

DOCKETED

Docket Number:	20-DECARB-01
Project Title:	Building Initiative for Low-Emissions Development (BUILD) Program
TN #:	239714
Document Title:	BUILD Program's Preliminary Program Design document
Description:	N/A
Filer:	Camille Remy Obad
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	9/14/2021 4:48:09 PM
Docketed Date:	9/14/2021

California Energy Commission

PRELIMINARY PROGRAM DESIGN

**Building Initiative for Low-
Emissions Development
(BUILD) Program**

(Senate Bill 1477, 2018)

September 2021 | CEC-300-2021-011

California Energy Commission

Erica Chac
Adriana Dominguez
Larry Froess
Myoung-Ae Jones
Tiffany Mateo

Primary Authors

Camille Remy Obad
Project Manager

Deana Carrillo
Office Manager
LOCAL ASSISTANCE AND FINANCING OFFICE

Natalie Lee
Deputy Director
RENEWABLE ENERGY DIVISION

Drew Bohan
Executive Director

DISCLAIMER

Staff members of the California Energy Commission (CEC) prepared this report. As such, it does not necessarily represent the views of the CEC, its employees, or the State of California. The CEC, the State of California, its employees, contractors, and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the CEC nor has the Commission passed upon the accuracy or adequacy of the information in this report.

Senate Bill 1477 directed the creation of two building decarbonization initiatives. The California Public Utilities Commission's subsequent Decision D-20-03-027 designated the California Energy Commission to administer one of the initiatives, the Building Initiative for Low-Emissions Development Program.

ABSTRACT

This *Preliminary Program Design for the Building Initiative for Low-Emissions Development (BUILD) Program* outlines staff proposals for key elements of the BUILD Program that will be further developed in final BUILD Program Guidelines, including eligibility requirements, participation process, and incentive structure. BUILD is a building decarbonization initiative established by Senate Bill (SB) 1477 (Stern, Chapter 378, Statutes of 2018) that will provide financial incentives for new low-income residential building projects using near-zero-emission building technologies. BUILD is further governed by California Public Utilities Code (CPUC) Decision (D.) 20-03-027. Applicants are required to adopt all-electric building design and technologies in their new housing developments for low-income Californians, reducing greenhouse gas emissions and energy demands from future buildings. Incentives are determined based on the estimated greenhouse gas emissions reduction quantities achieved through the installation of eligible technologies, with the option of increasing the incentive amounts through specific technology use. In addition, technical assistance will be provided to eligible low-income residential developers and builders.

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

Please use the following citation for this report:

Chac, Erica, Adriana Dominguez, Larry Froess, Myoung-Ae Jones, and Tiffany Mateo. 2021. *Building Initiative for Low-Emissions Development Program Preliminary Program Design*. California Energy Commission. Publication Number: CEC-300-2021-011.

TABLE OF CONTENTS

	Page
ABSTRACT	i
TABLE OF CONTENTS	iii
List of Figures.....	iii
List of Tables.....	iii
Section 1: Program Overview.....	1
Section 2: Eligibility Requirements.....	5
Section 3: Program Participation	9
Section 4: Incentive Structure.....	16
Section 5: Required and Eligible Technologies	21
Section 6: Technical Assistance.....	24
Glossary.....	26
Appendix A: Eligible Equipment Lists	1
Appendix B: Reference Documents.....	1
Appendix C: Modeled Resident Utility Costs Methodology	1

LIST OF FIGURES

	Page
Figure 3.1: Program Participation Overview.....	9
Figure 4.1: Total Incentive Equation.....	16
Figure 6.1: Technical Assistance.....	24
Figure C.1: Example Regression Curve for Incremental PV	6
Figure D.1: Eligible Natural Gas Utility Service Area (California, 2020)	1

LIST OF TABLES

	Page
Table 1.1 BUILD Program Budget.....	3
Table 1.2 BUILD Program Budget Allocation by Natural Gas Territory.....	4
Table 4.1: Incentive Level for Technology Kickers	17
Table 5.1: Technologies for BUILD Base Incentives – Low-rise Residential.....	21
Table 5.2: Technologies for BUILD Base Incentives – Mid and High-rise Residential ...	22
Table 5.3: Eligible Technologies for BUILD Kicker Incentives	23
Table A.1: Eligible Equipment Lists.....	1
Table C.1: Gas Rates.....	4
Table C.2: Electric Rates.....	4

Section 1: Program Overview

Background

Assembly Bill 3232¹ (AB 3232, Friedman, Chapter 373, Statutes of 2018) finds that the buildings sector accounts for 25 percent of all greenhouse gas (GHG) emissions in California, with 10 percent of all GHG emissions coming from the combustion of fossil fuels in buildings, primarily for space and water heating. AB 3232 required the California Energy Commission (CEC) to assess the potential for the state to reduce the emissions of GHGs from the state's residential and commercial building stock by at least 40 percent below 1990 levels by January 1, 2030.

In 2018, Senate Bill 1477 (Stern, Chapter 378) 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.

SB 1477 requires the CPUC, in consultation with the CEC, to develop and supervise the administration of the BUILD Program. SB 1477 makes available \$50 million annually for four years, 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 the implementation of both pilot programs, BUILD and TECH.

In January 2019, the CPUC instituted a new rulemaking on building decarbonization, R.19-01-011. Under this proceeding, the CPUC adopted D. 20-03-027, on March 26, 2020, to establish a framework and requirements for both programs authorized by SB 1477. Through this process, the CEC was named the administrator of the BUILD Program. A draft implementation plan and notice of availability were published for stakeholder input in July 2020. After considering stakeholder input, a revised implementation plan and notice of availability were published to the BUILD docket by the CEC in September 2020 and subsequently approved by the CPUC in April 2021. The revised implementation plan contains the broad policy parameters and direction, which will be expounded and clarified by future program guidelines.

The BUILD Program codified under Public Utilities Code (PUC) Sections 748.6, 921, and 921.1 and further governed by CPUC D. 20-03-027, will provide incentives for the installation of near-zero emission building technologies in new low-income residential buildings to reduce GHG emissions significantly beyond what otherwise would be expected to result from implementing the Building Energy Efficiency Standards adopted by the CEC in Part 6 of Title 24 of the California Code of Regulations (California Energy Code).

1 [AB 3232](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB3232), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB3232.

PUC Section 921.1 (c)(1) places specific programmatic emphasis on “new low-income residential housing” by requiring no less than 30 percent of the total TECH and BUILD Program funding be reserved for such projects. CPUC D. 20-03-027 appropriated \$80 million for the BUILD Program and established that \$60 million of the funding would be for the low-income residential markets. PUC Section 921.1 (d)(1) requires that new low-income, residential building projects must be offered technical assistance and that efforts to electrify these homes not result in higher utility bills for the occupants. PUC Section 921.1 (d)(4) authorizes the development of program guidelines to include program eligibility and evaluation requirements and enumerates certain project requirements and minimum metrics to be included in program evaluation.

Program Budget

Program funding is authorized under SB 1477 with an overall budget of \$200 million. Funding accrues over a four-year period, from Fiscal Year (FY) 2019–2020 to FY 2022–2023. D. 20-03-027 provided specific allocations and more detailed budget allocations for each of the two programs. D. 20-03-027 appropriates 40 percent of the \$200 million budget for the BUILD Program equal to \$80 million.

The overall program budget may be spent over the program duration; however, to meet requirements of the funding source, each year’s accrual must be spent 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 budget detail is 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)
BUILD Program Costs (Other, including mixed-market developments and 3 rd party technical assistance provider for low-income housing developments)	\$10,000,000 (no less 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. 20-03-027²

Technical assistance will be a key element of BUILD to support market penetration. Out of the \$10 million allocated for other BUILD Program expenditures, up to \$8 million has been set aside for up to six years to provide technical assistance to potential incentive applicants to assist in the design and technology challenges of introducing new equipment into the low-income residential markets. The CEC conducted a competitive solicitation for a technical assistance provider (TAP) with experience in providing technical experience in the design and installation of near-zero-emission technologies and buildings and working with low-income residential developers and stakeholders. The Associate for Energy Affordability (AEA) was selected and approved as the TAP at the CEC business meeting in September 2021. The technical assistance services are anticipated to be available in late 2021. The CEC will work with the TAP to establish a technical assistance manual, which will be provided to stakeholders and the public in the coming months.

