



**CALIFORNIA
ENERGY COMMISSION**



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natural
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AGENCY**

California Energy Commission

Draft Environmental Impact Report

Amendments to the Building Energy Efficiency
Standards (2022 Energy Code)

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Chapter 1

Executive Summary

Executive Summary

This summary is provided in accordance with Section 15123 of the California Environmental Quality Act (CEQA)¹ Guidelines (CEQA Guidelines),² which states that an environmental impact report (EIR) “shall contain a brief summary of the proposed actions and its consequences. The language of the summary should be as clear and simple as reasonably practical.” This summary includes:

1. A description of the project;
2. The environmental impacts of the project and recommended mitigation measures, if applicable;
3. Areas of controversy known to the California Energy Commission (CEC) including issues raised by agencies and the public; and
4. Identification of the alternatives evaluated and of the environmentally superior alternative.

1.1 Project Description Summary

The Warren-Alquist Act establishes the CEC as California’s primary energy policy and planning agency.³ The CEC is required to adopt regulations to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability.⁴ This is done through amendments to the Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (hereinafter, the “Energy Code”) on a three-year cycle. The Energy Code includes energy efficiency standards applicable to the construction of new buildings and additions and alterations to existing buildings. The CEC is required to adopt or revise standards that shall be cost-effective when taken in their entirety and when amortized over the economic life of the structure compared with historic practice.⁵

1 Pub. Resources Code § 21000 et seq. (The CEQA statutes generally require state and local government agencies to inform decision makers and the public about the potential environmental impacts of proposed projects and to reduce those environmental impacts to the extent feasible.)

2 Cal. Code of Regs., tit. 14, § 15000 et seq. (Guidelines) (Details the protocol by which state and local agencies comply with CEQA requirements.) Hereinafter the Guidelines are cited as “CEQA Guidelines, § ____.”

3 Pub. Resources Code § 25000 et seq.

4 Pub. Resources Code §§ 25402(a)-(b).

5 Pub. Resources Code § 25402(b)(3).

This draft environmental impact report (Draft EIR) evaluates the potential environmental impacts of the proposed triennial update to the Energy Code. The proposed amendments to the Energy Code is the “project” evaluated under the CEQA and hereinafter will be referred to throughout this EIR as the “2022 amendments” or “Energy Code updates.” Since this project is a change to existing building design and construction requirements applicable statewide, for purposes of this Draft EIR and the analyses herein, the boundary of the project area is the boundary of the state of California as set forth in the California Constitution and state statutes.

The project is the latest triennial update to the Energy Code. The amendments, if adopted, would be incorporated into the 2022 edition of the Energy Code, and become effective on January 1, 2023. As in prior updates to the Energy Code, the proposed Energy Code updates include numerous changes to the existing 2019 Energy Code. These amendments include new or updated standards to increase efficiency of different building systems and pieces of equipment.

The following is a summary of the 2022 amendments that the CEC proposes to the Energy Code:

- Revise the prescriptive compliance path available for building projects to include only heat pump technology in specific circumstances;
- Revise the “standard design” used for the modeling-based performance compliance path available for building projects to establish the performance baseline based on heat pump technologies in specific circumstances;
- Revise existing residential energy efficiency standards for solar photovoltaic (PV) systems, including battery storage and associated compliance options;
- Establish new prescriptive solar PV and battery requirements for the following newly constructed nonresidential building types: high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings;
- Establish new requirements that mixed fuel buildings be electric ready, meaning that electrical connections and other features needed to allow use of non-combustion equipment options are installed at the time of initial construction;
- Establish new energy efficiency standards for lighting, envelope (e.g., exterior walls, windows, roofs, and floors), and space conditioning systems serving controlled environment horticulture spaces;
- Revise energy efficiency standards for commercial and industrial process loads, including computer room air conditioning, refrigerated areas, fan systems, compressed air systems, and steam traps;
- Revise nonresidential and multifamily efficiency standards for building envelopes; fan and duct systems; heating, ventilation and air conditioning (HVAC) controls;

boilers and service water heating systems; indoor and outdoor lighting systems; and grid integration equipment such as demand responsive controls;

- Revise minimum standards for residential kitchen ventilation; and
- Revise and enhance requirements relating to duct sealing and ventilation.

The following is a summary of the statutory objectives guiding the 2022 amendments:

Objective 1: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy via the deployment of technically feasible and cost-effective technologies and measures;

Objective 2: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by increasing deployment and utilization of distributed, on-site renewable energy equipment and increasing the percentage of energy consumption from new residential and nonresidential buildings which is able to be served by renewable energy equipment;

Objective 3: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy by ensuring that newly constructed buildings designed for use of natural gas equipment include wiring and other design features necessary to allow future use of electric equipment when it becomes cost-effective and technically feasible to do so; and

Objective 4: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by improving the ability of buildings to engage in and benefit from energy storage and load management.

In addition, the Energy Code updates are consistent with and support other important statewide goals for the decarbonization of California's economy.

1.2 Summary of Environmental Impacts and Mitigation Measures

Table 1-1, presented at the end of this chapter, provides a summary of the environmental impacts for the proposed 2022 amendments that are evaluated in this Draft EIR. The table provides the level of significance of the impact and recommended mitigation measures, if any. Impacts are categorized as follows:

- **Beneficial Impact:** a positive impact on the environment. Beneficial impacts are distinct from "no impact" in that the environment is affected, however the change is not a significant impact under CEQA as the term "significant effect on the environment" is defined as "a substantial, or potentially substantial, *adverse* change in...physical conditions affected by the project..."⁶

6 CEQA Guidelines, § 15382.

- **No Impact:** no impact on the environment.
- **Less Than Significant Impact:** no substantial adverse impact on the environment, although a less than significant adverse impact may occur; or an adverse impact on the environment that would be potentially significant but can be eliminated or reduced to a less than significant level through compliance with existing federal, state, and local laws and regulations.
- **Less Than Significant with Mitigation:** a significant adverse impact on the environment that would be reduced to a less than significant level through implementation of feasible mitigation measures.
- **Significant and Unavoidable Impact:** a significant adverse impact on the environment that cannot be eliminated or reduced to a less than significant level through implementation of feasible mitigation measures. In some cases, mitigation may be available to lessen a given impact, but the residual effects of that impact would continue to be significant even after implementation of mitigation measures.

1.3 Summary of Known Areas of Controversy

In accordance with Public Resources Code section 21092 and CEQA Guidelines Section 15082, the CEC issued a Notice of Preparation on March 18, 2021, seeking input from responsible and trustee agencies and the general public regarding the scope and content of environmental areas in the EIR. CEC staff also hosted a virtual scoping meeting on April 9, 2021, during which environmental areas with potential significant impacts were discussed and comments heard. The CEC accepted comments on the scope of EIR between March 19, 2021, and April 23, 2021. In total, seven comment letters were received. Areas of controversy reflected in these comments include, but are not limited to, the following:

- Need for an appropriate baseline;
- Potential impacts to agriculture and forestry resources, air quality, biological resources, energy, greenhouse gas emissions, population and housing, utilities and service systems, and wildfire;
- All-electric building requirements as an alternative to the proposed amendments;
- Concerns with the proposed amendments for lighting; and
- Tribal consultation in compliance with Assembly Bill (AB) 52 and Senate Bill (SB) 18.

Areas of controversy that fall within the scope of CEQA are addressed in this Draft EIR and its appendices. Issues that fall outside the scope of CEQA are not evaluated in this Draft EIR.

1.4 Summary of Issues to be Resolved

1.4.1 Alternatives to the Project

CEQA requires that an EIR identify alternatives to the project as proposed and evaluate their comparative merits. CEQA Guidelines Section 15126.6 states that an EIR must describe a “reasonable range of potentially feasible alternatives,” focusing on those that “would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant environmental effects of the project.” Based on the requirements of CEQA and the summary of environmental impacts presented above, this EIR describes and analyzes five alternatives to the proposed project. A summary of project alternatives follows. The full analysis of project alternatives is provided in **Chapter 6 Alternatives**, along with a description of other alternatives considered but not carried forward for full analysis.

- **Alternative 1: No Project Alternative:** Assumes that the 2022 amendments will not be adopted and that the existing 2019 Energy Code will continue to be used until the next triennial update period in 2025.
- **Alternative 2: No Prescriptive Solar Alternative:** Adopts the proposed 2022 amendments but excludes the minimum prescriptive requirements for certain nonresidential buildings to install solar PV equipment.
- **Alternative 3: No Prescriptive Battery Storage Alternative:** Adopts the 2022 amendments without the minimum prescriptive requirements for certain nonresidential buildings to install battery storage equipment.
- **Alternative 4: No Removal of Prescriptive Compliance Path Options:** Adopts the proposed 2022 amendments with the exception of amendments that would remove gas-related options for prescriptive compliance with Energy Code requirements.
- **Alternative 5: Electric Space and Water Heating Alternative:** Amends the Energy Code to use energy efficient, heat pumps in newly constructed buildings for space heating and water heating, both prescriptively and through performance-based compliance. This alternative would result in greater electricity demand by newly constructed buildings and greater reductions in exposure to on-site combustion gases than the project.

Alternative 1 (No Project)

Under this alternative, the 2019 Energy Code will continue to be used with no amendments until the next triennial update in 2025 when additional amendments may be considered.

Alternative 2 (No Prescriptive Solar)

Under this alternative, the proposed amendments to the Energy Code that comprise the project would be pursued with the exception of new prescriptive minimum standards for

inclusion of solar PV equipment in specified newly constructed nonresidential buildings. Lack of a prescriptive requirement would result in fewer PV systems being installed at newly constructed buildings built during the three years that the 2022 Energy Code would be in effect. Electricity needs for powering equipment or charging energy storage devices that would be served through PV systems would instead be sourced from electric utilities. This alternative was found not to be environmentally superior and does not meet the project's core objective of effecting consumption of energy and grid reliability by increasing deployment and utilization of distributed, on-site renewable energy equipment.

Alternative 3 (No Prescriptive Battery Storage)

Under this alternative, the proposed amendments to the Energy Code that comprise the project would be pursued with the exception of new prescriptive minimum standards for inclusion of onsite battery storage equipment in specified newly constructed nonresidential buildings, resulting in fewer battery storage systems being installed at newly constructed buildings built during the three years that the 2022 Energy Code would be in effect. Fewer battery storage systems will reduce the ability of buildings to shift energy usage by storing energy for use at times when energy costs are higher or less renewable energy is available. This alternative was found not to be environmentally superior and does not meet the project's core objective of improving the ability of buildings to engage in and benefit from energy storage and load management.

Alternative 4 (No Removal of Prescriptive Compliance Path Options)

Under this alternative, the proposed amendments to the Energy Code that comprise the project would be pursued with the exception of removing existing prescriptive compliance options for the use of natural gas equipment. As a result, buildings constructed during the three-year period that the 2022 Energy Code is in effect would be allowed to continue to use the prescriptive compliance pathway when using natural gas equipment that are less efficient than heat pumps for that end use. In contrast, the Energy Code updates require that buildings use the performance compliance pathway when using less efficient natural gas equipment. Alternative 4 is expected to result in a higher number of less efficient gas space heating and water heating equipment installed and smaller number of efficient heat pump space heating and water heating equipment installed when compared to the proposed project. This alternative was found not to be environmentally superior and does not meet the project's core objectives of affecting consumption of energy through the deployment of feasible cost-effective, energy efficient technology or increase the percentage of energy consumption from new residential and nonresidential buildings which is able to be served by renewable energy equipment.

Alternative 5 (Electric Space and Water Heating)

Under this alternative, the Energy Code would require that more space and water heating loads be served by electric heat pump equipment . During the three-year period

that the 2022 Energy Code is in effect only heat pump space and water heating equipment would be used as the basis of the performance and prescriptive standards. This alternative would potentially amplify both negative and positive impacts identified in this EIR, but because of lack of market experience and performance data, evaluation of cost-effectiveness and technical feasibility would not be determinable for some applications. This alternative would also incur adverse economic and housing impacts. This alternative was found to not meet the project’s core objective of deployment of technically feasible and cost-effective technologies and measures.

1.4.2. Environmentally Superior Alternative

CEQA Guidelines Section 15126.6 calls for the identification of an environmentally superior alternative in an EIR and further states that, “if the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.”

Analysis of the project indicates that the 2022 amendments is not expected to result in significant environmental impacts. Additionally, there is no clear environmentally superior alternative to the project among the alternatives identified. However, identified alternatives result in infeasibility, failure to meet project objectives, or both. In this case the 2022 amendments are considered to be the superior option due to the less than significant environmental impacts and ability to meet project objectives.

Table 1-1 Summary of Impacts and Mitigation

CEQA Criterion	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
Aesthetics			
4.1.3-a Have a substantial adverse effect on a scenic vista?	No Impact	None required	No Impact
4.1.3-b Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact	None required	No Impact
4.1.3-c In non-urbanized areas, substantially degrade the existing visual character or quality of	Less than significant	None required	Less than significant

<p>public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?</p>			
<p>4.1.3-d Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?</p>	<p>Less than significant</p>	<p>None required</p>	<p>Less than significant</p>
<p>Agriculture and Farmland</p>			
<p>4.9.1-a Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?</p>	<p>No Impact</p>	<p>None required</p>	<p>No Impact</p>
<p>4.9.1-b Conflict with existing zoning for agricultural use, or a Williamson Act contract?</p>	<p>No Impact</p>	<p>None required</p>	<p>No Impact</p>
<p>4.9.1-c Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or</p>	<p>No Impact</p>	<p>None required</p>	<p>No Impact</p>

timberland zoned Timberland Production (as defined by Government Code section 51104(g))?			
4.9.1-d Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact	None required	No Impact
4.9.1-e Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	No Impact	None required	No Impact
Air Quality (including Public Health)			
4.2.5-a Conflict with or obstruct implementation of the applicable air quality plan?	Less than significant, Beneficial Impact	None required	Less than significant, Beneficial Impact
4.2.5-b Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	Beneficial Impact	None required	Less than significant, Beneficial Impact
4.2.5-c Expose sensitive receptors to substantial pollutant concentrations?	Less than significant, Beneficial Impact	None required	Less than significant, Beneficial Impact
4.2.5-d Result in other emissions (such as those leading to odors) adversely	Beneficial Impact	None required	Less than significant, Beneficial Impact

affecting a substantial number of people?			
Biological Resources			
4.3.3-a Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	Less than significant, Beneficial Impact	None required	Less than significant, Beneficial Impact
4.3.3-b Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	No Impact	None required	No Impact
4.3.3-c Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	No Impact	None required	No Impact
4.3.3-d Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with	No Impact	None required	No Impact

established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			
4.3.3-e Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	No Impact	None required	No Impact
4.3.3-f Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	No Impact	None required	No Impact
Cultural and Tribal Cultural Resources			
4.9.2-a Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	No Impact	None required	No Impact
4.9.2-b Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?	No Impact	None required	No Impact
4.9.2-c Disturb any human remains, including those interred outside of formal cemeteries?	No Impact	None required	No Impact
4.9.2-d Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical	No Impact	None required	No Impact

resources as defined in Public Resources Code section 5020.1(k)?			
4.9.2-e A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	No Impact	None required	No Impact
Energy and Energy Resources			
4.4.3-a Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	Less than significant	None required	Less than significant
4.4.3-b Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	Less than significant	None required	Less than significant
Geology and Soils			
4.9.3-a Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	No Impact	None required	No Impact

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			
ii. Strong seismic ground shaking?	No Impact	None required	No Impact
iii. Seismic-related ground failure, including liquefaction?	No Impact	None required	No Impact
iv. Landslides?	No Impact	None required	No Impact
4.9.3-b Result in substantial soil erosion or the loss of topsoil?	No Impact	None required	No Impact
4.9.3-c Be located on geologic units or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	No Impact	None required	No Impact
4.9.3-d Be located on expansive soil, as defined in Section 1803.5.3 of the California Building Code (2010), creating substantial direct or indirect risks to life or property?	No Impact	None required	No Impact
4.9.3-e Have soils incapable of adequately supporting	No Impact	None required	No Impact

the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?			
4.9.3-f Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	No Impact	None required	No Impact
Greenhouse Gas Emissions			
4.5.3-a Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than significant, Beneficial Impact	None required	Less than significant, Beneficial Impact
4.5.3-b Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Less than significant	None required	Less than significant
Hazards and Hazardous Materials			
4.6.3-a Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than significant	None required	Less than significant
4.6.3-b Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous	Less than significant	None required	Less than significant

materials into the environment?			
4.6.3-c Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Less than significant	None required	Less than significant
4.6.3-d Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	No Impact	None required	No Impact
4.6.3-e For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	No Impact	None required	No Impact
4.6.3-f Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less than significant	None required	Less than significant
4.6.3-g Expose people or structures, either directly or indirectly, to a significant	Less than significant	None required	Less than significant

risk of loss, injury or death involving wildland fires?			
Hydrology and Water Quality			
4.9.4-a Violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	No Impact	None required	No Impact
4.9.4-b Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	No Impact	None required	No Impact
4.9.4-c Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces in a manner which would: i.result in substantial erosion or siltation, on- or offsite;	No Impact	None required	No Impact
ii.substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	No Impact	None required	No Impact
iii.create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or	No Impact	None required	No Impact

provide substantial additional sources of polluted runoff; or			
iv. impede or redirect flood flows?	No Impact	None required	No Impact
4.9.4-e Conflict with or obstruct implementation of water quality control plan or sustainable groundwater management plan?	No Impact	None required	No Impact
Land Use and Planning			
4.9.5-a Physically divide an established community?	No Impact	None required	No Impact
4.9.5-b Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact	None required	No Impact
Mineral Resources			
4.9.6-a Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	No Impact	None required	No Impact
4.9.6-b Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	No Impact	None required	No Impact
Noise			
4.9.7-a Generation of a substantial temporary or	No Impact	None required	No Impact

permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			
4.9.7-b Generation of excessive ground-borne vibration or ground-borne noise levels?	No Impact	None required	No Impact
4.9.7-c For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No Impact	None required	No Impact
Population and Housing			
4.9.8-a Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact	None required	No Impact
4.9.8-b Displace substantial numbers of existing people or housing, necessitating the construction of	No Impact	None required	No Impact

replacement housing elsewhere?			
Public Services			
4.9.9-a Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: i.Fire protection?	No Impact	None required	No Impact
ii.Police Protection?	No Impact	None required	No Impact
iii.Schools?	No Impact	None required	No Impact
iv.Parks?	No Impact	None required	No Impact
v.Other public facilities?	No Impact	None required	No Impact
Recreation			
4.9.10-a Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	No Impact	None required	No Impact
4.9.10-b Does the project include recreational facilities or require the construction or expansion of recreational	No Impact	None required	No Impact

facilities, which might have an adverse physical effect on the environment?			
Transportation			
4.9.11-a Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	No Impact	None required	No Impact
4.9.11-b Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	No Impact	None required	No Impact
4.9.11-c Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact	None required	No Impact
4.9.11-d Result in inadequate emergency access?	No Impact	None required	No Impact
Utilities and Service Systems			
4.7.3-a Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	Less than significant	None Required	Less than significant

4.7.3-b Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	Less than significant, Beneficial Impact	None Required	Less than significant, Beneficial Impact
4.7.3-c Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Less than significant, Beneficial Impact	None Required	Less than significant, Beneficial Impact
4.7.3-d Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	Less than significant	None Required	Less than significant
4.7.3-e Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	Less than significant	None Required	Less than significant
Wildfire			
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:			
4.8.3-a Substantially impair an adopted emergency response plan or emergency evacuation plan?	No Impact	None required	No Impact
4.8.3-b Due to slope, prevailing winds, and other	No Impact	None required	No Impact

factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?			
4.8.3-c Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	Less than significant	None required	Less than significant
4.8.3-d Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	No Impact	None required	No Impact
Mandatory Findings of Significance			
5.3-a Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or	Less than significant, Beneficial Impact	None required	Less than significant, Beneficial Impact

animal or eliminate important examples of the major periods of California history or prehistory?			
5.3-b Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	Less than significant	None required	Less than significant
5.3-c Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Less than significant	None required	Less than significant

Chapter 2

Introduction

Introduction

This Draft EIR evaluates the potential environmental impacts of the 2022 amendments. It has been prepared in accordance with the requirements in Public Resources Code sections 21000-21177 and the CEQA Guidelines Sections 15000-15387. The CEC is the lead agency under CEQA for consideration of this EIR and potential project approval.

2.1 Purpose and Intended Use of this EIR

CEQA requires that public agencies consider the potentially significant adverse environmental effects of projects over which they have discretionary approval authority before approving those projects. The preparation of an EIR is required whenever a project may result in a significant adverse environmental impact.⁷ An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental effects of a project, identify possible ways to mitigate or avoid the significant effects, and describe a range of reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

The CEC is the lead agency, as defined by CEQA, for this EIR because it will consider approval of the project. Other public agencies with jurisdiction over the project are listed below in Section 2.3, "Agency Roles and Responsibilities."

2.2 Scope of the Draft EIR

The project is the 2022 amendments to the Energy Code. The 2022 amendments would add to existing building design and construction requirements in the 2019 Energy Code. The 2022 amendments, if adopted, would be incorporated into the 2022 edition of the Energy Code and become effective on January 1, 2023. The 2022 Energy Code would apply to newly constructed buildings and additions and alterations to existing buildings.

While the 2022 Energy Code would apply to new construction, it would not cause new construction to occur within the state. The Energy Code also does not regulate where such construction occurs nor does it change the application of zoning laws, land use restrictions, or any other laws that affect the siting of specific building projects. Rather, the Energy Code is a set of design and construction requirements that apply when a builder requests a building permit from a local jurisdiction to begin construction (i.e., the Energy Code provides conditions attached to the permit to construct a building or make improvements to an existing building). As such, adopting 2022 amendments do not directly cause any changes to the environment. Its effects are indirect, as builders and manufacturers respond to new requirements.

⁷ CEQA Guidelines, § 15064(f)(1).

Under CEQA, the degree of specificity required in a EIR corresponds to the degree of specificity involved in the underlying activity which is described in the EIR.⁸ CEQA provides that an EIR on a project such as the adoption or amendment of comprehensive zoning ordinance or a local general plan should focus on the secondary effects that can be expected to follow from the adoption, or amendment, but the EIR need not be as detailed as an EIR on the specific construction projects that may follow.⁹ The analysis in this Draft EIR addresses broad regulations that do not approve the construction of specific building projects, so a general level of detail is appropriate. However, this Draft EIR makes a rigorous effort to evaluate potential significant adverse impacts and beneficial impacts of the regulatory program and contains as much information about those impacts as is currently available, without being unduly speculative.

The scope of analysis in this Draft EIR is intended to help focus public review and comments on the project and ultimately to inform the CEC of the environmental benefits and adverse impacts before CEC action on the 2022 amendments. This analysis focuses on reasonably foreseeable potentially significant adverse and beneficial impacts on the physical environment resulting from compliance with the project. The term “compliance” refers to the reasonably foreseeable activities that may occur in response to the provisions in the 2022 amendments the Energy Code, including the mandatory (i.e., compliance with regulatory requirements) and optional aspects of the project (i.e., compliance by using either a prescriptive set of measures or performance-based compliance, which achieves the same performance as the prescriptive set of measures but does not mandate the use of any specific technology).

A determination of which impacts would be potentially significant was made for this project based on research and analysis of the relevant project during the preparation of this Draft EIR, as well as on the comments received as part of the public scoping process (Appendix A). The CEC has determined that the project will have less than significant impacts on aesthetics, air quality, biological resources, energy, greenhouse gas emissions, hazards and hazardous materials, utilities and services systems, and wildfire, which are addressed in detail in this Draft EIR.

Based on research and analysis of the relevant project during the preparation of this Draft EIR, as well as on the comments received as part of the public scoping process (Appendix A), the CEC has determined that the following resources would not experience any significant impacts: agriculture and forest resources, cultural and tribal resources, geology and soils, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, and transportation.

⁸ CEQA Guidelines, § 15146.

⁹ Ibid.

Chapter 4, “Environmental Setting, Impacts, and Mitigation” provides the analysis, as required by CEQA, that explains why the project will have no or less-than-significant impacts on the aforementioned resources.

2.3 Agency Roles and Responsibilities

The CEC has the exclusive authority to adopt energy efficiency standards for buildings, which are located in the Energy Code. As the lead agency under CEQA, the CEC is responsible for considering the EIR and determining if the proposed 2022 amendments to the Energy Code should be approved.

Under CEQA, a responsible agency is a public agency which proposes to carry out or approve the project, for which the lead agency is preparing or has prepared an EIR.¹⁰

Any adoption of building standards by any state agency is subject to approval by the California Building Standards Commission, making them a responsible agency for this project.

A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the project of the state of California.¹¹ The California Department of Fish and Wildlife is California’s trustee agency for the state’s fish, wildlife, and plant resources, and it may consider and comment on this Draft EIR in fulfillment of its duties. No other agency is expected to use the EIR, and no other permits or approvals are necessary for the 2022 amendments to be incorporated into the Energy Code.

2.4 CEQA Public Review Process

2.4.1 Notice of Preparation

The purpose of a Notice of Preparation (NOP) is to provide sufficient information about the project and its potential environmental impacts to allow agencies and interested parties the opportunity to provide a meaningful response related to the scope and content of the EIR, including mitigation measures that should be considered and alternatives that should be addressed.¹² Comments submitted in response to the NOP are used by the lead agency to identify broad topics to be addressed in the EIR.

