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STAFF REPORT

Building Initiative for Low-Emissions Development (BUILD) Program

Implementation Plan — 2024 Update

July 2024| CEC-300-2024-019

California Energy Commission

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ABSTRACT

Senate Bill 1477 (Stern, Chapter 378, Statutes 2018) authorized the Building Initiative for Low-Emissions Development (BUILD) Program. The program provides incentives to builders to encourage the design of innovative, low-emission buildings. The bill requires the California Public Utilities Commission (CPUC), in consultation with the California Energy Commission (CEC), to develop and administer the program.

The CPUC adopted Decision 20-03-027 which requested the CEC to develop an implementation plan establishing the framework and requirements of the program. The BUILD Implementation was adopted through a CPUC resolution on April 15, 2021.

The *Building Initiative for Low-Emissions Development (BUILD) Program Implementation Plan — 2024 Update* is the second program implementation plan. The plan updates CEC staff's approach to administering the program, including participation requirements, program eligibility, incentive structure, application process, eligible equipment, evaluation of new technology, bill savings calculation method, technical assistance and outreach, and the metrics used to evaluate program performance.

Keywords: SB 1477, building decarbonization, BUILD, heat pump, low-income, water heater, technical assistance, TECH, low-emission building, near-zero-emission technology, CPUC, D.20-03-027

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In 2018, Senate Bill (SB) 1477 (Stern, Chapter 378, Statutes 2018) authorized two building decarbonization programs: (1) Building Initiative for Low-Emissions Development Program (BUILD) and (2) Technology and Equipment for Clean Heating Initiative (TECH). These two programs encourage the development and installation of near-zero-emission building technologies to reduce the emissions of greenhouse gases (GHG) from buildings, as buildings contribute a quarter of California's GHG emissions. Among other things, SB 1477 requires the California Public Utilities Commission (CPUC), in consultation with the California Energy Commission (CEC), to develop and supervise the administration of the BUILD Program. The BUILD Program aims to encourage the design and construction of low-emission, energy-efficient buildings, with cobenefits that include reduced energy utility bills for low-income occupants and improved comfort, safety, and indoor air quality.

In January 2019, the CPUC instituted a rulemaking on building decarbonization, Rulemaking (R.) 19-01-011, including the implementation of SB 1477. Under this proceeding, the CPUC adopted Decision (D.) 20-03-027 on March 26, 2020, to establish a framework and requirements for both programs authorized by SB 1477. D.20-03-027 further designated the CEC as program administrator for the BUILD Program. The decision also requested the CEC, as program administrator, to develop and submit an implementation plan every two years for approval through the CPUC's resolution process. On July 24, 2020, the CEC submitted the first iteration of the plan to the CPUC and published the plan on the CEC BUILD Program docket for public input. On September 29, 2020, the CEC submitted the amended BUILD Implementation Plan to the CPUC incorporating public input. The CPUC approved the first BUILD Implementation Plan through a resolution on April 15, 2021. On May 18, 2023, the CEC was granted an update extension to allow more time to administer and evaluate program success.

The proposed BUILD Implementation Plan — 2024 Update aligns the original implementation plan with the BUILD Program Guidelines including: program eligibility, incentive structure, application process, eligible equipment, evaluation of new technology, bill savings calculation method, technical assistance and outreach, and the metrics to evaluate program performance. The Implementation Plan Update also provides a status of program activities and several performance metrics. Any recommendations in the implementation plan are subject to revision following public review and CEC consideration of the proposed draft BUILD Program Guidelines, Second Edition.

Due to the substantial similarity of the information in the BUILD Implementation Plan and Program Guidelines, the CEC requests this be the final update. This is further supported by the impending full subscription of most investor-owned utility (IOU) territories, and the ongoing evaluation, measurement and verification (EM&V) activities which informs BUILD program administrators of progress and potential refinements.

CHAPTER 1:
Introduction and Background

In 2018, Senate Bill 1477 (Stern, Chapter 378, Statutes 2018)[1] authorized two building decarbonization programs: (1) Building Initiative for Low-Emissions Development Program (BUILD) and (2) Technology and Equipment for Clean Heating Initiative (TECH). These two programs encourage the development and deployment of near-zero-emission building technologies to reduce GHG emissions from buildings, as buildings contribute a quarter of California's GHG emissions while also causing indoor and outdoor pollution.

SB 1477 requires the CPUC, in consultation with the CEC, to develop and supervise the administration of the BUILD Program. SB 1477 made available $50 million annually for four years through 2022-23, for a total of $200 million, derived from the revenue generated from the GHG emission allowances directly allocated to gas corporations and consigned to auction as part of the California Air Resources Board's (CARB) Cap-and-Trade Program for implementing both pilot programs, BUILD and TECH.

In January 2019, the CPUC instituted a rulemaking on building decarbonization (R.19-01- 011).[2] The proposed scope of the rulemaking includes implementing SB 1477.On March 26, 2020, the CPUC adopted D.20-03-027[3], establishing the framework and requirements for both programs authorized by SB 1477.

The BUILD Program, codified under Public Utilities Code (PUC) Sections 921 and 921.1[4], provides incentives for installing near-zero-emission building technologies in new homes that reduce GHG emissions significantly beyond what is otherwise expected from implementing Title 24, Part 6, prescriptive standards of the California Code of Regulations (Energy Code).[5] SB 1477 supports the programmatic emphasis on technical assistance and incentives for "new, low-income residential housing." Furthermore, SB 1477 requires that the efforts to electrify these new low-income, residential building projects do not result in higher utility bills for the occupants.

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1 SB 1447 (Stern, Chapter 378, Statutes 2018), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB1477.

2 CPUC Rulemaking 19-01-011, https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization.

3 CPUC Decision 20-03-027, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF.

4 Public Utilities Code Sections 921 and 921.1, https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=4.&article=12.

5 California Code of Regulations (Energy Code), https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards.

SB 1477 requires the program to include eligibility and evaluation requirements and enumerates certain project requirements and metrics to be monitored and evaluated as the program progresses.

The CEC recognized that in developing the BUILD Program, staff must understand and collaborate with existing organizations and programs supporting low-income housing development and programs encouraging the adoption of building decarbonization efforts.

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Initial Budget

Program funding is authorized under SB 1477 with an overall budget of $200 million dollars. BUILD Program funding accrued over a four-year period, from Fiscal Year (FY) 2019–2020 to FY 2022–2023, and the program has received all funding allocations as specified in D.20-03-027 for a total of $80 million.

The program budget may be spent over the program duration; however, to meet requirements of the funding source, each year's accrual must be expended within 10 years of allocation. There is no specific restriction on annual spending, provided it is within the overall budget and funds are available. The BUILD Program budget details are shown in Table 1.1.

Table 1.1: BUILD Program Budget

Budget Item	Amount
Program Costs (direct incentives for low-income housing developments)	$60,000,000 (no less than)
Other BUILD Program Costs Technical Assistance Provider — up to $8 million New Adopter Design Award — up to $2 million	$10,000,000 (no more than)
Administrative Costs	$8,000,000 (no more than)
Joint Evaluation Cost Share	$2,000,000 (no more than)
Total	$80,000,000

Source: CPUC D.20-03-027[6]

To comply with CARB regulations regarding cap-and-trade funds and allocation requirements laid out in D.20-03-027, regional spending for the BUILD Program is limited to the gas corporation service territories where the funds are derived: Southern California Gas Company (SCG), Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southwest Gas Corporation (SWG). The percentage allocation of funds to BUILD projects is consistent with each gas corporation's allocation of cap-and-trade allowances, as shown in Table 1.2.

Table 1.2: BUILD Program Budget Allocation by Natural Gas Territory

Natural Gas Utility Territory	Allocated Percentage of Budget
Southern California Gas Company	49.26%
Pacific Gas and Electric Company	42.34%
San Diego Gas & Electric Company	6.77%
Southwest Gas Corporation	1.63%

Source: CPUC D.20-03-027

As noted in D.20-03-027:

> "Any spending for the BUILD Program … with statewide or cross-territory benefits, including but not limited to administrative and evaluation spending, shall be attributed to the gas corporation service territories in proportion to their original funding

6 California Public Utilities Commission. March 26, 2020. *Decision Establishing Building Decarbonization Pilot Programs,* CPUC D. 20-03-027, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF.

contributions. Any unspent funds remaining as of July 1, 2033, must be returned to the ratepayers of the respective gas corporations."[7]

Implementation Plan Content Updates for 2024

D.20-03-027 specifies requirements for the BUILD Implementation Plan, which must, at a minimum, address the following topics (Chapter references are indicated.):

- Program eligibility criteria (Chapter 2)
- Incentive structure (Chapter 3)
- Criteria for scoring and selecting projects (Chapter 4)
- List of eligible technologies (Chapter 5)
- Process for evaluating new technologies (Chapter 6)
- Bill savings method (Chapter 7)
- Technical assistance (Chapter 8)
- Outreach plan (Chapter 9)
- Process and set of metrics by which to evaluate program performance (Chapter 10)

The proposed *BUILD Implementation Plan — 2024 Update* follows the same format, updating text with existing program requirements where necessary, providing performance metrics and recommendations for consideration within the context of the BUILD Program or for the development of subsequent programs, and highlighting proposed changes to address feedback where efficient and feasible.

7 Ibid., pg. 3, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF.

CHAPTER 2:
Program Eligibility Criteria

As described in Chapter 2 of the *BUILD Guidelines*, an eligible applicant is a nonprofit, tribal government, California tribal organization, private or public owner or developer of an eligible residential building. Consultants may apply on behalf of eligible applicants. Consultants will need to provide information regarding the eligible applicants and work with the eligible applicants to submit the proper paperwork.

Projects must meet the following eligibility criteria, as further described below:

- New, remodeled, or repurposed residential building
- All-electric
- Low-income building
- Eligible service territory

Detailed descriptions of eligible technologies are discussed in Chapter 4 of this document and are memorialized in the BUILD Guidelines, Chapter 4 and Appendix B.

