2019 Energy Code Standards – Battery Storage Systems

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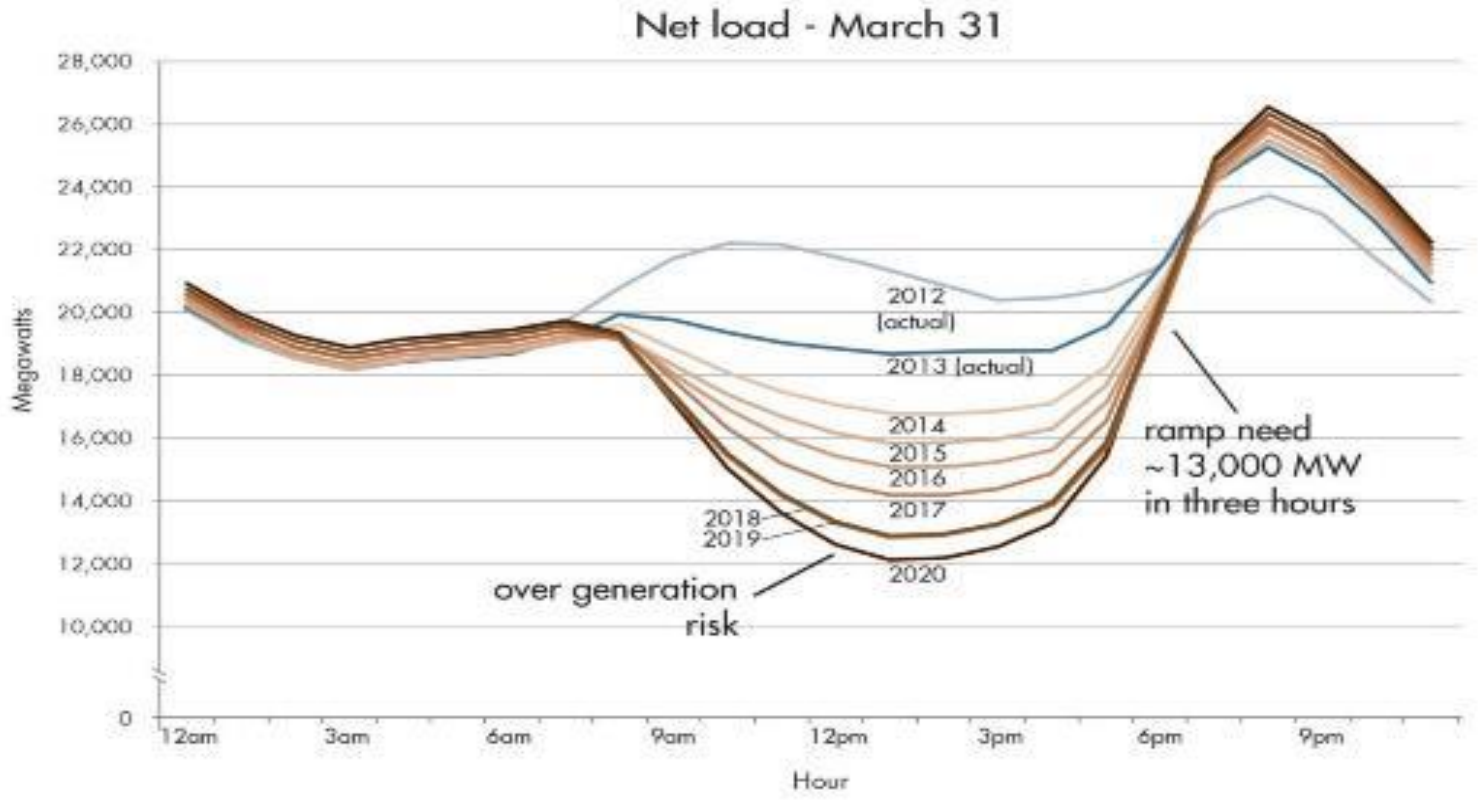
November, 2019
California Energy Commission

Challenge for renewables

Oversupply and ramping: A challenge as more renewables are integrated into the grid



JA12 – Qualification Requirement for Battery Storage System

- New Joint Appendix outlines the minimum qualification requirements for residential compliance credit
  - All batteries must be certified to CEC as meeting these requirements to get compliance credit

- Minimum Performance Requirements
  - Minimum usable capacity of 5 kWh
  - Round-trip efficiency of at least 80 percent (with more credit for better performers)
  - Energy capacity retention of 70 percent after 4,000 cycles or 70 percent under a 10-year warranty

JA12 – General Control Reqs.

- General Control Requirements
  - Programmed to first meet the load of the dwelling
  - Capable of being remotely programmed to change the charge and discharge periods
  - Twice a year, perform a system check to ensure the battery is not left in backup mode

JA12 – Control Strategy Reqs.