In accordance with CEQA Guidelines Section 15082, the CEC issued a NOP on March 18, 2021, to inform public agencies and the general public of the preparation of this Draft EIR for the project and to invite comments on the scope and content of the document (Appendix A). The CEC submitted the NOP to the State Clearinghouse, which then distributed the NOP to potential responsible and trustee agencies (State Clearinghouse

10 CEQA Guidelines, § 15381.

11 CEQA Guidelines, § 15386.

12 CEQA Guidelines, § 15082(b).

#2021-030504); posted the [NOP](#) on the CEC's website at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237212&DocumentContentId=70393>; and e-mailed the NOP to all persons subscribed to the following CEC service lists: Building Energy Efficiency Standards. In addition, the CEC mailed the NOP directly to the California Air Resources Board (CARB) Major Industrial Projects, CARB Atmospheric sciences and Climate Strategies Branch, CARB Research Planning, Administration, and Emissions Mitigation Branch, Department of Toxic Substance Control, State Water Resources Control Board (SWRCB) Division of Water Quality, California Department of Fish and Wildlife Habitat Conservation Planning, Department of Parks and Recreation, Department of Water Resources, California Natural Resources Agency, Department of General Services, Division of the State Architect, California Department of Transportation District 3, California Public Utilities Commission (CPUC), California Governor's Office of Emergency Services, Office of Historic Preservation, California Native American Heritage Commission, and the California Building Standards Commission. The CEC circulated the NOP for a 30-day review period, starting on March 18, 2021. The CEC accepted comments submitted through April 23, 2021.

In accordance with CEQA Guidelines Section 15082(c), the CEC issued a notice for a virtual scoping meeting for the Draft EIR on March 30, 2021. CEC staff hosted this virtual scoping meeting on April 9, 2021. During this meeting, CEC staff discussed environmental areas with potentially significant impacts and members of the public provided comments on the scope of the environmental areas in the EIR. CEC staff reviewed and considered the oral comments heard during the virtual meeting and written comments received during the NOP comment period. The comments are addressed as appropriate in the applicable technical section in this Draft EIR. **Appendix A** contains the written comment letters submitted during the NOP comment period. The comments the CEC received related to the NOP and the location of any response in this Draft EIR are summarized in **Table 2.1**.

**Table 2-1
Comment Letters and Discussion Location in this Draft EIR**

NOP Comment Letter	Comment/Topic	Addressed in Draft EIR Chapter
Letter 1 Earthjustice and Sierra Club	Appropriate baseline	Chapter 3
	Impacts to Air Quality, Energy, Greenhouse Gas Emissions	Chapter 4
	All-electric building alternative to the proposed amendments	Chapter 6
Letter 2 Holland & Knight	Appropriate baseline	Chapter 3
	Impacts to Agriculture and Forestry Resources, Air Quality, Biological Resources, Energy, Greenhouse Gas Emissions, Population and Housing, Utilities and Service Systems, Wildfire	Chapter 4
Letter 3 Jon McHugh, PE	Proposed amendments for lighting	Chapter 4
	Additional building efficiency measures not evaluated	Chapter 6
Letter 4 Jim Stewart, PhD	Proposed amendments for lighting	Chapter 4
	Additional building efficiency measures not evaluated	Chapter 6
Letter 5 Sierra Club CA	Proposed amendments for lighting	Chapter 4
	Additional building efficiency measures not evaluated	Chapter 6
Letter 6 Southern California Gas Company	Impacts to Air Quality, Energy, Greenhouse Gas Emissions, Population and Housing, Utilities and Service Systems, Wildfire	Chapter 4
Letter 7 Native American Heritage Commission	Tribal consultation in compliance with AB 52	Chapter 4

2.4.2 Draft EIR

The CEC is circulating this Draft EIR for a 45-day period of review and comment by the general public, interested parties, agencies, and organizations. In accordance with CEQA Guidelines Section 15087(a), the CEC has provided public notice of availability of this Draft EIR (hereinafter "Notice") to all persons and organizations that have previously requested such notice in writing by emailing the Notice to all persons subscribed to the following CEC service lists: Building Energy Efficiency Standards.

CEQA Guidelines Section 15087(a) also requires that the Notice be given by at least one of the following procedures:

- (1) Publication at least one time in a newspaper of general circulation in the area affected by the proposed project. If more than one area is affected, the notice shall be provided in the newspaper of largest circulation from among the newspapers of general circulation in those areas.
- (2) Posting of notice by the public agency on and off site in the area where the project is to be located.
- (3) Direct mailing to the owners and occupants of property contiguous to the parcel or parcels on which the project is located. Owners of such property shall be identified as shown on the latest equalized assessment roll.

To comply with section 15087(a), the CEC published the Notice in the Los Angeles Times on May 20, 2021. In accordance with CEQA Guidelines Section 15087(e)-(f), the CEC submitted the Draft EIR to the State Clearinghouse to distribute to state agencies for review.

In addition, as encouraged by CEQA Guidelines Section 15087(d), the CEC posted the Draft EIR to the [project's docket](#) at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-02> and hardcopies are available at the following locations for review:

California Energy Commission
1516 Ninth Street
Sacramento, California 95814-5512

During the 45-day public comment period, written comments on the Draft EIR's accuracy and completeness may be submitted to the CEC. Written comments (including via email) must be received by **5:00 p.m. on July 8, 2021**.

The CEC encourages use of its electronic commenting system. To submit written comments electronically, visit the [e-commenting page](#) at <https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=21-BSTD-02>. Enter contact information and a comment title describing the subject of the comment(s). Comments may be included in the "Comment Text" box or attached as a downloadable, searchable document in Microsoft® Word or Adobe® Acrobat®. The maximum file size allowed is 10 MB.

Please note that written comments, attachments, and associated contact information (including address, phone number, and email address) will become part of the public record with access available via any internet search engine.

Written comments may be submitted by email. Include docket number 21-BSTD-02 and 2022 Energy Code Update CEQA Documentation in the subject line and email to docket@energy.ca.gov.

A paper copy of written comments may be sent to:

California Energy Commission
Docket Unit, MS-4
Docket No. 21-BSTD-02
1516 Ninth Street
Sacramento, California 95814-5512

2.4.3 Final EIR

After the end of the 45-day public comment period, CEC staff will evaluate and prepare proposed responses to comments received on environmental issues. Consistent with CEQA Guidelines Section 15088(b), the CEC will provide written proposed responses to commenting agencies by at least 10 days before any action is taken on the Final EIR or project. The Final EIR (containing this Draft EIR and the Responses to Comments document) will then be considered for certification and approval by the CEC Commissioners at a CEC business meeting.

The level of detail contained throughout this Draft EIR is consistent with CEQA Guidelines Section 15151 and court decisions, which provide the standards of adequacy on which this Draft EIR is based. The Guidelines state as follows:

An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of the environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.¹³

As such, the standards for adequacy provide that an EIR can be certified if: (1) the EIR provides sufficient analysis to allow decisions to be made regarding the proposed project with consideration given to its environmental impacts; (2) the EIR shows a good faith effort at full disclosure of environmental information. If the CEC Commissioners find that the Final EIR is adequate, complete, and a good faith effort at full disclosure," the CEC Commissioners may certify the Final EIR in accordance with CEQA.

¹³ CEQA Guidelines, § 15151.

2.5 Organization of this EIR

This EIR is organized into six chapters, as described below:

- Chapter 1 Executive Summary. This chapter provides a concise overview of the proposed project; a brief overview of the potential environmental impacts analyzed and mitigation measures to reduce or eliminate these impacts; areas of known controversy and issues to be resolved; and project alternatives.
- Chapter 2 Introduction. This chapter describes the purpose, intent, and scope of the EIR; identifies the roles and responsibilities of the lead agency and responsible and trustee agencies; explains the environmental review process, including the preparation of the NOP, Draft EIR, and Final EIR; and provides the organization of the EIR.
- Chapter 3 Project Description. This chapter provides a description of the project; presents the location of project; identifies the objectives sought by the project; discusses the project's technical, economic, and environmental characteristics; identifies the intended uses of the EIR by the lead agency and responsible and trustee agencies; and describes the environmental setting of the project.
- Chapter 4 Environmental Setting, Impacts, and Mitigation. This chapter describes the environmental setting; discusses the regulatory setting; and analyzes the potential environmental impacts of the project and identifies if mitigation measures are necessary to reduce potentially significant impacts to less than significant levels. The analysis is organized in the following environmental resource topics derived from CEQA Appendix G:
 - 4.1 Aesthetics
 - 4.2 Air Quality
 - 4.3 Biological Resources
 - 4.4 Energy Resources
 - 4.5 Greenhouse Gas Emissions
 - 4.6 Hazards and Hazardous Materials
 - 4.7 Utilities and Service Systems
 - 4.8 Wildfire

Chapter 4 also includes resource topics that have no potential to cause or otherwise result in environmental impacts. These are grouped together in section 4.9 of this chapter, titled Technical Areas Not Affected.

- Chapter 5. This Chapter includes other subjects identified as "Other CEQA-Required Discussions." The subjects include analysis of environmental justice (EJ) issues; and Mandatory Findings of Significance, including analysis of the

project's potential contribution to cumulative impacts, with discussions of each of the technical areas in sections 4.1 through 4.8. The subjects in this chapter are organized as follows:

5.1. Environmental Justice

5.2 Growth Inducing Impacts

5.3. Mandatory Findings of Significance

- Chapter 6. This chapter includes a discussion of a reasonable range of alternatives to the proposed project which could feasibly avoid or lessen the proposed project's potentially significant impacts and evaluates the comparative merits of the alternatives by assessing the extent to which the alternatives could meet the basic project objectives.
- Chapter 7. This chapter provides the list of preparers of this Draft EIR, including CEC's technical staff and other CEC staff.
 - Appendices. The Appendices to this Draft EIR are organized as follows:
 - Appendix A. Notice of Preparation & Public Comments
 - Appendix B. Project Energy & Greenhouse Gas Emissions Impacts
 - Appendix C. HERS Registrations, 2013 & 2016 Energy Codes Cycles
 - Appendix D. Documents Relied Upon for 2022 Energy Code Rulemaking

Chapter 3

Project Description

Project Description

3.1 Introduction

This chapter provides a detailed description of the CEC’s Energy Code updates. For the purposes of this Draft EIR, the CEC considers the 2022 amendments to be the “project” evaluated under CEQA. CEQA defines a “project” as a discretionary action that has the potential to result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.¹⁴ Here, the implementation and compliance actions taken in response to the proposed amendments to the Energy Code have the potential to result in either a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment.

The 2022 amendments would add to existing building design and construction requirements to the 2019 Energy Code and support the state’s energy efficiency, reliability, and clean energy goals, policies, and mandates. The amendments would increase the deployment of on-site renewable energy generation, reduce carbon emissions from new buildings, reduce growth in energy demand, increase energy demand flexibility, maintain grid reliability, and ensure that California buildings are as energy efficient as is found to be technically feasible and cost-effective. This chapter describes the project’s location, objectives, and technical, economic, and environmental characteristics, as well as the intended use of this EIR and the environmental setting.

3.2 Project Location

The project is a change to existing requirements for building design and construction that are applicable statewide. For purposes of this EIR and the analyses herein, the boundary of the project area is the boundary of the state of California as set forth in the California Constitution and state statutes.

3.3 Statement of Project Objectives

The Warren-Alquist Act¹⁵ establishes the CEC as California’s primary energy policy and planning agency. Public Resources Code section 25402(a)-(b) requires the CEC to adopt regulations to “reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability.” The CEC satisfies this requirement through updates to the Energy Code contained in California Code of Regulations, Title 24, Part 6. The Energy Code includes the energy efficiency requirements applicable to the construction of new buildings and additions and alterations to existing buildings.

¹⁴ CEQA Guidelines, § 15378.

¹⁵ Pub. Resources Code § 25000 et seq.

The CEC updates the Energy Code on a three-year cycle as part of the California Building Standards Code. The project is the latest triennial update to the Energy Code. The proposed amendments, if adopted, would be incorporated into the 2022 edition of the Energy Code and become effective on January 1, 2023. The CEC released the proposed amendments for public review and comment on May 7, 2021, with a deadline for written comments of June 21, 2021. Requirements for rulemaking under the Administrative Procedures Act include a 45-day public review period for the proposed changes, and either a 15-day or 45-day review period for any substantial revisions made as a result of consideration of received comments, prior to adoption of the proposed changes. The proposed amendments to the Energy Code may therefore be revised in response to public input throughout the public review process prior to consideration for adoption by the CEC. At the time of publication of this draft EIR, staff is anticipating at least one set of revisions to the 2022 amendments to result from the public review process.

The overall purpose of the 2022 amendments is to employ technically feasible and cost-effective technologies and measures “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability” consistent with the statutory direction in the Warren-Alquist Act.

The following specific objectives, derived from the statutory mandate, guided development of the 2022 amendments:

Objective 1: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy via the deployment of technically feasible and cost-effective technologies and measures;

Objective 2: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by increasing deployment and utilization of distributed, on-site renewable energy equipment and increasing the percentage of energy consumption from new residential and nonresidential buildings that can be served by renewable energy equipment;

Objective 3: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy by ensuring that newly constructed buildings designed for use of natural gas equipment include wiring and other design features necessary to allow future use of electric equipment when it becomes cost-effective and technically feasible to do so; and

Objective 4: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by improving the ability of buildings to engage in and benefit from energy storage and load management.

Based on the evidence in the rulemaking record,¹⁶ the CEC has determined that the project will provide benefits to the state by slowing energy demand growth, reducing the depletion of resources, improving grid reliability, minimizing costs, and reducing threats to the state's environmental quality.

In addition, the project is consistent with and supports other important statewide goals for the decarbonization of California's economy. These efforts include, but are not limited to, the following:

SB 1078 (Chapter 516, Statutes of 2002) established the Renewable Portfolio Standards (RPS) for electricity supply. The RPS establishes increasingly progressive renewable energy procurement requirements for the state's electricity load-serving entities, which include retail sellers of electricity and local publicly owned utilities. To meet the RPS procurement requirements, load-serving entities must generally demonstrate that they procured specified types and quantities of electricity products from eligible renewable energy resources. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales.

The California Global Warming Solutions Act of 2006 (AB 32, Núñez, Chapter 488, Statutes of 2006) includes several legislative findings relating to climate change and establishes a goal of reducing California's greenhouse gas (GHG) emissions to 1990 levels by 2020 — a reduction of approximately 15 percent below emissions projected as a "business as usual" scenario at the time of its adoption.

AB 758 (Skinner, Chapter 470, Statutes of 2009) begins with the legislature recognizing "the significant energy savings and greenhouse gas emission reductions inherent in the state's existing residential and nonresidential building stock," and "the need to establish a comprehensive energy efficiency program to capture these reductions." The bill requires that the CEC "develop a comprehensive program to achieve greater energy savings in the state's existing residential and nonresidential building stock."

AB 2514 (Skinner, Chapter 469, Statutes of 2010) requires that the CPUC establish targets for energy storage procurement by load-serving entities in California and requires local publicly owned utilities to develop their own energy storage procurement targets and report to the CEC on their progress toward meeting those targets. As a result of this bill, the CPUC issued Decision 13-10-040, which set an AB 2514 energy storage procurement target of 1,325 megawatts (MW) by 2020.

The Clean Energy and Pollution Reduction Act of 2015, also referred to as SB 350 (de León, Chapter 547, Statutes of 2015), established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set

16 2022 Energy Code Update Rulemaking, [21-BSTD-001](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01). Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01>.

specific 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing greenhouse gas emissions across the energy and transportation sectors. Relative to buildings, SB 350 codifies a goal of “doubl[ing] the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.¹⁷”

Executive Order B-30-15 directs state agencies to implement measures to reduce GHG emissions 40 percent below their 1990 levels by 2030 and to achieve a goal of an 80 percent GHG reduction by 2050.

SB 32 (Pavley, Chapter 249, Statutes of 2016) updated the Global Warming Solutions Act of 2006 to reduce the state’s GHG emissions to 40 percent below 1990 levels by 2030. This goal was reinforced by AB 3232 (Friedman, Chapter 373, Statutes of 2018) which required the CEC to assess costs and opportunities to reduce GHG emissions from residential and commercial buildings by 40 percent of 1990 levels by 2030 at the lowest possible cost.

The 100 Percent Clean Energy Act of 2018 (SB 100, De León, Chapter 312, Statutes of 2018) establishes a target for renewable and zero-carbon resources to supply 100 percent of retail sales and electricity procured to serve all state agencies by 2045. The bill also increases the state’s RPS to 60 percent of retail sales by December 31, 2030 and requires all state agencies to incorporate these targets into their relevant planning. The statute calls upon the CEC, and other sister agencies, to use programs under existing statutes to achieve this policy.

Zero-Emission Buildings and Sources of Heat Energy (AB 3232, Friedman, Chapter 373, Statutes of 2018) requires the CEC to assess the potential for the state to reduce the emissions of greenhouse gases from the state’s residential and commercial building stock by at least 40 percent below 1990 levels by January 1, 2030. The bill states that decarbonizing California’s buildings is essential to achieve the state’s greenhouse gas emission reduction goals at the lowest possible cost. The bill establishes that it is the intent of the Legislature to achieve significant reductions in the emissions of greenhouse gases by the state’s residential and commercial building stock by January 1, 2030.

On September 10, 2018, former Governor Brown issued Executive Order B-55-18. This executive order directed the CARB to work with other state agencies to identify and recommend measures to achieve carbon neutrality as soon as possible, and no later than 2045, and to maintain and achieve negative emissions thereafter. To implement this executive order, CARB is conducting a series of workshops on the transition to low carbon fuels across all sectors and considerations for associated infrastructure to achieve Statewide carbon neutrality.

17 [Clean Energy and Pollution Reduction Act of 2015](https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350). Chapter 547 § 2. Available at https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

SB 49 (Skinner, Chapter 697, Statutes of 2019) requires that the CEC adopt energy efficiency standards to manage energy loads to help maintain electrical grid reliability. The bill requires the CEC to adopt, by regulation, and periodically update, standards for appliances to facilitate the deployment of flexible demand technologies.

Executive Order N-19-19 calls for a concerted commitment and partnership by government, the private sector, and California residents to reach some of the strongest climate goals in the world, and requires every aspect of state government to redouble its efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy.

Executive Order N-79-20 requires sales of all new passenger vehicles to be zero-emission by 2035, all medium-and heavy-duty vehicles by 2045 for all operations where feasible, drayage trucks and by 2035.

AB 2514 (Skinner, Chapter 469, Statutes of 2010) requires that the CPUC establish targets for energy storage procurement by load-serving entities in California and requires local publicly owned utilities to develop their own energy storage procurement targets and report to the CEC on their progress toward meeting those targets. As a result of this bill, the CPUC issued Decision 13-10-040, which set an AB 2514 energy storage procurement target of 1,325 MW by 2020.

3.4 Project Technical, Economic, and Environmental Characteristics

Due to population growth, every year in California a multitude of new buildings are constructed, added on to, or remodeled. The Energy Code does not regulate the pace or location of construction but instead requires that permitted construction that does occur meets specified energy efficiency standards. The project also does not entail the approval of any construction project, nor does it streamline or otherwise affect the CEQA review requirements for future discretionary construction projects to be reviewed by local lead agencies. Lastly, the project does not mandate or otherwise require the use of electricity or prohibit the use of natural gas for end uses within buildings (e.g., space and water heating). Rather, newly constructed buildings comply with the proposed amendments by using either a prescriptive set of measures or performance-based compliance, which achieves the same performance as the prescriptive set of measures but does not mandate the use of any specific technology.

As in prior updates to the Energy Code, the 2022 amendments include numerous changes to the 2019 Energy Code. These amendments include new or updated standards to increase efficiency of different building systems and pieces of equipment. These changes are the result of new technologies, new industry standards, advances in the CEC's understanding of existing technologies, and new state laws, regulations, and policies. The changes reflect the CEC's most current understanding of the technological, economic, and environmental research in the building efficiency field. Examples of innovative new standards included in the proposed amendments to the Energy Code

include establishing standards for controlled environment horticulture spaces, separate standards for commercial cooling equipment using transcritical carbon dioxide (CO₂) as a refrigerant, and updates to lighting standards to keep pace with the evolution of light-emitting diode (LED) lighting and smarter and more interconnected controls.

A document containing an underline/strikethrough version of the 2019 Energy Code which reflects the proposed 2022 amendments is available at the [Energy Commission's 2022 Energy Code webpage](https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency) at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency>. This document and its appendices are hereby incorporated by reference as part of this draft EIR.

The principal Energy Code updates, which are analyzed in this EIR to the extent they may cause direct or indirect effects on the environment, are summarized as follows:

1. Revise the prescriptive measure-based compliance path available for building projects to include only heat pump technology in specific circumstances.

The Energy Code includes a set of prescriptive compliance options that allow builders to comply by using methods demonstrated to be energy efficient. A builder that chooses the prescriptive approach does not need to model the performance of the building using a software program or application. These prescriptive options also establish the "standard design" that is used for calculating the performance target for performance-based compliance. Due to the efficiency of heat pump technology, prescriptive options are being narrowed to require either heat-pump-based space heating or water heating, or both. Gas furnaces and water heaters may still be installed using performance-based compliance.

2. Revise the "standard design" used for the modeling-based performance compliance path available for building projects so that buildings are held to a single performance baseline based on heat pump technologies in specific circumstances.

Public Resources Code sections 25402 subdivisions (a)-(b) and 25402.1 emphasize the importance of building design and construction flexibility by requiring the CEC to establish performance standards, in the form of an "energy budget" based on the energy consumption per square foot of floor space. For this reason, the Energy Code also includes a performance option that allows builders complete freedom in their designs provided the building achieves the same overall efficiency as an equivalent building using the prescriptive option. However, due to the efficiency of heat pump technology, buildings that were previously held to fuel-specific performance targets (meaning that a proposed mixed fuel building would be compared to a mixed fuel "standard design" and an electric building compared to an electric "standard design"), are proposed to be held to a single target, based on the performance of a heat-pump-based "standard design." This does not prohibit the use of any specific fuel source or equipment, however buildings that elect to use equipment that is less efficient than

available heat-pump-based equipment may have to make additional improvements to the building's efficiency to offset the increase in energy use. This supports the objective of reducing the unnecessary or wasteful consumption of energy.

3. Revise existing residential energy efficiency requirements for solar PV systems, including battery storage, and associated compliance options.

The updates for single-family residential and for multifamily residential of three or fewer stories do not directly change minimum solar PV system size. Instead, the concept of solar access roof area has been clarified, exceptions meant to address cases where the amount of roof area or the total required size of the system is too small to be feasible or cost-effective have been clarified, and an exception relating to snow loads has been added. Battery ready requirements have also been proposed for these building types. Use of storage technologies supports the objectives of reducing unnecessary or wasteful energy consumption and maintaining electric grid reliability.

4. Establish new prescriptive solar PV and battery storage requirements for multifamily buildings with more than three habitable stories, and certain newly constructed nonresidential building types: hotel-motel, unleased tenant spaces, offices, medical offices or clinics, restaurants, grocery stores, retail stores, schools, warehouses, and theater/auditorium/convention center buildings.

Use of PV and storage technologies supports the objectives of reducing unnecessary or wasteful energy consumption and maintaining electric grid reliability. Sizes of minimum solar PV arrays (in kilowatt (kW)) and minimum supporting battery storage (BS) (in kilowatt hours (kWh)) for prototypical buildings are as follows:

**Table 3.4-1
Photovoltaic System Size by Climate Zone**

PV size in kW per CZ	CZ 1	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8
High-Rise Residential (10 stories, 94,000 sqft)	171	208	171	208	171	208	208	208
Mid-Rise Residential (4 stories, 113,000 sqft)	206	250	206	250	206	250	250	250
Large Office (12 stories, 499,000 sqft)	1291	1561	1291	1561	1291	1561	1561	1561
Medium Office (3 stories, 53,000 sqft)	136	165	136	165	136	165	165	165
Small Office (1 story, 5,500 sqft)	14	17	14	17	14	17	17	17
Large Retail (1 story, 240,000 sqft)	629	698	629	698	629	698	698	698
Medium Retail (1 story, 25,000 sqft)	65	72	65	72	65	72	72	72
Small Retail (1 story, 9,000 sqft)	25	27	25	27	25	27	27	27
Large School (1 story, 211,000 sqft)	268	344	268	344	268	344	344	344
Small School (1 story, 24,000 sqft)	31	40	31	40	31	40	40	40
Warehouse (1 story, 52,000 sqft)	20	23	20	23	20	23	23	23

PV size in kW per CZ (cont.)	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16
High-Rise Residential	208	208	208	208	208	208	261	171
Mid-Rise Residential	250	250	250	250	250	250	313	206
Large Office	1561	1561	1561	1561	1561	1561	1895	1291
Medium Office	165	165	165	165	165	165	200	136
Small Office	17	17	17	17	17	17	21	14
Large Retail	698	698	698	698	698	698	847	629
Medium Retail	72	72	72	72	72	72	87	65
Small Retail	27	27	27	27	27	27	33	25
Large School	344	344	344	344	344	344	519	268
Small School	40	40	40	40	40	40	60	31
Warehouse	23	23	23	23	23	23	30	20

**Table 3.4-2
Battery Storage System Size by Climate Zone**

BS size in kWh per CZ	CZ 1	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8
High-Rise Residential	176	214	176	214	176	214	214	214
Mid-Rise Residential	210	255	210	255	210	255	255	255
Large Office	0	2700	2234	2700	2234	2700	2700	2700
Medium Office	0	277	229	277	229	277	277	277
Small Office	0	25	21	25	21	25	25	25
Large Retail	673	747	673	747	673	747	747	747
Medium Retail	67	74	67	74	67	74	74	74
Small Retail	23	25	23	25	23	25	25	25
Large School	0	622	485	622	485	622	622	622
Small School	0	77	60	77	60	77	77	77
Warehouse	0	21	19	21	19	21	21	21

BS size in kWh per CZ (cont.)	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16
High-Rise Residential	214	214	214	214	214	214	268	176
Mid-Rise Residential	255	255	255	255	255	255	320	210
Large Office	2700	2700	2700	2700	2700	2700	3278	2234
Medium Office	277	277	277	277	277	277	336	229
Small Office	25	25	25	25	25	25	31	21
Large Retail	747	747	747	747	747	747	907	673
Medium Retail	74	74	74	74	74	74	90	67
Small Retail	25	25	25	25	25	25	31	23
Large School	622	622	622	622	622	622	939	485
Small School	77	77	77	77	77	77	116	60
Warehouse	21	21	21	21	21	21	28	19

5. Establish new requirements that mixed fuel buildings with residential dwellings be electric ready, meaning that electrical connections and other features needed to allow use of non-combustion equipment options are installed at the time of initial construction.