To support broad program impact and market transformation,

- applicants are eligible for up to 300 hours of technical assistance.
- Incentives are limited to no more than $2 million per entity to ensure funding is distributed across a variety of participants.
- $2 million of incentive funding was set aside for "new adopter" awards of $100,000 encourage development teams to build their first all-electric building and mitigate the perceived risks of adopting a new approach to building design.

In addition, to provide program flexibility, reduce participation barriers, and encourage market transformation, staff drafted the *BUILD Guidelines*, with long participation timelines and allowed projects in various development stages to apply for incentives to accommodate the inherent challenges of affordable housing development.

New Residential Building

A new residential building eligible for participation in BUILD, as defined in D.20-03-027, is one of the following:

1. A building that has never been used or occupied for any purpose[8]
2. Any work, addition to, remodel, repair, renovation, or alteration of any building(s) or structure(s) when 50 percent or more of the exterior weight bearing walls are removed or demolished[9]
3. An existing building repurposed for housing, whose original use was not residential.

Consistent with this requirement, staff have identified that eligible new residential building types may include:

- Single-family homes.
- Duplexes.
- Triplexes.
- Condominiums.
- Multifamily buildings.
- Dormitories.
- Residence hotels.
- Assisted living facilities.
- Farmworker housing in agricultural zones.
- All-electric mixed-use buildings (which include residential occupancies).

Ineligible project types are anticipated to include:

- Commercial buildings.
- Government buildings (excluding government-owned low-income housing).
- Agriculture projects (excluding farmworker housing).
- Schools.
- Churches.

8 Section 100.1 of Part 6 of Title 24 of the California Code of Regulations (Energy Code).

9 Chapter 15.06.030, Section R202 of the California Residential Building Code.

All-Electric Requirement

D.20-03-027 and *BUILD Guidelines*, Chapter 2, Section A.2 requires projects to be limited strictly to new residential, all-electric projects having no hookup to the gas distribution grid.

D.20-03-27 also required that "projects and installations in local government territories that have 'reach' codes which surpass the California Energy Code — or any other state requirement — are not prohibited from participating in the BUILD Program or the TECH Initiative." Thus, the BUILD Guidelines contain no reach code restrictions.

Low-Income Residential Housing Requirement

Under SB 1477 and D.20-03-027, at least $60 million of BUILD funding over four years must be reserved for new low-income residential housing unless the CEC and CPUC expand incentives for market rate housing. As such, the CEC offered BUILD funds exclusively to the low-income residential housing market during the initial offering. The CEC and CPUC considered and rejected expanding the applicant pools to include market-rate projects.

To qualify for BUILD funding, a project must meet the definition of low-income residential housing provided in SB 1477:

1. A multifamily residential building of at least two rental housing units that is operated to provide deed-restricted low-income residential housing[10] and that meets one or both of the following conditions:
    a. The property is in a disadvantaged community[11] or low-income community.[12]
    b. At least 80 percent of the households living in the building have incomes at or below 60 percent of the area median income.[13]
2. An individual low-income residence as described in Public Utilities Code, Section 2852(a)(3)(C): "(a)n individual residence sold at an affordable housing cost to a lower income household that is subject to a resale restriction or equity sharing agreement, for which the homeowner does not receive a greater share of equity than described in paragraph (2) of subdivision (c) of Section 65915 of the Government Code,[14] and public entity or nonprofit housing provider organized under Section 501(c)(3) of the Internal

10 The low-income housing must be provided as described in clause (i) of subparagraph (A) of paragraph (3) of subdivision (a) of Section 2852 of the Public Utilities Code.

11 A community identified as a disadvantaged community under Section 39711 of the Health and Safety Code.

12 A census tract or equivalent geographic area defined by the United States Census Bureau in which at least 50 percent of households have an income less than 60 percent of the area median gross income.

13 As defined in subdivision (f) of Section 50052.5 of the Health and Safety Code.

14 Public Utilities Code, Section 2852(a)(3)(C) further references Government Code Section 65915 (c)(2) in defining the share of equity.

Revenue Code[15] that has as its stated purpose in its articles of incorporation on file with the office of the Secretary of State to provide affordable housing to lower income households."

To help applicants apply and upload required documentation, including evidence of how their project meets federal, state, or local low-income participation requirements, CEC developed a data submission portal and BUILD Online application system. Further details on the low-income residential housing requirements are provided in the BUILD Guidelines, Chapter 2, Section A.4, Chapter 5, Section A(4)(a)(ii) and Appendix A, Section F(5).

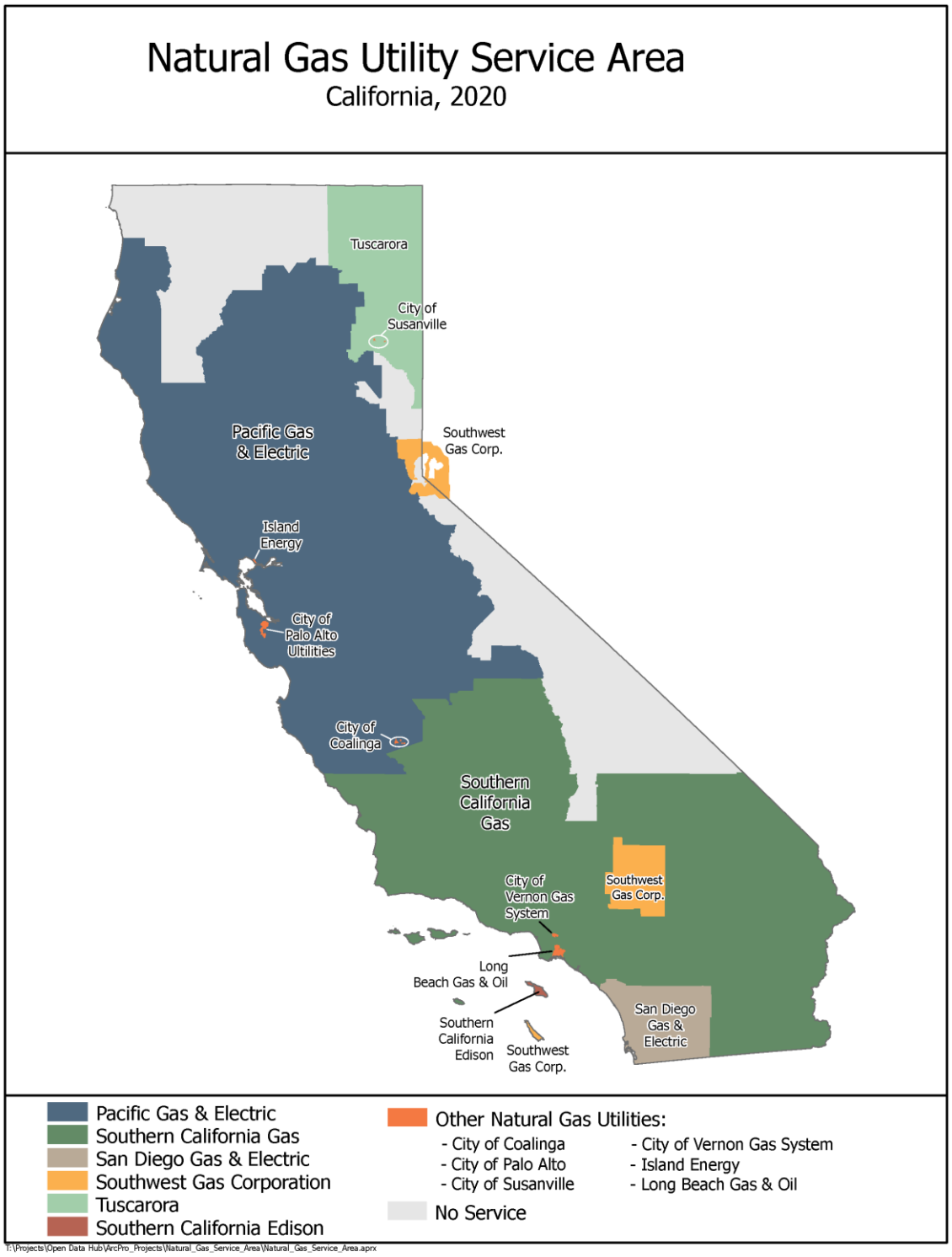
15 Public Utilities Code, Section 2852(a)(3)(C) further references Internal Revenue Code Section 501(c)(3) in defining exemption requirements for an organization organized or operated exclusively for exempt purposes.

Eligible Service Territories Requirement

To comply with rules regarding the use of cap-and-trade funds from consignment of allowances to auction, BUILD Program spending is proportionally directed to the natural gas corporation service territories where the funds are derived as shown in Table 2.1. To receive BUILD Program incentives, the project must be within one of the identified gas corporation territories in California as shown in Figure 2.1. Staff notes that completed BUILD projects may be served by any electricity supplier, including investor-owned utilities (IOU), publicly owned utilities (POU), community choice aggregators, or other retail suppliers.

Figure 2.1: Eligible Natural Gas Utility Service Area California, 2020

For visualization purposes and not a precise representation



Source: California Energy Commission

Table 2.1: Incentive Allocations for Each Natural Gas Corporation Territory

Natural Gas Corporation	Allocation Percentage	Statewide Expense Amount	Incentives Amount	Total Amount
Southern California Gas Company	49.26%	$9,852,000	$29,556,000	$39,408,000
Pacific Gas and Electric Company	42.34%	$8,468,000	$25,404,000	$33,872,000
San Diego Gas & Electric Company	6.77%	$1,354,000	$4,062,000	$5,416,000
Southwest Gas Corporation	1.63%	$326,000	$978,000	$1,304,000
Total	**100%**	**$20,000,000 (no less than)**	**$60,000,000**	**$80,000,000**

Source: CPUC D.20-03-027

Any BUILD project spending with statewide or cross-territory benefits, including administrative and evaluation spending, is attributed to the gas corporation service territories in proportion to their original funding contribution.

