DOCKETED	
Docket Number:	19-BSTD-03
Project Title:	2022 Energy Code Pre-Rulemaking
TN #:	235134
Document Title:	Staff Slides on Heat Pump and Nonresidential PV proposals presented on October 6
Description:	This document is the slide presentation given by Energy Commission staff at the October 6 workshop on the topic of nonresidential heat pump and solar photovoltaic standards opportunities.
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Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	10/8/2020 1:09:28 AM
Docketed Date:	10/8/2020

2022 Building Energy Efficiency Standards Overview

October 6, 2020 Staff Workshop

Heatpump Baselines and PV Requirements

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Heatpump Baseline and PV/Storage Workshops

Two workshops, twice the fun:

There are two workshops scheduled for heatpump baselines and nonresidential PV and battery storage requirements:

October 6, 2020
- High level overview of the proposed requirements for heatpump baseline scenarios and PV and storage requirements; will only include “TDV” and not “source energy” baseline options
- Draft language will not be presented today
- Seek public input for concepts presented
- Comments due to Commission by COB October 20

November 19, 2020
- Draft language and detailed analysis will be presented
- Will include both “source energy” and “TDV” baselines
- After seeking further public comments, will become the basis for 45-day language

2022 T24 Standards Goals

Heatpump Baselines For:

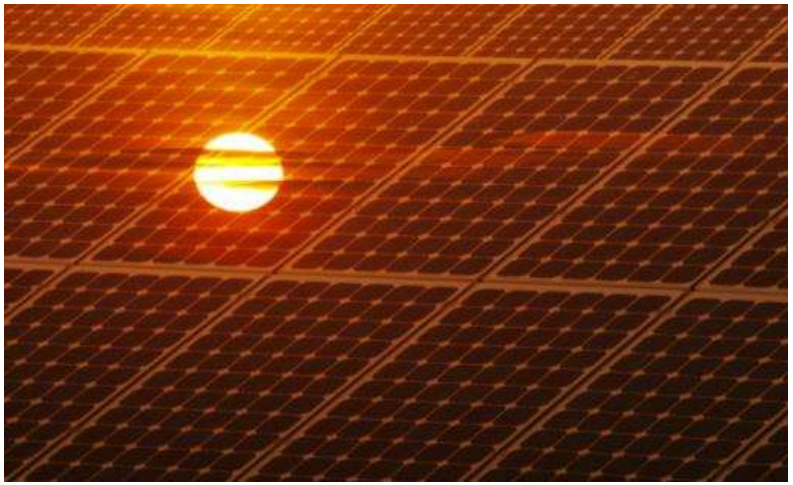
1. Lowrise Residential Buildings
2. Highrise Multifamily
3. Selected Nonresidential Occupancies

PV and Battery Storage Requirements For:

1. HRMF
2. Selected Nonresidential Occupancies

2022 T24 Standards Occupancies

New Electrified Baselines and PV Requirements for:



1. LRMF and HRMF
2. Office
3. Retail and Wholesale
4. Educational facilities
5. Warehouses
6. Mixed occupancy building where one or more of these types-of-uses makeup at least 80 percent of the floor areas of the building

Heatpump Baselines

Heatpump for space and water heating in the baseline for:

- HRMF and selected nonresidential occupancies
- Establish appropriate source energy and TDV baselines
- Must be feasible and cost effective

Creating feasible and cost-effective heatpump baselines may be a significant challenge for some occupancies

PV & Battery Storage Requirements

PV and Possibly Battery Storage Requirements for HRMF and Selected Nonresidential Occupancies:

1. Considering NEM2 and alternative NEM tariffs with hourly exports compensated at avoided cost
2. Emphasize maximizing self-utilization of PV generation and minimizing exports thru:
    i. “Right sizing” the PV system to avoid large exports
    ii. Coupling with battery storage, EV charging, and other load-shifting strategies to maximize self-utilization
3. Possible credit for standalone battery storage systems

Availability of suitable rooftop areas for PV installation may be a limiting factor

Heatpump Baseline For Lowrise Residential Buildings

For Part 6:

- Create a ~2 EDR credit (plus credit for T4 HPWH and DR) for builders who voluntarily switch to both HPWH and HPSH
  - ✓ Make R13 roofdeck insulation mandatory requirement
  - ✓ Make 0.064 U-factor walls mandatory requirement
- The mixed-fuel baseline will not be affected