This proposal requires that for each natural gas or propane furnace, cooktop or clothes dryer serving an individual dwelling unit, an appropriately sized 240-volt branch circuit be installed to facilitate future use of equivalent electric equipment. This requirement also extends to common area clothes dryers in multifamily buildings. This requirement supports the goal of ensuring that buildings can be easily retrofitted to take advantage of more efficient electric technology when feasible and cost-effective, thereby supporting energy efficiency and grid reliability objectives.

6. Establish new energy efficiency standards for lighting, envelope, and space conditioning systems serving controlled environment horticulture spaces.

The new standards proposed for controlled environment horticulture spaces permit the use of efficient high-pressure sodium and LED lighting while ruling out less efficient lighting types, require that dehumidification systems either include heat recovery or meet U.S. Department of Energy consumer product standards, require minimum U-factors for opaque wall and greenhouse fenestration assemblies, and ensure that space heating equipment meets applicable equipment standards. This requirement supports the objective of reducing unnecessary or wasteful use of energy.

7. Revise energy efficiency standards for commercial and industrial process loads, including, computer room air conditioning, refrigerated areas, fan systems, compressed air systems, and steam traps.

The new standards state that computer room space conditioning system design must prevent simultaneous heating and cooling of the same air, and if humidification is provided then it must be adiabatic. Systems with a capacity exceeding 60,000 btu/h must incorporate variable-speed fans. Computer room economizers must meet cooling or heating loads at adjusted supply air temperatures, and an option has been added to cover refrigerant-based economizing.

Computer room uninterruptible power supplies are proposed to be held to minimum performance standards consistent with Energy Star guidelines.

Refrigeration systems using transcritical CO₂ are held to proposed minimum efficiency standards, consistent with standards applicable to systems using traditional refrigerants.

Compressed air systems larger than specified size thresholds are required to incorporate an energy and air demand monitoring system, and separately to appropriately size and leak-test compressed air piping. Exceptions relating to alterations have also been clarified.

Laboratory exhaust requirements relating to use of anemometers has been clarified, and language added to account for (and thereby permit) sonic anemometers.

Steam systems above a certain size that use steam traps are proposed to incorporate monitoring sensors that report when a steam trap has failed, thus reducing the amount of time before a problem is detected and repaired.

Overall, these measures reduce energy waste (for example, by preventing failed steam traps from going undetected) and inefficiency (for example, by establishing minimum standards for uninterruptible power supplies and transcritical CO₂ systems, and updating standards for computer room space conditioning systems, compressed air systems and laboratory exhaust systems), consistent with Objective 1.

8. Revise nonresidential and multi-family efficiency standards for building envelopes (e.g., exterior walls, windows, roofs, and floors), fan and duct systems, HVAC controls, boilers and service water heating systems, indoor and outdoor lighting systems, and grid integration equipment such as demand responsive controls.

The proposed revisions to existing energy efficiency standards for nonresidential and multifamily buildings reduce the amount of energy consumed by the building, and also ensure that demand response controls and other load management controls and tools are installed where they are able to be effective and in ways that allow them to be effective. They therefore support Objectives 1 and 4.

9. Revise minimum standards for residential kitchen ventilation.

Residential kitchen ventilation minimum airflow rates are being increased to a minimum level determined to be necessary to avoid reactions to pollutants by sensitive populations. Energy utilized for the purpose of ventilation must result in an adequate level of ventilation in order to have been used efficiently; insufficient or otherwise ineffectual level of ventilation is wasteful, inefficient and uneconomic, even if the quantity of energy spent is less (in absolute terms) than what is needed to provide adequate ventilation. Based on recent research from Lawrence Berkeley National Laboratory (LBNL)¹⁸, the proposed revisions will increase the minimum level of performance for kitchen range hoods to what is shown to be necessary for them to be effective at their purpose. This supports Objective 1.

10. Revise requirements relating to duct sealing and ventilation.

These revisions relate to installation and acceptance testing procedures, meaning the step-by-step procedures used by installers to seal ducts to the level of air tightness required by the Energy Code and used by technicians to detect leaks after installation. Improved procedures support the objective of reducing unnecessary or wasteful use of energy by reducing the likelihood of errors during installation and, when errors none the less occur, reducing the likelihood that they escape detection and correction.

3.5 Intended Uses of This EIR

As the lead agency pursuant to the CEQA, the CEC is responsible for the preparation of this EIR. The CEC will use this EIR in support of its discretionary decision to adopt the Energy Code updates. It is expected that the California State Building Standards Commission, as the sole responsible agency affected by this project, will rely on the CEC's EIR in part in conjunction with their review and approval of the adopted amendments. The California Department of Fish and Wildlife is California's trustee agency for the state's fish, wildlife, and plant resources, and it may consider and comment on this Draft EIR in fulfillment of its duties. No other agency is expected to use the EIR, and no other permits or approvals are necessary for the 2022 amendments to be incorporated into the Energy Code.

In developing the EIR, consultation was only required with tribes that have requested such engagement. No other review or consultation is required.

18 2022 Energy Code Update Rulemaking, [21-BSTD-01](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01), TN# 235047. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01>.

3.6 Environmental Setting

Under CEQA, the environmental setting of a project is generally the physical environmental conditions in the vicinity of the project as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced.¹⁹ However, CEQA does not mandate strict adherence to this default rule.²⁰ Lead agencies may consider historic conditions pre-dating the commencement of the environmental analysis²¹ or near-term projected future conditions, such as forthcoming conditions expected to be present at the date the project is implemented or operational,²² in providing the public with information about a project's environmental setting. Lead agencies may also consider projections of longer-term environmental conditions to supplement an EIR and fully illustrate the anticipated effects of a project over time.²³ However, an exclusive reliance on a future-conditions description of the environmental setting requires a demonstration by the lead agency that the use of existing conditions "would be either misleading or without informative value to decision-makers and the public."²⁴

The environmental setting described in an EIR by the lead agency will normally constitute the baseline physical conditions by which the lead agency determines

19 CEQA Guidelines, § 15125(a)(1).

20 *Communities for a Better Environment v. S. Coast Air Quality Management District* (2010) 48 Cal. 4th 310, 328 ("[A]n agency enjoys the discretion to decide, in the first instance, exactly how the existing physical conditions without the project can most realistically be measured, subject to review, as with all CEQA factual determinations, for support by substantial evidence.").

21 CEQA Guidelines, § 15125(a)(1). ("Where existing conditions change or fluctuate over time, and where necessary to provide the most accurate picture practically possible of the project's impacts, a lead agency may define existing conditions by referencing historic conditions, or conditions expected when the project becomes operational, or both, that are supported with substantial evidence."); See also *Association of Irrigated Residents v. Kern County Board of Supervisors* (2017) 17 Cal.App.5th 708, 723-31 (upholding a lead agency's use of a historic baseline due to fluctuations in refinery operations).

22 *Ibid*; See also *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439, 453 ("[W]e find nothing precluding an agency from employing, under appropriate factual circumstances, a baseline of conditions expected to obtain at the time the proposed project would go into operation.").

23 *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th at 513; See also *Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 62 Cal.4th 204, 224–25, as modified on denial of rehearing (Feb. 17, 2016).

24 *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th at 513; See also CEQA Guidelines, § 15125(a)(2).

whether an impact is significant.²⁵ The environmental setting for this project consists of the state of California's existing built environment (i.e., the buildings already constructed and in use, or currently under construction, throughout the state) as well as the natural conditions existing within the state, including the existing conditions of "land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance."²⁶ For all buildings for which a building permit was issued after January 1, 2020, the 2019 Energy Code sets the current minimum energy efficiency standards for residential and nonresidential building design and construction occurring in California.²⁷ The 2019 Energy Code will continue to apply until at least December 31, 2022, and in the event the project is not approved, the 2019 Energy Code will continue to govern the physical condition of new buildings in California for the foreseeable future.

Hypothetical conditions, such as those that might be allowed but have never actually occurred under existing or previous iterations of the Energy Code, are not considered as part of the existing conditions for this EIR.²⁸ Rather, existing conditions are determined by looking at the differences between current conditions (with the 2019 Energy Code in effect) and conditions that will be changed as a result of implementation of the 2022 Energy Code. However, due to the fact that the impacts of the 2019 Energy Code occur throughout the state and stem from construction and use of thousands of individual building projects, it is not always possible to use actual historical data to establish existing conditions.²⁹ For those areas for which changes created by the 2022 Energy Code are quantified (as opposed to discussed qualitatively), this EIR utilizes a modeled baseline that incorporates the impacts of the 2019 Energy Code in 2023, when the new requirements of the 2022 Energy Code go into effect. Stated another way, for air quality, energy resources, greenhouse gas emissions, and utilities and services systems, the existing conditions described are those that would occur in 2023 under implementation of the 2019 Energy Code (including the number of building starts that

25 CEQA Guidelines, § 15125(a).

26 Pub. Resources Code § 21060.5. ("Environment" means the physical conditions which exist within the area which will be affected by a proposed project, including land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance.")

27 Both the 2019 and proposed 2022 Energy Codes are regulations that, although applicable statewide, are not general, specific, regional, or any other types of "plans," as those terms are used in CEQA; See also, e.g., CEQA Guidelines, §§ 15125(d), (e), 15166; See also *Environmental Planning and Information Council v. City of El Dorado* (1982) 131 Cal.App.3d 350, 359.

28 CEQA Guidelines, § 15125(a)(3).

29 The Energy Code is implemented by individual building departments throughout the state. Because 2020 is the first full year for which the 2019 Energy Code was in effect, and the applicable Energy Code to a building project is determined at the time a building permit is issued, many buildings completed in 2020 would have been built in accordance with the 2016 Energy Code or earlier codes, rather than the 2019 Energy Code.

would be subject to the 2019 Energy Code). For those areas for which changes were evaluated in a qualitative manner, including aesthetics, biological resources, hazards and hazardous materials, and wildfire, the EIR utilizes a default existing conditions baseline approach by comparing the potential impacts in each of these technical areas attributable to the project to the existing physical conditions within the state.

The use of a modeled date-of-implementation baseline analyze impacts to air quality, energy resources, and greenhouse gas emissions is critical to providing the most accurate picture practically possible of the project's likely impacts and significant benefits to Californians.³⁰ First, 2023 is the first full calendar year that the 2022 Energy Code amendments would take effect. The modeling captures changes – such as changes in the state's resources mix and construction starts – that will have occurred to the environmental setting by the effective date of these regulations. Thus, this modeled description of the "current conditions" expected in 2023 provides the clearest picture of the prevailing physical conditions likely to be affected by buildings constructed in 2023 and beyond, allowing a comparison of conditions both with and without the project. Such an approach obviates the need to assume, counterfactually, that the impacts of the 2022 Energy Code would affect conditions in existence as of the date the NOP was published for this EIR.³¹

Second, the 2023 date-of-implementation methodology applied in these sections is supported by data from reports submitted to the CEC as part of the rulemaking proceeding for the proposed 2022 amendments (**see Appendices B and D**). Building construction starts were determined following a methodology described in a memo to the CEC (Case Memo, 2021). Use of a baseline based on conditions other than those at the time of implementation, such as a future baseline of 2030 or 2045, could "mask or swamp the adverse effects seen in the shorter term."³² No such issue is present with the approach in this EIR because it focuses on the first period of implementation for the project.

Finally, the use of a full calendar year to demonstrate the effects of the 2022 Energy Code relative to the continuation of the 2019 Energy Code is critical to providing an accurate assessment of the project's potential environmental impacts because construction, energy production, meteorological and climatological conditions fluctuate over the course of a year, with corresponding effects on air quality, energy resources, and greenhouse gas emissions. As a simple example, a building would be expected to use less energy for heating during a day in May than a day in November, and more energy for heating on a rainy or snowy day than a sunny day in any month. Thus, using conditions that exist on a single date, such as the date of the NOP publication, could

30 CEQA Guidelines, § 15125(a)(1); See also Pub. Resources Code § 21061 ("The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project *is likely to have on the environment*" [emphasis added].)

31 *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th at 452.

32 *Ibid.* At 456-57.

skew data and result in modeling results that over- or under-estimate potential effects of the project. A full year approach is necessary to ensure a complete understanding of the anticipated energy use of a given building (and the effects of required efficiency features on its energy use).

Further information about environmental setting is provided in each of the following sections to document the methodologies utilized and the necessity for conducting these analyses in this manner.

3.7 References

CEC staff. 2021. [Express Terms 2022 Energy Code, Title 24 Parts 1 and 6](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237717). California Energy Commission. TN#237717. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237717>.

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CASE. 2021. [Statewide CASE Team Construction Forecast Methodology](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237851&DocumentContentId=71094). Memo. Codes and Standards Enhancement Team. TN#237851. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237851&DocumentContentId=71094>

Chapter 4

Environmental Setting, Impacts, and Mitigation

Environmental Setting, Impacts, and Mitigation

As described in **Chapter 3 Project Description**, the CEC proposes to adopt the 2022 amendments, which contain a set of proposed revisions to the 2019 Energy Code intended to require newly constructed buildings to employ technically feasible and cost-effective technologies and measures to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability, consistent with the statutory direction in the Warren-Alquist Act.

This chapter provides an environmental analysis of the physical impacts that could occur as a result of implementing the Energy Code updates. The chapter is organized into separate sections for each technical area selected for analysis, as listed below.

- 4.1 Aesthetics
- 4.2 Air Quality
- 4.3 Biological Resources
- 4.4 Energy Resources
- 4.5 Greenhouse Gas Emissions
- 4.6 Hazards and Hazardous Materials
- 4.7 Utilities and Service Systems
- 4.8 Wildfire

The following subsections are included in each resource section:

- **Environmental Setting** describes the existing or baseline conditions of the resources in the study area (California).
- **Regulatory Setting** describes existing plans, policies, statutes, and regulations relevant to the topic area and the project.
- **Environmental Impacts and Mitigation Measures** describes the methodology and criteria used to determine the significance of potential impacts, using the questions in CEQA Guidelines, Appendix G. For each potential impact, a significance determination is made (no impact, less than significant impact, less than significant impact with mitigation, or significant and unavoidable impact).

A discussion of the project's potential contribution to cumulative impacts addressing each of the topic areas in sections 4.1 through 4.8, is included in the Mandatory Findings of Significance section of **Chapter 5 Other CEQA Discussions**.

Several additional technical areas were evaluated by CEC technical staff, who concluded that there is no substantial evidence that the new measures included in the 2022 amendments would have the potential to cause or otherwise result in environmental impacts. These are grouped together in Section 4.9 of this chapter, titled **Technical Areas Not Affected**. For each of these technical areas, this EIR provides a brief statement of the reasons for concluding the project would not result in environmental impacts, using questions from Appendix G of the CEQA Guidelines.³³ These areas include the following:

- 4.9.1 Agriculture and Forestry Resources
- 4.9.2 Cultural and Tribal Cultural Resources
- 4.9.3 Geology and Soils
- 4.9.4 Hydrology and Water Quality
- 4.9.5 Land Use and Planning
- 4.9.6 Mineral Resources
- 4.9.7 Noise
- 4.9.8 Population and Housing
- 4.9.9 Public Services
- 4.9.10 Recreation
- 4.9.11 Transportation

³³ Pub. Resources Code § 21100(c). (EIRs shall “contain a statement briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report.”); See also CEQA Guidelines § 15128. (“An EIR shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR.”)

4.1 Aesthetics

This section describes the project’s environmental and regulatory setting and discusses potential aesthetic impacts on the existing landscape³⁴ associated with adoption of the 2022 amendments. These amendments focus on updating regulatory standards and compliance options related to building energy efficiency. The Energy Code updates would not approve or result in additional specific construction projects or otherwise impact the rate of building construction. The 2022 amendments would have no or less than significant impacts on aesthetics.

4.1.1 Environmental Setting

The 2019 Energy Code are a set of regulations that require energy efficient designs, features, equipment, and practices in new construction and certain additions and alterations to buildings within California. While most of the 2022 amendments exclusively affect building interiors and have no impact on aesthetics, prescriptive solar PV, battery energy storage, and energy efficient outdoor lighting requirements could alter the visual characteristics of specified new buildings within the state. As these 2022 amendments apply statewide, the environmental setting of the Energy Code updates is the entire state of California.

Though this project does not have a specific location or direct that future buildings be constructed in specific parts of the state, the requirements in the 2022 amendments would apply equally to new buildings whether they are located in urbanized or non-urbanized areas, areas with scenic vistas and scenic highways, or any other areas of the state. To focus on changes that would be attributable to the project, this section evaluates the potential for increases in statewide adverse aesthetic impacts from the 2022 amendments compared to the existing state of aesthetic impacts associated with buildings in California under the current building design and construction requirements of the 2019 Energy Code.

4.1.2 Regulatory Setting

Federal

No federal regulations related to aesthetics apply to the project.

34 Hull, R. and G. Revell. 1989. (Landscape is defined as, “The outdoor environment, natural or built, which can be directly perceived by a person visiting and using that environment. A scene is the subset of a landscape which is viewed from one location (vantage point) looking in one direction.”); See also Daniel and Vining. 1983. and Amir and Gidalizon. 1990. (“The term landscape clearly focuses upon the visual properties or characteristics of the environment, these include natural and man-made elements and physical and biological resources which could be identified visually; thus, non-visual biological functions, cultural/historical values, wildlife and endangered species, wilderness value, opportunities for recreation activities and a large array of tastes, smells and feelings are not included.”).

State

California Scenic Highway Program. The California Scenic Highway Program is contained in a provision of the Streets and Highways Code (sections 260 through 263) and was enacted in 1963. Under it, the Legislature has established the state's responsibility to preserve and enhance the natural beauty of California adjacent to the state highway system in specified areas.

Local

Many cities and counties throughout California include policies in general plans, specific plans, and other planning documents intended to promote the preservation of scenic areas, to mitigate potential adverse aesthetic impacts, or to locate projects in such a manner as not to cause aesthetic impacts. Cities and counties have also adopted zoning ordinances with lighting, design, and other restrictions on the aesthetic character of the new buildings in their jurisdictions.

4.1.3 Environmental Impacts and Mitigation Measures

a. Would the project have a substantial adverse effect on a scenic vista?

Neither CEQA nor the CEQA Guidelines provide a clear-cut definition of what constitutes a scenic vista. Lead agencies may look to local planning thresholds for guidance when defining the visual impact standard for the purpose of CEQA,³⁵ as many cities and counties in California have adopted general plans, specific plans, zoning codes, and other planning documents that may provide guidance, with which future buildings would need to comply. The 2022 amendments do not affect the ability of local lead agencies to enforce and implement these policies and ordinances which specify, and support the preservation of, local scenic vistas.

The 2022 amendments do not direct where new buildings would be constructed and do not include any provisions or exceptions specific to scenic vistas that incentivizes or otherwise increases the likelihood that future building projects would be sited, designed, or constructed in such a way as to adversely affect scenic vistas. Therefore, there would be no impacts on scenic vistas from the 2022 amendments.

Required Mitigation Measures: None.

35 A public view can be defined as the visible area from a location where the public has a legal and physical right of access to real property (e.g., city sidewalk, public park, town square, state highway). CEQA Guidelines Appendix G Environmental Checklist Form, I. Aesthetics, c. states "Public views are those that are experienced from publicly accessible vantage point."

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Neither CEQA nor the CEQA Guidelines provide a clear-cut definition of what constitutes a scenic resource. A scenic resource may be described as a widely recognized natural or man-made feature tangible in the landscape (e.g., a scenic resource designated in an adopted federal, state, or local government document, plan, or regulation, a landmark, or a cultural resource [historic values however differ from aesthetic or scenic values]). The CEC focused its evaluation on whether the 2022 amendments would substantially damage—eliminate or obstruct—the public view³⁶ of a scenic resource, and whether the Energy Code updates might indirectly result in future projects being situated so that they change the visual aspect of a scenic resource by being different or in sharp contrast. The 2022 amendments do not direct where new buildings would be constructed and do not include any provisions or exceptions specific to scenic resources that incentivizes or otherwise increases the likelihood that future building projects would be sited, designed, or constructed in such a way as to substantially damage scenic resources. Therefore, there would be no impacts on scenic resources from the 2022 amendments.

Required Mitigation Measures: None.

c. Would the project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Public Resources Code section 21071 defines an “urbanized area” as an incorporated city that either has a population of (1) at least 100,000 persons or (2) less than 100,000 persons if the population of that city and not more than two contiguous incorporated cities combined equals at least 100,000 persons, or an unincorporated area satisfying this criteria and additional criteria.³⁷ If a site-specific project is within an urbanized area, the applicable question in c. above requires review of the affected local government’s adopted General Plan, specific plan, local coastal plan (if any), and the municipal code (e.g., zoning) sections governing scenic quality. If the project is within a non-urbanized area, the applicable question asks would the project substantially

36 A public view can be defined as the visible area from a location where the public has a legal and physical right of access to real property (e.g., city sidewalk, public park, town square, state highway). CEQA Guidelines Appendix G Environmental Checklist Form, I. Aesthetics, c. states “Public views are those that are experienced from publicly accessible vantage point.”

37 Pub. Resources Code § 21071. (Specific requirements applicable to unincorporated areas.)

degrade the existing visual character or quality of public views of the site and its surroundings.

For a local agency to conduct this evaluation, aerial, surface, and street view imagery, site and vicinity photographs, area maps, architectural renderings of the project, building elevations, site plans, local government planning documents, and other information are necessary. Also, the distance of the public view between the project site and objects of aesthetic significance would need to be considered.

The prescriptive changes to the use of solar PV and batteries at specified nonresidential buildings, and the energy efficiency changes to exterior lighting on nonresidential buildings and multi-family residences, would result in marginal alterations to the visual characteristics of specified new buildings within the state, but not to a degree where the visual character and quality of the public views would be substantially degraded. Furthermore, the 2022 amendments do not curtail the ability of local lead agencies to enforce and implement policies and ordinances to protect the visual character or quality of views. Local lead agencies retain their discretionary authority to impose mitigation on or consider alternatives to future projects in order to avoid site-specific aesthetic impacts, or conflicts with applicable zoning and other regulations governing scenic quality, associated with future development projects. Therefore, there would be less than significant impacts on scenic resources from the 2022 amendments.

Required Mitigation Measures: None.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Light pollution is “[t]he inappropriate or excessive use of artificial light” (IDA 2021). Light pollution “occurs when outdoor lighting is misdirected, misplaced, unshielded, excessive or unnecessary. As a result, light spills unnecessarily upward and outward, causing glare, light trespass, and a nighttime urban ‘sky glow’ overhead, indicating wasted energy and obscuring the stars overhead.” (DSS 2017) In addition, there is reflectivity. Reflectivity “... does not create its own light. It borrows light from another source. The borrowed light waves strike an object and ‘bounce’ from it. The reflectance of the object—how bright it shines—depends on the intensity of the light striking it and the materials from which it is made.” (3M 2004)

The energy efficiency changes to outdoor lighting would not cause the light to be brighter than current 2019 Energy Code requires. Cities and counties have also adopted zoning ordinances with respect to controlling lighting to ensure that outdoor light is not misdirected, misplaced, unshielded, excessive, or unnecessary for the new buildings in their jurisdictions.

The Energy Code updates would induce an increase in the number of surfaces that could cause glare in the state as the 2022 amendments include the new prescriptive solar PV requirements for newly constructed nonresidential buildings (specifically for high-rise multifamily, hotel-motel, tenant space, office, medical office, clinic, retail,

grocery stores, restaurants, schools, theatres, auditoriums and convention centers). PV panels are a net absorber of light, reducing and redirecting net sunlight that shines on them. Modern PV panels reflect as little as 2 percent of incoming sunlight, about the same as water, but less than soil and wood shingles (NREL 2018). PV panels do not generate their own light. Any perceived glare would be temporary (a few minutes) as the reflected beam of the sun moves. For these reasons, new PV requirements contained in the 2022 amendments would not create a new source of substantial light or glare that would affect day or nighttime views.

Moreover, under the California Government Code section 65850.5(a), "it is the policy of the state to promote and encourage the use of solar energy systems and to limit obstacles to their use." The Energy Code updates are consistent with and further the purpose of California Government Code section 65850.5, which also provides that it is the "intent of the Legislature that local agencies not adopt ordinances that create unreasonable barriers to the installation of solar energy systems, including, but not limited to, design review for aesthetic purposes, and not unreasonably restrict the ability of homeowners and agricultural and business concerns to install solar energy systems." The California Legislature has also demonstrated its intent that CEQA not be used as a barrier to the installation of rooftop solar in most instances by enacting the statutory exemption in Public Resources Code section 21080.35 in 2011, which exempts from CEQA most installations of solar energy systems on the roofs of existing buildings and existing parking lots.

Since the 2022 amendments would not create a new source of substantial light or glare that would affect day or nighttime views, the project's impacts would be less than significant.

Required Mitigation Measures: None.

4.1.4 References

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4.2 Air Quality

This section describes the project's environmental and regulatory setting and discusses potential air quality emissions impacts associated with adoption of the 2022 amendments to the Energy Code. This section also addresses the public health impacts associated with the anticipated emissions from the project. These 2022 amendments focus on updating regulatory standards and compliance options related to building energy efficiency. The 2022 amendments would not approve or result in additional specific construction projects or otherwise impact the rate of building construction. The 2022 amendments would have no significant impacts on California's air quality.

4.2.1 Environmental Setting

The 2022 amendments cover the entire state; therefore, the environmental setting includes the 35 air districts throughout the state which regulate air quality on a regional basis and develop plans to meet air quality standards. The setting also includes the air monitoring stations deployed throughout the state to measure air pollution. Pollutants in the ambient air can cause health problems, especially for children, the elderly, and people with heart or lung problems. Healthy adults may experience symptoms during periods of intense exercise. Pollutants can also cause damage to vegetation, animals, and property.