Any unspent funds remaining as of July 1, 2033, will be returned to the ratepayers of the respective gas corporations.

Energy Efficiency Requirements

According to the *BUILD Guidelines*, all buildings receiving technology incentives must comply with the applicable energy efficiency requirements under the Energy Code and local authority having jurisdiction. Applicants may also verify which Energy Code a project is subject to using the following dates:

- *2019 California Energy Code*: Building permit application(s) submitted to the building department January 1, 2020 through December 31, 2022.
- *2022 California Energy Code*: Building permit application(s) submitted to the building department on or after January 1, 2023.

As energy efficiency requirements under BUILD change to reflect updates to meet or exceed the Energy Code, additional information will be found in the BUILD Guidelines, Appendix B.

CHAPTER 3:
Incentive Structure

Incentive Structure

When administering the BUILD Program incentives, the CEC ties incentives to the cost of equipment, incremental cost difference for builders, and estimated GHG emission reduction level, with prioritization given to projects in low-income and disadvantaged communities, consistent with the requirements of D.20-03-027.

During the BUILD Program design, stakeholders expressed the need for simplified and accurate participation models. In response, CEC staff developed two incentive calculation tools that encourage participation and leveraged the design, modeling, and program participation efforts project developers already undertake. The incentive structure is designed to meet program requirements in the initial years and be flexible to support new standards and respond to changes without a major investment of resources in redesign that would divert funds from the best use.

BUILD incentives are made up of four components:

1. Base incentive based on GHG emissions avoided.
2. Increased building efficiency incentive based on a percentage of energy efficiency above code.
3. Incremental photovoltaic (PV) incentive based on a flat rate for PV above code to ensure modeled resident utility cost savings.
4. Kicker incentive for additional GHG reduction technologies.

For more information on incentive amounts, please refer to Chapter 4 of the latest BUILD Guidelines.

GHG Emission Calculation

The GHG emission reduction calculation is used as a basis for the incentive structure and a factor in incentive levels and is reported as part of program evaluation. Regulatory and statutory requirements include reporting of total avoided GHG emissions and cost per metric ton of avoided GHG emissions.

The GHG emission reduction calculation for projects funded with BUILD Program incentives are based on whole-building performance,[16] modeled using the CEC's California Energy Code Compliance (CBECC) software. The GHG emission factors developed initially

17 The energy performance of the entire building from the energy model will be considered for GHG emission calculations.

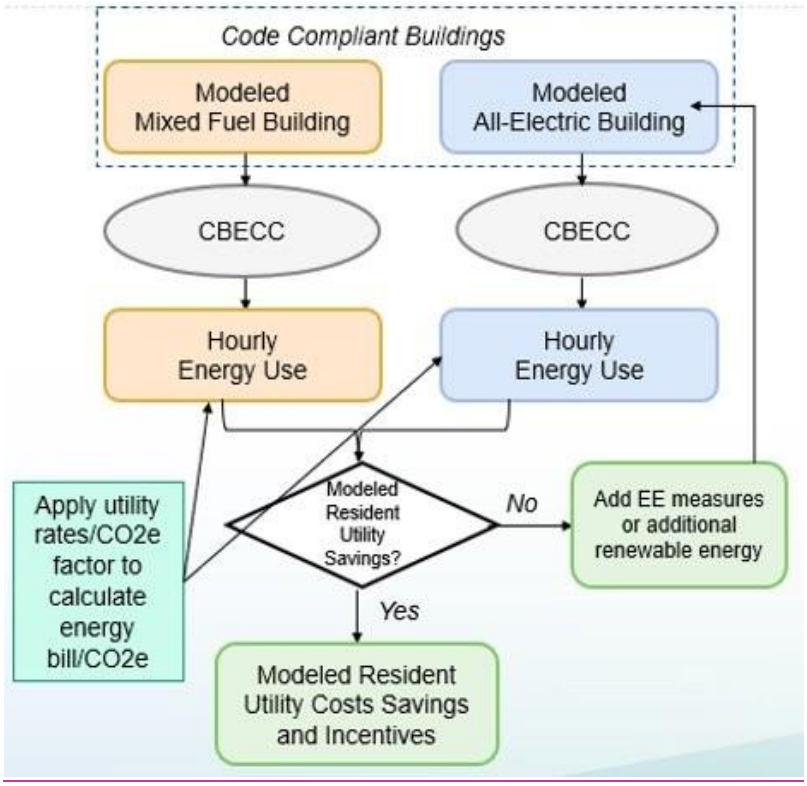
for the 2019, and now the 2022, Energy Codes will continue to be used for incentive calculations. The CBECC emissions calculation includes site fuel emissions, mainly the combustion of natural gas from space and water heating, and emissions associated with the generation of electricity. To calculate emission reductions, the all-electric modeled building emissions are compared to the mixed-fuel prescriptive building emissions baseline based on the Energy Code in effect at the time the applicant applies for the building permit with the applicable local agency or tribal government. This baseline may continue to be updated as appropriate based on future updates to Title 24 and CBECC software.

The lifetime GHG emission reductions are calculated on a 30-year term, which is consistent with the life-cycle analysis of a residential building under codes and standards. See Chapter 6 for more information on the bill savings method.

Energy Bill Savings Calculation

As the BUILD Program has mutual goals of GHG emission reduction and bill savings, staff developed tools for project developers to calculate their bill savings requirements. The bill savings of a project are significantly affected by local utility rates and may be specific to certain service territories. As such, staff developed tools to account for various climate zones and utilities. Figure 3.1 is a flow chart of this process. See Chapter 7 for additional information on the bill savings method.

Figure 3.1: Incentive Structure Development Flow Chart



Source: California Energy Commission

Kicker Incentives

For building design features that are additional to those considered in the base incentive and represent additional GHG emission reductions, kicker incentives are offered at a flat rate for specific design features. Additional information on kicker incentives technologies and levels is in Chapter 4 of this document and the *BUILD Guidelines*. Incentive Calculations

The program launched with two pathways to calculate the incentive value of a project – the BUILD Calculator and the Custom Path Tool. Both pathways provide the upfront analysis necessary to meet statutory program requirements while streamlining participation. The BUILD Calculator provided a simplified approach to estimate incentive for low-income developers and was intended for estimation purposes only. Due to energy rate updates, the BUILD Calculator is no longer current, and neither design decisions nor expenditures are to be based on its results. However, the Custom Path Tool continues to be updated and calculates incentives and GHG avoidance based the project's energy models, thus providing a more accurate estimation. While CEC staff recognizes the initial important role of the BUILD Calculator, specifically for new adopter low-income developers as it can assist with securing project funding in the predevelopment phase, the use of the calculator requires potentially significant incentive

amount revisions later in the application process and CEC's continued use of the calculator for most incentive application submissions is not recommended – based on stakeholder experience and feedback during the first two years of implementation. CEC staff is considering amending the Guidelines to address this issue.

CHAPTER 4:
Required and Eligible Technologies

The BUILD Program encourages the design and construction of low-emission, energy-efficient buildings, with cobenefits that include reduced energy utility bills for the occupants and improved comfort, safety, and indoor air quality. D.20-03-027 does not restrict BUILD Program incentives to specific technologies or measures. Instead, *BUILD Guidelines* provide for base incentives for core technologies as well as any combination of additional technology incentives or "kicker incentives", including energy efficiency and demand-response measures, electric battery storage, and other measures and technologies. Based on stakeholder input, the BUILD Program incentives support the installation of technologies beyond what is required for Energy Code compliance, including induction cooktops and electric vehicle charging equipment.

All-electric building design with no gas hookup is a D.20-03-027 requirement for the BUILD Program. As such, technologies that use fossil or renewable natural gas or hydrogen will not be included in the BUILD Program. Please see the equipment list in Appendix A for each technology type under the BUILD Program.

BUILD Base Incentives

The BUILD Program incentivizes a combination of energy efficient, low-emission technologies and measures, including energy efficiency, space conditioning, water heating, cooking, and laundry needs. Details on technology types and corresponding incentive amounts are listed in Tables 4.1 and 4.2.

Table 4.1: Technologies for BUILD Base Incentives

Energy End Use	Core Technologies	Minimum Requirements	Incentive Amount
Space Conditioning	Heat Pump HVAC	Heating Seasonal Performance Factor (HSPF2) ≥ 7.5	$150/metric ton (MT) of avoided GHG emissions
Water Heating	Unitary Heat Pump Water Heater	Northwest Energy Efficiency Alliance (NEEA) Tier 3	$150/metric ton (MT) of avoided GHG emissions
Water Heating	Central On-Site Heat Pump Water Heater	Approval in CBECC software	$150/metric ton (MT) of avoided GHG emissions

Source: California Energy Commission

Heat Pump Space Conditioning

During the heating season, heat pumps move heat from outside into the home; during the cooling season, heat pumps run in reverse, moving heat from inside the home to the outdoors.

Electric heat pumps substitute gas furnaces and are a low-emission technology, eliminating the need for on-site combustion of natural gas for space heating and, therefore, reducing GHG emissions. For space conditioning, heat pumps must have a heating seasonal performance factor (HSPF2) of 7.5 to be eligible for BUILD incentives.

Heat Pump Water Heating

Heat pump water heaters use electricity to move heat from one source (typically ambient air) to water instead of using an electric resistance element. Because of this function, they can be more than three times as energy-efficient than conventional electric resistance water heaters. They are also low-emission compared to gas water heaters by avoiding on-site combustion of natural gas. To meet the cost-savings and carbon-reduction goals, unitary heat pump water heaters used under the BUILD Program include those meeting the Northwest Energy Efficiency Alliance (NEEA) Tier 3 criteria for residential electric advanced water heating specifications.[17] To be eligible for BUILD incentives, central heat pump water heaters must be approved in the CBECC software. These requirements are further delineated in the BUILD Guidelines, Appendix B, Section B.

