

## IBPSA Project 2: BOPTEST Virtual Progress Meeting

12/12/2023  
10:30 AM – 12:00 PM U.S. Eastern Time

### Participation

	Name	Affiliation
1	Lieve Helsen	KU Leuven
1	Javier Arroyo	
1	Jelger Jansen	
	Filip Jorissen	Builtwins
1	David Blum	LBNL
	Michael Wetter	
	Christoph Gehbauer	
1	Ettore Zanetti	
	Zhe (Walter) Wang	Hong Kong University of Science and Technology
	Dan Wang	
	Wanfu Zheng	
	Valentin Gavan	ENGIE Lab
	Piljae Im	ORNL
	Yeonjin Bae	
	Sen Huang	
	Yan Chen	PNNL
	Xing Lu	
	Draguna Vrabie	
	Laura Zabala	R2M
	Roel De Coninck	DeltaQ
1	Iago Cuepero	
1	Bart Merema	
1	Harald Taxt Walnum	SINTEF
	Gaurav Chaudhary	NTNU Norway
	Esther Borkowski	ETH Zurich
	Kyle Benne	NREL
1	Matt Robinson	University of Colorado-Boulder
	Patrick Henkel	
	Fabian Wullhorst	
	Laura Maier	
1	Peder Bacher	DTU
	Konstantin Filonenko	
	Sicheng (James) Zhan	National University Singapore
	Rossella Alesci	Politecnico di Milano
	Davide Fop	Politecnico di Torino
	Justin Prince	Arup
	Xu Han	Harvard University, University of Kansas
	Zheng Oneill	Texas A&M University
1	Mingzhe Liu	
	Kun Zhang	École de Technologie Supérieure (ÉTS)
	Xuezheng Wang	Syracuse University
1	David Wolfle	FZI

**Total: 12**

## Agenda (timing is approximate)

### 1. Project Administration (~ 0:00)

- In-Person Meeting at IBPSA USA SimBuild 2024 in Denver CO May 21-23 – Dave will send out poll for interest and make request for space provided by conference, they offered 4-hour meeting space.
- Task leader meeting held to discuss Project structure and initiatives moving forward.
  - i. Each task will begin own initiatives and establish task-specific meetings where more breadth and depth can be covered, also by more participants.
  - ii. Task meetings will likely be monthly for Tasks 2 and 3, Task 1 more on an as-needed basis, Task 4 will organize workshop-style meetings for participants to present and discuss results. Look for task leaders to start setting up meetings.
  - iii. There will still be monthly Project-level meetings, but will primarily be for updates for each task and coordination among tasks.
- No request for any submittals by IBPSA at this time.

### 2. Emulators (~0:15)

- Multizone Hydronic Simple [Bart, Iago]
  - i. Iago added heat pump and updated documentation. Did it in a way so can choose before compilation whether want heat pump or boiler. For BOPTEST, use heat pump. Also updated libraries and merged latest BOPTEST master.
  - ii. Compilation issue with expandable connector update in latest IDEAS, not supported by OCT nor OM. But was able to compile with commit before that which implements expandable connector (with OCT 1.32).
    - 1. Jelger created IDEAS branch “BOPTEST” for time being that includes other changes on master except expandable connector.
  - iii. Interzonal air exchange model being implemented in IDEAS
    - 1. Jelger asked Klas about whether he thinks would impact emulator model, will likely have answer this week. 15 m high space may make results dependent on model.
    - 2. Implementation in IDEAS will likely take another couple of weeks at least, but also needs validation with CONTAM. So likely 2-3 months before ready.
  - iv. Dave tried to compile with OCT 1.43 and failed (both IDEAS master and “BOPTEST” branch). Also failed with Dymola 2023x and OpenModelica 1.23-dev.
    - 1. Jelger can try to solve the issues in IDEAS, Iago mentions possible pedantic flag in OCT? Dave to report OCT and Dymola issues to IDEAS so can be addressed if possible within IDEAS (Jelger to help).
  - v. Next steps: Solve compilation errors reported by Dave and use IDEAS “BOPTEST” branch to move forward with emulator release (Jelger/Dave/Iago). Support for compilation by OCT or OM with

expandable connector and interzonal airflow exchange will take more time and will be addressed in an update when possible.