For Part 11 (Calgreen):

- Include HPWH and more efficient windows in the standard design
  - ✓ HPWH and HPSH can also comply
  - ✓ Make R13 roofdeck insulation mandatory requirement
  - ✓ Make 0.064 U-factor walls mandatory requirement

Battery Storage Ready

New residential mandatory battery storage ready requirements

1. Panel requirements to accommodate electric end-uses, PV, EVs, and future battery storage installation

2. Identification and isolation of emergency circuits

3. Compatibility with both battery storage systems and backup generators to help with PSPS events

Will reduce the future battery storage installations by $2,000 or more

2022 Building Standards

Cleanup Language

2022 Building Standards Cleanup

1. Make sure PV sizing equation 150.1(c) is consistent with 2022 TDVs
2. New exception for PVs systems that are less than 2.0 kWDC per building
   - ✓ May also address the ADU issue
3. Exception 1 - PV systems are not required to be larger than what can be installed in the Available Effective Annual Solar Access Area (EASAA); clarify the what happens when EASAA is greater than 80 square feet, but smaller than the area required for full NEM compliance
4. Exceptions 2 (CZ15), 3 (2-story buildings), 4, (3-story buildings) – Do we still need these Exceptions given items 2 and 3 above?
5. New Exception for occupied roofs (flat patio areas) - Consider referring to Part 2 provisions for occupiable roofs
6. New Exception for areas for high snow loads

Cleanup Continued

7. 10-109(k) PV Determinations - Review to determine whether this language needs to be clarified or amended
8. 10-115 Community Solar - Review to determine whether this language needs to be clarified or amended; consider lessons learned from SMUD CS application and interactions with the IOUs
9. Other changes proposed by stakeholders?

Cleanup Continued

11. **JA 11:**

i. Clean up language on system orientation, there is some confusion on the prescriptive and performance requirements
ii. Solar assessment tool - Amend language based on lessons learned from prior approval of solar assessment tools: create clear list of functions needed for approval
iii. Clearly define in Part 6 “Annual Solar Access”, “Effective Annual Solar Access”, and “Effective Annual Solar Access Areas”; how about EASAA facing north?
iv. Others?