BUILD Kicker Incentives

As stated in Chapter 3, BUILD Program kicker incentives are additional incentives to offset the costs of added or more advanced technology not captured in the base incentive calculation. Eligible technologies available for kicker incentives are listed in Table 4.2. These technologies offer advanced energy efficiency, GHG emissions reductions, grid-flexible capability, additional renewable energy generation, or storage. Kicker incentives are not provided for technologies used to meet Energy Code compliance.

CEC is considering if updates need to be made to eligible technologies or GWP refrigerant levels for kicker incentives. For the current guidance on kicker incentives requirements by technology type, please consult the *BUILD Guidelines*, Appendix B.

Table 4.2: Eligible Technologies for BUILD Kicker Incentives

Eligible Technologies	Minimum Requirement	Incentive Level
Grid Flexibility	JA13-compliant unitary HPWH[18]	$500/per unit

17 Northwest Energy Efficiency Alliance. March 1, 2022. *NEEA Advance Water Heating Specification,*, https://neea.org/img/documents/Advanced-Water-Heating- Specification.pdf.

18 "Joint Appendix 13," https://efiling.energy.ca.gov/GetDocument.aspx?tn=227876&DocumentContentId=59256.

Eligible Technologies	Minimum Requirement	Incentive Level
	Smart thermostat	$50/per unit
Refrigerant	Lower-GWP (GWP < 750) Low GWP (GWP < 150)	$500/lb of refrigerant $1,500/lb of refrigerant
Induction Cooktop	Induction, permanent fixture (this includes slide-in ranges)	$300/per unit
Clothes Dryer	Heat pump clothes dryer, ENERGY STAR®-certified	$150/per unit
Battery Storage System	Listed on the Solar Equipment Lists and JA 12 Compliant	$250/kWh storage capacity
Electric Vehicle Supply Equipment (EVSE) [19]	For AC EVSE only, be capable of delivering electricity to a plug-in electric vehicle at a minimum rate of 6.2 kilowatts (kW) Listed on the CALeVIP Eligible Equipment List (or future CEC equivalent list) or ENERGY STAR-certified	$200/per unit (single family) $300/per unit (multifamily)
Smart Electric Vehicle Supply Equipment (Smart EVSE)	For AC EVSE only, be capable of delivering electricity to a plug-in electric vehicle at a minimum rate of 6.2 kilowatts (kW) Listed on Southern California Edison's Approved Product List.	$500/per unit (single family) $600/per unit (multifamily)
Bidirectional Electric Vehicle Supply Equipment (Bidirectional EVSE)	Meet the smart EVSE requirements listed above. Demonstrate that the electric utility serving the project allows installing bidirectional	$1000/per unit

19 For the BUILD Guidelines, smart EVSE is EVSE capable of managing charging based on electricity rates, greenhouse gas signals, or other dynamic grid signals. See BUILD Guidelines, Appendix B, Table B.4 for minimum requirements.

Eligible Technologies	Minimum Requirement	Incentive Level
	EVSE by submitting an approved interconnection agreement or an equivalent approval from the electric utility. (for projects in electric IOU territories only). Shall be safety certified to the applicable UL standard for utility interconnection in California. As of November 2023, EVSE must be certified to UL 1741 Supplement SB as a prerequisite for interconnection. Please refer to the applicable utility's interconnection tariff (Rule 21) for the latest requirements. The CEC maintains a list of UL 1741 Supplement SB certified equipment on the V2G Equipment List.	

Demand Response/Load Flexibility

Heat pump water heaters have the capability to provide load flexibility, and the electricity consumption of heat pump water heaters can be scheduled or adjusted to match times of high renewable energy supply. In this way, heat pump water heaters can act as a battery, loading and storing thermal energy when it is beneficial to the electric grid. Heat pump water heaters with grid flexibility capabilities may be eligible for kicker incentives. These heat pump water heaters must comply with 2019 Title 24 Part 6 Joint Appendix JA13[20] Water Heater Demand Management. They must also comply with CTA-2045 or other open-source compliance standards. CEC staff explored these considerations with public input and provided final eligibility guidance in the BUILD Guidelines, Appendix B, Sections B and C.

On July 8, 2020, the CEC adopted JA13. The JA13 specifications for water heater demand management includes system components, safety requirements, minimum energy efficiency performance, and control requirements. The control requirements, or demand management functionality, must have the ability for basic load-up, advanced load-up, return to standard

20 "Joint Appendix 13," https://efiling.energy.ca.gov/GetDocument.aspx?tn=227876&DocumentContentId=59256.

operation, light shed, deep shed, and full shed. These functionalities allow the heat pump water heater to communicate and react to real-time price signals and other grid metrics to optimize operation for demand management while ensuring sufficient hot water supply.

CTA-2045 refers to a specification published by the Consumer Technology Association (CTA) and dual-listed by the American National Standards Institute (ANSI). From 2008 through 2012, this national standard was created through a collaboration by the Electric Power Research Institute (EPRI), the Smart Grid Interoperability Panel (SGIP),[21] manufacturers, utilities, and several standards experts from the high-tech industry. The CTA-2045 communications port is analogous in concept to a USB socket on a camera, television, or computer, but this socket is specifically designed for appliances. The most important purpose of the standard is to define how to pass information from a universal communication module to the smart grid device (SGD) or appliance. The socket enables external communication and puts the customer in charge of how communication links to their appliances will occur.

Additional information about grid flexibility technologies considered for kicker incentives is found in Appendix B, Section E, of the BUILD Guidelines.

Low-GWP Refrigerants

Heat pump systems transfer heat using a refrigerant. Systems using a refrigerant have associated GHG emissions either through annual leakage or end-of-life leakage. Conventional refrigerants typically have high global warming potential (GWP) values, around 1,500–2,000, which contributes to GHG emissions. Encouraging the use of low-GWP refrigerants in heat pump systems is part of the state's overall decarbonization goal.

Reducing refrigerant-based GHG emissions has some of the greatest potential to reduce overall GHG emissions in California, and lower GWP refrigerants will further the objectives of SB 1477 to promote emerging building decarbonization technologies and strategies. As stated in D.20-03-027, in determining kicker incentives relating to refrigerant usage, the CEC provides tiered incentives for space- and water-heating equipment that use low-GWP refrigerants and midrange GWP refrigerant. CPUC defines "high-GWP" refrigerants as refrigerants with a GWP above 750, consistent with CARB's recent regulatory proposal for new stationary air conditioning systems starting January 1, 2023. While CEC staff understands that refrigerants with a GWP of 750 or greater are prohibited[22] for a specific AC equipment category as of January 1, 2023,[23] the GWP kickers will remain to continue encouraging applicants with incentives to choose the lower GWP options.

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22 Smart Grid Interoperability Panel https:// www.nist.gov/programs-projects/smart-grid-national-coordination/smart-grid-interoperability-panel-sgip.

22 Per the HFC Regulation, prohibition means "no person shall sell, lease, rent, install, use, or otherwise enter into commerce, in the State of California, any refrigeration equipment or foam system manufactured after the effective date… ." https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2020/hfc2020/frorevised.pdf.

23 "CARB Air-conditioning Equipment," https://ww2.arb.ca.gov/our-work/programs/california-significant-new-alternatives-policy-snap/air-conditioning-equipment.

Heat pump systems using refrigerants with a global warming potential below 750 qualify for kicker incentives. As stated in D.20-03-027, "Refrigerants used in the space and water heating appliances of building projects funded by the BUILD Program ... shall not exceed the 750 GWP threshold by January 1, 2023."[24] These criteria may change in revisions to the BUILD Implementation Plan as rulemaking through CARB may require low-GWP refrigerants in heat pump air-conditioning systems.

Cooking and Laundry Needs

If a builder or developer provides cooking and laundry appliances, which is common in low-income multifamily housing, ultra-efficient appliances are eligible for BUILD kicker incentives. Only the highest performing appliances are considered for incentive kickers. CEC staff determined the appropriate performance threshold or ENERGY STAR®[25] rating in the BUILD Guidelines. Induction cooking is one of the most efficient cooking technologies. With this technology, up to 90 percent of the energy consumed is transferred to the food, compared to about 74 percent for traditional electric systems and 40 percent for gas. Induction cooktops use an electromagnetic field below a glass surface to transfer current directly to magnetic cookware, causing it to heat up. Induction also cooks faster and offers superior temperature control.

Heat pump clothes dryers are a type of condensing dryer. The moisture from the damp clothes condenses on the cold coil of the heat pump, and the condensed water is discharged into a drainpipe. Because they use heat pump technology, these clothes dryers are among the most energy-efficient on the market. Many clothes dryers on the ENERGY STAR Most Efficient list are heat pump dryers. Products that make the ENERGY STAR Most Efficient list deliver cutting-edge energy efficiency along with the latest technology innovation. They represent the year's best for energy savings and environmental protection.

As identified in Chapter 4 of the BUILD Guidelines, kicker incentives include induction cooktops and heat pump clothes dryers.

On-Site Energy Storage

The benefits of onsite solar PV generation can be maximized by pairing the system with battery storage. Furthermore, storing energy can reduce grid dependence and GHG emissions by shifting load and providing grid harmonization.

Battery storage paired with PV generation is an eligible kicker incentive. Technology or a portion of installed technology required under the Energy Code is not eligible for BUILD kicker incentives. However, staff recognizes that in some cases, such as energy storage, limiting

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24 California Public Utilities Commission. D. 20-03-027, *Decision Establishing Building Decarbonization Pilot Programs.* pg. 68, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF.

25 "ENERGY STAR," https://www.energystar.gov/.26 California Energy Commission, Building Initiative for Low-Emissions Development –*"Build Factsheet Layering",* https://www.energy.ca.gov/media/9581.

eligibility could be contrary to the other policies supporting adoption of beneficial technologies. CEC staff explored these considerations and provided final eligibility guidance in Appendix B, Sections C and E of the BUILD Guidelines.

