Creating Supply-Following Energy Loads

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Today vs. Tomorrow

Today: Dispatchable sources and non-dispatchable loads → Load-following supplies

Tomorrow: Non-dispatchable sources and dispatchable loads → Supply-following loads

Renewable Energy Sources

- Solar exhibits a more regular daily pattern, has relatively slower ramping, and less annual variability – though is not widely deployed
- Wind spreads over hours of the day evenly, has high and irregular ramping, and nearly linear variability – is the fastest growing renewable

Modeling Thermostatic Loads

- Similar techniques for heater, A/C, fridge, and water heater
- Fit warming, cooling, and energy curves
- Can interpolate and extrapolate in models
- Slack measures energy stored within the system

Supply-Following Loads

- Oblivious heater does not consider any external signals.
- Supercool heater allows extra natural cooling before heating when energy is scarce.
- Wide Guardband heater is supercool plus extended warming when energy is plentiful.

Future Work

- Adapting to non-dispatchable loads
- Assessing data fidelity versus violation rate
- Incorporating outside data (e.g. weather, occupancy)
- Implementing control of thermostat and fridge