PhyLFlex HEMS Benchmarking

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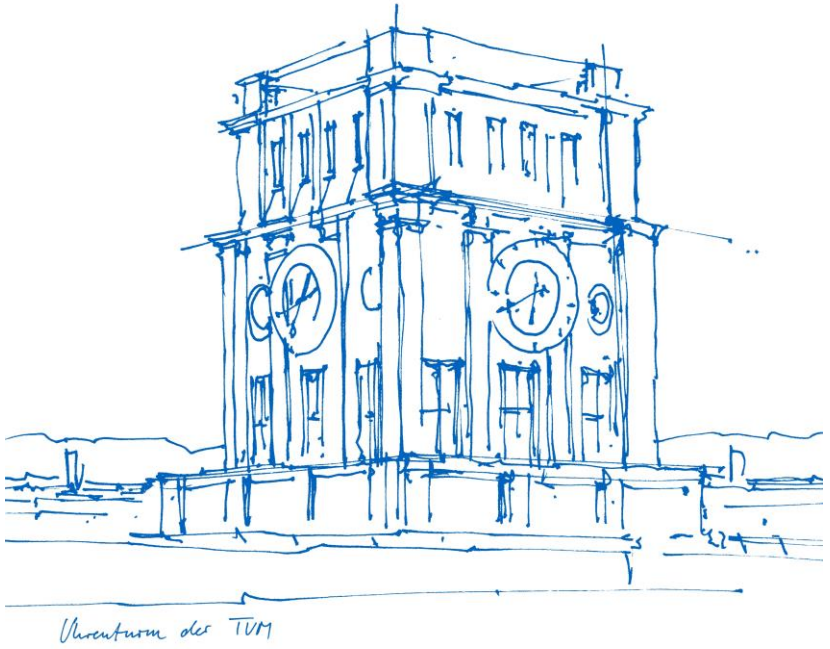

HEMS Benchmarking in Germany – story so far...

- HEMS Finder - a project to compare all available HEMS being sold in Germany
  - Second annual survey is currently out – open-access report here
  - More information can be found on the website – https://hems-finder.org/
- Current comparison is limited to a manufacturer survey through a questionnaire.
- A true benchmarking requires subjecting HEMS to test conditions
- But what are these conditions?

HEMS FINDER
Find your perfect Home Energy Management System

HEMS Benchmarking in Germany

- There are separate standards for benchmarking – a tale of three worlds.

	Research world	**Regulations world**	**Real world**
Motivation	What ***could*** be possible?	What ***should*** be possible?	What ***is currently*** possible?
Focus	Algorithms and forecasts	Discrimination free access, privacy by design, grid stability	Ease of implementation, converging on interoperable solutions.

- Research project PhyLFlex (2025-2028) is focused on this problem.
  - How to evaluate various HEMS strategies?
  - Can there be a universal methodology?

PhyLFlex

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PhyLFlex HEMS Benchmarking Suite

- Validation strategy for laboratory and demonstrator

CoSES Laboratory, TUM

ÜZW Grid section

EMS benchmarking suite

1. Rule based
2. MPC
3. Reinforcement Learning
4. Physics based (combination of above)

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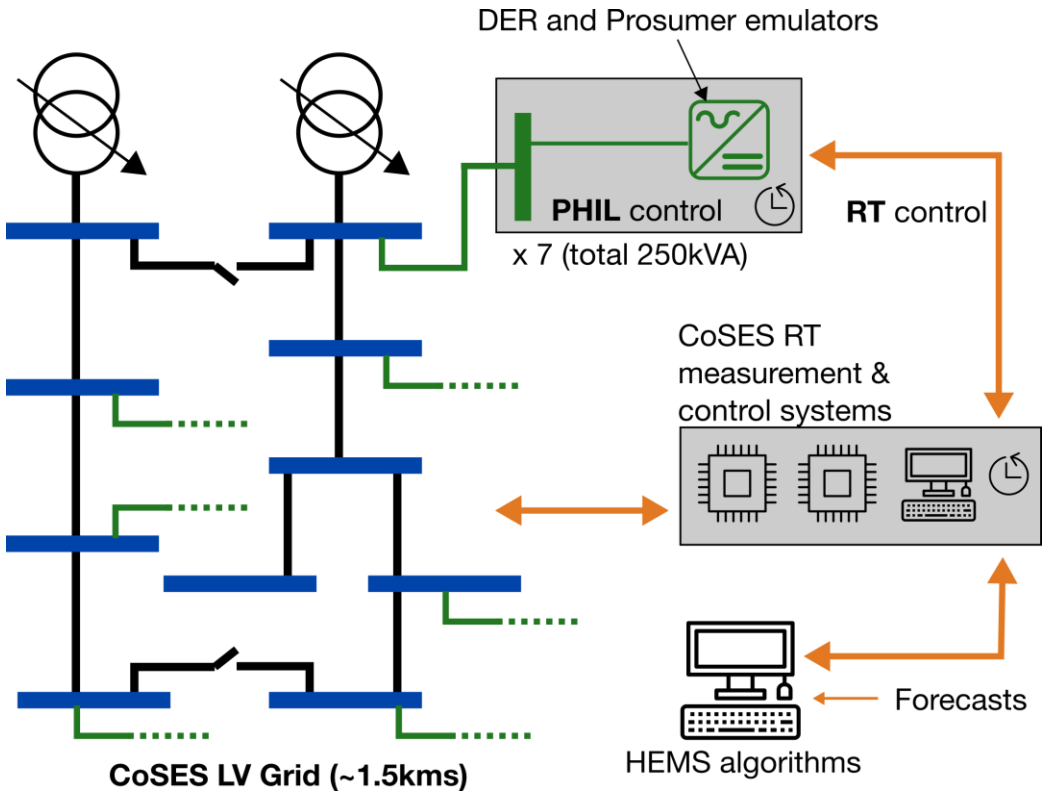
The research benchmark – What ***could*** be possible?