Pollutants of particular concern that can impact public health and the environment and are found within the state include the following:

Ozone. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x), including NO₂. ROG and NO_x are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight.

People most at risk for adverse health effects from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure. Studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engage in vigorous activities compared to adults. Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures (U.S. Environmental Protection Agency (EPA) 2016).

Particulate Matter. PM10 and PM2.5 represent size fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly or can contain adsorbed and absorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates can also damage materials and reduce visibility.

Nitrogen Dioxide. Breathing air with a high concentration of NO₂ can irritate airways in the human respiratory system. Such exposures over short periods (as represented by the 1-hour standards) can cause respiratory symptoms (such as coughing, wheezing or difficulty breathing) and aggravate respiratory diseases, particularly asthma, leading to hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO₂ (as represented by the annual standards) may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the health effects of NO₂.

Carbon Monoxide. CO is a pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Sulfur Dioxide. SO₂ is produced through combustion of sulfur-containing fuels such as coal. SO₂ is also a precursor to the formation of atmospheric sulfate and particulate matter (PM10 and PM2.5) and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead. Lead has a range of adverse neurotoxin health effects and, in the past, was predominately released into the atmosphere primarily via the combustion of leaded gasoline. The phase-out of leaded gasoline has resulted in significant decreased levels of atmospheric lead.

4.2.2 Regulatory Setting

The air quality evaluation below assesses the degree to which the 2022 amendments to the Energy Code would potentially cause a significant impact according to CEQA guidelines established by the state of California. The CARB is responsible for achieving air quality requirements in California. In addition, local air districts are also responsible for attainment and maintenance of the federal and state ambient air quality standards (AAQS) and associated program requirements within their district.

The air quality evaluation addresses both emissions of criteria pollutants (which have health-based standards) and toxic air contaminants (which are identified as potentially harmful even at low levels and for which reference exposure levels or health-based ambient air quality standards have not been established).

Federal

Clean Air Act. The federal Clean Air Act (CAA) establishes the statutory framework for regulation of air quality in the United States. Under the CAA, the U.S. EPA oversees implementation of federal programs for permitting new and modified stationary sources, controlling toxic air contaminants, and reducing emissions from motor vehicles and other mobile sources.

Title I (Air Pollution Prevention and Control) of the federal CAA requires establishment of National Ambient Air Quality Standards (NAAQS) for criteria pollutants, air quality designations, and plan requirements for nonattainment areas. States are required to submit a state implementation plan (SIP) to the U.S. EPA for areas in nonattainment with NAAQS. The SIP, which is reviewed and approved by the U.S. EPA, must demonstrate how state and local regulatory agencies will institute rules, regulations, and/or other programs to attain NAAQS over time.

Prevention of Significant Deterioration (PSD) is a federal program for federal attainment areas. The purpose of the federal PSD program is to ensure that attainment areas remain in attainment of NAAQS based upon a proposed facility's annual potential to emit. If annual emissions of a proposed project are less than prescribed amounts, a PSD review is not required.

National Emission Standards for Hazardous Air Pollutants (HAPs) are addressed in CAA section 112³⁸. The CAA defines HAPs as a variety of substances that pose serious health risks. Direct exposure to HAPs has been shown to cause cancer, reproductive effects or birth defects, damage to brain and nervous system, and respiratory disorders. Categories of sources that cause HAP emissions are controlled through separate standards under CAA Section 112: National Emission Standards for Hazardous Air Pollutants (NESHAP). These standards are specifically designed to reduce the potency, persistence, or potential bioaccumulation of HAPs. New sources that emit more than ten (10) tons per year of any specified HAP or more than 25 tpy of any combination of HAPs are required to apply Maximum Achievable Control Technology (MACT).

The 2022 amendments are not expected to affect federal clean air programs operating under the CAA.

State

The CARB is the primary administrator of California's federal CAA compliance efforts, while local air quality districts administer air rules and regulations at the local and

³⁸ Hazardous Air Pollutants, 42 U.S.C. § 7412.

regional levels. CARB is also responsible for California's state regulated air quality management, including establishment of California Ambient Air Quality Standards (CAAQS) for criteria air pollutants, mobile source/off-road equipment/portable equipment emission standards, portable equipment registration, GHG regulations, as well as oversight of local or regional air quality districts and preparation of implementation plans, including regulations for stationary sources of air pollution.

California Health and Safety Code section 39606 requires the CARB to adopt ambient air quality standards at levels that adequately protect the health of the public, including infants and children, with an adequate margin of safety. Ambient air quality standards define clean air (CARB 2020c).

Air Toxic "Hot Spots" Information and Assessment Act. The Air Toxic "Hot Spots" Information and Assessment Act, also known as AB 2588, identifies Toxic Air Contaminant³⁹ (TAC) hot spots where emissions from specific stationary sources may expose individuals to an elevated risk of adverse health effects, particularly cancer or reproductive harm. Many TACs are also classified as HAPs. AB 2588 requires that a business or other establishment identified as a significant stationary source of toxic emissions provide the affected population with information about health risks posed by their emissions. The 2022 amendments are not expected to affect air toxic hot spots.

Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations. CARB has established the Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations to minimize the generation of asbestos from earth disturbance or construction activities. The Asbestos ATCM applies to any project that would include sites to be disturbed in a geographic ultramafic rock unit area or an area where naturally occurring asbestos (NOA), serpentine, or ultramafic rocks are determined to be present. The amendments to the Energy Code are not expected to affect asbestos-containing materials.

Criteria Pollutant Evaluation. The CARB and U.S. EPA have both established ambient air quality standards (AAQS) for criteria pollutants. While both state and federal AAQS apply to every location in California, typically the state standards are lower (i.e., more stringent) than federal standards.

The U.S. EPA has set NAAQS for ozone (O₃), carbon monoxide (CO), NO₂, particulate matter less than or equal to 10 microns (PM₁₀), fine particulate matter less than or equal to 2.5 microns (PM_{2.5}), sulfur dioxide (SO₂), and lead (Pb). These pollutants are commonly referred to as "criteria pollutants." Primary standards were set to protect public health; secondary standards were set to protect public welfare against visibility impairment, damage to animals, crops, vegetation, and buildings. In addition, CARB has

39 Substances Identified as Toxic Air Contaminants, Cal. Code of Regs., tit. 17, § 93000; See also Public Health and Welfare, 42 U.S.C. § 7412(b) also included in California Health and Safety Code §39655(a).

CAAQS for these pollutants, as well as for sulfate (SO₄), visibility reducing particles, hydrogen sulfide (H₂S), and vinyl chloride. The standards currently in effect in California are shown below in **Table 4.2-1**.

Air monitoring stations, usually operated by local air districts or CARB, measure the ambient air to determine an area's AAQS attainment status. Depending on the pollutant, the time period over which these pollutants are measured varies from 1-hour to 3-hours, to 8-hours, to 24-hours and to annual averages. Most criteria pollutants have ambient standards with more than one averaging time. Pollutant concentrations are expressed in terms of mass of pollution per unit volume of air, typically using micrograms for the mass portion of the expression and cubic meters of air for the volume, or "micrograms per cubic meter of air, expressed as "µg/m³." The concentration can also be expressed as parts of pollution per million parts of air, or "ppm."

Some forms of air pollution are primary air pollutants, which are gases and particles directly emitted from stationary and mobile sources. Other forms of air pollution are secondary air pollutants that result from complex interactions between primary pollutants, background atmospheric constituents, and other secondary pollutants. Some pollutants can be a combination of both primary and secondary formation, such as PM_{2.5} (particulate matter with an aerodynamic diameter less than 2.5 micrometer [µm]). The primary pollutant component of PM_{2.5} is directly emitted, such as from the stack of diesel-fueled engines, and the secondary pollutant component of PM_{2.5} is formed in the air by transformation of NO_x and sulfur oxides (SO_x) gases into PM_{2.5} particles. In this case, the NO_x and SO_x emissions are called precursors to the formation of the secondary aerosol pollutant.

**Table 4.2-1
Federal and State Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards ^a	National Standards ^b Primary	National Standards ^b Secondary
O ₃	1hour	0.09 ppm (180 µg/m ³)	—	Same as Primary Standard
O ₃	8hour	0.070 ppm (137 µg/m ³)	0.070 ppm (137 µg/m ³)	Same as Primary Standard
PM10	24hour	50 µg/m ³	150 µg/m ³	Same as Primary Standard
PM10	Annual Mean	20 µg/m ³	—	Same as Primary Standard
PM2.5	24hour	—	35 µg/m ³	Same as Primary Standard
PM2.5	Annual Mean	12 µg/m ³	12 µg/m ³	15 µg/m ³
CO	1hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	—
CO	8hour	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	—
NO ₂	1hour	0.18 ppm (339 µg/m ³)	100 ppb (188 µg/m ³) ^c	—
NO ₂	Annual Mean	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as Primary Standard
SO ₂ ^d	1hour	0.25 ppm (655 µg/m ³)	75 ppb (196 µg/m ³)	—
SO ₂ ^d	3hour	—	—	0.5 ppm (1,300 µg/m ³)
SO ₂ ^d	24hour	0.04 ppm (105 µg/m ³)	0.14 ppm (for certain areas) ^d	—
SO ₂ ^d	Annual Mean	—	0.030 ppm (for certain areas) ^d	—

Notes: ppm=parts per million; ppb = parts per billion; $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; “—” = no standard

- a California standards for O_3 , CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2 , and particulate matter (PM₁₀, PM_{2.5}, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded.
- b National standards (other than O_3 , particulate matter (PM), NO_2 [see note c below], and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM₁₀, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above $150 \mu\text{g}/\text{m}^3$ is equal to or less than one. For PM_{2.5}, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
- c To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb.
- d On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Source: CARB 2016

California is divided into 35 local air districts. CARB oversees activities within local districts. CARB develops guidance for these local air districts, and both CARB and the local agency work together to develop rules and regulations in the district that are intended to reduce emissions to meet or maintain both the CAAQS and the NAAQS. Areas that meet the AAQS based upon air monitoring measurements made by either the local district or CARB are classified as “attainment areas” if measured concentrations are below NAAQS and areas that have monitoring data that exceed NAAQS are classified as “nonattainment areas.” An area can be classified as attainment for some pollutants and nonattainment for others. Even for the same pollutant, an area can be attainment for one averaging time and nonattainment for another. Attainment areas develop maintenance plans to avoid becoming nonattainment.

Air districts adopt rules, regulations, and attainment and maintenance plans aimed at protecting public health and reducing emissions. Air districts incorporate these requirements into SIP for areas that do not meet NAAQS. SIPs include components developed by local districts in consultation with CARB, which must approve them before sending them to the U.S. EPA for federal approval. Once a SIP is approved by the U.S. EPA, the requirements in the SIP become federally enforceable. The state and local districts also develop plans to attain CAAQS.

Non-Criteria Pollutant Evaluation

Non-criteria pollutants that are typically evaluated are airborne toxic pollutants identified to have potential harmful human health impacts. Evaluations assess the potential risks from toxic air contaminants (TACs) and hazardous air pollutants (HAPs). TACs include toxic air pollutants identified by the state and HAPs include toxic air pollutants identified at the federal level. Most toxic air pollutants do not have AAQS; however, AAQS have been established for a few TACs.

According to section 39655 of the California Health and Safety Code, a TAC is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." In addition, substances which have been listed as federal HAPs pursuant to section 7412 of Title 42 of the United States Code are TACs under the state's air toxics program pursuant to section 39657 (b) of the California Health and Safety Code. CARB formally made this identification on April 8, 1993⁴⁰.

Odor Impact Evaluation

Aside from criteria air pollutants and TACs, impacts may arise from other emissions, notably related to odor. The 2022 amendments are not expected to affect these other emissions sources.

Attainment Status and Air Quality Plans

As noted above, the U.S. EPA, CARB, and the local air districts classify an area as attainment, unclassified, or nonattainment. The classification depends on whether the monitored ambient air quality data show compliance, insufficient data are available, or non-compliance with the federal ambient air quality standards, respectively. Much of California is not in attainment of one or more AAQS and the CARB and local air districts have ongoing plans to attain AAQS in the future. Reducing criteria pollutant emissions from the building sector by implementing the 2022 amendments to the Energy Code will assist these regions in their efforts to improve local air quality.

4.2.3 Methodology to Assess Impacts

The 2022 amendments to the Energy Code include measures that will reduce energy use in newly constructed and altered single family, multifamily, and nonresidential buildings. These measures will affect these buildings by adding new prescriptive and performance standards for electric heat pumps for space conditioning and water heating, as appropriate for the various climate zones in California; requiring PV and battery storage systems for multifamily and selected nonresidential buildings;

40 Hazardous Air Pollutants Identified as Toxic Air Contaminants, Cal. Code of Regs., tit 17 § 93001. (California Office of Environmental Health Hazard Assessment, 2020)

establishing efficiency measures for lighting, building envelope and HVAC systems; and making covered process load improvements.

The 2022 amendments expand building “alteration measures” that improve the energy use of existing buildings. These requirements improve the energy performance of “altered components” in existing buildings, when owners are required to pull building permits and meet building code requirements that specifically apply to them. The amendments expand alteration measures to many different altered components, including the building envelope, lighting, heating, ventilation and air conditioning components, and water heating systems, and process loads.

The 2022 amendments would take effect on January 1, 2023. Overall, the 2022 amendments are expected to reduce electricity and fossil fuel natural gas (and propane) use when compared to continued use of existing Energy Code requirements. Under the 2022 amendments, on a statewide basis by 2024, all measures for newly constructed buildings and altered components of existing buildings, collectively would save approximately 33 million therms of fossil fuel natural gas and 1.3 billion kWh of electricity, which result in net reductions of NO_x and SO_x emissions beginning by the end of 2023. See **Tables 4.2-2** and **4.2-3** for emissions and emissions reductions in California buildings expected as a result of the 2022 amendments.

As described more fully in **Chapter 3 Project Description**, this EIR utilizes a modeled baseline for four technical areas to identify the environmental setting in 2023, when the requirements of the 2022 amendments would take effect.

This modeled baseline forecasts the number of anticipated building construction starts for year 2023 and the anticipated criteria air pollution emissions from those new buildings, which would be subject to the 2019 Energy Code if the project is not approved. The results of the forecast are then compared to the criteria air pollution emissions from the new buildings that would be constructed in 2023 under the 2022 amendments to provide information about potential impacts on air quality if the project is approved.

The calculated criteria air pollutant emissions from the avoided fuel use and from the marginal MWh generated over the life of the building standard are limited to NO_x and SO_x. These two pollutants are representative of, or proxies for, the suite of criteria air pollutant emissions that are generally associated with fuel combustion. Further, the fuel use and criteria emissions are also proportional to TAC emissions associated with fuel combustion. Reductions in fuel use and criteria emissions would lead to proportional reductions in TAC emissions, which are therefore not separately calculated or shown.

Table 4.2-2
Typical NOx Emissions from California’s Building Sector
For 2019 (BAU) and 2022 Energy Code
(in lbs/year and tons/year)

	BAU (1) (2019 Energy Code)	2022 (2) Energy Code	Program Reductions
Newly Constructed Buildings Single Family Heat Pumps (standard design)(lbs/year)	231,467	158,319	73,148
Newly Constructed Buildings Multifamily (includes Heat Pumps, Photovoltaics/Batteries, and Efficiency Upgrades) (lbs/year)	67,766	59,486	8,280 (a)
Newly Constructed Buildings Nonresidential Upgrades (includes Heat Pumps, Photovoltaics/Batteries and Efficiency Upgrades) (lbs/year)	132,115	99,848	32,266 (b)
Newly Constructed Buildings Covered Processes (lbs/year)	1,083,761	1,039,030	44,730
Alterations to Existing Buildings Nonresidential (lbs/year)	16,665,112	16,590,667	74,445
Alterations to Existing Buildings Single family residences (lbs/year)	22,039,635	22,028,493	11,142
Alterations to Existing Buildings Multifamily (lbs/year)	5,321,924	5,320,093	1,830
Totals (lbs/year)	45,541,780	45,295,937	245,843
Totals (tons/year)	22,771	22,648	123

- (1) “BAU” values represent emissions in a typical future year, starting in 2023. BAU assumes the 2019 Energy Code remains in effect and the 2022 Energy Code is not implemented.
- (2) “2022” represents emissions in future years, starting in 2023 and assuming the 2022 Energy Code is in full effect for one full year.
- (a) Multifamily Program Reductions in lbs/year are as follows: Heat Pumps = 3,934;
Photovoltaics/Batteries = 1,608; Efficiency Upgrades = 2,738
- (b) Nonresidential Upgrades Program Reductions in lbs/year are as follows: Heat Pumps = 11,382;
Photovoltaics/Batteries = 6,951; Efficiency Upgrades = 13,933

Table 4.2-3
Typical SOx Emissions from California’s Building Sector
For 2019 (BAU) and 2022 Energy Code
(in lbs/year and tons/year)

	BAU (1) (2019 Energy Code)	2022 (2) Energy Code	Program Reductions
Newly Constructed Buildings Single Family Heat Pumps (standard design) (lbs/year)	180,961	107,203	73,758
Newly Constructed Buildings Multifamily (includes Heat Pumps, Photovoltaics/Batteries, and Efficiency Upgrades) (lbs/year)	50,688	44,103	6,585 (a)
Newly Constructed Buildings Nonresidential Upgrades (includes Heat Pumps, Photovoltaics/Batteries and Efficiency Upgrades) (lbs/year)	88,119	66,488	21,631 (b)
Newly Constructed Buildings Covered Processes (lbs/year)	876,669	845,794	30,875
Alterations to Existing Buildings Nonresidential (lbs/year)	11,655,919	11,598,236	57,683
Alterations to Existing Buildings Single family residences (lbs/year)	18,848,244	18,843,822	4,422
Alterations to Existing Buildings Multifamily (lbs/year)	4,639,754	4,638,452	1,302
Totals (lbs/year)	36,340,354	36,144,098	196,256
Totals (tons/year)	18,170	18,072	98

- (1) “BAU” values represent emissions in a typical future year, starting in 2023. BAU assumes the 2019 Energy Code remains in effect and the 2022 Energy Code is not implemented.
- (2) “2022” represents emissions in future years, starting in 2023 and assuming the 2022 Energy Code is in full effect for one full year.
- (a) Multifamily Program Reductions in lbs/year are as follows: Heat Pumps = 4,047; Photovoltaics/Batteries = 78; Efficiency Upgrades = 2,459
- (b) Nonresidential Upgrades Program Reductions in lbs/year are as follows: Heat Pumps = 11,640; Photovoltaics/Batteries = 339; Efficiency Upgrades = 9,653

Changes in criteria air pollutants emissions from the amendments were calculated for the building stock affected by the 2022 amendments. The amendments would affect

building combustion of fuels for water heating, space conditioning, and cooking. The 2022 amendments would decrease natural gas, propane and electricity consumption on an annual basis in newly constructed buildings while potentially shifting peaks in electricity consumption for certain seasons, relative to what would have occurred if the buildings were built under the existing building standards. The criteria air pollutant emission reductions from fossil fuel for water heating or space conditioning replaced by heat pumps can be directly calculated based on emission factors and the reduced therms of natural gas used. The net emissions reductions by power plants attributable to the overall decrease in grid electricity use (after accounting for the potential shifts in peak electricity consumption) can be similarly calculated using emissions factors representing California's electricity generation resource mix.

The project could create a potential for seasonal air pollutant criteria emissions to increase from portions of the electricity generation sector despite the 2022 amendments resulting in an annual net decrease in electricity consumption for the newly constructed and altered buildings and an overall decrease in associated emissions. The increased electricity used due to the increased replacement of on-site fossil fuel with electric heat pumps for space heating in the cooler months of the year may result in new peaks of electricity demand and generation in those months. In the near term, existing in-state under-utilized electric sector capacity is projected to be available to meet an increase in winter demand when zero carbon emitting capacity is unavailable. Considering the long-term impacts of this project, meeting SB 100 objectives will ensure any seasonal near-term increases in utilization of current carbon emitting capacity will be offset by renewable energy and other zero carbon energy sources.⁴¹

Complicating the calculations of criteria air pollutant emissions with the shift of electricity demand to cooler months are the aggressive renewable (i.e., non-fuel combustion generation) targets that California has adopted. Today's mix of renewable, fossil, hydroelectric and nuclear fueled power plants have a set of average criteria air pollutant emission factors. However, even those emission factors vary over each day, month, season, and drought. Further, tomorrow's generation mix will be different again as new renewable generation resources are deployed and existing resources are retired as California moves towards meeting its renewable and zero carbon energy resources goals. The CEC has extensively modeled the generation resources to calculate the marginal MWh emissions for each hour of the day and for the MWhs attributed to the new building subject to the 2022 amendments. The calculations incorporate the expected pathway of the resource mix to the 2045 renewable and zero carbon energy mix. As the system gets "cleaner" the average criteria air pollutant emissions per MWh decrease.

41 CEC. [California Energy Commission Renewable Energy Tracking Progress](https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf. p.2.

Net changes in criteria air pollutant emissions due to the 2022 amendments were calculated out to 2052 for the building sector. The data in the table below are for both existing and new California building stock. Net criteria air pollutant emissions, and TACs by proxy, would decrease statewide in each year the 2022 amendments to the Energy Code are in place.

Emissions for 2024 were obtained for the existing California building stock using emissions factors from the U.S. Environmental Protection Agency’s Continuous Emissions Monitoring System (CEMS) for the California building sector (E3 2020, page 104).

Future values were developed by incorporating the trend in decreasing carbon intensity (i.e., reduction of fuel combusted) of statewide electricity production between 2019 and 2052, along with an assumed decrease in carbon intensity (the decarbonization of pipeline natural gas through the addition of biogas and renewable hydrogen) of the natural gas used in the state (E3 2020, page 105). The 2022 amendments would reduce natural gas use (and to some extent, propane) for water and space heating in new construction in California by the increase use of electric heat pumps for space heating in some climate zones in California and for water heating in other climate zones. This would decrease natural gas and propane consumption in new construction while correspondingly increasing electricity consumption.

The data in **Table 4.2-4** below show the net of the decrease in NO_x and SO_x emissions associated with reduced fuel use and annual electricity consumption in new construction. Trends for other criteria pollutants and TACs are expected to be similar to these two representative criteria pollutants.

Table 4.2-4

California’s Entire Building Sector Emissions of NO_x and SO_x (Tons/year)

Pollutant	2025	2030	2035	2040	2045	2050
NO _x	22,243	21,482	20,688	20,010	19,469	18,751
SO _x	22,412	21,820	21,227	20,639	20,058	19,468

The values in **Table 4.2-4** above show the trend expected to result from all 2022 amendments. They include the effect of reducing the carbon intensity of both electricity and natural gas used in buildings built and altered after the 2022 amendments go into effect on January 1, 2023. The table does not account for the effect of decarbonization of pipeline natural gas on the portion of existing buildings not altered, so the emission reductions shown are conservative. Actual reductions are expected to be greater than shown.

The net reduction in criteria air pollutant emissions is an environmental benefit to the state and reflects the compounding benefits of decarbonizing our energy end use sectors to address global climate change, while at the same time realizing reductions

that address our persistent air pollution problems. There is no doubt that locations that tend to have California's sunny climate and mountainous topography exacerbate regional air quality problems, resulting in continuing need to directly reduce criteria air pollutant emissions to improve air quality.⁴²

Additionally, the decrease of fossil fuel use in newly constructed and altered buildings would result in a reduction of criteria air pollutant emissions from an area source. An area source, compared to a point source of air pollution, is more indeterminate of location, such as a highway, dirt road, forest fire, or tilled field. Or, for example, a neighborhood of water heater stacks would be an area source. Most area sources are aggregations of a multitude of small sources, but often relatively uncontrolled and located at ground level near receptors like humans with the potential for higher impacts.

A concurrent potential increase in criteria air pollutant emissions in some months would result from increase generation tied to the proposed increase use of electric heat pumps. The current proportion of the California generation resources mix that is fossil fuel would likely share some of the increased generation demand, resulting in an increase of criteria air pollution emissions in some months at these point sources. However, like most point sources in California, power plants are subject to stringent best available emission control technologies, monitoring, reporting and ongoing maintenance to ensure constant compliance. And, unlike area sources, emissions are emitted at elevated temperatures and velocities, and from a tall stack, resulting in dispersion of the air pollutants before they can reach ground level receptors.

The fossil fueled power plants are licensed for operation up to a permitted number of hours per year, and emissions per hour, day or year. These permit requirements reflect the approved plans adopted by local air districts to achieve and maintain ambient air quality standards. The 2022 amendments would increase electricity use in the fall, winter, and spring seasons for heating, and year-round for water heating. Because of the dynamic nature of California's wholesale energy market and the moment-to-moment decisions made by the Independent System Operator it is impossible to estimate whether, where, or when any increases would occur, how much they would be, and of what duration, rendering any analysis of any impacts from these potential increases to be speculative.⁴³ However, they would not cause the power plants to exceed their emissions limits or any limits on hours of operations.

42 Nathanson, Jerry A. "[Pollution](#)." Britannica. Available at <https://www.britannica.com/contributor/Jerry-A-Nathanson/4206>.

43 California ISO. [About Us, Our Business webpage](#) at <http://www.caiso.com/about/Pages/OurBusiness/Default.aspx>. ("Every five minutes, the ISO forecasts electrical demand and dispatches the lowest cost generator to meet demand while ensuring enough transmission capacity for delivery of power.") Last accessed May 15, 2021.