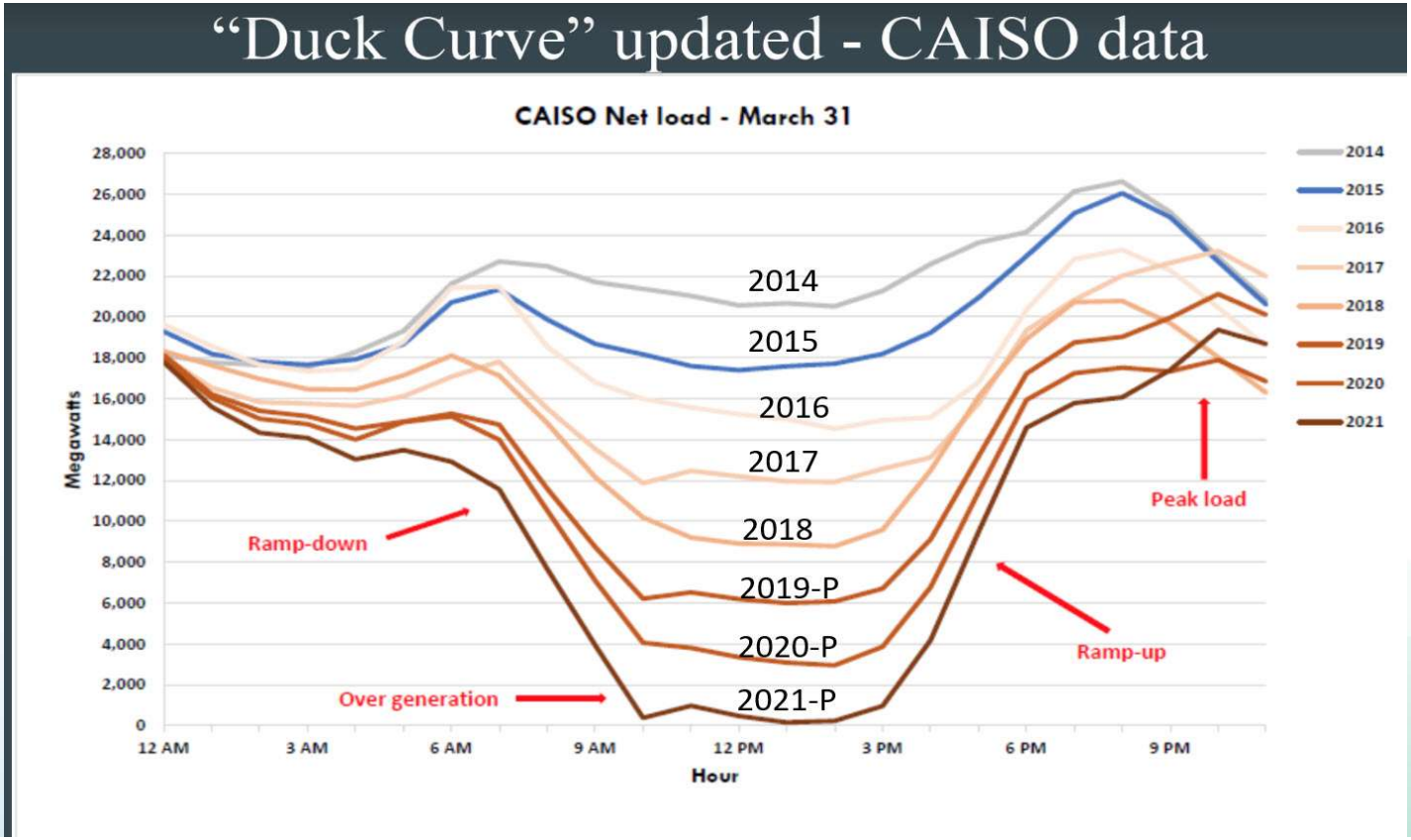
Cleanup Continued

12. **JA 12:**

i. Allow credit for standalone battery storage systems
ii. Revisit roundtrip efficiency
iii. Revisit control strategies requirements: Basic, TOU, and Advanced DR
iv. Others?

Why Batteries? Bad Duck

2018 Oversupply and Ramping: A challenge as more renewables are integrated into the grid



Solutions
Target energy efficiency
Increase storage and demand response
Enable economic dispatch of renewables
Decarbonize transportation fuels
Retrofit existing power plants
Align time-of-use rates with system conditions
Diversify resource portfolio
Deepen regional coordination

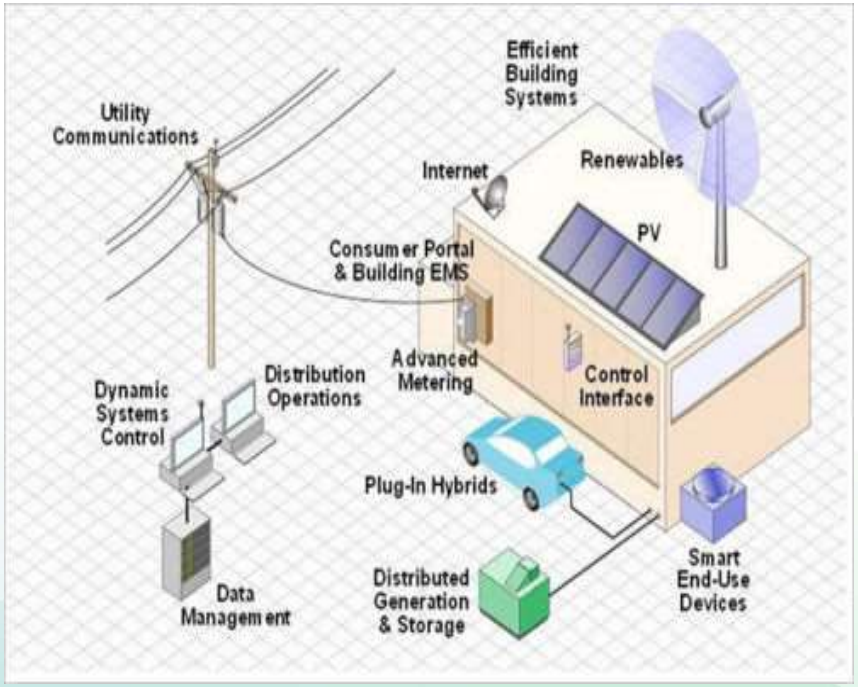
Grid Harmonization

Grid harmonization strategies (GHS) when coupled with customer owned PV systems bring maximum benefits to the grid, environment, and occupants