Battery storage technologies, batteries, or energy storage systems must also be listed on the CEC's Solar Equipment Lists. The system must comply with the 2019 Title 24, Part 6, Joint Appendix 12 (JA12)— Qualification Requirements for Battery Storage System.

Alignment With Other Incentives

The CEC recognizes several programs are or have been implemented to address building decarbonization. As the CEC collaborated with the CPUC and the public to develop proposed program requirements, the layering of incentives is now addressed in the BUILD Guidelines, Chapter 6, Section L. Since initial program implementation, the CEC continues to monitor overlap between BUILD base and kicker incentives and other incentive programs in the state and will propose changes to the CPUC when appropriate. Moreover, to simplify incentive layering with complementary programs, the BUILD Program developed a program layering fact sheet[26] available on the BUILD webpage.

26 California Energy Commission, Building Initiative for Low-Emissions Development –*"Build Factsheet Layering",* https://www.energy.ca.gov/media/9581.

CHAPTER 5:
Process for Evaluating New Technologies

SB 1477 requires the BUILD Program to develop a process for evaluating new technologies. Technologies considered in the base incentive modeling and calculations under BUILD must be incorporated into the CBECC software. There are two existing processes for manufacturers to add their equipment to the CBECC software during the standard three-year iterative Energy Code update process or the compliance process. The compliance process begins by working with CEC staff and then eventually proceeding to a business meeting. This process will require a verification process that can take significant time and be costly for manufacturers but will provide assurance that the new technology is performing as expected.

Certain new technologies that fit in the categories for kicker incentives will need to meet the minimum requirements and be listed on the technology specific lists provided in the BUILD Guidelines.

If a technology cannot be incorporated into the CBECC software, the product will not be eligible under the base incentive structure of the BUILD Program. Please consult the BUILD Guidelines, Appendix B, Section D for additional information.

CHAPTER 6:
Bill Savings Method

Energy Bill Savings Method

As delineated in the *BUILD Guidelines*, Appendix C, SB 1477 directs the CPUC, in supervising the administration of the BUILD Program, to ensure that projects funded in new low-income residential buildings in disadvantaged or low-income communities do not result in higher utility bills for building occupants.

D.20-03-027 directs the CEC to develop or adopt a tool or method to measure bill savings resulting from the BUILD Program. Rather than developing a new calculation tool, CEC staff used existing tools and information to model resident utility costs.

This section describes the method CEC staff developed to calculate bill savings for projects receiving incentives through the BUILD Program. This method seeks to accurately estimate modeled resident utility cost to better estimate the statutory required savings. The method relies on the modeled estimate of the designed energy of a building and applicable utility rates to calculate the expected resident utility costs.

To assist with design considerations in cases where the expected combination of energy efficiency measures and new electric technologies did not indicate bill savings, CEC staff used CBECC analysis to determine what building performance criteria must be met to show utility bill savings. This analysis includes mechanical system performance efficiencies, additional PV generation beyond what is required in code, and building envelope performance. These performance criteria may differ in different climate zones. *BUILD Guidelines*, Appendix C provides more details about the bill savings methodology.

Building Energy Modeling

CBECC is a free computer program developed by the CEC for demonstrating compliance with the Energy Code. CBECC takes inputs on building envelope and mechanical system design and calculates the energy usage of the building. One output of CBECC consists of hourly energy use profiles, which are the estimated therms and kilowatt-hours used by the designed building each hour of a calendar year. By applying the therms to hourly natural gas utility rates, the natural gas bill can be calculated. Likewise, by applying the kilowatt-hours to hourly electric utility rates, the electric bill can be calculated. The combination of these bills totals the energy bill that can be compared to evaluate bill savings.

Establishing the Baseline

The focus of the BUILD Program is on new low-income housing, primarily in newly constructed buildings. Newly constructed buildings have no historical data for utility costs. To calculate bill savings, a baseline must be set for these projects. In the BUILD Guidelines, energy bills of a mixed-fuel building meeting the 2019 or 2022 Energy Code prescriptive

standards is the baseline. This is consistent with the requirements for setting a GHG emissions baseline under the BUILD Program.

Defining Bill Savings

Under the BUILD bill savings methodology, "bill savings" shall be defined as no energy utility (natural gas and electricity) bill increase on an annual basis.

Rates

The California Alternative Rates for Energy (CARE)[27] program offers qualifying low-income IOU customers a 30–35 percent discount on their electric rate and a 20 percent discount on their natural gas rate. Many POUs offer similar discounts to their qualifying low-income customers. It is reasonable to assume that most tenants in low-income affordable housing buildings qualify for discounted energy utility rates. Therefore, the rates used in this bill savings methodology as proposed are baseline CARE rates and time-of-use (TOU) rates. CEC staff considered other approaches for rates in the bill savings methodology in the BUILD Guidelines, Appendix C, Section D.2.

Because the value of the utility rates is essential in the bill savings methodology, it is important that they be accurate. Utility rates can change, so there is a process and schedule for updating the rates. For the bill savings methodology, CEC staff update rates every two years.

Treatment of Excess PV Generation

The 2019 and 2022 Energy Codes require PV systems on residential buildings. PV generation offsets electricity demand from the grid and, therefore, can offset the electricity bill for the building occupant. During certain times of day throughout the year, there may be an excess of PV generation compared to estimated building electricity load. CEC staff evaluated how best to address excess PV generation under net-metering agreements and any successor tariffs in the assessment of bill savings. The CEC issued full guidance on this matter in the *BUILD Guidelines*, Appendix C, Section E.1.

Limitations

Ensuring energy bills do not increase is challenging due to uncertainties in ways that occupants will use a building, varying weather conditions, and other factors. CEC staff has continued using a conservative method for the bill savings methodology that incorporates an additional 5 percent cushion in the calculation of realized cost, as compared to baseline cost, to ensure the resulting project complies with the bill savings requirement. This method includes only CARE rates and default TOU rates. However, there are many rate structures/schedules and tiers within each rate depending on energy usage, and each rate can vary on a month-to-month basis. Details in rates used for this method are in the BUILD

27 California Public Utilities Commission. "California Alternative Rates for Energy (CARE)," https://www.cpuc.ca.gov/lowincomerates/.

Guidelines, Appendix C, Sections D and H.

CHAPTER 7:
Technical Assistance

SB 1477 and D.20-03-027 requires the BUILD Program to include technical assistance to encourage and support the use of the program and the development of all-electric affordable housing by prospective applicants.[28] CEC contracted a third-party technical assistance provider (TAP) through a competitive bidding process. As the program offers incentives to low-income residential housing projects, the TAP has expertise in working with low-income housing developers, in disadvantaged communities, and with specific design considerations unique to low-income housing development.

The TAP provides design assistance to stakeholders to explore project designs and overcome any technical challenges encountered in developing an all-electric residential project. The guidance provided includes project design options and recommendations, permitting assistance, and assisting the developer and energy consultants in demonstrating code compliance for the project. The initial TAP contract awarded $6 million for a four-year term, with the CEC reserving the options to (1) add up to $2 million dollars for a total funding amount not to exceed $8 million and (2) add up to an additional two years for a total contract term of six years.

The TAP has a thorough understanding of all currently available technologies identified as eligible for BUILD Program incentive funding, including the installation and maintenance needs for these technologies.

In addition to the technical assistance provided to project owners and developers, capped at 300 hours of no-cost technical assistance per eligible applicant, the TAP also provides education, outreach, and stakeholder engagement support to the program. Through these efforts, the BUILD Program maintains a robust pipeline of projects receiving 270 technical assistance applications of which 156 are active.

Technical Assistance Progress and the New Adopter Design Award

TAP services include assisting eligible applicants throughout all phases of building design and construction, supporting building design and installation considerations of near-zero emission equipment and technologies, helping fill knowledge gaps in the local permitting of all-electric residential buildings, and supporting submission of applications in compliance with the BUILD Program. As stated in Chapter 3 of the *BUILD Guidelines*, to advance the BUILD Program goals of "support[ing] the low-income housing industry's transformation to all-electric development that incorporates near-zero emission technologies," the TAP's building

28 Public Utilities Code Section 921.1(d)(1).

electrification knowledge was made available to a wider audience, including architects, engineers, energy consultants, and staff of an eligible applicant prior to and throughout the BUILD participation process.

To increase participation from project owners and developers who have not built an all-electric residential building, the CEC allocated $2 million as additional incentive for new adopters. The new adopter design award provides an eligible applicant constructing their first all-electric, low-income multifamily building with up to $100,000 to defray direct design costs — with the specific goal of affecting a developer's early decision-making in housing development. As of March 2024, CEC staff reserved BUILD incentive funds for five new adopter projects and nine projects are under review. At an estimated $100,000 award per applicant, 70 percent of the $2 million additional incentives for the new adopter design award has been requested. The table below summarizes the number of new adopter projects in their respective IOU service territory. Table 7.1 illustrates the interest of the new adopter design award with less experienced all-electric applicants.

Table 7. 1: New Adopter Design Award by IOU Territory

IOU Territory	Funding Allocation per IOU	Amount Reserved	Amount Under Review	Total Estimated Funds Remaining
SCG	$985,200	$100,000/1 app	$600,000/6 apps	$285,200
PG&E	$846,800	$300,000/3 apps	$300,000/3 apps	$246,800
SDG&E	$135,400	$100,000/1 app	$0	$35,400
SWG	$32,600	$0	$0	$32,6000
Total	$2,000,000	$500,000	$900,000	$600,000

Source: California Energy Commission

CHAPTER 8:
Outreach Plan

SB 1477 requires implementation of an outreach plan to encourage applications for participation in the BUILD incentive program.[29] Public Utilities Code Section 921.1(d)(5) requires the CPUC to implement a BUILD Program outreach plan to encourage applications for projects funded with money reserved for low-income housing developments. Section 921.1(d)(1) requires the CPUC to ensure that new low-income residential housing building projects are offered technical assistance to encourage applications eligible for BUILD Program incentives. Moreover, D.20-03-027 provided analysis and guidance on the implementation of the outreach program supporting BUILD and the complementary efforts supporting the TECH initiative. Consistent with D.20-03-027, the CEC staff works closely with the TAP to implement the multiyear education and outreach (E&O) plan and provide technical assistance to all prospective applicants and stakeholders for new low-income residential housing to encourage greater participation in the BUILD Program.