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 must be proportionally directed to the gas corporation service territories where the funds are derived. The percentage allocation for program spending in each gas corporation service territory will be consistent with each gas corporation's allocation of cap-and-trade allowances, as shown in Table 1.2.

² [CPUC D. 20-03-027](http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF), p. 31, at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF>.

Table 1.2 BUILD Program Budget Allocation by Natural Gas Territory

Natural Gas IOU Territory	Allocation Percentage
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%
Total	100%

Source: CPUC Decision 20-03-027

Any spending for the BUILD Program with statewide or cross-territory benefits, including administrative and evaluation spending, shall be attributed to the gas corporation service territories in proportion to their original funding contribution. To the extent that there are unspent GHG allowance proceeds allocated for a gas corporation’s service territory, and no remaining eligible projects within that service territory, the remaining GHG allowance proceeds may be spent outside that gas corporation’s service territory, starting two years after implementation. Any unspent funds remaining as of July 1, 2033, will be returned to the ratepayers of the respective gas corporations.

Section 2: Eligibility Requirements

- A. Eligible applicant: a private, nonprofit, or public developer of a new residential building, that is deed restricted (as described in Section 2.F below).
1. The applicant must demonstrate at least five years of experience in the industry.
- B. New residential building includes one of the following:
1. A building that has never been used or occupied for any purpose³
 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 demolished⁴
 3. An existing building repurposed for housing, whose original use was not residential.
- C. Eligible residential building types include:
- Single-family homes
 - Duplexes
 - Triplexes
 - Condominiums
 - Multifamily buildings
 - Dormitories
 - Residence hotels
 - Assisted living facilities
 - Homeless or transient housing
 - Mixed-use buildings which include residential units
- D. Ineligible residential building types include:
- Manufactured and mobile homes, and any other residential buildings that do not comply with Part 6 of Title 24 of the California Energy Code (Energy Code).
- E. Required fuel source for projects. D. 20-03-027 requires projects to be limited strictly to new residential projects that are all-electric and have no hookups to the gas distribution system. Electricity shall be the fuel for all space heating and cooling, water heating, cooking, and clothes drying. The use of other fuels as the source of the energy of a building, including, but not limited to natural gas, renewable gas, and propane are prohibited.

³ Section 100.1 of Part 6 of Title 24 of the California Code of Regulations (California Energy Code).

⁴ Chapter 15.06.030 Section R202 of the California Residential Building Code.

1. New residential buildings cannot have gas distribution lines installed.
2. Existing buildings, consistent with B.2 above, must cap or remove the gas lines connected to the building.
3. Outdoor community spaces, not attached to the building envelope (for example, BBQs, fire pits) are excluded from this provision.

F. Low-Income Residential Housing Income Limit Requirements:

1. Multifamily. A building of at least two rental housing units that is operated to provide deed-restricted low-income residential housing⁵ and meets one or more of the following conditions:
 - a. The property is in a disadvantaged community as defined under Section 39711 of the Health and Safety Code.⁶
 - b. The property is in a low-income community, as defined as 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.⁷
 - c. At least 80 percent of the households living in the building have incomes at or below 60 percent of the area median income.⁸

The income limits for the multifamily residential building under 2.F.1.a and 2.F.1.b will be consistent with the requirements of the affordable multifamily financing entity, as described by PUC Section 2852(a)(3)(A).

2. Single family. A low-income residence, as defined in PUC Section 2852 (a)(3)(C), is a 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,^[9] with a public entity or nonprofit housing provider organized under Section 501(c)(3) of the Internal Revenue Code^[10] that has as the 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.
3. The length of the deed restriction of low-income residential housing, as described in PUC Section 921 (d)(1), cannot be less than 15 years.

5 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](#).

6 A community identified as a disadvantaged community under [Section 39711 of the Health and Safety Code](#).

7 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.

8 As defined in subdivision (f) of [Section 50052.5 of the Health and Safety Code](#).

9 Public Utilities Code Section 2852 (a)(3)(C) further references [Government Code Section 65915 \(c\)\(2\)](#) in defining the share of equity.

10 Public Utilities Code Section 2852 (a)(3)(C) further references [Internal Revenue Code Section 501\(c\)\(3\)](#).

G. Utility Territory Limits for Program Incentives

1. Incentive awards shall be allocated proportionally to the gas corporation service territories where the funds are derived. To receive incentives through the BUILD Program, the project must be in California in one of the identified gas corporation territories. See Figure D.1 in Appendix D for a general map of service territories for reference.
2. Projects may be served by any electricity supplier, including investor-owned or publicly owned utilities, community choice aggregators, or other retail suppliers.

H. Modeled Resident Utility Costs. Under PUC Section 921.1 (d)(3)(C), projects receiving incentives under BUILD must not result in higher utility bills for building occupants than would have otherwise been realized.

It is reasonable to anticipate that residents of new energy-efficient residential buildings will realize lower utility costs when moving into a new building due to increased efficiency and reduced energy demand. CEC research also found that it's reasonable to anticipate that a resident's utility costs will be even lower on average over the lifetime of the equipment and building; however, that projected period cannot reasonably be expected to align with any tenant's occupancy under the program.

For compliance with PUC Section 921.1 (d)(3)(C) and to ensure projects do not result in higher energy costs for low-income residents than would otherwise occur, eligible applicants must demonstrate — through a modeled comparison of the all-electric design of the building to the design of a mixed-fuel, code-compliant building — that the project will result in at least a 5 percent reduction of modeled resident's utility cost savings in the first year of operation.

The CEC is establishing a tool to, along with assistance from the TAP, help potential applicants demonstrate compliance with this statutory requirement.

To meet this requirement, applicants must:

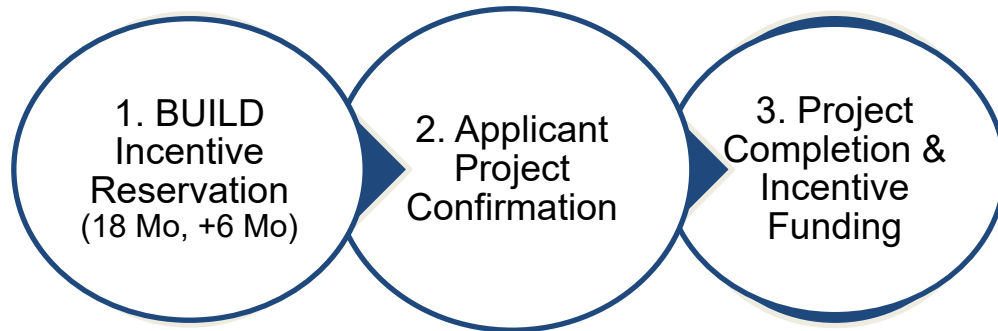
1. Model the projected resident utility costs under the method described in Appendix C. Should the initial model not demonstrate 5 percent of estimated resident utility costs at the time of the reservation application (Section 3), the building design must be modified to reduce energy demand and lower anticipated utility costs for the residents. A project is not eligible until this statutory requirement can be demonstrated to be met through the model.
2. Project designs should consider envelope improvements, high-performance materials and appliances, and the installation of additional photovoltaic (PV) solar energy equipment above code requirements; however, a project developer may select a combination of equipment, envelope improvements, and PV to achieve the required result.

Under this model, should the potential applicant choose to include PV on its project to meet this statutory requirement, the program will require:

- a. The PV to directly benefit the resident to the extent feasible. This requirement would meet the statutory requirement for modeled resident utility costs discussed above.
 - b. If virtual net energy metering is not available to the project, or if the specific project design does not accommodate the PV that may be required to meet program requirements, staff is exploring whether this requirement can be addressed by the building owner providing direct payments or rent/utility credits to tenants on a monthly basis at an equivalent rate as required under the program.
- I. HERS Registry. Because all BUILD projects will be treated as newly constructed buildings, Title 24 Part 6 will require the buildings to be registered at a Home Energy Rating System (HERS) registry. It is expected that each project will have the certificates of installation (CF2Rs) accurately filled out reflecting the actual installed equipment and products, and that the appropriate field verifications are performed by a qualified HERS rater and have accurately completed the certificates of verification (CF3Rs). The CEC may review the CF2Rs and CF3Rs at any time to verify that the installed equipment and products match the descriptions in the project application.

SECTION 3: Program Participation

Figure 3.1: Program Participation Process (3 Steps)



Source: California Energy Commission

The program participation process is designed to recognize the funding and regulatory processes required for developing low-income homes and provide flexibility to better support the unique challenges such developments face.

