ES-Control: An Evaluation and Testing Platform for Energy Storage Control Strategies and Algorithms

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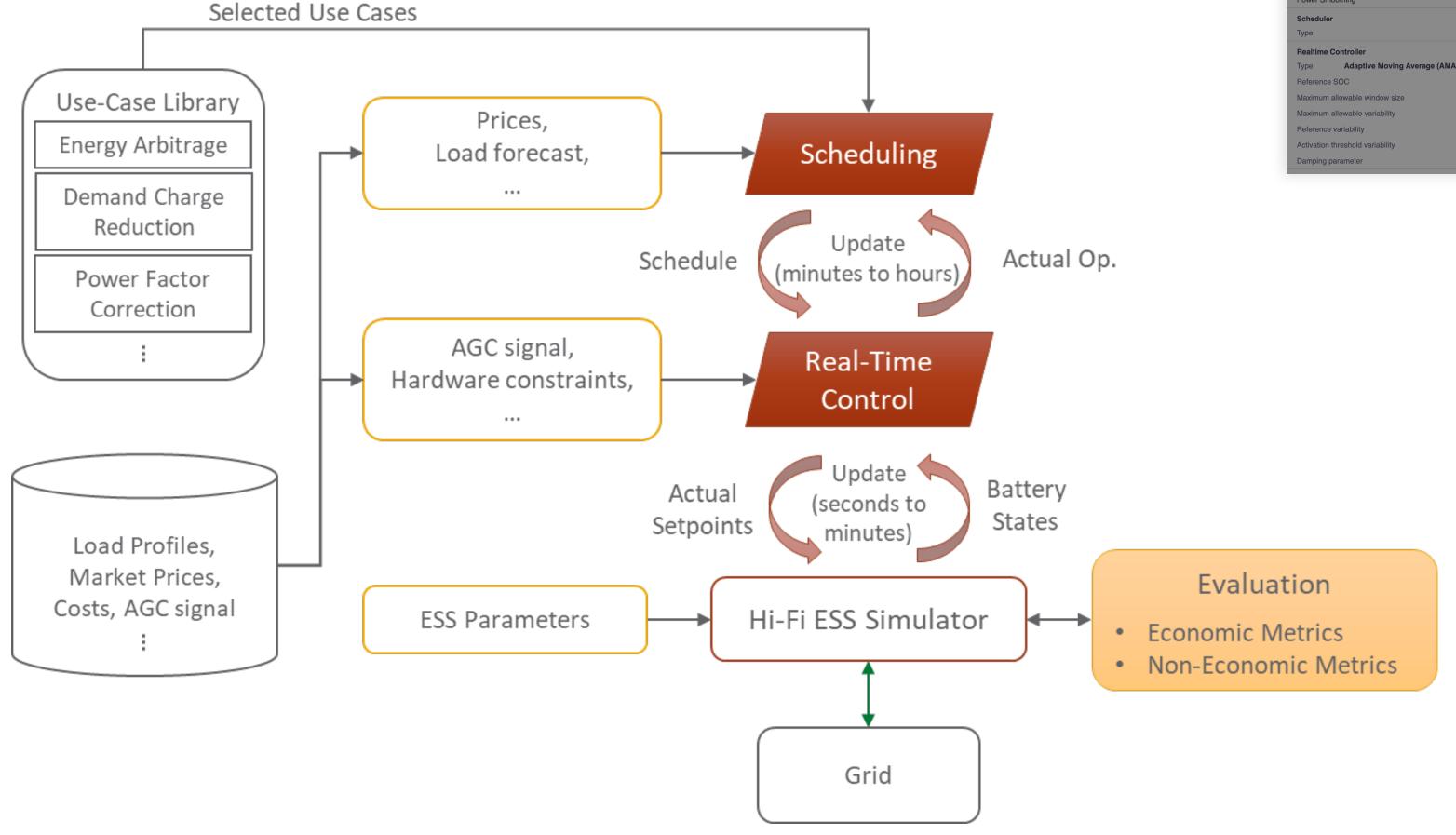
Needs for Energy Storage Control Tools

- Technical feasibility of energy storage has been demonstrated

- Capturing stacked value streams is important for a project to be economically viable

- Control strategies and algorithms are crucial to realize the potential benefits, considering
  - Combination of use cases
  - Performance of the energy storage system (ESS) based on different technologies
  - Operation of generation or load collocated with the ESS
  - Impact on the degradation of the ESS

Key Features

- Various ESS models to represent technical characteristics and physical capabilities

- Sandbox environment with high-fidelity ESS simulators with flexible time scales for short- or long-term studies

- A broad range of grid and end-user services across different energy storage deployment scenarios

- Built-in customizable controllers based on rule sets, optimization, and machine learning

- Built-in database of utility rates, electricity market prices, renewables and building loads, and energy storage cost

Structure and Main Components

Included in v1.0

- ESS Technologies
  - LFP and NMC Li-ion Battery
  - VRF Battery

- Use Cases
  - Energy Arbitrage
  - Frequency Regulation
  - Generation/Load Following
  - Power Smoothing

- Schedulers
  - Optimization
  - Rule-based
  - Reinforcement Learning

- Controllers
  - Rule-based
  - Adaptive Moving Average Filter (AMAF)

Usage Examples

Input Pages

Evaluation Results – Power Smoothing w/ AMAF

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