Grid Harmonization Strategies Defined:

Grid Harmonization are strategies and measures that allow the home occupants to use their energy assets to maximize self-utilization of PV array output, and limit grid exports to periods beneficial to the grid and the ratepayer;

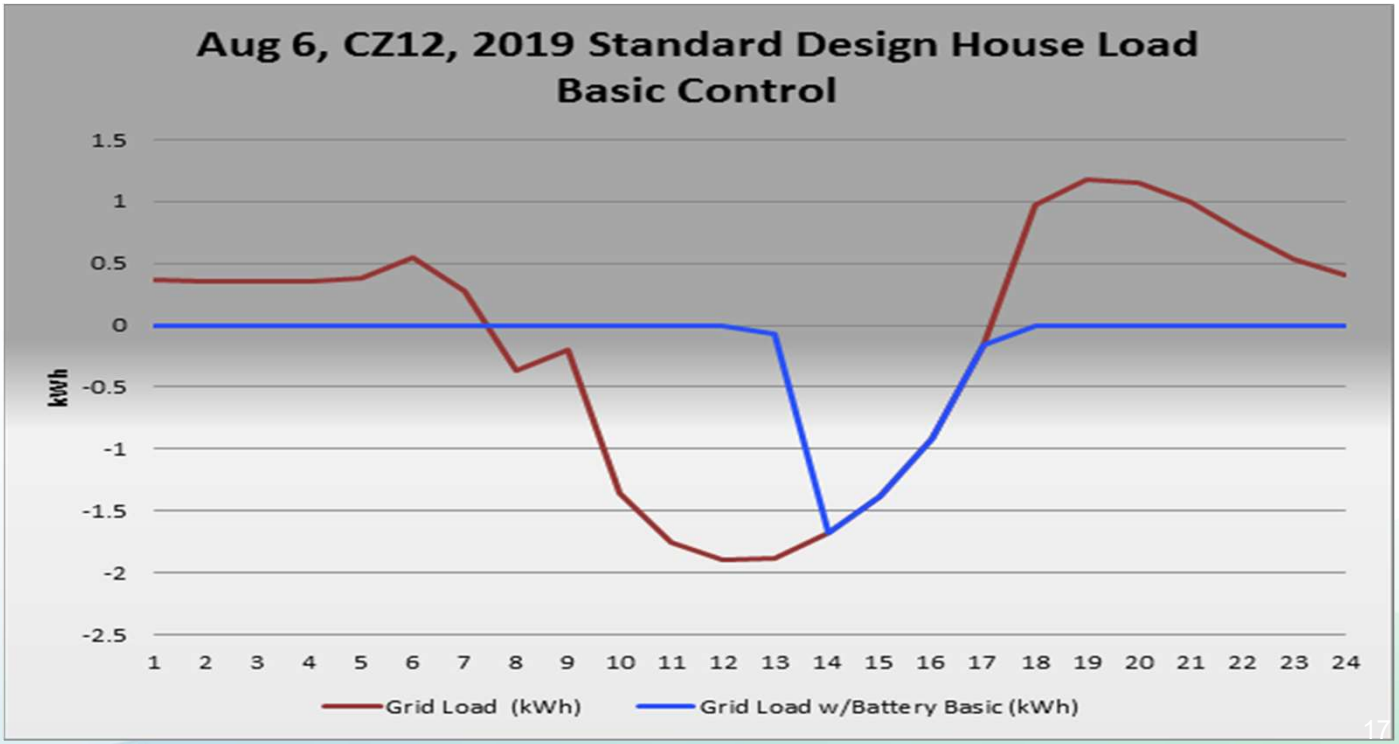
Examples of GHS include but are not limited to PVs in combination with battery storage, demand response, thermal storage, and in the future Electric Vehicle (EV) harmonization.



Good Duck

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



Questions?