Broadly, there are three steps in the incentive process under the program:

- Step 1: Incentive Reservation. After working with the technical assistance provider as applicable (as further described in Section 6 and the future technical assistance manual), the applicant will have their initial building design developed to apply for an incentive reservation. The eligible applicant will provide the information outlined in Section 3.A. below and, upon review and approval by CEC staff, will receive an incentive reservation before receiving construction financing for the project. The term of the reservation is 18 months to provide applicants time to obtain their construction financing.
- Step 2: Applicant Project Confirmation. Upon receipt of their construction financing, the approved applicant will return to the CEC and confirm any changes to their project, project eligibility and measures, and corresponding incentive value. Upon CEC staff's confirmation of the continued eligibility and incentive value of the project, an applicant will have 24 months to construct their project. This is described in Section 3.B below.
- Step 3: Project Completion and Incentive Funding. Upon the approved applicant's completion of the project, the applicant will provide the appropriate documentation demonstrating construction, which the CEC will review and cause the incentive payment to be issued.

- A. Step 1: Incentive Reservation. Before obtaining construction or project financing, the applicant must apply for and receive an incentive reservation. The reservation value is estimated by the incentive calculation method described in Section 4.
1. Incentive reservation applications will be accepted on an ongoing basis in accordance with funding amounts attributed to each specific gas utility territory. (See Table 1.2.)
 2. Reservation applications must be submitted before the applicant applies for a building permit.
 3. For required applicant information, the applicant must submit:
 - a) BUILD reservation application form.
 - i. Project location address and gas and electric utility service jurisdiction(s).
 - ii. Anticipated funding sources and application dates for affordable housing financing
 - iii. Anticipated number of units and bedrooms.
 - iv. Income limit restrictions under the anticipated deed restriction.
 - v. Anticipated project schedule, identification of milestones, and potential risks to planned development schedule.
 - vi. Demonstration of developers experience with successful construction of low-income residential developments in California (5+years).
 - vii. Low-income eligibility or CalEnviroScreen score for the location of the planned development.
 - b) Project modeling (requires knowledge of measures to be installed).

Applicants can use one of the following pathways to calculate their estimated incentive amount, building design features, and anticipated modeled resident utility costs.

 - i. BUILD Calculator Pathway. The CEC has established a tool that will enable applicants to choose from a selection of anticipated envelope improvement measures and other design features for their project to calculate the anticipated GHG reduction, incentive values, and any additional PV that could be used to demonstrate compliance with the modeled resident utility cost requirements of the program. To participate in this pathway, the applicant will be required to commit to specific building design features and efficiencies. At this point, the applicant will commit to a voluntary, above-code performance-percentage based on the time-dependent valuation (TDV) energy compliance margin. More information on

the Modeled Resident Utility Cost method can be found in Appendix C.

- ii. Custom Energy Model Pathway. The applicant will provide the energy model input file, created with CEC-approved compliance software. It will be up to the applicant to specify a combination of energy efficiency and PV system measures to be installed. Once the model is submitted, CEC staff will review and confirm the incentive values and eligibility. The CEC is exploring additional tools that will assist applicants under this approach.
 - c) Building design documentation (Preliminary CF1R-PRF-01E or NRCC-PRF-01-E).
 - d) Attestation, submitted under penalty of perjury, of intent to develop an eligible project and the accuracy of information submitted
 4. Term. Each initial project reservation is valid for 18 months. Within 18 months, the approved applicant must confirm it i) has received construction financing for the project, ii) is moving forward with a confirmed project (and the corresponding design elements), and iii) will construct the project within two years.
 5. Extension. An additional six-month extension will be approved upon the applicant's demonstration that the project can receive construction financing during that period.
 6. Transferability. The applicant may transfer their reservation to another project, as long as it is otherwise eligible, and funding is available according to the funding caps of the program. If granted, a transfer of an incentive reservation does not extend the 18-month term.
 7. CEC staff will endeavor to review completed reservation applicants within three weeks.
 - B. Step 2: Applicant Project Confirmation. Within 18 months, and after the applicant receives construction financing for the project, the applicant will confirm with the CEC that the project is moving forward, and provide:
 1. Required information.
 - a) Updated project summary with confirmation or revision of building design and project information.
 - b) Energy model input file used to obtain the building permit, created with CEC approved compliance software.
 - i. Model must demonstrate compliance with all program requirements.
 - c) Energy efficiency documentation (Revised CF1R-PRF-01E or NRCC-PRF-01-E).
 - d) Proof of financing (for example, TCAC award or financing award).

- e) Proof of building permit.
- 2. Incentive value.
 - a) The value of the incentive may be modified at this time because of:
 - i. Changes in the project characteristics that may have been made between the reservation and applicant project confirmation stages.
 - ii. The initial reservation incentive value was calculated under a prior version of the Energy Code than the version under which the permit for the project was issued.
 - iii. The value of the incentive may increase, as appropriate, if program funds are available.
 - 3. Term. The project must be constructed within 24 months after receiving the CEC's confirmation of the continued eligibility and incentive confirmation of the project.
 - 4. CEC staff will endeavor to review and approve applicant project confirmations within three weeks of receiving a complete package.
- C. Step 3: Project completion and incentive funding. Upon completion of project construction, the applicant will submit project completion documentation before receiving incentive funding.
 - 1. Required information.
 - a) Certificate of occupancy
 - b) Recorded deed restriction/regulatory agreement demonstrating corresponding number of low-income units and bedrooms
-or-
Resale restriction or equity-sharing agreement¹¹
 - c) Permission to operate PV
 - d) Proof of purchase for equipment eligible for kicker incentives as listed in Table 4.2
 - e) CF2R and CF3R documents completed by installers and qualified HERS Raters
 - f) Affirmative attestation of cooperation with the CPUC evaluation, measurement, and verification process.
 - 2. Incentive payments. The CEC will endeavor to cause payments to be made within about 90 days.

¹¹ Required only for individual low-income homes developed for sale at an affordable cost to an eligible low-income household. See PUC 921(d)(2) and PUC 2852(a)(3)(C).

The CEC is exploring a comparable process for otherwise eligible projects within tribal communities and in Indian Country to provide similar appropriate documentation to demonstrate intent, eligibility, and project completion.

- D. Attestations. To participate in the program, applicants must attest to comply with the forthcoming guidelines, which will include several provisions, including
- a. Compliance. CEC staff, and its agents, may take various steps, as needed, to ensure compliance with program requirements. These steps may include:
 1. Requesting relevant documents, photos, or other materials from the applicant.
 2. Contacting the local building department.
 3. Contacting the gas utility serving the territory of the project.
 4. Conducting a virtual or onsite verification.
 5. Performing an audit.
 - b. Liquidated damages. Applicant must agree that 10 percent of the reserved incentive shall be paid to the CEC should the applicant fail to make a good faith effort to proceed with the project identified in their application form. That amount shall constitute liquidated damages, and not penalties, and are in addition to all other rights of the CEC. An approved applicant will acknowledge that:
 1. The amount of loss or damages likely to be incurred is incapable or is difficult to precisely estimate,
 2. The amount specified bears a reasonable relationship to, and is not plainly or grossly disproportionate to, the probable loss likely to be incurred in connection with any failure by the approved applicant to proceed with the project in good faith, and
 3. One of the reasons for the CEC and the approved applicant reaching an agreement as to such an amount was the uncertainty and cost of litigation regarding the question of actual damages that would result from a bad faith reservation of BUILD funds.
 - c. Taxes. Applicants are responsible for any federal and state taxes associated with the receipt of incentive payments.
 - d. Record retention requirements. Applicants shall keep all records relating to and verifying the accuracy of any information included as part of a reservation application, applicant confirmation, payment claim, or report submitted following the forthcoming guidelines. These records shall be kept for no fewer than three years after the end of the calendar year in which the reservation application is approved or the final payment claim is made, whichever is later.