The E&O campaign of the BUILD Program is designed to increase awareness and understanding of the availability and benefits of building all-electric housing and the technologies that enable these buildings. Audiences include builders, developers, state, and local agencies involved in low-income housing development, community-based organizations (CBOs), and state and local leaders that can influence and lead the intended transformation in policy and direct implementation.

The initial and ongoing public outreach of the BUILD Program raises awareness and adoption of building decarbonization technologies into Californian homes, including customers who are low-income, disadvantaged, and hard to reach. Outreach efforts advance the degree to which Californians are not only aware of, but also engaged in, building decarbonization adoption to advance the markets for technologies, create demand and supply benefits, and ensure that customers are able to adopt building decarbonization technologies.

29 Public Utilities Code, Section 921.1(d)(5).

Messages and delivery methods are tailored for the specific identified audiences and the strategies developed complement related existing and planned programs and activities. The BUILD Program team continues to assess the needs of specific regions and populations in developing messages, materials, and communication approaches.

The BUILD Program is situated within a complex landscape of programs supporting low-income housing development. In recognition of this, CEC staff and the TAP partner with and leverage other decarbonization communications efforts such as transportation electrification, building electrification, energy efficiency, and onsite renewables to ensure stakeholders are provided information about the broader suite of program opportunities available through utility, local, state, and federal programs.

To ensure participation and partnership with customers across a variety of demographic groups, the BUILD team partners with organizations that serve primarily low-income, disadvantaged, and hard-to-reach customers, such as community-based organizations and local housing authorities. CEC staff also coordinated with the Disadvantaged Communities Advisory Group (DACAG) to ensure programs and policies are informed by and create real benefit for disadvantaged communities.

To ensure BUILD Program reached affordable developers serving low-income residents and disadvantaged communities, the BUILD team consults with and partners with key organizations, associations, and agencies that have experience and insight into these industry sectors.

Education and Outreach Activities

For the BUILD Program goal of expanding building electrification knowledge through E&O tools and activities, numerous electrification and program fact sheets have been published to the BUILD website and are also provided to interested stakeholders at conference events and during TAP intake interviews. BUILD Program Fact Sheet, Technology Kicker Incentives Fact Sheets, and Electrification FAQ are a few examples of E&O program materials.[30] The BUILD Program team has also conducted numerous outreach webinars and presentations to train applicants on the BUILD online systems, supplementing project funds with kickers technologies and program-layering opportunities.

To date, the BUILD Program team's E&O efforts have reached thousands of stakeholders through the tabling, participation, and panel presentations at conference and stakeholder events; examples include the Southern California Association of Nonprofit Housing (SCANPH) conference, the Non-Profit Housing's (NPH) Annual Conference, the LA Decarbonization

30 California Energy Commission, Building Initiative for Low-Emissions Development (BUILD), https://www.energy.ca.gov/programs-and-topics/programs/building-initiative-low-emissions-development-program-build.

Summit, Housing California, and the San Joaquin Valley Housing Collaborative (SJVHC) conference. The TAP also provides numerous presentations to various local planning agencies and CBOs, including the Los Angeles Latino Chamber of Commerce.

The BUILD Program team continues to conduct email campaigns to Affordable Housing and Sustainable Communities (AHSC) and TCAC low-income tax credit program participants. Additional BUILD program team activities include publishing LinkedIn posts and a quarterly newsletter to educate stakeholders on key benefits of going all-electric and encourage participation in the TA services and incentives provided by the BUILD Program to offset electrification costs.

CHAPTER 9:
Participation Process

BUILD Program participation typically aligns with the following steps:

1. TAP identifies and reaches out to developers and other interested parties planning projects that may be eligible for BUILD incentives.
2. Prospective applicant indicates interest. CEC staff works independently or with the TAP team to perform an interest and eligibility intake to determine appropriate level of technical assistance and support.
3. TAP supports design considerations and the level of application assistance needed. CEC staff determines the appropriate hours that are estimated to result from support. Maximum levels of technical assistance support and structure are determined in collaboration with the TAP.
4. Eligible applicant submits BUILD Program application. Initial considerations for application requirements include:
    - Project description.
    - Proof of eligibility.
    - Location details and documentation as needed.
    - Technology design description (elements that connect to funding).
    - Incentive calculations.
    - Project budget and timeline.
    - Potential risks.
5. CEC completes review of application, issues corrections, approves application, reserves funds, and keeps the applicant notified of participation process and steps to receive interim payments as specified in the *BUILD Guidelines.*
6. Applicant notifies the CEC of project changes, if applicable, while progressing through the application steps. All required monitoring and evaluation metrics as required by statute, D.20-03-027, are provided to a program evaluator. Project updates and revisions will be considered and approved as necessary depending on information submitted during application transitions or as identified by project developer.
7. The final payment is made.
8. The CEC provides additional outreach support to the program evaluator for required evaluation, measurement, and verification (EM&V) activities.

Application System

The BUILD Program incentive estimation tools and guidelines were designed to accommodate the needs of the affordable housing industry, with an emphasis on simplified and streamlined

participation while ensuring that all program requirements are met. CEC staff developed an initial BUILD Online System to collect and process applications and after early stakeholder feedback, upgraded the system to provide a more robust and user-friendly application process.

Reservation Application

Often with TAP assistance, prospective program participants submit a program application and supporting documentation during the design stage before construction, or during the construction stage, signaling a commitment to build all-electric housing consistent with the goals and requirements of the BUILD Program. BUILD Program applications and incentive calculations are at the subdivision or whole-building level to bundle and streamline documentation requirements. Under the *BUILD Guidelines*, when an application is approved, the CEC reserves funding for the project for a specified period, allowing the applicant to complete construction and submit payment claims.

Payment Claim Application

CEC staff designed BUILD to provide for progress payments before project completion at the request of affordable housing stakeholders. This includes 25 percent of the base GHG avoidance incentive when a qualifying project is granted a building permit and an additional 50 percent of the base incentive upon proof of a completed foundation. Program participants with approved reservations can submit progress payment claims during the construction phase and a final payment claim upon completion of the project. Final payment requires the issuance of a temporary certificate of occupancy. For more information on program participation and the incentive claims process, please see Chapter 5 and Appendix A of the *BUILD Guidelines*.

Application Selection Criteria

The BUILD Program is focused on qualifying eligible low-income housing projects on a first-come, first-served basis. While the BUILD Program accepts all qualifying applications as funding allows, eligible applicants are limited to receiving no more that $2 million total in BUILD incentive and reservations. The new adopter design award does not count against this limit. CEC staff continues to monitor disbursements by gas corporation territories to ensure that funding meets all allocation requirements. If no projects are available to support the allocation as required, CEC staff will work with CPUC staff to determine appropriate actions to further encourage fund disbursal l in the relevant gas corporation territory.

CEC staff is considering program changes that would increase tribal access where funds remain, ensure incentive calculation accuracy, and update the utility cost savings method and equipment requirements for applicants.

D.20-03-27 found that it is appropriate to prioritize BUILD Program incentives toward the regions in the state with the highest potential for achieving program goals, including reducing GHG emissions and serving low-income customers. The BUILD Program team continues to support activities, outreach, and program monitoring designed to advance these goals

throughout the life of the program.

CHAPTER 10:
Process and Metrics to Evaluate Program Performance

BUILD Program Metrics

BUILD is a pilot program intended to test a programmatic approach toward building decarbonization. As a pilot, information and data collected from this program will guide future policy decisions. It is important to collect information and data that will be most valuable for these decisions.

SB 1477 requires BUILD Program metrics to include, at a minimum:

- The number of low-emission systems installed in each building type.
- Projected utility bill savings.
- Cost per metric ton of avoided GHG emissions.

To assist with market transformation, information sharing, and data collection, the CEC developed the BUILD Online System[31] and BUILD GIS Dashboard[32] The BUILD Online System has application and reporting functionality that gathers metrics from the BUILD calculator tools and payment claim processes. The BUILD GIS Dashboard gives any internet connected stakeholder immediate program status information and allows them to gather a significant amount of data about program participants.

Program Evaluation and Data Reporting

Pursuant to D.20-03-027, the BUILD Program and TECH Initiative have a single evaluator covering both programs. A single evaluator simplifies engagement during program design to ensure the pilot programs are set up with evaluation needs in mind. Using metrics including those identified in SB 1477, the program evaluator measures the effect of program activities, as well as qualitatively assess the success and scalability of the strategies of the programs and analyze bill savings under BUILD.[33] As the BUILD Program administrator, the CEC collects program data and delivers the data to the program evaluator in a timely fashion. The program evaluator ensures the BUILD Program administrator and TECH Initiative implementer include the following data annually so that gas corporations comply with their reporting obligations under the Cap-and-Trade Program:

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30 BUILD Online Application System, https://buildapp.energy.ca.gov/Default.

31 BUILD GIS, https://experience.arcgis.com/experience/9dc75099c8d44288b9457b3a398db30e.

32 Opinion Dynamics. Evaluation of the Building Initiative for Low-Emissions Development (BUILD) Program, https://pda.energydataweb.com/#!/documents/2585/view.

- Total avoided GHG emissions expected from that year's expenditures (estimated)
- Total expenditures
- Itemization of administration and outreach expenditures

CHAPTER 11:
Next Steps

CEC staff will continue to collaborate with CPUC staff and program stakeholders to implement and improve the BUILD Program. The BUILD Program continues to accept incentive applications, process existing reservations, and participate in the CPUC's EM&V evaluation process. CEC staff is also extending the TAP contract through October 2027 to continue providing education on all-electric best practices across all residential building systems, assist stakeholders with transforming their standard practices in this new era of all-electric buildings and support incentive application transitions and claim processes.

