelica.
 - Buildings grid components are now in IBPSA Library as well
 - Outlook
 - Making individual buildings price reactive in Modelica model so researchers can overwrite pricing to expect some change in the building – not done yet, ongoing.
 - KPIs for district - Right now each agent is aggregated in KPIs, but would be good to know each bill for individual building – this functionality may need to add/modify new parameters in read block.
 - Belonging to same repository of BOPTTEST, or fork, or separate repository?
 - So far, largely additions. Might conflict what is needed for BOPTTEST purpose.
 - But probably better to have in same repo, especially for maintenance.
 - Others working in district? Jelger, Konstantin, Davide (might be interested).

Trials by Participants (9:45-10:00, 15 min)

- How can we boost trials by participants? - Dashboard, competitions.

Break (10:00-10:10, 10 min)

Software (10:10-10:30, 20 min)

- Repository refactoring – no time, skipped.

Outreach and Dissemination (10:30-10:45, 15 min)

- Dashboard
 - Dave overviewed what's there now at dashboard.boptest.net
 - Not enough funding from DOE to subcontract work for updates, Kyle will have to do. If possible, add subcontracting for BOPTTEST Dashboard (and OpenModelica) to project budgets.
 - What are some priorities the group sees?
 - Add new KPIs not there
 - Reduce decimal places shown
 - KPI units shown not right (e.g. not per m^2 or per zone)
 - Brand the dashboard with IBPSA Project 2
 - For detailed results showing KPI ranges, use “plotly parallel coordinates” to be able to filter tests on KPI ranges (using a slider) while seeing relationship with other tests.
 - Can add reminders to upload results? Maybe in command line message when starting or finishing test.

In-Person Kickoff meeting planning (10:45-11:00, 15 min)

- First plan was to co-locate with IBPSA SimBuild 2024 in Denver CO May 21-23 (Tue – Thu).
 - Have not heard back from Carrie on room reservation possibilities. Need to find out cost too.
 - Lieve can't make it.
- Another option is hold at American Modelica Conference October 14-16, 2024 Connecticut, USA (Mon-Wed)
 - Likely when next Modelica Working Group meeting would be. Could hold Project 2 together with that.
 - Consider 1.5 days with parallel sessions to allow people to catch flights.
 - If critical mass at SimBuild 2024, hold concentrated workshop there too.