- e. Annual reporting requirements. Approved applicants will be required to provide annual reports, on a (to be determined) day of each year, providing an update on project milestones, construction schedules, occupation of residential units.
- f. Participation in CPUC's evaluation, measurement, and verification process. Approved applicants will be required to participate in the CPUC's evaluation, measurement, and verification process as outlined in D. 20-03-027 and related CPUC administrative law actions.
- g. Prevailing wage. Applicants shall acknowledge acceptance of BUILD technical assistance or incentives may trigger public works laws (Labor Code Section 1720 *et seq.*), a requirement of which is to pay prevailing wages. Approved applicants are responsible for complying with all applicable laws, which can include public works requirements. Only the California Department of Industrial Relations (DIR)¹² and courts of competent jurisdiction may issue legally binding determinations that a project is or is not a public works project. Approved applicants shall assume their projects are public works unless they obtain a determination to the contrary from DIR or an appropriate court. As such processes can be time-consuming, please plan accordingly. Without such a determination, approved applicant shall explain how they have included appropriate budgets for prevailing wages.
- h. Incentive layering. Generally, participation in another program does not prevent participation in the BUILD Program. However, an approved applicant for incentive funding may not receive BUILD funds if, when combined with funds from another program, cumulative incentive funding exceeds the total cost of the project approved for a reservation. Furthermore, program funds shall be used only for distinct, eligible costs described in forthcoming guidelines that are not funded by another funding source. CEC reserves the right to review and audit all incentive and funding award documents to ensure compliance with this requirement.
- i. California Environmental Quality Act. In general, the CEC must comply with California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.; *see also* California Code of Regulations Title 14, Section 15000 et seq.), which requires public agencies to identify and consider potential environmental impacts of proposed projects, when the CEC supports proposed projects with grants or other subsidies. (*See* Pub. Resources Code, § 21065[b].) CEQA does not apply to projects over which public agencies only exercise ministerial authority. (Pub. Resources Code, § 21080[(d)][1]; Cal. Code Regs., tit. 14, § 15300.1.) Under forthcoming program guidelines, the BUILD incentives and technical assistance will be provided to future development projects through a

¹² California Department of Industrial Relations (DIR) protects and improves the health, safety, and economic well-being of over 18 million wage earners and helps their employers comply with state labor laws. See the [DIR webpage](https://www.dir.ca.gov/aboutdir.html) for more information, <https://www.dir.ca.gov/aboutdir.html>

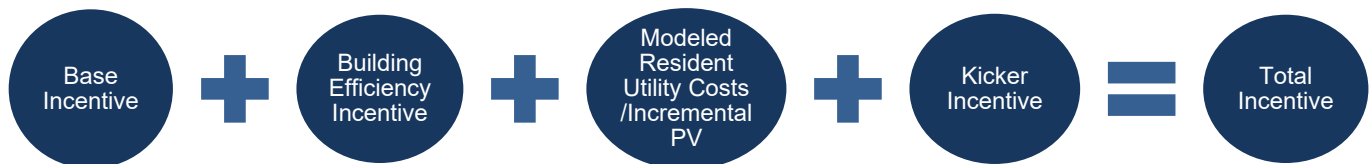
purely ministerial process, and the CEC's authority over these projects is solely ministerial. Because of the limited scope of the CEC's oversight authority and the timelines built into the forthcoming guidelines, the CEC will not fund any project under BUILD that would result in the CEC becoming a lead agency under CEQA.

Applicants for BUILD funding should consult with local planning and building departments to ensure development projects are otherwise consistent with CEQA requirements. CEC staff will not extend BUILD reservation deadlines due to CEQA-related project delays.

- j. Information Practices Act (IPA). The IPA is codified at California Civil Code Sections 1798 *et seq.* "Personal information" is defined in the IPA at Civil Code Section 1798.3(a). An approved applicant shall comply and ensure that all of their subcontractors and project partners shall comply with the IPA relative to the activities under their project.

SECTION 4: Incentive Structure

Figure 4.1: Total Incentive Equation



Source: California Energy Commission

- A. The BUILD Program has the following three types of incentives that can be combined for a total project incentive amount:
1. Base incentive. The base incentive is calculated at a flat rate of \$150/metric ton (MT) of avoided GHG emissions.¹³
 - a. Calculated for whole-building GHG performance modeling using CEC’s California Building Energy Code Compliance (CBECC) software as compared to a mixed-fuel baseline.¹⁴
 - i. Mixed-use projects. Only the residential portion, including the associated common areas, will be calculated and offered incentives.
 - b. Avoided GHG emissions will vary by building design and climate zone; incentive levels for similar projects will also vary by climate zone.The BUILD base incentive is a per bedroom incentive to estimate energy use and GHG emissions more accurately.
 2. Increased building efficiency. If the developer chooses to increase the building envelope and efficiency measures, the project will be eligible to receive additional incentives up to \$1,000 per bedroom, depending on the percentage of increased efficiency above code.
 3. Modeled resident utility costs and incremental PV. If the project installs additional PV beyond the applicable Energy Code to meet the statutory Modeled Resident

¹³ Cost of carbon is consistent with the GHG planning prices in CPUC’s Integrated Resource Plan (IRP).

¹⁴ The baseline is a 2019 Energy Code-compliant prescriptive building with gas-fired space heating, water heating, clothes dryer, and cooktop, consistent with prescriptive requirements as specified in the 2019 Residential and Nonresidential ACM Reference Manuals.

Utility Costs requirement for the program, an incentive will be provided to offset the incremental costs of the additional PV.

- a. Single-family and low-rise multifamily (three or fewer habitable stories above grade): \$1.30/watt (W)
 - b. Mid-rise and high-rise multifamily (four or more habitable stories above grade): \$3.00/W
 - c. The program will not offer incentives for PV required by the Energy Code or PV beyond what is needed to address the Modeled Resident Utility Costs requirement.
4. Specific equipment or kicker incentives. The program provides kicker incentives for technologies that meet other clean energy, GHG emissions and demand reduction goals. These incentives include funding for improved building envelope and efficiency measures.

Table 4.1: Incentive Level for Technology Kickers

Technology Kicker	Incentive Level
Grid Flexibility	\$50/smart thermostat \$100/HPWH CTA-2045 wi-fi module
GWP Refrigerants < 750	To be determined as equipment becomes available, but less than \$1,500/lb
GWP Refrigerants < 150	\$1,500/lb of refrigerant
Induction Cooktop	\$300/induction cooktop unit
Heat Pump Clothes Dryer	\$150/heat pump clothes dryer
On-Site Energy Storage	\$250/kWh storage capacity
Electric Vehicle Supply Equipment	\$500/charger

Source: California Energy Commission

- B. Incentive Pathways. As noted above, there are two pathways to calculate the incentive value of a project at the time of reservation application.
1. BUILD Calculator Pathway. The incentive is initially estimated through the BUILD Program calculator. This pathway allows potential BUILD Program applicants to quickly calculate the estimated incentive amount they can receive before undertaking further building modeling. When an approved applicant submits their project confirmation (step 2), the specific incentive amount will be confirmed.
 2. Custom Energy Model Pathway. The incentive is calculated by CEC staff from the applicant’s submitted building energy model. The base incentive and PV capacity

will be determined by the results of the submitted data. BUILD kicker incentives will apply the same to either pathway.

- C. Funding cap. BUILD applicants are limited to \$3 million in total incentives paid or reserved. For calculating this limit, any approved applicant is the same if it has more than 50 percent ownership of any specific legal entity or parent company.

Incentive Examples

I. Examples: BASE Incentives

Below are three BUILD base incentives for a hypothetical all-electric project. Higher energy-performing projects will receive higher incentives because of more avoided GHG emissions and the building efficiency incentive. These examples do not include PV incentives.