At time of inspection, the battery shall use one of the following control strategies, and may be able to switch to others:

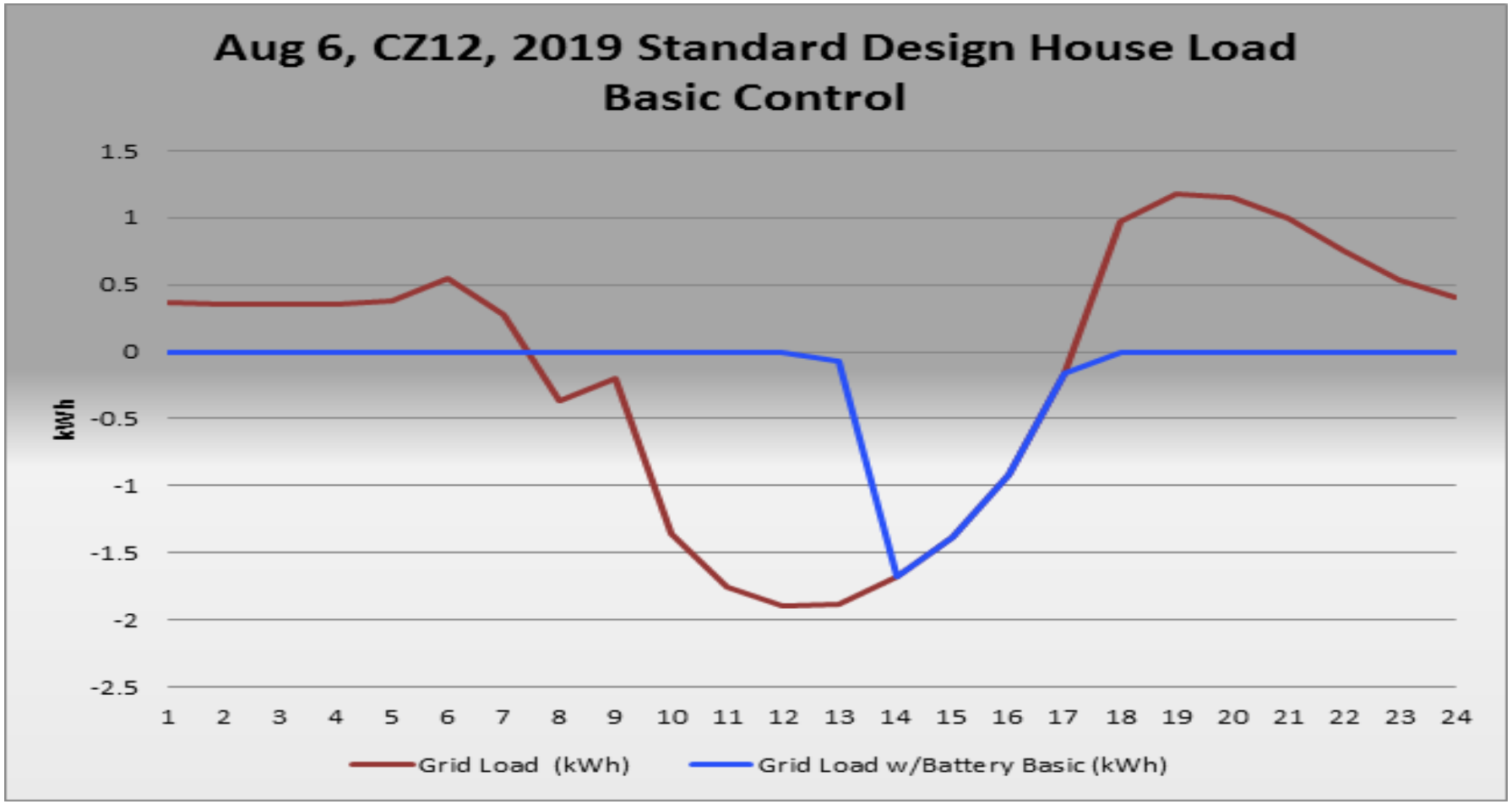
- Basic Control Strategy
  - Charge when generation is greater than load
  - Discharge when PV production is less than the dwelling load
- Time-of-Use Control Strategy
  - Charge when generations is greater than load (same as Basic Control)
  - Discharge to dwelling and/or grid only during peak TOU hours

JA12 – Control Strategy Reqs. (2)

- Advanced Demand Response Control Strategy
  - Programmed as Basic or TOU Control, **plus**
  - The battery can change the charge and discharge periods based on a signal from a utility provider or aggregator

- CEC's Executive Director may approve additional control strategies, if there's a proven, beneficial strategy that doesn't fall into one of the above.

Benefit of Battery Storage System



The Invisible House - PV Plus Basic Battery – A "Mild" Summer Day

"Annual" netting assumes all hours of the day/year have the same emission and energy cost values, not a correct assumption - Blue line smooths out the belly of the duck and achieves zero carbon and zero energy without resorting to netting

At Inspection

- Inspector is only looking for three things:
  1. Are the forms there?
  2. Is the battery there?
  3. Is it starting in the right control mode?
- Inspectors are NOT asked to get on roofs, check electrical connections, etc. Straightforward visual inspection only.
- Trust your gut; dig deeper if it seems off

Looking towards 2022

- Incorporate any lessons learned from 2019 requirements
  - Updates to control strategies?
  - Maximum system sizes?
  - Discuss battery technologies?
- Add appendix for thermal storage (JA13)
- Find ways to apply similar ideas to nonresidential buildings
  - Specifications for microgrids?
  - More consideration of battery-only systems?

Questions?