Within two years after the March 1, 2022, program launch, more than one-third of the incentive funds have been allocated. Table 11.1 provides the total incentives approved, requested, and TAP pipeline projections through March 2024. Based on BUILD incentive applications received and anticipated, three of the four IOU territories comprising the BUILD Program should be fully subscribed by 2025. Since most of the BUILD Program gas IOU territories are near full subscription, and to simplify program administration, BUILD staff recommends this be the final update to the BUILD Implementation Plan.

Table 11.1: Anticipated Program Funding Status by Natural Gas Corporation Territory (As of March 2024)

Natural Gas IOU Territory	IOU Incentive Allocation Totals (initial)	Incentives Approved	Incentives In Review	TAP Pipeline Project Estimates	Remaining Funds
SCG	$29,556,000	$9,058,558	$6,050,342	$13,472,000	$20,497,442
PG&E	$25,404,000	$12,137,122	$11,338,818	$19,333,559	$13,266,878
SDG&E	$4,062,000	$ 2,717,255	$0	$ 4,820,737	$1,344,745
SWG	$978,000	$0	$0	$0	$978,000
Total	**$60,000,000**	**$23,912,935**	**$17,389,160**	**$37,626,296**	**$36,087,065**

Source: California Energy Commission

Market Transformation

While CEC staff continues to assist the program evaluator with annual metrics data for cap-and-trade reporting obligations, provided in Tables 11.1 and 11.2 is a snapshot of the progress of the BUILD Program to date.

Some trends include:

- Majority of applications are received in Design Reservation phase (Table 11.2)
- Near full subscription. Based on BUILD incentive applications received and anticipated, three of the four IOU territories comprising the BUILD Program should be fully subscribed by 2025. Although the SWG total funding amount is considerably less that other territories, the BUILD Program team continues to target the region to encourage all-electric affordable housing projects in the area. (Table 11.1)
- While BUILD incentive application processing and payment awards continue to climb, some applications cancel out for various reasons. Incomplete applications failing to provide corrections in a timely manner comprise the largest percentage of application cancellations. Other reasons for application cancellation include exceeding the $2 million funding cap, inability to allocate PV generation to tenants to satisfy the utility bill savings requirement, or projects have already obtained a certificate of occupancy. While some project cancellations are temporary, and applicants are encouraged to reapply, CEC staff examines all unsuccessful applications to evaluate project requirements and explore program adjustments, including project phasing or modifications to project size, when feasible.
- Table 11.3 below provides an overview of the number of housing units either designed, under construction, or completed throughout California's various climate regions.
- BUILD core technologies are installed almost exclusively in mid- and low-rise multifamily residential units (1–7 stories) (Table 11.4)
- Few high-rise facilities (8 stories or above) have received an award, one in SDG&E Territory, and two additional high-rise applications are anticipated in the TAP pipeline.
- Accessory dwelling units (ADUs) are an emerging affordable housing project type using BUILD funding in the SCG and PG&E territories, all are single-family rental projects

Table 11.2: BUILD Program Progress to Date March 2022–2024

Applications	Step 1 Design Reservation	Step 2 Construction Reservation	Step 3 Project Completion	Total
Applications:				
Approved	28	23	1	52
In Review	25	15	2	42
Cancelled	14	8	3	25
Number of Projects:				
Number of Projects Initially Received in Step 1-Design or Step 2-Construction	70	43	N/A	
Incentive Amounts:				
Approved	$13,706,324	$9,854,781	$351,830	$23,912,935
In Review	$11,242,277	$6,146,883	$975,249	$17,389,160
Incentive Amounts Approved by IOU:				
SCG	$4,356,376	$4,702,182	$0	$9,058,558
PG&E	$6,938,573	$4,846,719	$351,830	$12,137,122
SDG&E	$2,411,375	$305,880	$0	$2,717,255
SWG	$0	$0	$0	$0
Estimated Program Lifetime GHG Savings for Approved Projects				3,097 MT CO2e

Source: California Energy Commission

Table 11. 3: Number of Affordable All-Electric Residential Units by Region

Region	Design Reservation	Construction Reservation	Completion Reservation	Total
Central Coast	302	415	105	822
Inland Desert	0	328	0	328
Los Angeles	657	248	0	905
Sacramento Valley	296	168	51	515
San Diego	624	127	0	751
San Francisco Bay Area	642	141	60	843
San Joaquin Valley	66	117	40	223
Sierra Nevada Mountains	0	70	0	70
Total Number of Affordable Units	**2,587**	**1,614**	**256**	**4,457**

Source: California Energy Commission

Table 11.4: Number of Low-Emissions Core Technologies Approved for Incentives by IOU Territory

IOU Territory	HVAC Heat Pumps	Drain Water Heat Recovery	Heat Pump Water Heater
SCG	658	437	808
PG&E	1,896	967	799
SDG&E	383	62	0
SWG	0	0	0
Total	**2,937**	**1,466**	**1,607**

Source: California Energy Commission

Table 11. 5: Number of Kicker Technologies Approved for Incentives by IOU Territory

IOU Territory	Smart Thermostat	GWP Refrigerant 150/lbs	GWP Refrigerant 750/lbs	Induction Cooktop	Heat Pump Clothes Dryer	Battery (kWh)	Electric Vehicle Supply Equipment (EVSE)	Smart EVSE or Bi EVSE
SCG	131	25.4	78	153	10	27	25	0
PG&E	374	83.48	0	483	106	541	80	0
SDG&E	127	0	0	0	0	0	0	0
SWG	0	0	0	0	0	0	0	0
Total	**632**	**109**	**78**	**636**	**116**	**568**	**105**	**0**

Source: California Energy Commission

Smart thermostat and induction cooktops are the most prevalently used kicker technology incentives at this time, while smart and bidirectional EV charging technologies are likely to be cost-prohibitive for affordable housing developments. Staff anticipated increased uptake of the BUILD battery storage incentive due to current market conditions. A BUILD Program key performance indicator is GHG avoidance. Based on the calculations provided by the BUILD GIS dashboard the number of all-electric multifamily buildings enrolled thus far are projected to avoid an estimated 5,120 metric tons of carbon over the project lifetimes. For comparison,

based on the Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies calculator,[34] this is equivalent to saving 13,094,746 miles driven by an average gasoline-powered vehicle, 5,642,632 pounds of coal burned, and equivalent electricity use of 668 homes for one year.

Conclusion

As evidenced in the activity descriptions and status tables, the BUILD Program continues to grow and adapt. The BUILD Online System for application and claims processing is complete, and the BUILD Custom Path Tool continues to be updated to accommodate program needs, such as including community solar pricing and updating the various utilities rates used to calculate tenant bill savings, as required by SB 1477. Furthermore, staff is evaluating program changes to increase tribal access where funds remain, ensure incentive calculation accuracy, and update the utility cost savings method and equipment requirements.

Based on the revision and public input process afforded in the BUILD Program Guidelines, as well as most IOU territories nearing full subscription, and to simplify program administration, BUILD staff recommends this be the final update to the BUILD Implementation Plan.

34 EPA Greenhouse Gas Equivalencies calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.

GLOSSARY

Key Words and Terms

Word/Term	Definition
American National Standards Institute (ANSI)	A private, non-profit organization that administers and coordinates the U.S. voluntary standards and conformity assessment system.
Building Initiative for Low-Emissions Development (BUILD)	Program designed to provide technical assistance and incentives for new all-electric low-income residential buildings that reduce greenhouse gas emissions.
California Building Energy Compliance (CBECC)	A free software developed by the CEC for demonstrating compliance with the Energy Code. This software is available on the CEC website.
California Electric Homes Project (CalEHP)	Incentive program for the construction of new market-rate residential buildings as all-electric and/or with battery storage.
State Energy Resources Conservation and Development Commission, commonly called the California Energy Commission (CEC)	State Energy Resources Conservation and Development Commission, commonly called the California Energy Commission, the Energy Commission, or the CEC is responsible for advancing state energy policy, developing renewable energy, transforming transportation, increasing energy efficiency, investing in energy innovation, certifying thermal power plants, and preparing for energy emergencies.
California Public Utilities Commission (CPUC)	Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises.
Coefficient of Performance (COP)	The relationship between the power (kW) that is drawn out of the heat pump as cooling or heat, and the power (kW) that is supplied to the compressor.
Cold Climate Air Source Heat Pump (ccASHP) Specification	Specification designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates.
Consumer Technology Association	A trade association representing U.S. consumer technology industry.
Custom Path Tool	A BUILD Program tool used to calculate the incentive amount using the building design energy model and assist applicants

	with meeting the modeled resident utility cost savings requirement.
Electric Power Research Institute	A U.S. independent, nonprofit organization that conducts research and development related to the generation, delivery, and use of electricity.
Global Warming potential (GWP)	A measure of how much energy the emissions of 1 ton of a greenhouse gas will absorb over a given period (usually 100 years), relative to the emissions of 1 ton of carbon dioxide.
HPWH	Heat pump water heaters use electricity to move heat from one place to another instead of generating heat directly
Heating Seasonal Performance Factor (HSPF)	The HSPF is specifically used to measure the efficiency of air source heat pumps. HSPF is defined as the ratio of heat output (measured in BTUs) over the heating season to electricity used (measured in watt-hours).
Investor-owned utility (IOU)	As used in this document, investor-owned utilities refer to Pacific Gas and Electric Company (PG&E), Southern California Edison, and San Diego Gas & Electric Company (SDG&E) for electric service, and Southern California Gas Company (SoCalGas), PG&E, SDG&E, and Southwest Gas Corporation for gas service.
Low-Income Housing Tax Credit (LIHTC) Program	Created by the Tax Reform Act of 1986, the program gives State and local LIHTC-allocating agencies authority to issue tax credits for the acquisition, rehabilitation, or construction of rental housing targeted to lower-income households.
Metric Ton	A unit of weight equal to 1,000 kilograms (2,205 pounds).
Nationally Recognized Testing Laboratory (NRTL)	A term used by the United States Occupational Safety and Health Administration to identify third-party organizations that have the necessary qualifications to perform safety testing and certification of products.
Northeast Energy Efficiency Partnership (NEEP)	A nonprofit organization that supports state efficiency policies and programs by fostering collaboration and innovation, developing tools, and disseminating knowledge.
Photovoltaic (PV)	Technology that converts solar energy into electricity.
Publicly Owned Utility (POU)	A local publicly owned electric utility as defined by Public Utilities Code Section 224.3.