Sample 1: Mateo Valley Garden. All-electric minimum standard (no high-efficient building incentive): HVAC (8.2 HSPF, 14 SEER), Title 24 prescriptive envelope, windows (0.3 u-factor), Sanden Central HPWH, low-rise (2 stories), 72 bedrooms, Climate Zone 13.

$$\text{BUILD Base Incentive} = \text{incentive level} \times \# \text{ of bedrooms}$$

Base incentive level (minimum standard) = \$2,087.66/bedroom

Total Base Incentive = \$2,087.66/bedroom x 72 bedrooms = \$150,312

Sample 1a: Mateo Valley Garden. Same as Sample 1 but with above-code energy efficiency measures: HVAC (12 HSPF, 18 SEER), Sanden Central HPWH with drain water heat recovery and 2-inch hot water pipe insulation

$$\text{BUILD Base Incentive} = \text{incentive level} \times \# \text{ of bedrooms}$$

Building Efficiency = incentive level (depending on % above code) x # of bedrooms

Base incentive level (above minimum standard) = \$2,248.66/bedroom

Base Incentive = \$2,248.66/bedroom x 72 bedrooms = \$161,904

Building Efficiency Incentive = \$1000/bedroom x 72 bedrooms = \$72,000

Total Incentive = \$161,904 + \$72,000 = \$233,904

Sample 2: ELC Senior Bay Community. All electric above-code energy efficiency measures with Title 24 prescriptive envelope (VRF [COP 4.0, EER 12.9]), windows (0.3 u-factor), Sanden Central HPWH with drain water heat recovery], mid-rise (5 stories), 256 bedrooms, Climate Zone 3

$$\text{BUILD Base Incentive} = \text{incentive level} \times \# \text{ of bedrooms}$$

Building Efficiency = incentive level (depending on % above code) x # of bedrooms

Base incentive level (above minimum standard) = \$2,875.78

Base Incentive = \$2,875.78 x 256 bedrooms = \$736,200

Building Efficiency Incentive = \$1000 x 256 bedrooms = \$256,000

Total Incentive = \$992,200

II. Example: Modeled Resident Utility Savings and Incremental PV

The amount of additional PV that may be required for modeled resident utility costs requirements will vary by climate zone and electric utility. Below are two BUILD PV incentives for a hypothetical all-electric project located in Climate Zone 13.

$$\text{BUILD PV Incentive} = \frac{\$1.30}{\text{watt}} \times \text{PV watt (beyond code)}$$

Sample 1: Mateo Valley Garden. All-electric minimum standard, low-rise (two stories), 72 bedrooms, Climate Zone 13, PG&E electric utility

BUILD PV Incentive = \$1.30/watt x 25,107 watts beyond code = \$32,640

III. Example: Kicker Incentive

Below is one example of BUILD kicker incentives for a hypothetical all-electric project in Climate Zone 13. Kicker incentives are in addition to BUILD base incentive and PV incentive (if applicable).

Sample 1: Mateo Valley Garden. All-electric minimum standard, low-rise (two stories), 72 bedrooms, Climate Zone 13

Low-GWP refrigerant HPWH = \$1,500 x 18.7lb refrigerant = \$28,050

On-site energy storage = \$250 x 28kWh battery = \$7,000

Total BUILD Kicker Incentives = \$28,050 + \$7,000 = \$35,050

IV. Example: Combined Incentives

This is the same hypothetical project referred to as "Sample 1" in all the previous samples shown.

$$\textit{Total BUILD Incentive} = \textit{Base Incentive} + \textit{PV Incentive} + \textit{Kicker Incentive}$$

Sample 1: **Mateo Valley Garden.** All-electric minimum standard, low-rise (2 stories), 72 bedrooms, climate zone 13

Base Incentive	=	\$150,312
Incremental PV Incentive	=	\$32,640
Kicker Incentive	=	\$35,050
Total BUILD Incentive	=	\$218,002

SECTION 5: Required and Eligible Technologies

- A. Buildings must comply with Title 24 Part 6 and use approved compliance software using the performance method to be eligible for BUILD incentives.
- B. All appliances and equipment must be installed per manufacturer’s instructions and applicable code requirements.

See Appendix A for the equipment lists required by the CEC for each technology type under the BUILD Program.

C. BUILD Base Incentives

- 1. The BUILD Calculator Pathway, at application reservation, uses the BUILD calculator to estimate incentive amounts. This pathway requires installation of space heating and water heating equipment that use the specified Core Technologies and meet the Minimum Requirements in Table 5.1:

Table 5.1: Technologies for BUILD Base Incentives — Low-Rise Residential

Energy End Use	Core Technologies	Minimum Requirements
Space Conditioning	Air-source split central heat pump ¹	HSPF ≥ 8.2
	Packaged Terminal Heat Pump ²	COP ≥ 3.0
	Variable Capacity Heat Pump ³	See footnote ³
Water Heating	Unitary Heat Pump Water Heater	NEEA Tier 3
	Central On-site Heat Pump Water Heater	UEF ≥ 3.75
	Drain Water Heat Recovery (DWHR)	Unequal to shower, 43% CSA Rated Efficiency

Source: California Energy Commission

- 1. Qualifying air-source heat pumps shall have ANSI/AHRI Standard 210/240 rating.
- 2. Qualifying packaged terminal heat pumps shall have ANSI/AHRI Standard 310/380 ratings at 47°F dry-bulb.
- 3. Qualifying variable-capacity heat pumps shall meet the requirements of publication [CEC-400-2019-012](#).

Table 5.2: Technologies for BUILD Base Incentives — Mid and High-Rise Residential

Energy End Use	Core Technologies	Minimum Requirements
Space Conditioning	Air-source split central heat pump ¹	HSPF ≥ 8.2
	Variable Refrigerant Flow (VRF) ²	HSPF ≥ 7.7, COP ≥ 3.3
	Variable Capacity Heat Pump ³	HSPF ≥ 7.7, COP ≥ 3.3
Water Heating	Unitary Heat Pump Water Heater	NEEA Tier 3
	Central On-site Heat Pump Water Heater	UEF ≥ 3.75 CEC Certified ⁴ and available in the CEC approved compliance software
	Drain Water Heat Recovery (DWHR)	Unequal to shower, 43% CSA Rated Efficiency

Source: California Energy Commission

1. Qualifying air-source heat pumps shall have ANSI/AHRI Standard 210/240 rating.
2. Qualifying variable-refrigerant-flow systems shall have ANSI/AHRI Standard 1230 rating at 47°F dry-bulb.
3. Qualifying variable-capacity heat pumps shall have ANSI/AHRI Standard 1230 rating at 47°F dry-bulb.
4. Qualifying central heat pump water heater shall be certified and on the CEC's [certification list](#).

2. Custom Energy Model Pathway. The energy model can use any equipment and features available within the software and is not limited to Tables 5.1 and Table 5.2, such as high-performance building envelope features, or other types of ventilation, space heating and water heating systems.

D. Kicker Incentives

Table 5.3: Eligible Technologies for BUILD Kicker Incentives

Eligible Technologies	Minimum Requirement
Grid Flexibility	For smart thermostats, ENERGY STAR®-certified For HPWHs, must comply with 2019 Title 24 Part 6 Joint Appendix 13 CTA-2045-compliant
Refrigerant	Lower-GWP refrigerants (GWP < 750) Low GWP (GWP < 150)
Cooktop	Induction - no prescriptive or performance standard exists
Clothes Dryer	Heat pump clothes dryer, ENERGY STAR-certified
On-Site Energy Storage	Listed on the Solar Equipment Lists and JA 12-compliant
Electric Vehicle Supply Equipment	No prescriptive or performance standard exists

Source: California Energy Commission

E. Process for Evaluating New Technologies.

At BUILD’s launch, the CEC will be using its California Building Energy Code Compliance (CBECC) software to calculate GHG emissions and incentives. For new technologies to be considered under the program, they must be included in CBECC.

1. There are two existing processes available to add new technologies in the software:
 1. During the standard three-year iterative Energy Code update process, some new technologies may already be field-tested and vetted with enough documentation to be incorporated into the software. As the next generation of compliance software is developed, the qualified new technologies may be included in the software; or
 2. There is the compliance option process. The compliance option process begins by working with CEC staff anytime during a code cycle to present the proposed technology. The technologies must have reliable performance data based on field studies, usually conducted by a neutral party, for a typical California year. The data are then vetted by staff, and when found acceptable, can be incorporated into the software. More information about the compliance option process can be found at the CEC’s Special Cases for Building Energy Efficiency Standards website.¹⁵

¹⁵ [CEC’s Special Cases for Building Energy Efficiency Standards](https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/special-cases-building-energy), <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/special-cases-building-energy>.