In 2001, the fleet average capacity factor of the natural gas power plants in California was 45 percent. By 2018, the fleet average capacity was only 26 percent, meaning that there is underutilized permitted capacity available to maintain the grid reliability with clean, efficient generation (Nyberg 2020, page 10) as renewables continue to be added. The change in capacity factor of the fossil plants correlates with large past and continuing additions of renewable generation throughout California, at the grid level and behind the meter. In particular, the nearly 20,000 MW of in-state combined cycle units (about half the existing fossil fleet) were only operating at about 40 percent capacity factor (Nyberg 2020, page 10). These units are typically permitted for 100 percent capacity factor, while operating near 60 percent energy conversion efficiency (from fuel input to electricity output).

Lastly, most of the existing fossil fueled power plants were required to obtain offsets, for some of their criteria air pollutant emissions to obtain and maintain their operating permits. Offsets are generated through cleaning up or shutting down existing point sources, and because air districts typically require a greater than 1:1 offset ratio, they provide the air basin reductions in emissions and improve air quality. Because of the dynamic nature of California's wholesale energy market and the moment-to-moment decisions made by the California Independent System Operator it is impossible to estimate whether, where, or when any increases would occur, how much they would be, and of what duration, rendering any analysis of impacts of these potential increases to be speculative⁴⁴. However, increases of operating levels of existing permitted fossil units would not add emissions to an air basin that were not modeled and permitted.

4.2.4 Indoor Air Quality

The 2022 amendments improve the rate of removal of cooking-generated gases and aerosols generated when cooking indoors and lead to lower concentrations of PM_{2.5} and NO₂ in the indoor environment compared to the 2019 Energy Code. Cooking-related air pollution is associated with various health risks, and there is a growing body of research that highlights the health impacts from cooking-related pollution⁴⁵. Cooking over any type of cooktop (natural gas or electric) releases ultrafine and fine particles such as PM_{2.5}, as well as other irritants and potentially harmful gases including formaldehyde, acetaldehyde, acrolein, and polycyclic aromatic hydrocarbons (Singer and Chan 2021).

The 2022 amendments improve upon the 2019 Energy Code requirements regarding indoor air quality associated with indoor cooking by increasing the air handling capacities of range hoods to remove cooking-related air pollution (CASE 2020). Specifically, the amendments would increase airflow rates of residential kitchen range

44 Ibid.

45 Seals, Brady and Andee Krasner. 2020. [Gas Stoves: Health and Air Quality Impacts and Solutions](#). Report. Rocky Mountain Institute. Available at <https://rmi.org/insight/gas-stoves-pollution-health/>.

hoods to a minimum level. The amendments build upon recent research from LBNL that estimated the minimum cooktop range hood capture efficiency needed to maintain fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂) concentrations at acceptable levels. Capture efficiency and exhaust volume flows are specified depending on the square footage of the dwelling unit. The capture efficiency test method is new and manufacturer organizations are in the process of establishing rating points for capture efficiency.

4.2.5 Environmental Impacts and Mitigation Measures

Appendix G of the state CEQA Guidelines provides that a project would result in a potentially significant impact on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors affecting a substantial number of people).

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

The 2022 amendments are regulatory changes and do not approve any construction projects or regulate the rate and quantity of new building construction. The 2022 amendments would result in a net decrease in criteria pollutant and TAC emissions statewide. The 2022 amendments also would not affect the ability for local air districts to impose air quality requirements on construction projects.

The 2022 amendments contain provisions that are expected to potentially cause a change from using natural gas (or in some cases, propane) for water and space heating in new construction in California to the use of electric heat pumps for space heating in some climate zones in California and for water heating in other climate zones. The decrease of natural gas and propane consumption in new construction would increase winter electricity consumption for heat pump operations, while other program elements reduce electricity consumption. Overall, on an annual basis, the 2022 amendments will reduce both electricity and natural gas consumption. However, on a seasonal basis there may be an increase in, or a shift to, wintertime electrical (megawatt) demand. This seasonal demand is expected to be met with existing capacity. Overall, the 2022 amendments would result in a net decrease in criteria pollutant and TAC emissions statewide. Improvements in building envelope, increases in equipment efficiencies, and other requirements included in the Energy Code updates will also decrease overall energy use compared to the existing 2019 Energy Code. Therefore, the impacts from

the 2022 amendments would be less than significant and positive which would support, not obstruct, the implementation of any air quality plan.

Required Mitigation Measures: None

b. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

On an annual basis, the energy efficiency requirements set forth in the 2022 amendments would reduce electricity and natural gas and propane usage and the emissions of criteria pollutants and TACs compared to existing Energy Code requirements. Based on this reduction, the 2022 amendments would result in a net reduction of criteria air pollutant emissions statewide. There may be some short-term wintertime increases due to seasonal issues as discussed in "a" above, but such impacts would be within allowable permit limits and will be less likely to occur over time as the electricity demand becomes more fully served by renewable technologies. Therefore, the impacts from the 2022 amendments would be less than significant and due to the positive impacts from reduced emissions of criteria pollutants, would not result in a cumulative considerable net increase of any criteria pollutant.

The 2022 amendments would improve indoor air quality associated with cooking within enclosed spaces such as kitchens and there would be no cumulatively considerable impacts.

Required Mitigation Measures: None.

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

The 2022 amendments are regulatory changes and do not approve any construction project or regulate the rate and quantity of new building construction. The 2022 amendments also do not affect the ability for local air districts and jurisdictions to impose air quality requirements on construction projects to reduce the exposure to substantial pollutants by sensitive receptors.

Overall, as stated above in "a" and "b" on an annual basis, the 2022 amendments are expected to reduce electricity and fossil fuel natural gas (and propane) use when compared to continued use of existing Energy Code requirements. In addition, short-term emissions are expected to be within permit limits. This will result in net reductions of NOx and SOx emissions beginning by the end of 2023.

The 2022 amendments would also improve indoor air quality associated with cooking within enclosed spaces such as kitchens and this improvement over the existing Energy Code would help to prevent sensitive receptors from being exposed to substantial pollutant concentrations.

Therefore, the impacts from the 2022 amendments would be less than significant and due to the positive impacts from reduced emissions of criteria pollutants, would not expose sensitive receptors to substantial pollutants.

Required Mitigation Measures: None

d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The 2022 amendments are regulatory changes and do not approve any construction projects or regulate the rate and quantity of new building construction. The 2022 amendments also do not affect the ability for local air districts and jurisdictions to impose air quality requirements on construction projects to reduce the exposure to substantial pollutants by sensitive receptors.

The 2022 amendments would improve indoor air quality associated with cooking within enclosed spaces such as kitchens and there would be no adverse odor impacts.

Therefore, the impacts from the 2022 amendments would be less than significant and due to the positive impacts from reduced emissions of criteria pollutants, would not result in other emissions adversely affecting a substantial number of people.

Required Mitigation Measures: None

4.2.6 References

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4.3 Biological Resources

This section describes the environmental and regulatory setting related to biological resources in the state and discusses impacts associated with the project. The analysis in this section concludes that the 2022 amendments would have no or less than significant impacts on biological resources.

4.3.1 Environmental Setting

The 2019 Energy Code are a set of regulations that require energy efficient designs, features, equipment, and practices in new construction and certain additions and alterations to buildings within California. While most of the 2022 amendments would have no impact or beneficial effects on biological resources, some of the requirements, such as prescriptive solar PV and battery energy storage requirements, would alter the external characteristics of specified new buildings within the state in a manner that could potentially result in foreseeable direct or indirect impacts to biological resources. As these 2022 amendments apply statewide, the environmental setting of the Energy Code updates is the entire state of California. To focus on changes that would be attributable to the project, this section evaluates the potential for increases in statewide biological resources impacts from the proposed 2022 amendments compared to the existing state of biological resources impacts associated with buildings in California under the current building design and construction requirements of the 2019 Energy Code.

4.3.2 Regulatory Setting

Federal

Endangered Species Act (16 U.S.C., § 1530 et seq., and 50 CFR, part 17.1 et seq.). The Endangered Species Act (ESA) designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. Its purpose is to protect and recover imperiled species and the ecosystems on which they depend. It is administered by the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The USFWS is responsible for terrestrial and freshwater organisms; MFS is responsible for marine wildlife such as whales and anadromous fish (such as salmon). Species may be listed as endangered or threatened. All species are defined to include subspecies, varieties, and for vertebrates, distinct population segments. The ESA protects endangered and threatened species and their habitats by prohibiting the “take” of listed animals and the interstate or international trade in listed plants and animals, including their parts and products, except under federal permit. Take may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.

Migratory Bird Treaty Act (16 U.S.C., §§ 703-711). The Migratory Bird Treaty Act (MBTA) makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or

eggs of such a bird except under the terms of a valid federal permit. The USFWS has authority and responsibility for enforcing the MBTA.

State

California Endangered Species Act (Fish and Game Code sections 2050-2098). The California Endangered Species Act (CESA) of 1984 states that all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected and preserved. CESA prohibits the take of any species of wildlife designated by the California Fish and Game Commission as endangered, threatened, or candidate species. The California Department of Fish and Wildlife (CDFW) may authorize the take of any such species if certain conditions are met. These criteria are listed in Title 14 of the California Code of Regulations, section 783.4 subdivisions (a) and (b). For purposes of CESA “take” means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.⁴⁶

California Fish and Game Code. The administering agency for the Fish and Game Code sections discussed above is CDFW.

- Section 3503: This section makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.
- Section 3503.5: This section makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
- Section 3513: This section protects California’s migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame birds.

4.3.3 Environmental Impacts and Mitigation Measures

- a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?**

Implementation of the Energy Code updates would not substantially affect protected species, either directly or through habitat modification. As shown in **Tables 4.2-1** through **4.2-3** in **Section 4.2 Air Quality**, the 2022 amendments would result in the reduction of ambient criteria pollutants, such as nitrogen oxides and sulfur dioxides.

⁴⁶ Fish & G. Code § 86.

Such amendments do not adversely impact biological resources, as they would reduce the adverse effects of nitrogen deposition and other environmentally harmful emissions that could result from new construction and building modifications if the Energy Code updates are not adopted. These emissions adversely affect flora and fauna by disrupting normal ecological function: promoting invasive and/or weedy growth by process of outcompeting native plants (CEC 2006); detrimentally affecting associated native species such as pollinators (butterflies and bees, etc.) (Hoover 2012); diminishing populations of sensitive and rare plant species (Valliere et al. 2017); and harming the wildlife that depends on these habitats and food sources to survive (Hernandez et al. 2017). Therefore, the 2022 amendments would yield a positive environmental impact.

The new prescriptive solar PV requirements for newly constructed buildings, including high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings, would increase the number of surfaces that may attract birds, bats, and other species (invertebrates) and cause a potentially significant adverse environmental impact to those species.

While utility-scale projects are well documented to have various adverse impacts on biota (Kosciuch et al. 2020), little scientific data is available on distributed PV, such as rooftop solar, to suggest that distributed PV would have comparable biological resources impacts. Moreover, **Section 4.4 Energy** indicates that the 2022 amendments, including the distributed PV and battery storage requirements and other efficiency requirements, “would save approximately 33 million therms of fossil fuel natural gas and 1.3 billion kWh of electricity” in the first full year of implementation. Thus, the beneficial changes in energy demand attributable to the project are not likely to result in the development of future utility-scale renewable projects either directly or indirectly.

The 2022 amendments do not direct where new buildings should be constructed and do not include provisions or exceptions that would make it more likely for new buildings to be sited, designed, or constructed in ecologically-rich areas or in such a way as to introduce new or additional adverse effects on candidate, sensitive, or special-status species relative to buildings constructed under the 2019 Energy Code or earlier Energy Codes. Therefore, implementation of the 2022 amendments into foreseeable future buildings would have less than significant impacts on protected species, as would any future habitat modification resulting from the project’s beneficial effects on ambient air quality.

Required Mitigation Measure: None

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

The 2022 amendments do not include any provisions or exceptions that would cause regulated buildings to be more likely to be sited, designed, or constructed in such a way as to adversely affect riparian habitat or other sensitive natural communities. Therefore, there would be no impact to riparian habitat or other sensitive natural communities from the proposed amendments.

Required Mitigation Measure: None

c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?

The 2022 amendments do not include any provisions or exceptions that would cause regulated buildings to be more likely to be sited, designed, or constructed in such a way as to adversely affect federally protected wetlands through direct removal, filling, hydrological interruption, or by other means. Therefore, there would be no impact to federally protected wetlands from the proposed amendments.

Required Mitigation Measure: None

d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?

The 2022 amendments do not include any provisions or exceptions that would cause new buildings to be more likely to be sited, designed, or constructed in such a way as to interfere with the movement of native resident species or with established migratory wildlife corridors or impede native nurseries. Therefore, there would be no impact to native fish or wildlife species or established wildlife corridors or wildlife nurseries from the proposed amendments.

Required Mitigation Measure: None

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The 2022 amendments do not induce or incentivize regulated buildings to be designed, sited, or constructed in such a way that they would conflict local policies or ordinances

protecting biological resources. Therefore, there would be no impact to local policies or ordinances protecting biological resources from the proposed amendments.

Required Mitigation Measure: None

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The 2022 amendments do not induce or incentivize regulated buildings to be designed, sited, or constructed in such a way that they would conflict with habitat conservation plans. Therefore, there would be no impact to an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan from the proposed amendments.

Required Mitigation Measure: None

4.3.4 References

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4.4 Energy Resources

This section describes the project’s environmental and regulatory setting and analyzes the potential impacts to energy and energy resources from the 2022 amendments and is prepared pursuant to Section 15126.2(b) and Appendices F and G of the CEQA Guidelines. The analysis concludes that the adoption of the 2022 amendments would not result in inefficient, wasteful, and unnecessary consumption of energy. The 2022 amendments would have less than significant impacts on California’s energy resources.

4.4.1 Environmental Setting

Energy Types and Sources

California’s electricity system consists of a diverse mix of natural gas, petroleum, renewable, hydroelectric, and nuclear generation resources. In 2019, 63 percent of the state’s electricity retail sales came from non-fossil fuel sources, including large hydropower, nuclear, solar, wind, geothermal, and biomass energy generation. One-third of the energy consumed in California is produced by combusting fossil fuel natural gas.⁴⁷ The amount of electricity generation from natural gas plants was 91 gigawatt-hours (GWh) in 2018, a decrease of roughly 22 percent, from 117 GWh in 2009.

California has added large amounts of renewable generation to its electricity system. Solar generation represents the largest portion of renewable generation currently consumed in California. Solar and wind generation together account for more than 62 percent of all renewable energy generation, not including behind-the-meter (BTM) or off-grid generation. The CEC estimates that 36 percent of California’s 2019 retail electricity sales were provided by RPS-eligible renewable energy sources. In 2019, the estimated total renewable generation, including out-of-state generation delivered to California and BTM solar generation, was 105,559 GWh.⁴⁸

Energy Use for Buildings

In 2019, residential and non-residential buildings represented approximately 69 percent of California’s electricity consumption,⁴⁹ and 53 percent of California’s fossil fuel natural gas consumption.⁵⁰ The 2019 Residential Appliance Saturation Survey (RASS) estimated that the fossil fuel natural gas combusted in statewide households results from the

47 CEC. [California Energy Commission Renewable Energy Tracking Progress](https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf.

48 Ibid.

49 CEC. [Electricity Consumption by Entity webpage](http://www.ecdms.energy.ca.gov/elecbyutil.aspx) at <http://www.ecdms.energy.ca.gov/elecbyutil.aspx>.

50 CEC. [Gas Consumption by Entity webpage](http://www.ecdms.energy.ca.gov/gasbyutil.aspx) at <http://www.ecdms.energy.ca.gov/gasbyutil.aspx>.

following three end uses: water heating at 59 percent, space heating at 32 percent, and cooking at 5 percent.⁵¹

As described more fully in **Chapter 3 Project Description**, this EIR utilizes a modeled baseline for four technical areas that incorporates the impacts of the 2019 Energy Code in 2023, when the requirements of the proposed 2022 amendments would take effect. This modeled baseline forecasts the number of anticipated building construction starts for year 2023 and the anticipated consumption of energy resources from those new buildings, which would be subject to the 2019 Energy Code if the project is not approved. The results of the forecast are then compared to the anticipated consumption of energy resources from the new buildings constructed in 2023 under the 2022 Energy Code to provide information about potential impacts on energy resources if the project is approved.

4.4.2 Regulatory Setting

Federal

Energy Policy Act of 1992. The Energy Policy Act of 1992 establishes a process by which each state is required to review and potentially update its state energy code whenever national model energy standards (ANSI/ASHRAE/IES Standard 90.1 for nonresidential buildings and the International Energy Conservation Code for residential buildings) are updated. The statute requires each state to certify to the U.S. Department of Energy that it has reviewed the updated national model energy standard and its determination of whether the state energy code meets or exceeds the updated national model energy standards. The CEC has made this certification for the 2019 Energy Code.

State

Warren-Alquist Act. Public Resources Code section 25402(a)-(b), requires the CEC to adopt regulations “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including energy associated with the use of water, in new residential and new nonresidential buildings, and to manage energy loads to help maintain electrical grid reliability.” The CEC accomplishes this in large part through the adoption of building standards and appliance efficiency standards. The building standards are adopted every three years as part of the California Building Standards Commission’s triennial update cycle, whereas appliance efficiency standards are adopted intermittently as standards development is completed. Both sets of standards are required to be technically feasible and cost-effective.

51 CEC. [2019 California Residential Appliance Saturation Survey \(RASS\) webpage](http://www.ecdms.energy.ca.gov/elecbyutil.aspx) at <http://www.ecdms.energy.ca.gov/elecbyutil.aspx>. (The CEC is conducting a 2019 RASS with results expected in 2021.)

2019 Building Energy Efficiency Standards (2019 Energy Code). The 2019 Building Energy Efficiency Standards, in California Code of Regulations, Title 24, Part 6, establish a range of mandatory and prescriptive energy efficiency measures for newly constructed residential and nonresidential buildings, as well as additions and alterations to existing buildings, to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserving energy resources, and assuring that statewide environmental, public safety, and land use goals are met. This code cycle-initiated focus on the decarbonization of buildings with the introduction of solar PV system requirements for newly constructed low-rise residential buildings. It also introduced the recognition of battery storage systems and demand flexibility options in the form of compliance credits, encouraging the design and installation of systems that support the decarbonization of buildings and grid stability.

SB 1078. California Renewable Portfolio Standards Program (SB 1078, Chapter 516, Statutes of 2002) established the RPS for electricity supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales. The RPS affects the impacts of the Energy Code by increasing the percentage of renewable generation consumed in the state, which has a different operational and environmental profile than non-renewable sources.

AB 32. In 2006, the California State Legislature enacted the Global Warming Solutions Act of 2006, or AB 32, which provides the framework for regulating GHG emissions in California. This law requires the CARB to design and implement emission limits, regulations, and other measures such that statewide GHG emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020.

SB 350. The Clean Energy and Pollution Reduction Act of 2015 (SB 350, de León, Chapter 547, Statutes of 2015) called for a new set of objectives in clean energy, clean air, and pollution reduction for 2030 and beyond. These objectives included increasing the procurement of electricity from renewable sources from 33 percent to 50 percent and establishing targets to achieve a cumulative doubling of energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030 through energy efficiency and conservation by 2030. The Building Energy Efficiency Standards were the first effort mentioned by the statute to contribute to doubling efficiency to accomplish climate change objectives. SB 350 also modified the direction of AB 758 related to the Energy Efficiency Action Plan.

AB 758. The California Energy Efficiency Action Plan (AB 758 Skinner, Chapter 470, Statutes of 2009), as further modified by SB 350, requires the CEC to develop and periodically update an action plan to increase energy efficiency savings in new and

existing buildings. On December 11, 2019, the CEC adopted the California 2019 Energy Efficiency Action Plan (2019 Action Plan) to serve as the state's most recent policy map for increasing energy efficiency. The 2019 Action Plan includes strategies for achieve a statewide doubling of energy efficiency savings from electricity and natural gas end uses by 2030. It also addresses financing mechanisms, resiliency, multifamily building energy efficiency, building decarbonization, industrial and agricultural energy efficiency, use of energy data to better design and target efficiency, demand response measures, and barriers and opportunities to expand low-income and rural residents' access to energy efficiency and renewable energy. The Action Plan recognized that going forward to full decarbonization of the state's economy (pursuant to Executive Order B-30-15), energy efficiency can and must play a central role. Building decarbonization must be built from three components: a clean supply of energy, high levels of energy efficiency, and demand flexibility. Distributed energy resources (DERs), including behind-the-meter solar generation, energy efficiency, demand response (DR), electricity storage, and electric vehicles (EVs), represent significant opportunities for demand flexibility, especially when coupled with advanced communications and automated controls. Providing building decarbonization pathways in the building standards for new construction and retrofits was highlighted by the Action Plan. AB 758 does not impose specific regulatory requirements.

Executive Order B-30-15. On April 29, 2015, Governor Brown issued Executive Order B-30-15, directing state agencies to implement measures to reduce GHG emissions 40 percent below their 1990 levels by 2030 and to achieve the previously-stated goal of an 80 percent GHG reduction by 2050.

AB 32 Scoping Plan & Update. Part of CARB's direction under AB 32 was to develop a Scoping Plan that contains the main strategies California will use to reduce GHG emissions that cause climate change. CARB first approved the AB 32 Scoping Plan in 2008 and released its first update in 2014. The Scoping Plan includes a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program. In December 2007, CARB set the statewide 2020 emissions limit, defined as reducing emissions to 1990 levels, at 427 million metric tons of carbon dioxide equivalent (CO_{2e}) (MMTCO_{2e}). The May 2014 First Update to the Climate Change Scoping Plan adjusted the 1990 emissions estimate and the statewide 2020 emissions limit goal to 431 MMTCO_{2e} (CARB 2014). The California Building Energy Efficiency Standards have been identified as a key means of accomplishing climate change GHG reductions in the Scoping Plan.

SB 32 and AB 197. On September 8, 2016, SB 32, codified as Section 38566 of the Health and Safety Code, was enacted. It extends California's commitment to reduce GHG emissions by requiring the state to reduce statewide GHG emissions by 40 percent below 1990 levels by 2030. A companion bill, AB 197, assures that the state's

implementation of its climate change policies is transparent and equitable, with the benefits reaching disadvantaged communities.

SB 100. The 100 Percent Clean Energy Act of 2018 (SB 100, De León, Chapter 312, Statutes of 2018) established a nation-leading target for renewable and zero-carbon resources to supply 100 percent of retail sales and electricity procured to serve all state agencies by 2045, displacing fossil fuel consumption within the state. SB 100 also increased the state’s RPS target to 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and to 60 percent by December 31, 2030, and requires all state agencies to incorporate these targets into their relevant planning.

AB 3232. Zero-Emission Buildings and Sources of Heat Energy (AB 3232, Friedman, Chapter 373, Statutes of 2018) requires the CEC to assess the potential for the state to reduce the emissions of greenhouse gases from the state’s residential and commercial building stock by at least 40 percent below 1990 levels by January 1, 2030. The bill states that decarbonizing California’s buildings is essential to achieve the state’s greenhouse gas emission reduction goals at the lowest possible cost. The bill establishes that it is the intent of the Legislature to achieve significant reductions in the emissions of greenhouse gases by the state’s residential and commercial building stock by January 1, 2030.

Executive Order B-55-18. On September 10, 2018, former Governor Edmund Brown signed Executive Order B-55-18 which set a goal of statewide carbon neutrality by 2045 and net negative emissions thereafter. The Building Energy Efficiency Standards are one means among many that will be required to successfully meet this worldwide, groundbreaking goal. The 2022 amendments to the Energy Code are a first step to shift towards efficient heat pumps, which will enable decarbonization at the building site in support of this Executive Order.

Executive Order N-79-20. On September 23, 2020, Governor Gavin Newsom signed Executive Order N-79-20 requiring sales of all new passenger vehicles to be zero-emission by 2035, all medium-and heavy-duty vehicles by 2045 for all operations where feasible, drayage trucks and by 2035.

Integrated Energy Policy Report. SB 1389 (Chapter 568, Statutes of 2002) requires the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC uses these assessments and forecasts to develop and evaluate energy policies and programs that conserve resources, protect the environment, ensure energy reliability, enhance the state’s economy, and protect public health and safety.⁵² The CEC includes these energy policy recommendations in its biennial Integrated Energy Policy Report (IEPR) that is issued in odd-numbered years with update reports in even-numbered years.

52 Pub. Resources Code § 25301(a).

The 2019 IEPR, adopted by the CEC on February 20, 2020, placed special emphasis on building decarbonization. The IEPR stated the following: "Leveraging the decarbonization of the electricity system by transitioning space and water heating in buildings toward highly efficient electric appliances, coupled with strategies to enable greater ability to shift when energy is consumed, will be key to reducing emissions from buildings." "Codes and standards development will continue to be a significant pathway for change and improvement." "Future code updates will aim to enable ... highly efficient, low-carbon pathways for newly constructed ... buildings." (2021 SB 100 Joint Agency Report.)

SB 100 Report. On March 15, 2021, the CEC, CPUC, and CARB published the first joint agency examining how the state's electricity system can become carbon free by 2045 as required by SB 100. The report recognized that all other actions required to accomplish California's society-wide 2045 carbon neutrality goal established by Executive Order B-55-18 must be addressed by the SB 100 2045 carbon free grid, including all vehicle and building decarbonization actions that will be taken by 2045. This would include 100 percent vehicle electrification pursuant to Executive Order N-70-20, all building decarbonization achieved through efficient electric technologies through all building code updates between now and 2045, and the much greater electrification that would be needed to decarbonize the existing building stock. The joint agencies completed a robust analysis of the massive grid improvements that will be necessary to accomplish that. Those improvements include tripling the current capacity of renewable generation that exists in California, including a major expansion of customer owned renewable generation, as well as of utility-scale renewable generation. The improvements also include an expansion of battery resources in the state by 8 times. A major improvement in the demand flexibility of California's buildings will be extremely important to achieving a reliable grid. Customer owned batteries will be an important factor in achieving that. The report cited the important ongoing role of the Building Energy Efficiency Standards in achieving climate change GHG goals through energy efficiency, onsite PV generation, and demand flexibility through battery storage and other means.