Seasonal Energy Efficiency Ratio (SEER)	The efficiency of central air conditioning systems is rated by a Seasonal Energy Efficiency Ratio (SEER). In general, the higher the SEER, the less electricity the system needs to operate.
Tax Credit Allocation Committee (TCAC)	Administers the federal and state Low-Income Housing Tax Credit Programs
Technology and Equipment for Clean Heating Initiative (TECH)	An initiative to accelerate the adoption of clean space and water heating technology across California homes.
Therm	A non-SI unit of heat energy equal to 100,000 British thermal units (BTU).

APPENDIX A:
Eligible Equipment Lists

Eligible Equipment Lists

As administrator of the BUILD Program, the CEC aims to develop proposed program guidelines that not only achieve program GHG emissions reductions and bill savings goals, but simplify participation. The CEC acknowledges that there are existing processes for evaluating the safety and performance of the range of technologies employed in meeting the GHG emissions reduction goals of BUILD. Rather than create a new evaluation process, the CEC intends to use existing evaluation processes and sources of information. This use will simplify participation and support the efforts of organizations that have similar goals to promote the design, manufacturing, and installation of high-quality, energy-efficient products. Table A.1 provides the eligible equipment list sources for each technology type.

Table A.1: Eligible Equipment Lists

Technology	Eligible Equipment Lists
Heat Pump HVAC	NEEP's Cold Climate Air-Source Heat Pump Products List
Heat Pump Water Heater	NEEA's Advanced Water Heater Specification Qualified Products List for Heat Pump Water Heaters
Central Heat Pump Water Heater	CEC's Central HPWH Performance Map Certification List
Heat Pump Clothes Dryer	ENERGY STAR's Product Finder
Battery Storage System (Battery or Energy Storage System)	CEC's Solar Equipment Lists

California Energy Commission

Cold Climate Air Source Heat Pump List

The Northeast Energy Efficiency Partnership (NEEP) is a nonprofit organization that supports state efficiency policies and programs by fostering collaboration and innovation, developing tools, and disseminating knowledge. Its mission is to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, and communities.

NEEP leads the High-Performance Air Source Heat Pump Initiative, whose participants include energy efficiency program administrators, heat pump installers, state energy office staff, and technology experts. The Initiative developed the specification to better characterize heat pump

performance with the Cold Climate Air Source Heat Pump (ccASHP) Specification.[35] The specification was designed to identify air source heat pumps that are best suited to heat efficiently in cold climates. It is intended as a model equipment specification to be used broadly for clean energy and energy efficiency program qualification. It is also intended for engineers and contractors who need assurance that the equipment they select will have the require heating capacity and design temperature without unnecessary oversizing and will serve the load efficiently throughout the ambient temperature range.

The ccASHP specifications require that units be part of an Air Conditioner, Heating, and Refrigeration Institute (AHRI) matched system, defined by federal regulation 10 C.F.R. § 430.2 as a central air-conditioning heat pump. Performance requirements also include a minimum HSPF, minimum coefficient of performance (COP), and minimum seasonal energy efficiency ratio (SEER). The ccASHP specifications are updated on an as needed basis and is on Version 3.0. NEEP keeps a list of products[36] that meet the ccASHP specifications, and lab testing results or engineering data for each system must be reported. This product list is used by programs in the Northeast, Midwest, Northwest, and Canada. Because these products work well in cold climates, they should also work well in all of California's climates, which usually experience milder temperatures.

Advanced Water Heating Specification Qualified Products List for Heat Pump Water Heaters

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of more than 140 Northwest utilities and energy efficiency organizations working to deliver energy efficiency cost-effectively through market transformation. One of NEEA's areas of work is advancing the market for heat pump water heaters. Utilities, energy efficiency organizations, and market partners developed the Advanced Water Heating Specification[37] to advance higher-performing water heaters. While the specification aims to ensuring performance in cooler northern climates, the applicability and benefits extend beyond the Northwest.

Since the BUILD Program is a residential building decarbonization program, the specification to evaluate technologies eligible under the BUILD Program will be the Electric Advanced Water Heating Specification[38] for residential water heaters. This specification provides guidance to manufacturers and market actors interested in developing products that not only meet ENERGY STAR criteria, but also are able to provide high levels of consumer satisfaction and energy performance in a range of climates. The specification includes requirements for energy efficiency, noise, condensate management, minimum warranty, and testing guidelines.

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35 NEEP's ASHP Specification, https://neep.org/ASHP-Specification.

36 NEEP's Heat Pump List, https://ashp.neep.org/#!/.

37 NEEA's Advanced Water Heating Specification, https://neea.org/our-work/advanced-water-heating-specification.

38 NEEA's Advanced Water Heating Specification for Residential Water Heaters, https://neea.org/img/documents/Advanced-Water-Heating-Specification.pdf.

Manufacturers who wish to include their products on the qualified products list[39] must submit an assessment showing the product meeting all the requirements. A third-party lab also independently tests the products to verify performance results. NEEA updates the product list about once every six to eight months.

Products meeting the specification are in the 40- to 80-gallon range. Most commonly, systems of this size are used in single-family houses or small multifamily buildings, such as duplexes. There is an effort to set design criteria, performance specifications, and installation guidelines for heat pump water heaters with larger capacity.

The goal of the Advanced Water Heating Initiative (AWHI) is to advance the development and adoption of heat pump water heating technologies, including central heat pump water heating systems. The AWHI aims to encourage low-GWP refrigerants, plug-and-play packed systems, ability for load shifting, reliability, and cost-effectiveness. This effort will lead to better guidelines for central heat pump water systems used in larger multifamily buildings.

A central heat pump water specification is under development with NEEA, and the CEC will consider adopting these specifications when they are available.

Central HPWH Performance Map Certification List

Central heat pump water heaters that are approved in CBECC will be eligible for the BUILD Program. The Central Heat Pump Water Heater (HPWH) Performance Map Certification List[40] can be referenced for approved equipment. To be listed, manufacturers will be required to submit performance data from a third-party test lab, bench tests by third-party consultants, tests carried out in the factory, or data collected from working field demonstrations.

ENERGY STAR

ENERGY STAR is the trusted, government-backed labeling program for energy efficiency. The U.S. Environmental Protection Agency (EPA) established the ENERGY STAR label to reduce GHG emissions and other pollutants caused by the inefficient use of energy. The ENERGY STAR label also makes it easier for consumers to identify and purchase energy efficient products that offer savings on energy bills, without sacrificing performance, features, and comfort.

The EPA established ENERGY STAR specification[41] based on the following set of key guiding principles:

- Product categories must contribute significant energy savings nationwide.
- Certified products must deliver the features and performance demanded by consumers, in addition to increased energy efficiency.
- If the certified product costs more than a conventional, less-efficient counterpart,

39 NEEA's Qualified Products List, https://neea.org/img/documents/qualified-products-list.pdf.

40 CEC's Central HPWH Performance Map Certification List, https://www.energy.ca.gov/media/4026.

41 How Product Earns ENERGY STAR Label, https://www.energystar.gov/products/how-product-earns-energy-star-label.

purchasers will recover their investment in increased energy efficiency through utility bill savings, within a reasonable period.

- Energy efficiency can be achieved through broadly available, nonproprietary technologies offered by more than one manufacturer.
- Product energy consumption and performance can be measured and verified with testing.
- Labeling would effectively differentiate products and be visible for purchasers.

The EPA will consider ENERGY STAR specification revision based on these factors:

- A change in the federal minimum efficiency standards.
- Technological changes with advances in energy efficiency that allow a revised ENERGY STAR specification to capture additional savings.
- Product availability.
- Significant issues with consumers realizing expected energy savings.
- Performance or quality issues.
- Issues with test procedures.

There are established ENERGY STAR specifications clothes dryers. For the BUILD Program, the ENERGY STAR rating will be used as the process for evaluating new clothes-drying technologies. Home appliance products that earn the ENERGY STAR label are independently certified to save energy and money for the consumer.

CEC Solar Equipment Lists

The CEC maintains lists of solar and storage equipment that include photovoltaic (PV) modules, inverters, batteries, energy storage systems, meters, performance monitoring and reporting systems, and other solar energy-generating systems. The CEC's Solar Equipment Lists[42] were developed under SB 1, establishing criteria and standards for solar projects applying for ratepayer-funded incentive programs under the California Solar Initiative. The purpose and use of these lists have expanded over time and provide information that supports solar incentive programs, utility grid connection services, consumers, and many other state and local programs.

Manufacturers who wish to include their equipment on the Solar Equipment Lists must submit all required documentation showing their equipment meets all safety and performance standards outlined in the *Guidelines for California's Solar Electric Incentive Programs (SB 1)*.[43]

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42 California Energy Commission. "Solar Equipment Lists," www.energy.ca.gov/programs-and-topics/topics/renewable-energy/solar-equipment-lists.

43 Mehrshahi, Abtin and Joseph Omoletski. December 2018. *Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1), Seventh Edition*. California Energy Commission. Publication Number: CEC-300-2018-009-CMF, https://efiling.energy.ca.gov/GetDocument.aspx?tn=226057&DocumentContentId=56796.

For energy storage systems, the safety certification must be from a Nationally Recognized Testing Laboratory (NRTL) and performance characteristics are provided from manufacturers. The Energy Storage System List reflects equipment certified to UL 9540, advanced inverter functions, and the approval status of the equipment for JA 12 requirements.