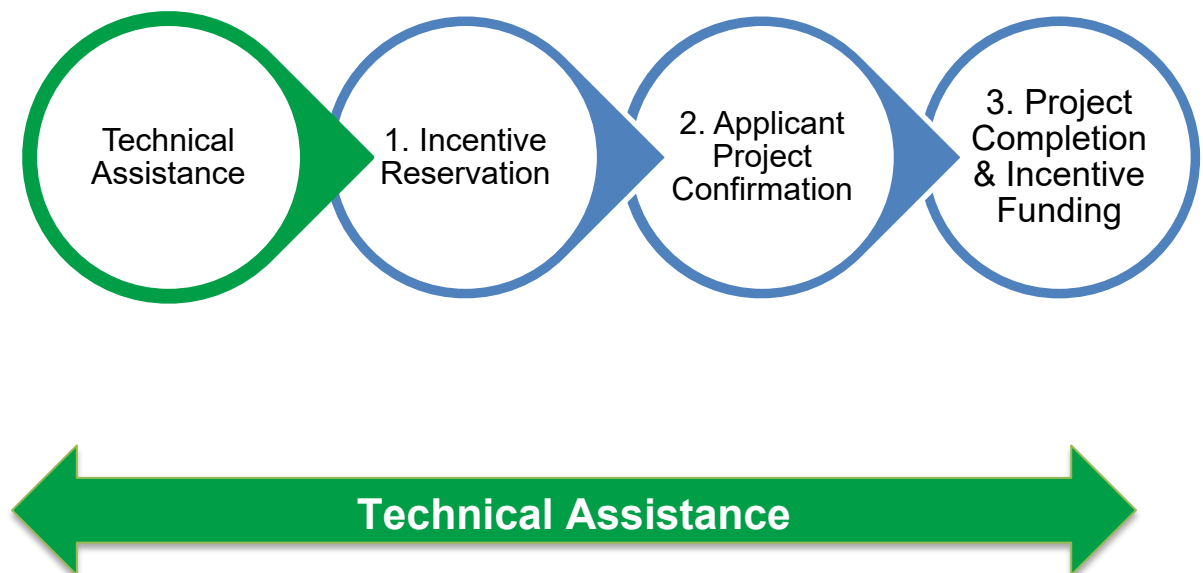
SECTION 6: Technical Assistance

Technical assistance is to support the low-income housing industry to transform its building practices to move to all-electric housing and near-zero emission technologies — in accordance with Decisions 20-03-027 and SB 1477 — with the goal of reducing GHG emissions from the residential building sector.

As noted above, the CEC conducted a competitive solicitation process for a technical assistance provider (TAP) with experience in providing technical experience in the technical design and installing near-zero-emission technologies and buildings and working with low-income residential developers and stakeholders. The Associate for Energy Affordability (AEA) was selected and approved as the TAP at the CEC business meeting in September 2021. The technical assistance services are anticipated to potential applicants and stakeholders in late 2021.

The CEC will work with the TAP to establish a technical assistance manual, which will be provided to stakeholders and the public in the coming months.

Figure 6.1: Technical Assistance



Source: California Energy Commission

- A. Technical assistance will be available to all potential applicants.
 - 1. Applicants are not required to use technical assistance
 - 2. Recipients of technical assistance are not required to apply for an incentive.

B. After a potential applicant has received technical assistance for their first two projects under BUILD, it is eligible to receive technical assistance on two additional projects with a 50-hour cap per project.

C. The service cap will be waived if the project is:

1. In a different climate zone with substantial meteorological differences from the builder's previous projects, requiring new sets of technical knowledge in low-emission building design, technologies, and construction.
2. In a disaster area such as after a wildfire or flood event.
3. In a tribal community.
4. New all-electric low-income housing projects meriting special consideration, such as high air or water pollution areas designated by CalEnviroScreen and projects in disadvantaged communities with the score of 70 percentile or above

Glossary

CALENVIROSCREEN — A screening method that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution. The CalEnviroScreen tool combines different types of census tract-specific information into a score to determine which communities are the most burdened or "disadvantaged."

COMMUNITY CHOICE AGGREGATOR (CCA) — Community choice aggregation (or CCA) lets local jurisdictions aggregate, or combine, their electricity load to purchase power on behalf of their residents. In California, community choice aggregators are legally defined by state law as electric service providers and work together with the region's existing utility, which continues to provide customer services (for example, grid maintenance and power delivery).

DISADVANTAGED COMMUNITIES — a community identified as a disadvantaged community under Section 39711 of the Health and Safety Code.

GREENHOUSE GAS — Any gas that absorbs infrared radiation in the atmosphere. Common examples of greenhouse gases include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated fluorocarbons (HCFCs), ozone (O₃), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).

HERS — The California Home Energy Rating System as described in Title 20, Chapter 4, Article 8, Section 1670.

INVESTOR-OWNED UTILITIES — A private company that provides a utility, such as water, natural gas, or electricity, to a specific service area. The California Public Utilities Commission regulates investor-owned utilities that operate in California.

LOW-INCOME COMMUNITIES — Defined as a census tract or equivalent geographic as 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

METRIC TON — A unit of weight equal to 1,000 kilograms (2,205 pounds).

NATURAL GAS — A hydrocarbon gas found in the earth composed of methane, ethane, butane, propane, and other gases.

PUBLICLY OWNED UTILITIES — A local publicly owned electric utility as defined by Public Utilities Code section 224.3.

TIME-DEPENDENT VALUATION (TDV) ENERGY — TDV energy accounts for the energy used at the building site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation and transmission and distribution losses.

UNIFORM ENERGY FACTOR (UEF) — The uniform energy descriptor used to describe the overall water heater efficiency as determined using the applicable test method in the Appliance Efficiency Regulations. Typical gas storage water heaters have typical UEFs of about 0.60-

0.76, electric storage water heaters about 0.90, and gas instantaneous units approximately 0.80–0.94. It replaced the “energy factor” metric previously used for residential water heaters.

VIRTUAL NET ENERGY METERING (VNEM) — is a program that allows multitenant building owners to install a solar system to cover the electricity load of both common and tenant areas connected at the same service delivery point.

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 the Modeled Resident Utility Cost 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	AHRI Directory of Certified Products DOE Compliance Certification Database
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 and Smart Thermostats	ENERGY STAR's Product Finder
Battery Storage System (Battery or Energy Storage System)	CEC's Solar Equipment Lists

Source: California Energy Commission

Air Source Heat Pump List

The Air Conditioning, Heating, and Refrigeration Institute (AHRI) is an organization that has an equipment certification program that is globally recognized. It assures that manufacturers produce products with consistent and valid ratings and provides a level playing field for manufacturers in that competing products are tested and rated to the same standard or specification. AHRI maintains a searchable database that can easily find products.

The U.S. Department of Energy (DOE) also houses a database of certified equipment called the Compliance Certification Database. The database houses certification reports and compliance statements submitted by manufacturers for covered products and equipment subject to federal conservation standards. The database offers consumers an easy-to-use

search function for existing records in a readily downloadable format and has a consumer-friendly selection tool as well as a search-by-model function.

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 cost-effectively deliver energy efficiency through market transformation. One of NEEA's area of work is advancing the market for heat pump water heaters. Utilities, energy efficiency organizations, and market partners developed the Advanced Water Heating Specification¹⁶ to advance higher performing water heaters. While the specification aims to ensuring performance in cooler northern climates, the applicability and benefits extends beyond the Northwest.

Because 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 Specification¹⁷ 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 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. Manufacturers who wish to include their products on the qualified products list¹⁸ must submit an assessment that shows the product meeting all the requirements. A third-party lab also independently tests the products to verify performance results. NEEA updates the product list often.

Products meeting the specification are in the 40- to 80-gallon range. Most commonly, systems of this size are used in single-family homes or multifamily dwelling units. CEC is setting design criteria, performance specifications, and installation guidelines for heat pump water heaters with larger capacity.

Advanced Water Heating Initiative (AWHI) seeks 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

16 [NEEA's Advanced Water Heating Specification](https://neea.org/our-work/advanced-water-heating-specification), <https://neea.org/our-work/advanced-water-heating-specification>.

17 [NEEA's Advanced Water Heating Specification for Residential Water Heaters](https://neea.org/img/documents/Advanced-Water-Heating-Specification.pdf), <https://neea.org/img/documents/Advanced-Water-Heating-Specification.pdf>.

18 [NEEA's Qualified Products List](https://neea.org/img/documents/qualified-products-list.pdf), <https://neea.org/img/documents/qualified-products-list.pdf>.

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 List¹⁹ can be referenced for approved equipment. To be listed, manufacturers are required to submit performance data from a third-party test lab, bench tests by third-party consultants, test 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 and make it easy 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 specification²⁰ 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, purchasers will recover their investment in increased energy efficiency through utility costs 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, which include heat pump clothes dryers. For the BUILD Program, the ENERGY STAR rating will be used for evaluating

19 [CEC's Central HPWH Performance Map Certification List](https://www.energy.ca.gov/media/4026), <https://www.energy.ca.gov/media/4026>.