Local

Pursuant to Public Resources Code section 25402.1(h)(2) and California Code of Regulations, Title 24, Part 1, sections 10-106, cities and counties may adopt local building energy efficiency standards that reduce energy consumption levels below those set in the state building energy efficiency standards so long as these local standards are cost-effective. After action by local jurisdiction, the CEC must determine whether to approve the changes. Once approved by the CEC, these local energy efficiency standards are implemented in lieu of the Energy Code and represent an important tool for local jurisdictions to meet their specific GHG reduction goals.

Local ordinances have acted as a bellwether for statewide standards, serving as laboratories by providing a place to test market readiness of technologies not mandated by the Energy Code. They drive innovation and can bring down the cost of efficient

building technologies. To date, 37 local ordinances that exceed California’s 2019 Energy Code have been approved by the CEC.⁵³ Nineteen of these ordinances have all-electric requirements.⁵⁴

4.4.3 Environmental Impacts and Mitigation Measures

Appendix G of the CEQA Guidelines establishes that a project would result in a potentially significant impact on energy resources due to:

- Wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

In addition to addressing energy impacts in Appendix G, the CEQA Guidelines in Section 15126.2(b) and Appendix F identify specific energy impacts that a project may have, which are analyzed below as applicable to the 2022 amendments.

a. Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Pursuant to Public Resources Code section 25402, the CEC is required to set building design and construction standards for new residential and nonresidential buildings, as well as alterations and additions to existing buildings, that increase efficiency in the use of energy. The project consists of amendments to the Energy Code. The amendments will not result in the approval of any specific construction project. However, because the amendments may change the type and amount of energy consumption in new buildings anticipated to be constructed, this EIR evaluates whether the amendments would result in potentially significant impacts due to wasteful, inefficient, or unnecessary consumption of energy resources compared to new buildings anticipated to be constructed under the current 2019 Energy Code.

1. The project’s energy requirements and its energy use efficiency by amount and fuel type.

The 2022 amendments include measures that will reduce energy use in single family, multifamily, and nonresidential buildings. These measures will affect newly constructed buildings by adding new prescriptive and performance standards for electric heat pumps for space conditioning and water heating, as appropriate for the various climate zones in California, requiring PV and battery storage systems for multifamily and selected nonresidential buildings, and establishing efficiency measures for lighting,

53 Local Ordinances Exceeding the 2019 Energy Code, [Docket 19-BSTD-06](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-06). Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-06>.

54 Ibid.

building envelope (e.g. insulation in walls, floors, and floors, window improvements, roofing product heat rejection improvements), HVAC, and ventilation for indoor air quality (IAQ). The measures will also require making improvements to reduce the energy loads of certain covered processes, which involves equipment covered by the Energy Code that is not related to the occupant needs in the building, such as refrigeration equipment in refrigerated warehouses, systems serving controlled environment horticulture spaces, or air conditioning for computer equipment in data processing centers.

The Energy Code updates also affect certain types of existing buildings. Specifically, the 2022 amendments expand building “alteration measures” that improve the energy use of existing buildings. These requirements improve the energy performance of “altered components” in existing buildings, which are required to pull building permits and meet building code requirements that specifically apply to them. The 2022 amendments expand alteration measures to many different altered components, including the building envelope, lighting, HVAC, water heating systems, and equipment serving covered processes.

The Energy Code updates would take effect on January 1, 2023. Overall, the 2022 amendments are expected to reduce electricity and fossil fuel natural gas usage when compared to continued compliance with the 2019 Energy Code requirements. Under the 2022 amendments, California buildings would consume approximately 198,600 GWh of electricity and 6.14 billion therms of fossil fuel natural gas in 2023 compared to approximately 199,500 GWh and 6.17 billion therms of electricity and fossil fuel natural gas, respectively, under the 2019 Energy Code. As shown on Table 4.4-1 below, on a statewide basis throughout 2023, all measures for newly constructed buildings and altered components of existing buildings collectively would save approximately 33 million therms of fossil fuel natural gas and 1.3 billion kWh of electricity.

These measures would save 45 billion-time dependent valuation (TDV, kBTU) in 2023. Time dependent valuation (TDV) is the “common currency” adopted first by the CEC in 2003 as a result of the 2000 electricity crisis and updated every Energy Code cycle to reflect changes to energy systems resulting from adopted state energy policy. This enables time dependent valuation of all fuel types (natural gas, propane, and electricity) for the building standards, combining hourly increases and decreases in each of these fuel types into one overall energy metric. TDV creates the means to determine the value for all measures addressed by the standards, including efficiency, generation, storage, and demand response measures.⁵⁵

55 E3. 2020. [Time Dependent Valuation of Energy for Developing Building Efficiency Standards -- 2022 Time Dependent Valuation \(TDV\) and Source Energy Metric Data Sources and Inputs.](#)

Energy+Environmental Economics. TN#233345 Available at

<https://efiling.energy.ca.gov/GetDocument.aspx?tn=233345&DocumentContentId=65837>.

While PV and battery storage systems, envelope efficiency measures, and covered process load improvements reduce the use of natural gas, electricity, and TDV energy across all building types, the new prescriptive and performance standards for heat pump technology for water and space heating is expected to result in a modest increase in the total electricity consumed in affected buildings. However, as indicated in Table 4.4-1 below, the increase in electricity resulting from heat pumps would be more than offset by the natural gas savings in the same buildings as shown by the TDV savings. As noted in Table 4.4-1, TDV values are positive for all buildings with space or water heating heat pumps in the standard design.

**Table 4.4-1
2022 Energy Code First Year Therms, kWh, and TDV Savings**

Building Types and Measures	Therms	kWh	TDV, kBTU
Newly Constructed Single Family Heat Pump Measures	12,685,939	-125,227,444	531,549
Newly Constructed Multifamily Heat Pump Measures	696,820	-6,715,355	38,181,271
Newly Constructed Nonresidential Heat Pump Measures	2,003,424	-15,451,367	90,885,902
Newly Constructed Multifamily Solar PV System + Battery Storage	0	89,670,588	2,067,940,104
Newly Constructed Nonresidential Solar PV System + Battery Storage	0	363,116,456	8,398,509,628
Newly Constructed Multifamily Efficiency – All Prototypes	420,348	3,393,407	276,449,300
Newly Constructed Nonresidential Efficiency – All Prototypes	1,621,790	107,381,502	2,104,611,447
Newly Constructed Covered Processes	5,186,000	348,338,000	10,268,754,846
Alterations Single Family – All Buildings	701,000	189,720,000	7,368,900,000
Alterations Multifamily – All Buildings	219,112	13,047,528	510,978,915
Alterations Nonresidential – All Buildings	9,769,295	381,396,210	13,952,395,356
Grand Totals – All Buildings	33,303,728	1,348,669,525	45,078,138,318

Source: Appendix B

The electricity savings from measures for both newly constructed buildings and alterations to existing buildings, including PV and battery storage, efficiency measures, and reductions in covered process loads, would strongly outweigh the relatively small

increase in electricity used by heat pumps of approximately 147 million kWh, resulting in a net statewide electricity reduction of 1.3 billion kWh in 2023. As such, the project does not result in wasteful, inefficient, or unnecessary consumption of energy. Given that the 2022 amendments would result in an overall reduction in the use of energy resources, in the form of both electricity and natural gas, the project's impacts on energy resources is less than significant.

Required Mitigation Measures: None

2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.

The project is a change to existing building design and construction requirements that are applicable statewide. The 2022 amendments will increase electrification of new buildings while reducing the use of natural gas within the state by providing a mix of requirements and incentives for builders to install efficient electric appliances. Therefore, over time, the project does have a potential to indirectly impact the mix of energy supply in the state.

Independent of the project, California's electric utilities are required to steadily increase supply and capacity to shift to renewable energy resources and greater use of electricity as identified in the laws and policies noted in the Regulatory Setting. These include increasing the amount of renewable and zero carbon energy sources required by SB 100 and the state's RPS requirements. The RPS requires load serving entities (LSEs) in the state to achieve escalating procurement targets. LSEs were required to procure increasing amounts of renewable electricity each year ramping up to achieve at least 33 percent of retail sales by December 31, 2020 increasing to 60 percent by 2030. After 2030, the 60 percent RPS requirement continues along with the added SB 100 goal to supply renewable and zero-carbon resources for the remaining 40 percent of California delivered electricity. SB 100 will impact the implementation of electric power facilities through 2045. The SB 100 Joint Agency Report: Charting a path to a 100 percent Clean Energy Future, estimates an increased utility-scale capacity of 145 GW by 2045, which includes in state and out of state renewable sources and energy storage.⁵⁶

In addition, the Integrated Resource Plan and Long Term Procurement Plan (IRP-LTPP) adopted by the CPUC as a part of their implementation of SB 350 includes requirements relating to RPS targets applicable to IOUs⁵⁷, and PUC Section 9621 requires POUs to adopt an IRP that ensures the POU procures at least 50 percent eligible renewable

56 CEC, CPUC, CARB. 2021. [California Energy Commission SB 100 Joint Agency Report Achieving 100 Percent Clean Electricity in California: An Initial Assessment. Report.](#) p. 75. TN#237167. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100>.

57 CPUC. [Integrated Resource Plan and Long Term Procurement Plan webpage](#) at <https://www.cpuc.ca.gov/irp/>.

energy resources by 2030, consistent with PUC Article 16 (commencing with Section 399.11)⁵⁸.

Therefore, given the existing increase in renewable energy resources and the decrease in energy demand the project will have over the existing standards, the project would have less than significant impacts on local or regional energy supplies or capacity.

Required Mitigation Measures: None

3. The effects of the project on peak and base load period demands for electricity and natural gas.

The project will not increase summer peak demand due to the energy efficiency improvements and new PV and battery system requirements. Use of heat pump equipment for space heating does not alter anticipated electricity demand for space cooling, and the improved building energy efficiency associated with the 2022 amendments will reduce total demand and peak demand relative to the environmental setting.

Any winter peak demand impacts from this project can be met with existing in-state under-utilized thermal capacity⁵⁹. The California thermal fleet is becoming more efficient over time.⁶⁰ The expected incremental winter capacity from this project is small enough to not trigger the use of any of California's less efficient thermal generation. During the winter period, this project is expected to only utilize the unused capacity from the most efficient thermal capacity. At the same time any increases in electricity demand this project creates also increases the eligible retail sales for which California utilities will have to procure renewable energy generation in order to comply with RPS targets. Considering the long-term impacts of this project, SB 100 objectives will ensure any near-term increases in utilization of current carbon emitting capacity will be offset by renewable energy and other zero carbon energy sources.^[60] This supports the conclusion that the 2022 amendments to the Energy Code do not result in wasteful, inefficient, or unnecessary consumption of energy, and impacts on energy resources are less than significant.

Required Mitigation Measures: None

58 CEC. [Publicly Owned Utility Integrated Resource Plan webpage](https://www.energy.ca.gov/rules-and-regulations/energy-suppliers-reporting/clean-energy-and-pollution-reduction-act-sb-350-0) at <https://www.energy.ca.gov/rules-and-regulations/energy-suppliers-reporting/clean-energy-and-pollution-reduction-act-sb-350-0>. (See Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines – PDF)

59 CEC Staff. 2020. [Thermal Efficiency of Natural Gas-Fired Generation in California: 2019 Update](#). Staff report. TN#233380. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=233380&DocumentContentId=65895>.

60 Ibid. See Figure 1.

b. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The project would not conflict or obstruct a state or local plan setting forth renewable energy or energy efficiency requirements. The amendments include requirements for newly constructed buildings, including new prescriptive and performance standards for electric heat pump technology for space or water heating, requiring PV and battery storage systems for high-rise residential and selected nonresidential buildings, establishing efficiency measures for lighting, building envelope and HVAC, and making covered process load improvements, as well as requirements to improve the energy performance of altered components in existing buildings. All these measures are consistent with the CEC's responsibility to set building design and construction standards that increase efficiency in the use of energy and with the state's goal to decarbonization of energy use in new and existing buildings.

Cities and counties may adopt local building energy efficiency ordinances that reduce energy consumption levels even lower than the statewide standards set in the Energy Code, so long as these local ordinances are cost-effective. Thus, local jurisdictions can establish more stringent standards in the form of local reach codes for increased energy efficiency, renewable energy, or increased reliance on electric technologies. Forty-two local jurisdictions have adopted local ordinances that exceed California's 2019 Energy Code.

Given that the 2022 amendments to the Energy Code further state and local plans for renewable energy and energy efficiency, the project's impact on energy resources is less than significant.

Required Mitigation Measures: None

4.4.4 References

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CEC staff. 2020. [Final 2019 Integrated Energy Policy Report](#). California Energy Commission. Publication Number: CEC-100-2019-001-CMF. Available at <https://efiling.energy.ca.gov/getdocument.aspx?tn=232922>.

CEC. [California Energy Commission Renewable Energy Tracking Progress](#) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf.

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4.5 Greenhouse Gas Emissions

This section describes the project's environmental and regulatory setting and discusses potential GHG emissions impacts associated with 2022 amendments to the Energy Code using the approach to determining the significance of impacts from GHG emissions specified in CEQA Guidelines section 15064.4. The 2022 amendments focus on updating regulatory standards and compliance options related to building energy efficiency. The 2022 amendments would not approve or result in additional specific construction projects. Overall, the amendments that comprise the Energy Code updates would have no significant impacts on California's GHG emissions.

Global warming is a public health and environmental concern around the world. As global concentrations of atmospheric GHGs rise, increases in global temperatures, weather extremes, and air pollution concentrations also occur. Global warming and climate change have been observed to contribute to poor air quality, rising sea levels, melting glaciers, stronger storms, more intense and longer droughts, more frequent heat waves, increases in the number of wildfires and their intensity, and other threats to human health (Intergovernmental Panel on Climate Change (IPCC) 2007).

4.5.1 Environmental Setting

Unlike emissions of criteria and toxic air pollutants, which can have potential local or regional direct impacts, emissions of GHGs can have a much broader, global indirect impact. Global warming associated with the "greenhouse effect" is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The anthropogenic GHGs that contribute to global warming and climate change include CO₂, methane (CH₄), nitrous oxide (N₂O), black carbon, and fluorinated gases (F-gases). The F-gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). These GHGs are attributable in large part to anthropogenic, or human, activities associated with transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors (CARB 2014, page 14). The anthropogenic GHGs that contribute to global warming and climate change include CO₂, CH₄, N₂O, black carbon, and F-gases. The F-gases are HFCs, PFCs, and SF₆.

Each GHG has its own potency and effect upon the earth's energy balance, expressed in terms of a global warming potential (GWP), with CO₂ being assigned a value of 1. Specifically, the GWP is a measure of how much energy the emissions of one ton of a gas will absorb over time, relative to the emissions of one ton of CO₂. The larger the GWP, the more that a given gas warms the earth compared to CO₂ over the same time period, usually 100 years. The F-gases are sometimes called high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO₂. For example, according to the Fifth Assessment Report (AR5) of the IPCC 2013, CH₄ has a GWP of 28 over 100 years, which means that it has a global warming effect 28 times greater than CO₂ on an equal-mass basis (CARB 2014, page 16).

To analyze GHG impacts when multiple GHGs are involved, gases other than carbon dioxide must be converted into their CO₂e. The CO₂e for a source is obtained by multiplying each quantity of emitted GHG by its GWP and then adding the results together to obtain a single, combined emission rate representing all emitted GHGs in terms of CO₂e.

California and the United States contribute to global GHG emissions. The total gross California GHG emissions in 2016 were about 430 million metric tons of carbon dioxide equivalent (MMTCO₂e) emissions (CARB 2018). The largest source of GHG emissions in California is transportation, followed by industrial activities and in state and out of state electricity generation (CARB 2018). In 2016, total gross U.S. greenhouse gas emissions were about 6,510 MMTCO₂e (U.S. EPA 2018).

4.5.2 Regulatory Background

Federal

Endangerment Finding and Cause or Contribute Finding. In April 2007, the U.S. Supreme Court held that GHG emissions are pollutants within the meaning of the Clean Air Act (CAA). In reaching its decision, the Court also acknowledged that climate change results, in part, from anthropogenic causes.⁶¹ The Supreme Court's ruling paved the way for the regulation of GHG emissions by the U.S. EPA under the CAA.

In response to this Supreme Court decision, on December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under the CAA, section 202(a):

- Endangerment Finding: That the current and projected concentrations of the GHGs in the atmosphere threaten the public health and welfare of current and future generations; and
- Cause or Contribute Finding: That the combined emissions of GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

U.S. EPA has also enacted regulations for GHG reporting, the phase-out and banning of high global warming potential chemicals, and stationary GHG emissions source permitting. However, the amendment to the Energy Code would not be subject to any of these federal regulations.

⁶¹ *Massachusetts et al. v. Environmental Protection Agency* (2007) 549 U.S. 497.

State

SB 1078. California Renewable Portfolio Standards Program⁶² established the RPS for electricity supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales. The RPS affects the impacts of the Energy Code by increasing the percentage of renewable generation consumed in the state, which has a different operational and environmental profile than non-renewable sources.

Global Warming Solutions Act of 2006. In 2006, the California State Legislature enacted the Global Warming Solutions Act of 2006, or AB 32, which provides the framework for regulating GHG emissions in California. This law requires the CARB to design and implement emission limits, regulations, and other measures such that statewide GHG emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020.

Regulation for the Mandatory Reporting of Greenhouse Gas Emissions. One key regulation resulting from AB 32 was CARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, which came into effect in January 2009. It requires annual GHG emissions reporting from electric power entities, fuel suppliers, CO₂ suppliers, petroleum and natural gas system operators, and industrial facilities that emit 10,000 MTCO₂e/yr from stationary combustion or process sources.

AB 32 Scoping Plan & Update. Part of CARB's direction under AB 32 was to develop a Scoping Plan that contains the main strategies California will use to reduce GHG emissions that cause climate change. CARB first approved the AB 32 Scoping Plan in 2008 and released its first update in 2014. The Scoping Plan includes a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program. In December 2007, CARB set the statewide 2020 emissions limit, defined as reducing emissions to 1990 levels, at 427 million metric tons of CO₂e (MMTCO₂e). The May 2014 First Update to the Climate Change Scoping Plan adjusted the 1990 emissions estimate and the statewide 2020 emissions limit goal to 431 MMTCO₂e (CARB 2014). The California Building Energy Efficiency Standards have been identified as a key means of accomplishing climate change GHG reductions in the Scoping Plan.

SB 2. In April 2011, SB 2 of the First Extraordinary Session (SB X1-2) was signed into law. SB X1-2 expressly applies the new 33 percent Renewables Portfolio Standard by

62 Senate Bill 1078 (Sher, Chapter 516, Statutes of 2002).

December 31, 2020, to all retail sellers of electricity and established renewable energy standards for interim years prior to 2020.

Executive Order B-30-15. On April 29, 2015, former Governor Brown issued Executive Order B-30-15, directing state agencies to implement measures to reduce GHG emissions 40 percent below their 1990 levels by 2030 and to achieve the previously-stated goal of an 80 percent GHG reduction by 2050.

SB 32 and AB 197. On September 8, 2016, SB 32, codified as Section 38566 of the Health and Safety Code, was enacted. It extends California's commitment to reduce GHG emissions by requiring the state to reduce statewide GHG emissions by 40 percent below 1990 levels by 2030. A companion bill, AB 197, assures that the state's implementation of its climate change policies is transparent and equitable, with the benefits reaching disadvantaged communities.

SB 350. On October 7, 2015, SB 350 was signed into law, establishing new clean energy, clean air, and greenhouse gas reduction goals for 2030 and beyond. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030.

Short Lived Climate Pollutant Reduction Strategy. In an effort to best support reduction of GHG emissions consistent with AB 32, CARB released the Short Lived Climate Pollutant (SLCP) Reduction Strategy in March 2017. This plan, required by SB 1383,⁶³ establishes targets for statewide reductions in SLCP emissions of 40 percent below 2013 levels by 2030 for methane and hydrofluorocarbons and 50 percent below 2013 levels by 2030 for anthropogenic black carbon (CARB 2017b). The SLCP Reduction Strategy was integrated into the 2017 update to CARB's Scoping Plan.

2017 Scoping Plan Update. CARB updated the AB 32 Scoping Plan in 2017 (CARB 2017a). This update is guided by the goal of achieving California GHG emissions 40 percent below 1990 emissions by 2030. CARB is also working to achieve carbon neutrality by 2045 to implement the former governor's Executive Order B-55-18.

SB 100. The 100 Percent Clean Energy Act signed into law on September 10, 2018, advances the state's RPS target to 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and to 60 percent by December 31, 2030 and requires all state agencies to incorporate these targets into their relevant planning. SB 100 also established a target for renewable and zero-carbon resources to supply 100 percent of retail sales and 100 percent of electricity procured to serve all state agencies by December 31, 2045.

AB 3232. Signed into law on September 13, 2018, AB 3232 requires the CEC to assess the potential for the state to reduce the emissions of greenhouse gases from the state's residential and commercial building stock by at least 40 percent below 1990 levels by

63 Senate Bill 1383 (Lara, Chapter 395, Statutes of 2016).

January 1, 2030. The bill states that decarbonizing California's buildings is essential to achieve the state's greenhouse gas emission reduction goals at the lowest possible cost. The bill establishes that it is the intent of the Legislature to achieve significant reductions in the emissions of greenhouse gases by the state's residential and commercial building stock by January 1, 2030.

Executive Order B-55-18. On September 10, 2018, former Governor Brown issued Executive Order B-55-18. This executive order directed CARB to work with other state agencies to identify and recommend measures to achieve carbon neutrality as soon as possible, and no later than 2045, and to maintain and achieve negative emissions thereafter.

Executive Order N-19-19. On September 20, 2019, Governor Gavin Newsom signed Executive Order N-19-19, in the face of inaction on climate change from the federal government, calling for a concerted commitment and partnership by government, the private sector, and California residents to reach some of the strongest climate goals in the world. The Order required every aspect of state government to redouble its efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy.

Executive Order N-79-20. On September 23, 2020, Governor Gavin Newsom signed Executive Order N-79-20 requiring sales of all new passenger vehicles to be zero-emission by 2035, all medium-and heavy-duty vehicles by 2045 for all operations where feasible, and drayage trucks by 2035.

2019 Integrated Energy Policy Report. The 2019 IEPR, adopted by the CEC on February 20, 2020, placed special emphasis on building decarbonization. The IEPR stated the following: "Leveraging the decarbonization of the electricity system by transitioning space and water heating in buildings toward highly efficient electric appliances, coupled with strategies to enable greater ability to shift when energy is consumed, will be key to reducing emissions from buildings." "Codes and standards development will continue to be a significant pathway for change and improvement." "Future code updates will aim to enable ... highly efficient, low-carbon pathways for newly constructed ... buildings."

2021 SB 100 Joint Agency Report: *Achieving 100 Percent Clean Electricity in California: An Initial Assessment.* On March 15, 2021 the CEC, CPUC, and CARB published the first joint agency examining how the state's electricity system can become carbon free by 2045 as required by SB 100. The report recognized that all other actions required to accomplish California's society wide, 2045 carbon neutrality goal established by Executive Order B-55-18 must be addressed by the SB 100 2045 carbon free grid, including all efforts to vehicle and building decarbonization actions that will be taken by 2045. This would include 100 percent vehicle electrification pursuant to Executive Order N-79-20, all building decarbonization achieved through efficient electric technologies through all building code updates between now and 2045, and the much greater electrification that would be needed to decarbonize the existing building stock.

The joint agencies completed a robust analysis of the massive grid improvements that would be necessary to accomplish that. Those improvements include tripling the current capacity of renewable generation that exists in California, including major expansion of customer owned renewable generation as well as of utility-scale renewable generation. The improvements also include expansion of battery resources in the state by eight times. Extremely important to achieving a reliable grid will be major improvement in the demand flexibility of California’s buildings; customer owned batteries will be an important factor in achieving that. The report cited the important ongoing role of the Building Energy Efficiency Standards in achieving climate change GHG goals through energy efficiency, onsite PV generation, and demand flexibility through battery storage and other means.

4.5.3 Environmental Impact and Mitigation Measures

Appendix G of the CEQA Guidelines establishes that a project would result in potentially significant GHG impacts if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Significance Criteria

The principal guidance for determining the significance of GHG emissions impacts is CEQA Guidelines section 15064.4. Under Section 15064.4, a lead agency “shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions from a project.” Once a project’s GHG emissions are quantified, the lead agency has the discretion to analyze those emissions either quantitatively, qualitatively, or both.⁶⁴ Section 15064.4 further provides that a lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project’s emissions to the effects of climate change and consider a timeframe that is appropriate for the project.⁶⁵ The agency’s analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes.⁶⁶ The analysis can also utilize a model or methodology to estimate greenhouse gas emissions resulting from a project, at the discretion of the lead agency, “to enable decision makers to intelligently take into account the project’s incremental contribution to climate change.”⁶⁷ Finally, Section 15064.4 includes a nonexclusive list of

64 CEQA Guidelines, § 15064.4(a).

65 CEQA Guidelines, § 15064.4(b).

66 Ibid.

67 CEQA Guidelines, § 15064.4(c).

factors a lead agency should consider when determining the significance of a project's impacts from GHG emissions on the environment:

- (1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
- (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.⁶⁸

In analyzing the potential GHG emissions impacts from the 2022 amendments, the CEC has undertaken both a quantitative and a qualitative approach. Because the CEC is not aware of any threshold of significance that would apply to the project, the focus of this analysis is on the first and third of these factors.

a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The use of California buildings results in GHG emissions from on-site combustion of fuels for water and space heating and for cooking. Additionally, on-site electricity use can result in the generation and distribution of electricity at renewable and fossil-fuel power plants, resulting in GHG emissions.

