

NEW THIS MONTH!



Q&A WITH ALEA GERMAN: LOOKING AT BATTERY STORAGE FOR SINGLE FAMILY HOMES

As an engineer at Frontier Energy, Alea's focus is on whole building energy optimization, technology assessment, and code development, particularly as it relates to zero net energy (ZNE) design. Alea is a skilled energy modeler with 15 years of experience with various software tools. Overseeing Frontier's energy code consulting services, she has a broad understanding of California's Title 24, Part 6 code and leads statewide technical code change proposals. As a key technical lead for the California Codes and Standards Reach Codes program, Alea provides technical support to local governments on adopting ordinances to meet energy and greenhouse gas reduction goals. Over her career, she has contributed to research evaluations of residential technologies such as ventilation cooling, air to water heat pumps, and heat pump water heaters and has experience with field surveying and testing in retrofit and new construction applications. Alea, a licensed professional engineer, received her Master of Science in Mechanical Engineering from the University of California, Davis and Bachelor of Science in Mechanical Engineering from Johns Hopkins University.

Q: Tell us a little about this topic, Alea, why would stakeholders be interested in battery storage for single family homes?

A: There are numerous intertwined benefits to coupling a battery storage system with a rooftop photovoltaic (PV) system for single family homes. There are economic benefits from improving the utilization of the PV system by capturing the excess generation during the middle of the day and storing it for later. With time-of-use rates this allows for lower utility bills by reducing consumption of grid-generated power during peak periods (summer late afternoon / evening). On a larger scale, the use of these systems offers a much-needed stabilizing influence on the statewide grid by helping to level the late-day demand for power. This load shifting also results in carbon emission savings, and at the jurisdiction level policymakers can encourage adoption of battery technology to achieve their decarbonization and climate goals.

Q: What kind of resources are available for jurisdictions looking at battery storage measures?

A: The statewide reach codes team conducted a preliminary cost-effectiveness study in 2018 for the 2016 code cycle. Most recently, the team is updating this study, focusing on single family homes, for the 2019 code cycle. The updated study looks at both new construction and existing homes, using the prototypes defined by the Energy Commission. The analysis evaluates behind-the-meter battery systems coupled with a photovoltaic (PV) solar system but did not analyze stand-alone battery systems.

The report will provide valuable information for local jurisdictions interested in reach codes that target load shifting and decarbonization measures, as it includes analysis for nine different battery scenarios across all 16 climate zones.

Q: These systems can be quite expensive to install. Are there any financial resources or incentives for homeowners?

A: Yes. In fact, a key finding of the study was that battery storage systems are not yet cost-effective in the absence of these types of incentives.

On the federal side, there remains the federal residential solar energy credit, also referred to as an Investment Tax Credit, or ITC. This can be claimed on federal income taxes for a percentage of the cost of a solar photovoltaic (PV) system, as well as battery storage devices that are charged exclusively by the associated solar PV panels. In December 2020, Congress passed an extension of the ITC, which provides a 26%



2022 BUILDING ENERGY EFFICIENCY STANDARDS OFFER BOLD FOCUS ON FOUR KEY AREAS

This is the first of a two-part series on the new 2022 Building Energy Efficiency Standards adopted by the Energy Commission on August 11, 2021.

At its monthly business meeting on August 11, 2021, the California Energy Commission adopted the 2022 Building Energy Efficiency Standards (Energy Code) for newly constructed and renovated buildings that will produce benefits to support the state's public health, climate and clean energy goals.

As the state's primary energy policy and planning agency, the Energy Commission updates these standards every three years to cost-effectively increase the energy efficiency and lower the carbon footprint of buildings. As the Commission's website notes, homes and businesses use nearly 70 percent of California's electricity and are responsible for a quarter of the state's greenhouse gas (GHG) emissions.

According to the Commission's news release announcing its action, the 2022 Energy Code update focuses on four key areas in new construction of homes and businesses:

- Encouraging electric heat pump technology and use
- Establishing electric-ready requirements when natural gas is installed
- Expanding solar photovoltaic (PV) system and battery storage standards
- Strengthening ventilation standards to improve indoor air quality

For residential new construction, the 2022 Standards:

- Establish energy budgets based on efficient heat pumps for space or water heating to encourage builders to install heat pumps over gas-fueled HVAC units.
- Require homes to be electric-ready, with dedicated 240-volt outlets and space so electric appliances can eventually replace installed gas appliances.
- Increase minimum kitchen ventilation requirements so that fans over cooktops have higher airflow or capture efficiency to better exhaust pollution from gas cooking and improve indoor air quality.
- Allow exceptions to existing solar PV standards when roof area is not available (such as for smaller homes).

For nonresidential new construction, the 2022 Standards:

- Establish combined solar PV and battery standards for select businesses. Systems are sized to maximize onsite use of solar energy and avoid electricity demand during times when the grid must use gas-powered plants.
- Establish new efficiency standards for commercial greenhouses (primarily cannabis growing).
- Improve efficiency standards for building envelope, various internal systems, and grid integration equipment, such as demand-responsive controls, to assist grid stability.

Over 30 years, the new Standards are estimated to provide \$1.5 billion in consumer benefits and reduce 10 million metric tons of greenhouse gases (GHGs), equivalent to taking almost 2.2 million cars off the road for a year.

The Reach Codes sister programs under the Statewide Utility Codes and Standards (C&S) Program are vital collaborators in the Energy

tax credit for systems installed in 2020-2022, and 22% for systems installed in 2023.

There may also be local incentives through the Self Generation Incentive Programs (SGIP) offered by the California investor-owned utilities.

Q: What about analysis for nonresidential buildings?

A: Further work is underway for nonresidential buildings. The newly adopted 2022 statewide Energy Standards include a prescriptive requirement for solar photovoltaic (PV) and battery storage systems for the first time for a range of building types (see the companion article in this newsletter for more information).

Q: When will the report on battery storage for single family homes be available?

A: The Reach Codes team expects to publish the report before the end of September. The webinar recording and presentation slides discussing the analysis are available [here](#).

Standards process. The C&S Codes and Standards Enhancement (CASE) Team actively supports the Energy Commission to update Title 24, Part 6 by developing code change proposals that recommend either new requirements or upgrades to existing requirements for various technologies. Visit <https://title24stakeholders.com> to find out more about their development support for the 2022 code cycle. The C&S Energy Code Ace Program is hard at work creating resources, tools, and trainings for the 2022 Standards well in advance of its January 1, 2023 effective date. The Energy Commission has published a Summary of the new Standards available [here](#).

Next month, the second of our series will explore specific new provisions of the 2022 Standards.



This program is funded by California utility customers and administered by Pacific Gas and Electric Company, San Diego Gas & Electric Company (SDG&E®) and Southern California Edison Company under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.

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