20 [How Product Earns ENERGY STAR Label](https://www.energystar.gov/products/how-product-earns-energy-star-label), <https://www.energystar.gov/products/how-product-earns-energy-star-label>.

heat pump clothes dryers. Home appliance products that earn the ENERGY STAR label are independently certified to save energy and save money to the consumer.

CEC Solar Equipment Lists and Energy Storage Systems

The CEC maintains lists of solar and storage equipment that includes 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 Lists²¹ establish 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 (Senate Bill 1)*.²²

For energy storage systems, the safety certification must be from a 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.

21 [Solar Equipment Lists](http://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/solar-equipment-lists), www.energy.ca.gov/programs-and-topics/topics/renewable-energy/solar-equipment-lists.

22 [Guidelines for California's Solar Electric Incentive Programs \(Senate Bill 1\), Seventh Edition](https://efiling.energy.ca.gov/GetDocument.aspx?tn=226057&DocumentContentId=56796), <https://efiling.energy.ca.gov/GetDocument.aspx?tn=226057&DocumentContentId=56796>.

APPENDIX B:

Reference Documents

[BUILD Implementation Plan, Revised September 2020 CEC-300-2020-010-REV](https://efiling.energy.ca.gov/getdocument.aspx?tn=234936)

[https://efiling.energy.ca.gov/getdocument.aspx?tn=234936.](https://efiling.energy.ca.gov/getdocument.aspx?tn=234936)

[CPUC Decision D. 20-03-027 for BUILD](https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF)

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF>

[CPUC Resolution E-5116 for BUILD, approving the Implementation Plan](https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M376/K936/376936477.PDF)

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M376/K936/376936477.PDF>

[Senate Bill SB 1477 \(Stern, 2018\)](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1477)

https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1477

[The TECH Initiative Program](https://energy-solution.com/tech/)

<https://energy-solution.com/tech/>

APPENDIX C:

Modeled Resident Utility Costs Method

SB 1477 directs the CPUC, in supervising the administration of the BUILD Program, to ensure that new low-income all-electric homes receiving BUILD incentives do not result in higher utility bills for building occupants.

D. 20-03-027 directs the CEC to develop or adopt a tool or a method to measure bill savings as a result of 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 have developed for project applicants to analyze resident utility costs for projects receiving incentives through the BUILD Program. The method seeks to accurately estimate modeled resident utility costs 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.

CEC staff developed the modeled resident utility costs methodology using the following guiding principles:

- **Ensures Compliance with Statutory Requirement Specific to BUILD to Avoid Utility Bill Increases for Building Residents**

SB 1477 and the CPUC require projects receiving incentives under the program to not result in higher utility bill savings for low-income building occupants and owners. CEC staff designed this methodology to incorporate an additional 5 percent safeguard in the calculation of modeled utility cost as compared to the modeled baseline cost to ensure the resulting projects complies with the statutory requirement. This buffer is to account for uncertainties due to modeling assumptions.

- **Easy and Flexible for Builders**

To help simplify the process for builders to demonstrate the modeled resident utility costs, CEC staff developed a BUILD Calculator to assist builders and developers in the Reservation Application process (step 1). Flexibility is also given to builders by providing them with a custom pathway as described in Section 3.

- **Accurate and Repeatable**

To accurately estimate utility costs across a diverse set of potential projects, the modeled resident utility costs method accounts for California's diverse climates, buildings types, and utility rates. CEC staff developed an automated process to simplify repeated analyses for future updates to the method, such as utility rate updates.

Building Energy Modeling

CBECC is a free energy analysis 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 energy usage of the building. CBECC outputs 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 estimated therms used by the building to natural gas utility rates, the natural gas bill can be calculated. Likewise, by applying the kilowatt-hours to electric utility rates, the electric bill can be calculated. The total of these bill calculations model resident utility costs.

Assumptions

The following assumptions were made to simplify the modeled resident utility cost savings analysis:

- Tenants will be on default TOU rates where applicable. It is likely BUILD projects will need a PV system to either meet the Energy Code or BUILD minimum requirements. Under NEM 2.0, TOU rates are mandatory for residential PV customers. Moreover, IOUs are transitioning to default TOU rates for their customers.
- Building occupants do not exceed the baseline allowance. The baseline allowance is the amount of energy a utility customer can pay at the lowest (baseline) price. Based on the energy usage modelled in CBECC, there are few instances when building occupants exceeded the allowance. Additionally, in the instances where the baseline was exceeded, the amount of energy usage exceeding the baseline was minimal.
- The California Climate Credit is not applied. The value of the California Climate Credit changes year to year, and the continuation of the credit is not definite. To be conservative, the credit will not be accounted for in the modeled resident utility costs analysis.
- Single-family homes are individually metered for gas and electricity.
- Multifamily homes are master-metered for gas and individually metered for electricity.

Results

All-electric new construction built to minimum code compliance will almost always produce bill savings compared to an average utility bill for existing homes in 2019.²³ Using the 2019 Energy Code mixed fuel baseline will ensure that bills are even lower than the mixed-fuel new construction alternative. In the BUILD Calculator, if the modeled all-electric building achieves 5 percent or greater energy cost savings than the baseline, the modeled project meets the statutory requirement for bill savings.

In many utility areas and climate zones, to achieve modeled resident utility cost savings against the baseline, many projects may need to include additional PV and/or increased energy efficiency measures to overcome the current difference between electricity rates and gas rates in year one of building occupancy. Despite the higher energy-efficient, electric appliances in all-electric homes, estimated additional PV ranging from 250W to 750W per unit

²³ [Resolution E-5105](#) provides data requirements to PG&E, SDG&E, SCE, Southwest Gas Corp, and Southern California Gas Company. As part of the data requirements, the average customer bill, organized by rate schedule and climate zone, is published. (<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M348/K071/348071702.PDF>)

is needed in most projects to overcome the difference in current rates and ensure modeled first-year resident utility bill savings.

Annual Resident Utility Costs

Resident utility costs can be assessed monthly, seasonally, or annually. Staff determined analyzing the bills on an annual basis is reasonable. An annual analysis gathers and averages the seasonal fluctuations in energy bills.

Establishing the Baseline

Energy costs are estimated for a mixed-fuel building meeting the 2019 Energy Code prescriptive standards as specified by the 2019 Residential and Nonresidential ACM Reference Manuals. These estimates are consistent with the statutorily required baseline set for GHG emissions under the BUILD Program and CPUC D. 20-03-027.

Rates

The rates used in this method are California Alternative Rates for Energy (CARE) rates (or an equivalent low-income rate), and default TOU or tiered rates. The CARE²⁴ 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 occupants of low-income affordable housing buildings qualify for discounted energy utility rates. However, it is possible that some low-income residents are not on CARE rates because they have not yet enrolled or are ineligible.

When an applicant completes a project analysis, the rates used to calculate the baseline must be appropriate for the characteristics of the project proposed for development and must match the rates used to calculate modeled resident utility costs. The Load Management Standards Proceeding²⁵ includes a requirement for utilities to report their hourly rates to a rate repository maintained by CEC. As these updated rates become available, CEC staff may input these rates in any updates to the BUILD-modeled resident utility costs method. CEC staff will consider other approaches for rates that may be used in future updates to the modeled resident utility costs method.

It is important for utility rates to best reflect current costs to residents in the modeled resident utility costs method. To reflect reasonably current utility rates, CEC staff may update the rates used in the tool supporting project energy costs be updated every two years.

The following tables display the rates used for the utilities:

²⁴ [California Alternative Rates for Energy \(CARE\)](https://www.cpuc.ca.gov/lowincomerates/), <https://www.cpuc.ca.gov/lowincomerates/>.

²⁵ The Load Management Standards Proceeding includes a requirement for utilities to report their hourly rates to a rate repository maintained by CEC. When these rates are available, CEC staff may use these rates in any updates to the BUILD modeled resident utility costs method. For more, see the [2020 Load Management Rulemaking page](https://www.energy.ca.gov/proceedings/energy-commission-proceedings/2020-load-management-rulemaking), <https://www.energy.ca.gov/proceedings/energy-commission-proceedings/2020-load-management-rulemaking>.