- Reference demand, generation profiles
- Reference objective functions
- Complete emulation

- To test:
  - Different algorithms
  - Forecasts
  - Control windows



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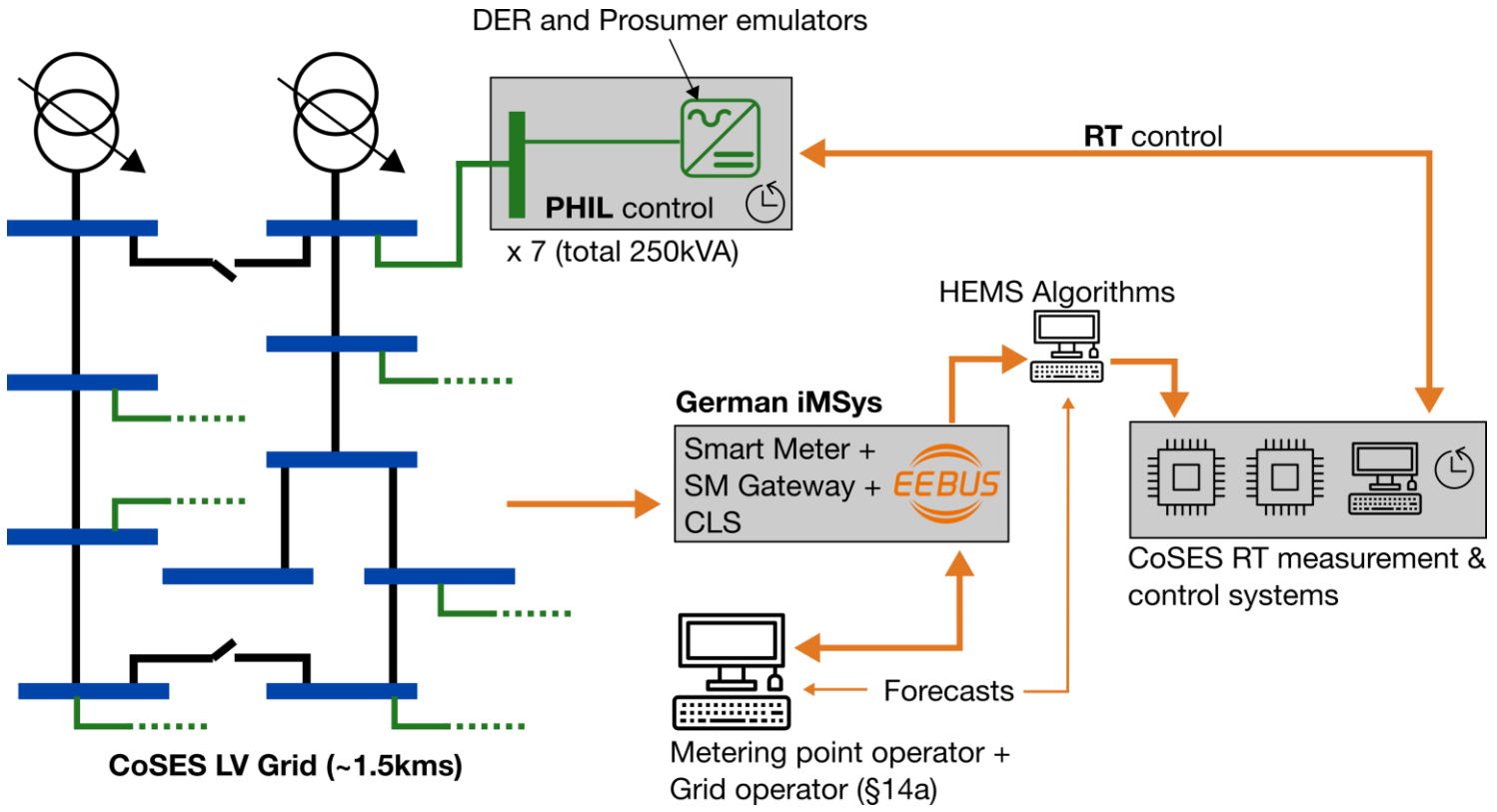
The iMSys benchmark – What ***should*** be possible?

- Reference demand, generation profiles
- Reference objective functions
- iMsys-in-the-loop
- DERs and prosumers emulated

- To test:
  - §14a signal efficacy
  - Max. utility from iMsys + FNN
  - Grid friendly EMS



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The real-world benchmark – What ***is currently*** possible?

- Reference demand, objective functions
- iMsys-in-the-loop
- Real DERs + Emulated consumption

- To test:
  - Device interoperability
  - HEMS → DER protocols
  - Claims vs Reality

- Further demonstrations at

HOCHSCHULE ANSBACH

10+ DER manufacturers

ÜZW NETZ

10 houses in ÜZW grid