The 2022 amendments include measures that will reduce energy use in single family, multifamily, and nonresidential buildings. These measures will:

- (1) Affect newly constructed buildings by adding new prescriptive and performance standards for electric heat pumps for space conditioning and water heating, as appropriate for the various climate zones in California,
- (2) Require PV and battery storage systems for newly constructed multifamily and selected nonresidential buildings,
- (3) Update efficiency measures for lighting, building envelope, HVAC, and
- (4) Make improvements to reduce the energy loads of certain equipment covered by (i.e., subject to the requirements of) the Energy Code that perform a commercial process that is not related to the occupant needs in the building (such as refrigeration equipment in refrigerated warehouses, or air conditioning for computer equipment in data processing centers).

As described more fully in the **Chapter 3 Project Description**, this EIR utilizes a modeled baseline to conduct a quantitative GHG analysis that incorporates the impacts

⁶⁸ CEQA Guidelines, § 15064.4(b); See also *Association of Irrigated Residents v. Kern County Board of Supervisors* (2017) 17 Cal.App.5th 708, 733-734.

of the 2019 Energy Code in 2023, when the requirements of the proposed 2022 amendments would take effect. This modeled baseline forecasts the number of anticipated building construction starts for year 2023 and the anticipated GHG emissions from those new buildings, which would be subject to the 2019 Energy Code if the project is not approved. The results of the forecast are then compared to the GHG emissions from the new buildings constructed in 2023 under the 2022 Energy Code to provide information about potential impacts on GHG emissions if the project is approved.

Under the amendments, on a statewide basis in the year 2023, all measures for newly constructed buildings and altered components of existing buildings, collectively, would save approximately 33 million therms of fossil fuel natural gas and 1.3 billion kWh of electricity, which result in net reductions of GHG emissions for 2023. (See **Table 4.5-1.**)

The project's net reduction in emissions was determined based on analysis of the carbon intensity of the current and future electricity systems, including the trend in decreasing carbon intensity of the statewide electricity production between the base year of 2019 and 2045 (the target year for SB 100 for fully transitioning to renewable sources for commercially produced electricity), consistent with state policies described above. In addition, the analysis assumes a decrease in carbon intensity of the natural gas used in the state. Specifically, renewable gas is blended into the retail gas pipeline, reaching 10 percent biogas by 2030 and 20 percent by 2050. In addition, pipeline natural gas is assumed to have 7 percent hydrogen by 2050. This blend is used for retail natural gas consumption but not in the natural gas used for electricity generation. (See E3 2020, p. 104.)

The 2022 amendments are expected to cause a change in the source of power for water and space heating in new construction. Currently, natural gas and propane are used primarily for these purposes. Under the 2022 amendments, electric heat pumps for space heating in some building applications and climate zones in California and for water heating in building applications and climate zones are expected to be the primary method used to comply with the amended building standards. This change in fuel source would decrease natural gas and propane consumption in new construction while correspondingly increasing electricity consumption across all resource technologies and fuels. The table below show the expected net change due to the proposed project, reflecting an overall increased use of electricity and a decreased use of fossil fuels.

Table 4.5-1
Typical Greenhouse Gas Emissions (1) from California’s
Building Sector For 2019 (BAU) and 2022 Energy Code
(in metric tons of carbon dioxide equivalent emissions per year)

	BAU (2) (2019 Energy Code)	2022 (3) Energy Code	Program Reductions
New Construction			
Single Family Heat Pumps (standard design)	350,175	300,295	49,880
New Construction			
Multifamily (includes Heat Pumps, Photovoltaics/Batteries, and Efficiency Upgrades)	110,925	98,806	12,119 (a)
New Construction			
Nonresidential Upgrades (includes Heat Pumps, Photovoltaics/Batteries and Efficiency Upgrades)	387,784	325,786	61,998 (b)
New Construction			
Covered Processes	1,863,742	1,781,051	82,691
Alterations to Existing Buildings			
Nonresidential	40,642,011	40,527,486	114,525
Alterations to Existing Buildings			
Single Family Residences	31,202,701	31,170,114	32,587
Alterations to Existing Buildings			
Multifamily Residences	6,957,567	6,953,236	4,331
Totals (metric tons CO2e)	81,514,905	81,156,775	358,130
Totals (million metric tons CO2e)	81.51	81.16	0.36

(1) These values include carbon dioxide emissions and methane, converted to carbon dioxide equivalents.

(2) “BAU” values represent emissions in a typical future year, starting in 2023. BAU assumes the 2019 Energy Code remains in effect and the 2022 Energy Code is not implemented.

(3) “2022” represents emissions in future years, starting in 2023 and assuming the 2022 Energy Code is in full effect for one full year.

(a) Multifamily Program Reductions in metric tons of CO2e are as follows: Heat Pumps = 2,388; Photovoltaics/Batteries = 6,757; Efficiency Upgrades = 2,974

(b) Nonresidential Upgrades Program Reductions in metric tons of CO2e are as follows: Heat Pumps = 7,164; Photovoltaics/Batteries = 29,208; Efficiency Upgrades = 25,626

In addition to considering the immediate impacts of the proposed 2022 amendments, the CEC analyzed the impacts from increased electricity use. The increased use of electricity would occur while there is a corresponding reduction in CO₂e emissions due to decreased natural gas and propane used for space and water heating. **Table 4.5-2** shows net changes in emissions of GHG emissions associated with the generation of electricity and the refrigerants (high GWP gases) used in heat pumps for heating and

cooling compared to those resulting from air conditioning alone. The total shows that the net effect is a statewide reduction in GHG emissions from the base year in 2019 through 2050. See Appendix B for a more detailed description of the effects of 2022 amendments that are summarized in the table below.

Table 4.5-2
Changes in Gross Greenhouse Gas Emissions
From California’s Building Sector (Million Metric Tons CO2e)

GHG Emission Sources	2025	2030	2035	2040	2045	2050
Natural gas and electricity emissions from space and water heating	79.46	77.10	74.52	72.99	72.78	70.89
Heat pump refrigerant leaks (high GWP gases)	0.06	0.16	0.27	0.37	0.47	0.58
Total GHGs	79.52	77.26	74.79	73.36	73.26	71.46

Therefore, the project would result in a reduction of GHGs and thus would have a less than significant impact on the emissions of GHGs.

Required Mitigation Measures: none.

b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

For the determination of whether the amendments would conflict with any plan, policy, or regulation adopted for the purpose of reducing GHG emissions, the CEC performed a qualitative analysis. As described above, the state of California has adopted a suite of laws and regulations to address the global nature of the issue of GHG emissions and climate change, including the Global Warming Solutions Act of 2006 (AB 32) (2020 target),⁶⁹ AB 32 2008, 2014, and 2017 Scoping Plans (2020 and 2030 targets),⁷⁰ Executive Order B-30-15 (2030 and 2050 targets),⁷¹ RPS,⁷² Clean Energy and Pollution Reduction Act of 2015 (SB 350),⁷³ SB 32 (2030 targets),⁷⁴ and the 100 Percent Clean

69 Health & Saf. Code § 38500 *et seq.*

70 *Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 62 Cal.4th 204, 253-254.

71 Pub. Util. Code, § 399.11 *et seq.*

72 *Ibid.*

73 Senate Bill 350 (de Leon, Chapter 547, Statutes of 2015); See also Pub. Util. Code, § 9621 *et seq.*

74 Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016); See also Gov. Code, § 14000.6 *et seq.*

Energy Act of 2018 (SB 100) (2026, 2030, 2045 targets).⁷⁵ Each of these has been considered in detail and is more thoroughly discussed in the regulatory setting above, and many of these plans and policies have specifically cited the Building Energy Efficiency Standards as a critical part of meeting the state’s GHG reduction goals. In combination, the programs and policies resulting from these laws have led and will continue to lead to significant vehicle and building decarbonization within California. The 2022 amendments support and further California’s plans, policies, and regulations adopted for the purpose of reducing GHGs and mitigating the effects of climate change. The 2022 amendments accomplish this by reducing the reliance of California buildings on natural gas and propane to provide space and water heating for residential and nonresidential uses, expanding distributed PV generation and battery storage, and introducing numerous new building energy efficiency measures. As shown above in **Tables 4.5-1** and **4.5-2**, the project would result in reductions of GHG emissions compared to inaction and the continuation of the existing Energy Code. Therefore, the 2022 amendments would not have a significant impact on GHG emissions and would not conflict with any plan, policy, or regulation that would further reduce GHG emissions.

Required Mitigation Measures: none.

4.5.4 References

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⁷⁵ Senate Bill 100 (de Leon, Chapter 312, Statutes of 2018); Pub. Util. Code § 454.53 et seq.

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4.6 Hazards and Hazardous Materials

This section describes the 2022 amendments' environmental and regulatory setting and discusses potential direct and indirect impacts associated with the Energy Code updates specific to hazards and hazardous materials.

4.6.1 Environmental Setting

The 2022 amendments are a set of regulations that require energy efficient designs, features, equipment, and practices in new construction and additions and alterations occurring within California. As these amendments apply statewide, the setting of the 2022 amendments to the Energy Code is the entire state of California. As California's population grows, every year hundreds of thousands of new buildings are constructed, added on to, or remodeled. The 2022 amendments do not regulate the pace of construction but instead requires that construction that does occur meets specified energy efficiency standards. Therefore, to focus on changes that would be attributable to the 2022 amendments, this chapter evaluates the potential for increases in statewide hazards and hazardous materials from the proposed 2022 amendments compared to the existing state of hazards and hazardous materials associated with buildings in California under the current building design and construction requirements of the 2019 Energy Code.

Changes in Demand for Energy Storage and Lithium Ion Batteries

The proposed Energy Code changes 2022 amendments would incorporate battery storage systems into specific nonresidential, high-rise residential, hotel, and motel building requirements.⁷⁶ Battery storage equipment relies most commonly on use of lithium ion batteries for their operation (NREL 2019). Currently, the Energy Code does not require battery storage for these kinds of buildings, although some buildings in California are being built with lithium ion battery storage in absence of any requirements to incorporate this technology. According to the California Solar and Storage Association (CALSSA), more than 10,000 California customers installed battery storage systems for a combined 138 MW of installed energy storage in 2019. This 2019 figure reflects a 27 percent increase from 2018 and approximately triple the energy storage capacity installed in 2017. (CEC 2021). Other estimates of recent small-scale (less than 1 MW) distributed energy storage installation in recent years have been even higher, including one report that the total installed capacity of small-scale distributed energy storage in 2018 was 234 MW, with about half of this coming from the commercial sector (Athalye et al. 2021). The CPUC, under the authority granted by AB 2514, has additionally established an energy storage procurement target of 1,325 MW by 2020. Some of this procurement is already being met by utility procurement of small

76 CEC Staff. 2021. [Express Terms 2022 Energy Code, Title 24 Parts 1 and 6](#). California Energy Commission. Section 140.10, Table 140.10-B, p. 314. TN#237717. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237717>.

commercial or behind the meter storage similar to that which would be implemented in accordance with the Energy Code updates. California is in line to meet the mandate by 2024, about the time the Energy Code updates would be implemented. The Energy Code updates' requirement to include these systems in specified buildings can be reasonably anticipated to result in marginal increases in production of lithium ion batteries and routine transport of lithium ion batteries to such construction projects, and recycling or disposal of batteries after their useful life. This would also likely result in a slight increase in generation of hazardous waste, statewide, which could potentially increase the incidence of exposure to battery-related hazardous wastes.

Even with this growth in demand for stationary energy storage, the number of lithium ion batteries required to meet the demand for compliance with the proposed 2022 amendments is expected to be small compared to those needed for electrification of the transportation sector. In September 2020, Tesla stated that to meet their 2030 car production targets they would need 9 times more lithium than the world produced in 2019. Steward et al., 2019, show projections of generation from lithium ion batteries for different applications. Their data shows that lithium ion batteries for the transportation sector (i.e., electric vehicles and buses) are expected to dominate the lithium ion batteries market in the coming years. The trend capacity of lithium ion batteries for transportation is about 75 percent of the total projected to 2025. Other uses such as utility scale and commercial/residential batteries make up the rest (Steward et al, 2019). Therefore, it is anticipated there would only be a marginal increase in lithium ion battery production, use, transport, and disposal attributable to the proposed 2022 amendments over existing conditions. Sizes of minimum solar PV arrays (in kW) and minimum supporting BS (in kWh) for prototypical buildings are identified in Chapter 3 Project Description. System sizes depend on type of building and climate zone the building will be located in.

Lithium Ion Battery Characteristics

In general, a Lithium ion (Li-ion) battery is a rechargeable type of battery consisting of three major functional components: a positive electrode made from metal oxide separated by a thin permeable membrane from a negative electrode made from carbon; and electrolyte solution made from lithium. Lithium ions move from negative to positive electrode during discharging and in the opposite direction when charging. There are five major Li-ion battery sub-chemistries that are commercially available. They are: 1. Lithium Nickel Cobalt aluminum (NCA) 2. Lithium Nickel Manganese cobalt (NMC) 3. Lithium Manganese oxide (LMO) 4. Lithium titanate oxide (LTO) 5. Lithium-iron phosphate (LFP). Li-ion batteries are used as an electrode material for electric vehicles and stationary energy storage facilities due to their low cost, thermal stability, abundance, and lack of toxicity.

Li-ion batteries are ubiquitous throughout consumer and commercial products, and compliance with existing federal and state laws allows them to be safely transported,

used, and recycled. Li-ion batteries are, however, regulated as a hazardous material under the U.S. Department of Transportation's Hazardous Materials Regulations.⁷⁷

Li-ion batteries used for industrial and commercial applications must meet stringent testing and safety standards. The failure rates of these types of batteries is relatively low. Improper management of Li-ion batteries could, however, pose an environmental hazard and be a concern for public safety. There have also been cases of non-certified batteries for consumer products, such as vape pens and hoverboards, igniting fires and causing safety concerns.

There are two basic types of battery failures. One involves the processes related to the electrode, permeable membrane or separator, and electrolyte interaction. These failures often involve a recall to correct a manufacturing defect or design flaw. The other is a random event or unique set of circumstances that are due to accidental conditions. It may be a stress event like charging at sub-freezing temperature, overheating in an enclosure, vibration, or perforation of the battery casing due to an unforeseen event. Failures can ignite fires that can be especially difficult to extinguish as temperatures can rapidly increase to up to 500 degrees Celsius (932 degrees Fahrenheit) as a result of interactions between a battery's cathodes and anodes (Battery University, 2018a). The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged, or exposed to a fire or a heat source. Although rare, Li-ion batteries are also susceptible to thermal runaway, a chain reaction leading to a violent release of its stored energy.

Lithium is the lightest solid metal. It can be absorbed into the body by inhalation of its aerosol and by ingestion and is corrosive to the eyes, skin, and respiratory tract. Lithium reacts violently with strong oxidants, acids, and many compounds (hydrocarbons, halogens, halons, concrete, sand, and asbestos) causing a fire and explosion hazard. In addition, lithium reacts with water, forming highly flammable hydrogen gas and corrosive fumes of lithium hydroxide. Lithium hydroxide represents a potentially substantial environmental hazard, particularly to water organisms. Li-ion batteries also contain potentially toxic materials including heavy metals, such as copper and nickel, and organic chemicals, like toxic and flammable electrolytes (Zeng et al., 2015). Safety standards such as Underwriters Laboratory 1642 (See also Table 4.6-1 below) ensure batteries meet minimum design specifications based on their intended use and are resistant to puncture, fire, or damage that could cause these hazardous effects. In addition, battery makers are continuing to improve manufacturing methods to enhance safety and increase operating life to make them more competitive.

77 U.S. Department of Transportation. [Hazardous Materials Regulations webpage](https://www.phmsa.dot.gov/lithiumbatteries) at <https://www.phmsa.dot.gov/lithiumbatteries>. (49 Code of Federal Regulations, Parts 171-180.)

Lithium Recycling and Disposal

Spent Li-ion batteries that are ready for recycling or disposal are considered 'universal wastes' which includes wastes that contain mercury, lead, cadmium, copper and other substances hazardous to human and environmental health. This characterization generally applies to common examples of universal wastes including televisions, computers, computer monitors, batteries, and fluorescent lamps. In California, universal wastes must either be sent directly to an authorized recycling facility or to a universal waste consolidator for shipment to an authorized recycling or hazardous waste disposal facility.

At the Battery Sustainability Summit in December 2020, American Battery Technology Company stated that 11 million metric tons of Li-ion batteries would be reaching the end of life by 2030. They also pointed out, however, that in 2020 less than 5 percent of the 100,000 tons of disposed Li-ion batteries were recycled (American Battery Technology Co - CTO Ryan Melsert - Battery Recycling an in-depth review. Sep 28, 2020⁷⁸). This means that much of the waste was disposed in landfills or is being stockpiled by owners and transfer facilities. In California, Li-ion batteries installed due to the 2022 amendments if not recycled would be disposed in hazardous waste landfills in California or would be shipped out to other states at the end of their useful life. There are currently two hazardous waste landfills that can be used for disposal in California: the Clean Harbors Buttonwillow Landfill Facility and the Waste Management Kettleman Hills Facility. In 2014, the [Kettleman Hills Facility was approved](#) for a 5.2 Million cubic yard expansion (available at <https://www.epa.gov/ca/kettleman-hills>). Even with the expansion, California operates near capacity for hazardous waste disposal, and hazardous waste is regularly sent to other states like Arizona, Nevada, and Utah for disposal. This can increase the cost of disposal.

Li-ion batteries are relatively expensive largely due to the cost to produce the metals used in their construction. The most expensive metal of Li-ion batteries is cobalt, which is found in higher performing batteries. The complex processes needed to construct Li-ion batteries also add to the cost. Because of the metals content there is significant value in spent Li-ion batteries; however, since the structure of the battery is complex it can be difficult to efficiently recover the valuable components.

There are recycling facilities that will take Li-ion batteries for recycling but many do not have economically feasible methods for production of high-quality material for reuse. This stems in part from the design of recycling facilities, which may not be specific to Li-ion batteries. Handling of batteries requires discharge, proper storage, and manual disassembly of some components. Costs for consumables coupled with waste disposal required at the end of the process add to the challenges of recycling. Once the metals

78 American Battery Technology Company. 2020. [Battery Recycling an in-depth review](#). Available at <https://www.youtube.com/watch?v=W68VRWhGgIY>.

are recovered, they are often of such low purity that they cannot be reused in batteries. They go to lower value uses such as greases and glass.

Recycling companies that specialize in metals recovery may use methods such as pyrometallurgy and hydrometallurgy, which rely on thermal and aqueous processes, respectively, to obtain metals from the cathode while the remainder of the battery is lost. Direct recycling involves reconditioning by removing the cathode and anode and placing them in a new battery. Costs and efficiencies for these methods vary. Argonne National Laboratory (January 25, 2018) has conducted modeling analysis considering the full life cycle cost of batteries. Their preliminary findings estimate that a lithium ion battery cell with a recycled cathode could cost 5 percent, 20 percent and 30 percent less than a new cell using pyrometallurgy, hydrometallurgy and direct recycling routes, respectively, according to estimates from Argonne's Greenhouse gases, Regulated Emissions and Energy use in Transportation (GREET) model recycling parameters.⁷⁹ That same cell could consume 10 percent, 20 percent and 30 percent less energy, respectively. Additionally, the model considers transportation-related costs and environmental factors, which can help steer the development of a recycling infrastructure. These findings suggest there are environmental and public health benefits that could be incorporated into the value of recycling. Such findings could also be used for development of national or state policies to encourage or require recycling.

Given the current and future volume of batteries that are and will be available, much research is being conducted in this field and significant opportunity for growth in recycling is expected. Markets and Markets (2020) shows the lithium-ion battery recycling market is estimated at \$1.5 billion in 2019 and projected to grow from \$12.2 billion in 2025 to \$18.1 billion by 2030, at a compound annual growth rate of 8.2 percent from 2025 to 2030. They also point out that most battery manufacturing companies have already started recycling Li-ion batteries as there is low accessibility for some of the raw materials such as lithium and cobalt.

The need for recycling may also be driven by the need to secure a stable and consistent supply chain in the U.S. In their Mineral Commodities Summary Report for 2020, USGS shows less than 1 percent of the manganese, nickel, cobalt, and lithium that could be used for batteries was produced in the U.S. Cobalt is the most expensive of the metals and primarily comes from Congo in Africa.⁸⁰

4.6.2 Regulatory Setting

The 2022 amendments do not require the siting, construction, or operation of a project at a specific site, including near or on hazardous waste sites, airports, schools,

79 Argonne National Laboratory. [GREET Model webpage](https://greet.es.anl.gov/) at <https://greet.es.anl.gov/>.

80 Frankel, Todd. September 20, 2016. "[The Cobalt Pipeline](https://www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/)." News article. Washington Post. Available at <https://www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/>.

emergency evacuation routes or areas where there is increased hazard from wildfire. The amendments would apply to future development projects throughout California that would be granted land development permits from a lead agency after complying with the CEQA, if necessary, and applicable local ordinances.

Local agencies are primarily responsible for enforcing the California Building Standards Code, and ensuring specific projects meet all applicable code requirements such as those found in the Fire, Electrical, and Energy Code. Local agencies are also empowered to make changes to their own building codes to deviate from the California Building Code and impose more restrictive building standards, including but not limited to green building standards, when reasonably necessary for local climatic, geological, or topographical conditions, provided they make those findings required by state building standards law.⁸¹

Codes and Standards Applicable to Lithium Ion Batteries

There are numerous codes and standards that would apply to installation and operation of lithium battery storage systems at the specified nonresidential, high-rise residential, hotel, and motel buildings set forth in the amendments to the Energy Code. In Article 480 and 706, the California Electrical Code includes requirements for battery storage systems in general and batteries specifically. Section 1206 of the California Fire Code includes standards specifically for fire protection of electrical energy storage systems. The CPUC also implements Interconnection Electric Rule 21 which is a tariff that describes the interconnection, operating and metering requirements for generation facilities and storage to be connected to a utility's distribution system. The tariff provides customers wishing to install generating or storage facilities on their premises with access to the electric grid while protecting the safety and reliability of the distribution and transmission systems at the local and system levels.

Other national and international standards and codes that may apply include those shown in Table 1 below. These standards and codes are designed to ensure safe and reliable operation of electrical systems such as those related to the installation and operations of battery storage systems.

81 Health & Saf. Code §§ 18941.5, 17958.5, and 17958.7; See also Cal. Code of Regs., tit. 24, Part 1, §§ 1.1.8 and 1.8.6.

**TABLE 4.6-1
Standards and Codes That May Apply to Lithium Ion Battery Storage Systems**

System or Equipment	Standards and Codes
Inverter, Converter, Controllers & Interconnection System Equipment	Underwriters Laboratory (UL) 1741 (Inverter only)
Interconnecting Distributed Resources with Electric Power Systems	Institute of Electrical and Electronics Engineers (IEEE) 1547
Seismic Rating	California Building Code zone designation based on project location - Section 1705A.13.3
Communication	Federal Communications Commission Part 15B Class A
Wire sizing, fuses, and circuit breakers.	National Electric Code 2011 National Fire Protection Association (NFPA) 70
Sizing of a fire suppression system	NFPA 2003
Transportation	UN Manual of Tests and Criteria (UN) Section 38.3, and Department of Transportation, PHMSA Class 9
Harmonic Control in Electrical Power Systems	IEEE 519
Signage of Hazardous Materials for Emergency Response	NFPA 704
Product Safety Signs and Labels	American National Standards Institute (ANSI) Z535
Transformer Standards	ANSI C57
Surge Withstand Capabilities	ANSI C37
Battery Cell safety	UL1642, International Electrotechnical Commission 62133, and UN38.3
Battery Module safety	UL1973 and UN38.3

Numerous laws and regulations have also been developed to regulate the management of hazardous materials such as lithium ion batteries. As a result, the storage, use, generation, transport, and disposal of hazardous materials and waste are highly regulated, and compliance with this regulatory framework will reduce or avoid potential

environmental impacts associated with hazardous materials. A summary of key regulations and policies is presented below.

Federal

Resource Conservation and Recovery Act. The federal Toxic Substances Control Act (1976) and the Resource Conservation and Recovery Act of 1976 (RCRA) established a program administered by the U.S. EPA for the regulation of the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle to grave" system of regulating hazardous wastes. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Act.

Comprehensive Environmental Response, Compensation, and Liability Act. Congress enacted the federal CERCLA, including the Superfund program, on December 11, 1980. This law provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enabled the revision of the National Contingency Plan, which provides guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The National Contingency Plan also established the National Priorities List. CERCLA was amended by the Superfund Amendments and Reauthorization Act on October 17, 1986.

Hazardous Materials Transportation Act (HMTA). Transportation of chemicals and hazardous materials is regulated by the U.S. Department of Transportation (DOT) under the Hazardous Materials Transportation Act (HMTA). Hazardous materials regulations for the types of containers, labeling, record keeping, and other requirements for the commercial movement of materials are contained in the Code of Federal Regulations (49 CFR, §§ 171-177 and 350-399). Transportation requirements vary with the hazard class of each hazardous material.

Federal Aviation Administration Regulations. The Federal Aviation Administration (FAA) has promulgated regulations and policies to protect the safety and compatibility of aircraft operations. Foremost is Part 77 of Federal Aviation Regulations (FAR Part 77), "Objects Affecting Navigable Airspace," which sets forth standards and review requirements for protecting the airspace near airports, particularly by restricting the height of potential structures and minimizing other potential hazards (such as reflective surfaces, flashing lights, and electronic interference) to aircraft approaching or departing an airport. Under FAR Part 77, the FAA must be notified of proposed structures within an extended zone defined by an imaginary slope that radiates out several miles from an airport's runways. Any proposed structure, including buildings,

trees, poles, antennae, and temporary construction cranes, which would penetrate this slope, or which would stand 200 feet or more in height irrespective of location relative to an airport, must be submitted to the FAA for an aeronautical review. As the FAA does not have authority to approve or disapprove a proposed off-airport land use, it is the responsibility of local land use jurisdictions to ensure that proposed development complies with the FAR Part 77 notification requirements and resulting FAA-issued determinations (the FAA does have the authority to protect the airspace by modifying flight procedures if feasible and/or restricting use of the airport). The FAA also has policies discouraging potential hazardous wildlife attractants near airports, such as landfills, other trash processing facilities, and waste-water treatment facilities.