- Large Office [Yan, Xing] –
  - i. From before: Primary comments being addressed: Xing implementing infiltration model (schedule based) and Co2 measurements for KPIs.
  - ii. From before: Dave to check CO2 calculation to see why testcase was running just fine
  - iii. From Dave: In separate meeting, Xing mentioned updating chiller plant and boiler plant sequences to latest ASHRAE Guideline 36.
- ADRENALIN Emulators and general update [Harald] – no update.
- DOPTEST [Javier]
  - i. Working on adding EV modeling and making heat pump responsive to prices. See framework development items below.
- Twozone Apartment Hydronic [Ettore] – no update.
- Ettore mentions for new IBPSA Project-supported test cases to be included and maintained in repo, suggestion to have application form and process. Lieve agrees there should be a justification process. Ettore to draft document template/questions and share within group for comment and feedback.

### 3. Software (~0:35)

- Weather Forecast Uncertainty [Laura and Zhe]
  - i. Dave, Zhe, Laura, Wanfu, Peder met to discuss next steps on addressing critical review comments for paper. First draft was rejected by Applied Energy. Peder also gave good comments to consider for paper revision, and possibly revision to technical approach or future work. Zhe and Wanfu addressing comments and determining next steps.
  - ii. In parallel, Wanfu extending Laura's initial software implementation to include solar irradiation models. Dave and Laura reviewed and provided feedback. Wanfu will continue.
- Repo refactor [Dave]
  - i. Dave designing new repos, discussed with Kyle with respect to integrating boptest-service architecture. Dave will keep working on this.
- Alfalfa alignment [Dave]
  - i. Dave and Kyle working with Alfalfa team to develop common API, starting with reading and writing points, that is consistent across projects and minimizes backwards incompatibility, allowing for shareable integrations (e.g. interfaces, software resources). Since boptest-service is based on Alfalfa architecture, also improves API coherency with repo refactor and better documentation of API using OpenAPI spec. Dave and Kyle continuing to work on this and will present more details on a proposed solution at later meeting.
- Online Dashboard [Dave]
  - i. Kyle deployed dashboard updates, especially related to account management and relation to boptest-service, on a development server and undergoing further testing. After this testing, Kyle/Dave will reach out to Harald for his additional testing, particularly with regards to the ADRENALIN use case.

- DOPTEST [Javier]
  - i. Javier met with Dave to discuss development and merging framework with repo master. Issues identified:
    1. In API, possibility to get disaggregated list of KPIs important for district agents. E.g. energy use per element (equipment in building, agent in district).
    2. At district level, added “Bill” KPI for revenue to aggregator, but need to compute the bill based on overwritten prices. This means this KPI needs to be calculated based on input signals, not just output signals like all others.
    3. Other kpis –compute domestic hot water discomfort, electric vehicle charging “discomfort” (i.e. battery energy not charged)
  - ii. **Javier** to make multiple PRs addressing specific issues.
- 4. Trials (~0:55)
  - Lieve has new PhD to use BOPTEST for compare different MPC with various models and state observers.
  - Marius Bagle (SINTEF) planning to visit LBNL in Spring to develop workflows for using RL and Modelica-FMI based workflows for implementing MPC for complex systems (e.g. HVAC and multizone). Will trial on BOPTEST.
  - Dave reports that as part of Task 4, in the task leader meeting, Zhe suggested organize seminars/workshops for those trialing control algorithms using BOPTEST to present and discuss their work. Dave thinks this promotes a key outcome of BOPTEST usage and Project 2 community: discussing controller testing results, what worked, what didn’t, why, and identification of promising directions and additional work needs.
- 5. Community Engagement and Outreach (~1:10)
  - Javier added trainings to website. See <https://ibpsa.github.io/project1-bopetest/training/index.html>.
  - Georgetown University professor interested in using tutorial for teaching data science class.
  - Javier contacted CCAI summer school organizers for next year. Awaiting confirmation.
  - **Javier** to schedule meeting in new year to discuss Task 1 goals/milestones for 2024.
- 6. Miscellaneous (if time)
  - Happy holidays and new year!
  - Look for new surveys for next meetings.