Table C.1: Gas Rates

Gas Utility	2020 Rates*
Pacific Gas and Electric	Gas Schedule G-1 or GM
Southern California Gas	Gas Schedule GR or GM
San Diego Gas & Electric	Gas Schedule GR or GM
Southwest Gas Corporation	Gas Schedule GN or SLT or GS

Source: California Energy Commission

Table C.2: Electric Rates

Electric Utility	2020 Rates*
Pacific Gas and Electric	Electric Schedule E-TOU-C (4-9 PM)
Southern California Edison	Schedule TOU-D (4-9PM)
San Diego Gas & Electric	Schedule TOU-DR1 (4-9 PM)
Los Angeles Department of Water and Power	Schedule R-1B (TOU) or Rate R-1A** (tiered)
Sacramento Municipal Utility District	Time-of-Day (5-8 PM)
Liberty Utilities	Schedule No. TOU D-1
Imperial Irrigation District	Schedule D (tiered)
All other utilities	Default rate (or low-income rate) of the utility, as identified by the Applicant, and in accordance with the BUILD methodology

Source: California Energy Commission

* CARE or an equivalent low-income rate or discount was applied when applicable.

** For LADWP, only tiered rates are available for low income.

Delivery Charges

Most utilities have a separate delivery charge from the total energy charge. The delivery charges account for the cost to deliver the energy to customers. In mixed fuel homes the delivery charge applies to both the gas and electric bill, and in all-electric homes only the delivery charges specific to electricity apply. These charges have been accounted for in the methodology and low income discounts were applied when applicable.

Calculations

The annual bill is calculated for the all-electric model and the mixed fuel baseline model to see the percentage difference. The hourly usage utility cost is calculated by multiplying the hourly energy usage from the modeled buildings by the hourly utility rate from utilities. This accounts for peak hours in TOU rates and any excess PV generation. The bill is summed monthly and

includes delivery charges and any PV bill credits. Lastly, all the hourly utility costs are summed to determine an annual total.

Treatment of Excess PV Generation

PV generation is accounted for in the modeled resident utility costs method. PV generation offsets electricity demand from the grid and, therefore, can reduce the electricity bill for the building occupants. During certain times of day throughout the year, there may be excess PV generation compared to the estimated building electricity load. This energy is exported to the grid. Exported energy is handled according to the utilities' net energy metering (NEM) agreements. NEM policies allow solar PV customers to be compensated for the electricity generated that is exported to the grid. Credits are accrued for each kilowatt-hour (kWh) exported back to the grid and is then used to pay for energy purchased from the grid. These credits included in the modeled resident utility costs method and are applied the same day, a different day, or another month to offset utility costs. However, a small component of the rate includes nonbypassable charges (NBCs) that cannot be offset by solar credits. When importing from the grid, NBCs are billed in the total electric rate (energy rate + NBC rate), but when exporting only the energy rate is credited. NBCs are tracked separately from usage charges to not be offset by PV credits. NBCs can include fees for public purpose programs, nuclear decommissioning, Department of Water Resources bond charge, competition transition charge²⁶, and others for POU's. Low-income discounts are applied where applicable. In cases when NEM agreements allow, a net surplus compensation rate is applied if the NEM customer's PV system produces excess energy over their entire annual billing period.

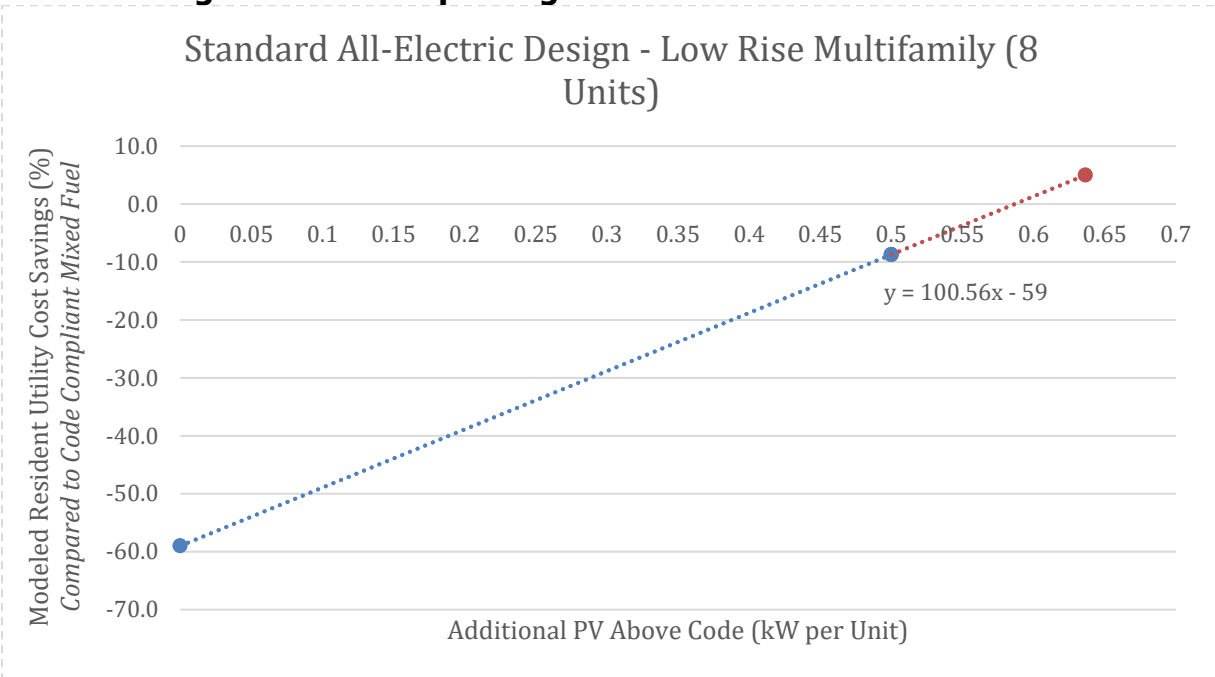
BUILD Calculator Pathway

Section 3 describes how applicants can elect to use the BUILD Calculator for the reservation application process to calculate the amount of increased efficiency and energy savings are needed for projects to be eligible for incentives. For example, as applicants look to design their projects, they can consider various trade-offs, such as installing increased efficiency measures instead of additional PV, or bundling PV and storage to reduce utility costs and increase resiliency.

CEC staff used a regression-based approach to develop equations for calculating the modeled resident utility costs from incremental energy efficiency and renewable energy measures. For measures that are independent from one another, a linear regression curve can be generated to predict the incremental energy usage savings. Independent measures include additional PV, energy storage, and domestic hot water systems. To illustrate this, a regression curve is plotted in Figure C.3 for an all-electric design in Climate Zone 12 (PG&E territory) with increasing additional PV to achieve resident utility cost savings.

²⁶ Competition transition charge is the charge for legacy electricity contracts, signed prior to 1998, that exceeds a CPUC-approved market price limit.

Figure C.1: Example Regression Curve for Additional PV



Source: California Energy Commission

To generate the regression curve, two modeled points (in blue) are plotted: one point is the minimally all-electric code compliant model and the other is an incrementally improved model. The x-axis is the additional PV above code requirements. The y-axis is the modeled resident utility cost savings percentage when comparing the all-electric model to an equivalent code-compliant mixed-fuel building. The regression curve can forecast a modeled point (in orange) that reflects the amount of additional PV needed (0.636 kW per unit) to achieve 5 percent utility cost savings.

The regression-approach is a good predictor of the modeled data. When modeling the forecasted additional PV from the example of the regression curve (0.636 kW per unit), the modeled resident utility costs method calculates savings of 4.83 percent. Since the predicted curves are similar to the actual results, the regression-based approach is used for developing the calculations for the BUILD Calculator.

Limitations

Ensuring no increase in modeled energy bills is challenging because the CEC can model energy use but cannot accurately project individual resident usage or future usage. The method uses an average modeled energy usage and does not reflect differences in household energy usage, varying weather conditions, and other factors.

Another limitation of this method is that it uses an average per bedroom energy utility cost for all building occupants. Central heat pump water heating systems and shared laundry equipment result in tenant-driven energy use. However, this equipment often is separately metered and paid for by the building owner. The energy use for this equipment is included in the modeled energy bill method. Staff is reviewing other approaches to balance the

appropriate assignment of energy use to residents in multifamily buildings with the need for streamlining program design.

This method includes only the rates mentioned in Table C.1 (Gas Rates) and Table C.2 (Electric 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. This method assumes a single tier within each rate for the annual period analyzed.

APPENDIX D: Natural Gas Territory Map

Figure D.1: Eligible Natural Gas Utility Service Area (California, 2020)



Source: California Energy Commission