State

California Environmental Protection Agency. The California Environmental Protection Agency (CalEPA), created in 1991, unified California's environmental authority in a single cabinet-level agency and brought the CARB, SWRCB, Regional Water Quality Control Boards (RWQCBs), Department of Toxic Substance Control (DTSC), Office of Environmental Health Hazard Assessment, and Department of Pesticide Regulation under one agency. These agencies under the CalEPA "umbrella" provide protection of human health and the environment and ensure the coordinated deployment of state resources. Their mission is to restore, protect and enhance the environment, to ensure public health, environmental quality, and economic vitality.

Department of Toxic Substances Control. DTSC is a department within CalEPA and is the primary agency in California that regulates hazardous waste, cleans up existing contamination, and looks for ways to reduce the hazardous waste produced in California. DTSC regulates hazardous waste in California primarily under the authority of RCRA and the California Health and Safety Code. Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Public Resources Code, Article 3, commencing with Section 42450.5.

(AB 2832, Dahle. Recycling: lithium-ion vehicle batteries: advisory group)

These sections of the Public Resources Code required the Secretary for Environmental Protection to convene the Lithium-Ion Car Battery Recycling Advisory Group to review, and advise the Legislature on, policies pertaining to the recovery and recycling of lithium-ion batteries sold with motor vehicles. The bill requires the advisory group to consult with specified entities and, on or before April 1, 2022, to submit policy recommendations to the Legislature aimed at ensuring that as close to 100 percent as possible of lithium-ion batteries in the state are reused or recycled at end-of-life in a safe and cost-effective manner. Although the focus of this group is on vehicle applications, the group's recommendations may contain policies that could also address the reuse and recycling batteries from stationary applications.

The California Hazardous Waste Control Law. CalEPA administers the California Hazardous Waste Control Law to regulate hazardous wastes. The Hazardous Waste Control Law lists 791 chemicals and about 300 common materials that may be hazardous; establishes criteria for identifying, packaging and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal and transportation; and identifies some wastes that cannot be disposed of in landfills.

Department of Resource Recovery and Recycling (CalRecycle). CalRecycle is a department within CalEPA that oversees the state's waste management, recycling, and waste reduction programs. CalRecycle was established in 2010 to replace the California Integrated Waste Management Board. CalRecycle and DTSC share responsibility in implementing regulations in Title 14, Division 7 of the California Code of Regulations for the Electronic Waste Recycling Act of 2003. Certain portions of the electronic waste stream are defined and the systems to recover and recycle them are administratively regulated beyond the universal waste rules that apply to material handling. CalRecycle also enforces California's Mandatory Commercial Recycling Law which requires businesses and other public entities to recycle as much of the waste they generate as possible. The purpose of the program is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California.

California Occupational Safety and Health Administration. California Occupational Safety and Health Administration (Cal OSHA) is the primary agency responsible for worker safety related to the handling and use of chemicals in the workplace. Cal OSHA standards are generally more stringent than federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (Title 8, Cal. Code Regs., §§ 337, 340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings.

Department of California Highway Patrol. Department of California Highway Patrol is the primary agency responsible for enforcing the regulations related to the transport of hazardous materials on California roads and highways (Title 13, Cal. Code Regs., §§ 1160-1167).

Local

Certified Unified Program Agency (CUPA) Program. The CUPA program was created by SB 1082 (1993) to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for several environmental and emergency management programs. The unified program is intended to provide relief to businesses complying with the overlapping and sometimes conflicting requirements of formerly independently managed programs. A CUPA is a local agency certified by CalEPA to implement and enforce six state hazardous waste

and hazardous materials regulatory management programs. These are typically organized as follows:

1. The Hazardous Waste Generator (HWG) program and the Hazardous Waste Onsite Treatment activities;⁸²
2. The Aboveground Storage Tank (AST) program Spill Prevention Control and Countermeasure Plan requirements;⁸³
3. The Underground Storage Tank (UST) program;⁸⁴
4. The Hazardous Materials Release Response Plans and Inventory (HMRRP) program;⁸⁵
5. California Accidental Release Prevention (CalARP) program;⁸⁶ and
6. The Hazardous Materials Management Plans and the Hazardous Materials Inventory Statement (HMMP/HMIS) requirements.⁸⁷

These programs provide for comprehensive identification, characterization, planning, tracking, response, and remediation of hazardous materials due to the maintenance, storage, spill, leakage, or discharge to the environment. They also address strategies for communities to reduce hazardous material use and to recycle or reuse products containing hazardous substances.

4.6.3 Environmental Impacts and Mitigation Measures

Appendix G of the CEQA Guidelines provides that a project would result in a significant impact related to hazards and hazardous materials if the project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

82 Health and Saf. Code, Division 20, Chapter 6.5; Cal Code of Regs., tit. 22, Division 4.5.

83 Health & Saf. Code § 25270.5(c).

84 Health & Saf. Code, Division 20, Chapter 6.7; See also Cal. Code of Regs., tit. 23, Chapters 16 and 17.

85 Health and Saf. Code, Division 20, Chapter 6.95, Article 1; See also Cal. Code of Regs., tit. 19, §§ 2620-2734.

86 Health and Saf. Code, Division 20, Chapter 6.95, Article 2; See also Cal. Code of Regs., tit., 19, §§ 2735.1-2785.1.

87 Cal. Code of Regs., tit. 24, Part 9, §§ 2701.5.1 and 2701.5.2.

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

The 2022 amendments' potential for significant direct or foreseeable indirect environmental impacts related to each of these questions is discussed in order below. Due to the increased transportation, use, and disposal of lithium ion batteries that would result from the 2022 amendments, the analysis below assesses the potential for any hazards and hazardous materials impacts related to battery energy storage systems. Hazards and hazardous materials associated with the other amendments to the Energy Code were also considered and determined to not present any foreseeable direct or indirect potential to increase the risk of environmental harm, personal injury, loss of life, or damage to property from the project.

Amendments to the Energy Code do not approve specific construction projects or regulate the pace or location of future construction. As such, any effects of the amendments would be indirect, occurring only as a result of buildings being constructed in compliance with the proposed Energy Code amendments after they have taken effect. As noted above, the main foreseeable indirect potential impacts derived from these amendments relate to the increase in battery storage systems installed at a specific subset newly built buildings including certain nonresidential, high-rise residential, hotels, motel buildings, and other listed buildings.⁸⁸ In preparing this analysis, the CEC considered the other amendments to the Energy Code and determined them to either be beneficial to the environment (e.g., by reducing existing hazards and hazardous materials affiliated with new buildings being built in California) or to have no direct or foreseeable indirect environmental impacts related to hazards and hazardous materials. Accordingly, the other amendments are not discussed in detail, and the focus of this section is on the proposed addition of prescriptive battery

88 CEC Staff. 2021. [Express Terms 2022 Energy Code, Title 24 Parts 1 and 6](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237717). California Energy Commission. Section 140.10, Table 140.10-B. TN#237717. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237717>.

storage requirements in the Energy Code and any foreseeable environmental consequences of these requirements.

The 2022 Energy Code's new battery storage requirement is expected to result in a total of 300 MW of battery storage installed from 2023-2025 (CEC 2021).⁸⁹ The marginal increase in lithium ion batteries for energy storage systems required by the amendments to the Energy Code could result in an incremental, but ultimately insignificant, increase in potential exposure to lithium, which is considered a hazardous material. The analysis below discusses the potential hazard from increased use of lithium ion batteries from a statewide perspective and concludes that compliance with the comprehensive regulatory framework at the federal, state, and local level would ensure foreseeable potential indirect impacts from the 2022 amendments would be less than significant. The local governing agency would be responsible—through building inspections to ensure building code compliance.

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Transport and Handling of Lithium Ion Batteries

Hazardous materials that are classified as universal wastes, such as lithium ion batteries, can be handled according to streamlined regulations. The regulations allow generators to handle and transport universal waste under a simple set of rules that are appropriate for the risks posed by the wastes. Large volume generators may be subject to more stringent requirements for transport, storage, and handling of waste. The appropriate methods for storage and handling would be identified in accordance with plans and requirements specified by the CUPA consistent with hazardous waste control law. A licensed professional with the necessary experience and knowledge would develop procedures for the proper identification, characterization, handling and disposal or recycling of hazardous materials generated as a result of a project. Methods for appropriate storage, labeling, and containment would be implemented during delivery, project construction, and operation. When not in use, any hazardous material such as lithium ion batteries would be stored in designated construction staging areas in compliance with local, state, and federal requirements. As wastes are generated, they would be placed, based on CUPA approved plans, in designated areas that offer secure, secondary containment, and/or protection from storm water runoff. Other forms of

89 CARB. April 14, 2021. [California electric vehicle rebate demand exceeds Clean Vehicle Rebate Project funding](https://ww2.arb.ca.gov/news/california-electric-vehicle-rebate-demand-exceeds-clean-vehicle-rebate-project-funding). News release. Available at <https://ww2.arb.ca.gov/news/california-electric-vehicle-rebate-demand-exceeds-clean-vehicle-rebate-project-funding>. (Over 145,000 electric vehicles were sold in California 2020. If each of those were a Chevy Bolt (200 HP/150 KW), the total peak MW equivalent of these 145,000 vehicles would be approximately 21,750 MW, or approximately 72.5 times greater than the 300 MW of stationary storage capacity expected to be installed from 2023 to 2025 under the 2022 Energy Code amendments.)

containment may include placing waste in steel bins or other suitable containers pending profiling and disposal or recycling. Regular inspections would be required to observe whether there are any spills or leaks that must be remedied. Compliance with the local agency's CUPA approved plans would ensure that any potential impact from handling and storage of lithium ion batteries resulting from the Energy Code updates is less than significant.

Since there is a long history of hazardous materials such as lithium ion batteries, being routinely transported, it is appropriate to consider the extensive regulatory framework that applies to the shipment of hazardous materials on California highways and roads to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law, 49 U.S.C. § 5101 et seq., DOT regulations 49 CFR subpart H, §§ 172–700, and Department of California Highway Patrol enforcement regulations for hazardous cargo). Further, transportation of lithium ion batteries is subject to 49 Code of Federal Regulations section 173.185. These regulations include requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and the requirement that no battery come in contact with other batteries or conductive materials. Adherence to the requirements such as training, safe interim storage, and segregation from other potential waste streams would minimize any public hazard related to transport, use, or disposal. Absent substantial evidence to the contrary, CEQA allows an agency to assume that existing transportation safety laws are sufficient to prevent significant impacts. Thus, the transportation of lithium batteries that would result from the amendments to the Energy Code would pose a less than significant risk to the public and environment.

Use of Lithium Ion Batteries

For the use of lithium battery storage systems, safety and reliability systems would be built in. Safety and reliability systems include voltage and current protection via software controls, physical protection via component isolation, and fire alarm and suppression systems. Depending on the lithium ion battery storage system design, there are cell, module, rack, and enclosure and control system level standards that also ensure safe operation.

The battery cell must pass abuse tests according to UL Standard 1642 for Lithium Batteries. This standard includes protocols for several tests designed to reduce the risk of fire or explosion, including electrical tests, mechanical tests, environmental tests, and fire exposure tests. At the module level, each battery storage system would be designed to prevent events such as over currents, over voltage, under voltage and over temperature. The module must also comply with UL Standard 1973 - Batteries for Use in Light Electric Rail and Stationary Applications. Battery protection at the rack level includes battery management system communication, pre-charge relay and resistors for inrush current prevention, circuit breakers to protect overcurrent, sensors for measuring voltage and current, and emergency stops. The enclosures may also have several safety systems including an HVAC system that is sized to maintain the advised temperature

range and account for the heat dissipation from the batteries when being charged or discharged. System-level protections designed to maintain battery health and safety may also include an automatic stop to battery operations at certain temperatures and dangerously high and low states of charge (i.e., near 0 percent and 100 percent). The battery storage control system could detect and categorize all device or internal communication faults as Warning, Normal Error or Critical Error faults. Fault occurrences could generate alerts that are sent to monitoring systems and over web service to the battery storage system supplier's portal, and email notifications to the project operator. If any critical error occurs, the system could stop charge/discharge operations within milliseconds and the DC contactor is opened to cut off any current flow. These codes and standards significantly increase the safe operation of battery storage systems. As such, the additional use of lithium battery storage systems resulting from the amendments to the Energy Code would have a less than significant impact on the public and environment.

The battery storage system supplier also would be required to develop Safety Data Sheets (SDS) for hazardous material such as lithium ion batteries in accordance with Cal OSHA requirements. The SDS includes information identifying the properties of each hazardous material; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting a hazardous material. As part of the project commissioning process, the battery storage system supplier could also provide classroom and field training (operations, maintenance, and safety) to the owners including instructions and procedures on power conversion system and battery/module safety during maintenance and replacement.

Depending on the size of the battery storage system, a project owner could be required to develop and implement contingency plans such as a Fire Protection Plan, Emergency Response Plan, and Hazardous Materials Business Plan in accordance with CUPA requirements and would include the SDS discussed above. These plans would address potentially hazardous materials used at a project, including lithium ion and other batteries. The plans would address discharge and fires, where fire suppression material is stored on the site, how the fire department could access the material, what the material is, and where copies of the plan are stored. All plan approvals would occur in coordination with the CUPA and other affected agencies such as the fire department or other local agency where a project would rely on emergency response services. Contingency plans must be updated on a regular basis and following any emergency or unanticipated situation during which contingency plan procedures are required to be implemented, in order to ensure that contingency plans remain relevant and applicable to the project site and surroundings. This comprehensive set of required plans would ensure that any incremental increase in risk to the public and environment from the use of lithium ion and other batteries resulting from the Energy Code updates would be less than significant.

Recycling and Disposal of Lithium Ion Batteries

Although there is no regulatory framework in place to require 100 percent recycling of lithium ion batteries, it is California policy to reduce, reuse, and recycle wherever possible. It is anticipated lithium ion batteries will be repurposed for a second life. The potential value in batteries is significant and data from Markets and Markets (2020) research shows there are already national and international partnerships being formed to recycle and reuse batteries from electric vehicles. The need for a stable supply chain for battery construction appears to be driving these partnerships. This is occurring independent of a state mandate to recycle batteries.

In addition, due to an increased demand for limited cobalt supply, rates and volume of lithium-ion battery recycling has increased (USGS, 2017a). At present, recycling activities for lithium-ion batteries primarily serve to conserve cobalt, which by comparison, is a rarer material (U.S. EPA, 2013). While not all lithium-ion batteries use cobalt, the additional volume of batteries using other metal combinations combined with consumer products and stationary batteries may provide economies of scale and thus further incentive for recycling. Recycling would also help address social-justice issues associated with the cobalt industry.

To meet forecasted increases in demand for reuse and recycling of batteries, new facilities or modifications to existing facilities have already been planned for construction to accommodate recycling activities. Current research and product data show grid connected batteries could have a life of 7 to 10 years depending on how well the battery is maintained (Smith et al, 2017). The [Tesla Powerwall specifications](https://www.tesla.com/powerwall) show they are warranted for 10 years (available at <https://www.tesla.com/powerwall>). Assuming a project is built shortly after the adoption of the Energy Code updates the need for battery recycling or disposal would occur in 2030 and beyond. Construction of a new recycling facility in Fernley, Nevada by American Battery Technology Corporation is near completion and is slated to process up to 20,000 tons per year. This will add significant recycling capacity equivalent to about 20 percent of the lithium battery waste disposed in 2020.

By the time batteries required by the Energy Code updates have reached their end of life, it is reasonable to anticipate shifts in the battery recycling industry as California, other states, and the federal government will have developed recommendations and implemented plans, policies, or regulations to address the forecasted increases in batteries that will be generated by the electric car industry. The evidence on increased efforts at recycling supports a conclusion that there will be sufficient opportunities for recycling by the time the batteries deployed as a result of the 2022 amendments are replaced.

As discussed above the demand for lithium batteries for electrification of the transportation sector (Steward et al. 2019) is much greater than the demand for batteries that would be used for building construction. Infrastructure development which is already underway to meet the transportation sector demand could also be

used to accommodate any new demand created by the Energy Code updates. The updates would also be implemented over time as new or remodel construction is approved by the local agencies and buildings subject to the Energy Code's prescriptive requirements for battery storage systems are constructed in 2023 and beyond. This would thus spread the need for recycling and disposal of lithium batteries over the period of the building life and provide for adequate time to plan and develop battery recycling facilities needed to meet demand.

In the unlikely event that plans, policies, or a regulatory framework is not developed or industry and regulatory bodies are slow to independently develop reuse and recycling programs, then lithium ion batteries may be disposed at hazardous waste landfills. Disposal of lithium ion batteries within the state must comply with California law, including but not limited to the Hazardous Waste Control law and implementing regulations which includes the Universal Waste Rule. This rule requires used batteries to be managed as hazardous waste and prohibits the disposal of used batteries to solid waste landfills. There are two hazardous waste landfills in California that have some limited remaining capacity for disposal. They are Chemical Waste Management - Kettleman Hills and Clean Harbors Buttonwillow facilities. There are also other out of state facilities that are currently in use, primarily in Nevada, Arizona, and Utah, for other hazardous waste disposal that could accommodate the disposal of the relatively small proportion of lithium ion batteries that would be needed to accommodate the forecasted increase in waste attributable to the Energy Code updates. These landfills are designed and operate in accordance with governing state and federal laws for hazardous waste disposal. Thus, disposal of the lithium ion batteries installed due to 2022 Energy Code amendments at the end of their useful life would not create a significant hazard to the public or the environment.

In summary, the marginal increase in routine transport, use, and disposal of batteries needed to install building battery storage systems in accordance with the Energy Code updates would not pose a significant hazard to the public or the environment. The project's potential impact would be less than significant.

Required Mitigation Measures: None

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Potential upset conditions for a lithium ion battery storage system would include system malfunction, intentional or unintentional damage, theft, or vandalism resulting in damage to the battery storage system or exposure of the battery system components to the environment. Under such conditions, the equipment could be shut down and rendered inoperable, with no potential for offsite impacts. Because such conditions are highly dependent on physical and operational context, it is anticipated that upset and accident conditions will primarily be addressed on a project-by-project basis at the

design stage. To prevent these types of upset conditions, the battery storage system could be located inside a secure gated or walled area. Surveillance cameras could be installed and continuously monitored. Fire Protection Plans, Emergency Response Plans, and Hazardous Materials Business Plans would also be required by the CUPA for project permitting. These plans would ensure there are procedures in place to respond to fire, explosion, leakage, and contamination of soil, water, and working surfaces and that cleanup is managed in accordance with RCRA and the California Hazardous Waste Control Law.

During normal operation there would be no emissions from a lithium battery project. However, in the event of an external fire or battery storage system malfunction, such as a runaway reaction or overcharge event, the project could emit pollutants to the surrounding air. Project emissions to the air would consist of combustion and vent products from the burning and/or venting of the battery cells due to a system malfunction or an external fire event. Compounds that could be emitted during a battery storage system malfunction or external fire event include hydrogen, carbon monoxide, carbon dioxide, methane, acetylene, ethylene, ethane, propene, propane, hydrogen fluoride, sulfur dioxide, nitrogen oxides, and fire suppressant (City of Goleta 2017). The primary pollutants released due to malfunction would be CO₂ and CO along with lesser amounts of other compounds, including any chemicals released by a fire suppression system. Inhalation is the main pathway by which air pollutants from battery cell combustion due to a system malfunction or external fire event could potentially cause public health impacts. The local agency and local fire authorities are responsible for accounting for specific projects and project sites to determine whether a proposed project has incorporated adequate fire and safety protection measures to ensure impacts to any nearby sensitive receptors are less than significant.

If a fire were to occur, the battery system would be protected by alerts, alarms, fire suppressions systems inside the enclosure, and external to the enclosure in accordance with fire safety plans approved by the CUPA and the fire suppression and safety systems required under the applicable provisions of the California Fire Code. As discussed above, battery storage systems are required to be designed and installed in accordance with various electrical and safety codes and regulations and include numerous safety features. Required safety features include voltage and current protection via software controls; physical protection via component isolation; and fire alarm and suppression systems. If smoke is detected or if the system is manually triggered, alarms would sound, strobes would flash, and agents appropriate for extinguishing lithium ion battery fires could be discharged. These systems would allow for timely response to upset, and protect the public, first responders, and the environment from reasonably foreseeable upset and accident conditions.

Electric and magnetic fields (EMF) are invisible lines of force that are part of the natural and manmade environment. A natural source of EMF is the earth's magnetic field. Manmade sources include household or building wiring, electrical appliances and electric power transmission and distribution facilities. EMF strength decreases rapidly with

distance from the source. Electric fields are created around appliances and wires wherever a voltage exists, similar to the water pressure in a hose. Electric field strength is measured in units of volts per meter (V/m). Health-related research around EMF focuses primarily on magnetic field exposures. Magnetic fields are created whenever electrical current flows, similar to the way water flows when the nozzle of a hose is opened. Magnetic field strength is measured in units of gauss (G) or more commonly in milligauss (mG). Potential EMF sources from the battery storage system are the battery system electronic components and the offsite electrical grid. EMF is not normally associated with the batteries themselves, as these are a pure DC source. Battery storage systems will not generally add incremental EMF to the existing offsite electrical grid. The battery storage system provides a new point of interconnection with the grid, and the grid will experience the same load as it would without the battery storage system. Given the low levels of EMF from a battery storage system's electronic components and the absence of new incremental EMF to the existing offsite electrical grid, no impacts from EMF would occur.

Given the existing framework of codes and standards that will ensure safe operation of the battery energy storage systems resulting from the Energy Code updates, there would not be a significant hazard to the public or the environment from reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Impacts would be less than significant.

Required Mitigation Measures: None

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The 2022 amendments are not expected to result in direct impacts to schools, and the amendments do not incentivize or increase the likelihood that projects will be built within one-quarter mile of an existing or proposed school. Compliance with the Energy Code updates could result in indirect impacts due to development of projects using lithium ion batteries to satisfy code requirements throughout the state. Although there is risk that lithium ion batteries could emit or create hazardous materials conditions as discussed in **item a** and **b**, above, the industry standards and fire code compliance that would be required to install and operate the system would ensure that the risk is managed and that there is an insignificant likelihood of harm to the environment and to public safety.

The extent to which future development projects may create project-specific hazards or hazardous materials impacts within one-quarter mile of an existing or proposed school will be evaluated locally by lead agencies with discretionary approval authority over future development. However, the specific nature and characteristics of such projects are not reasonably foreseeable to the CEC. Battery storage systems do not routinely subject those nearby to hazardous materials exposure under normal operations. This is especially so given the required design and installation measures to

ensure safe operations discussed above. Therefore, the potential impact from implementation of the Energy Code updates would be less than significant.

Required Mitigation Measures: None

- d. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?**

The amendments to the Energy Code will not create a significant hazard to the public or the environment due to location of a specific construction project on a hazardous materials site identified on a list compiled pursuant to Government Code section 65962.5. This project focuses on updating regulatory standards related to energy efficiency and does not affect decisions by building developers and local agencies regarding the location of specific future projects. A local or lead agency would be responsible for reviewing and mitigating any potential hazards and hazardous materials impacts related to the location of a project on a site where hazardous materials are known to exist. Therefore, there would be no impact from the Energy Code updates related to the location of a project on a hazardous waste site that would create a significant hazard to the public or the environment.

Required Mitigation Measures: None

- e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?**

The amendments to the Energy Code will not create a safety hazard or excessive noise within two miles of a public airport or within airport land use plan areas. This project focuses on updating regulatory standards related to energy efficiency and does not affect decisions by building developers and local agencies regarding the location of specific future projects. A local or lead agency would be responsible for reviewing and mitigating any potential hazards and hazardous materials impacts related to the location of future projects within airport land use plans or within two miles of a public airport or public use airport. Therefore, there would be no impact from the Energy Code updates related to the location of a project within two miles of an airport that would result in a safety hazard or excessive noise.

Required Mitigation Measures: None

- f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?**

Amendments to the Energy Code are not expected to have direct impacts to emergency response or evacuation plans. However, compliance with the Energy Code updates could result in indirect impacts to these plans due to development of a project using

lithium ion batteries to satisfy code requirements. Implementation of contingency plans such as a fire plan, hazardous materials business plan, and emergency response plan required by the CUPA would ensure the proper emergency response is in place, and that first responders are aware of which buildings within their jurisdiction have battery energy storage systems and prepared to respond to emergencies involving such systems, and that there are no conflicts with other response plans under their jurisdiction. In addition, site-specific impacts of future proposed development projects will be evaluated locally by lead agencies with discretionary approval authority over future developments to ensure such projects would not impair the implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. The Energy Code updates would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. The potential impact from implementation of the Energy Code updates would be less than significant.

Required Mitigation Measures: None

g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

The Energy Code updates would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. Compliance with the updates could result in a project using lithium ion batteries to satisfy code requirements. Although there is risk that a lithium ion battery could ignite a fire, such as in instances of battery failure or misuse, the industry standards and fire code compliance that would be required to install and operate the systems required by the Energy Code updates would ensure that this risk is minimized and that there is an insignificant resulting likelihood of harm to the environment and to public safety. As identified in **Section 4.18 Utilities and Service Systems**, amendments to the Energy Code also have a less than significant impact on expansion of electric infrastructure, which could be a source for starting wildfires, such as transmission lines. Furthermore, Energy Code amendments do not incentivize or increase the likelihood that buildings will be built within areas of the state that are sensitive to wildland fires. Any potential for site-specific impacts of future proposed development projects will be evaluated locally by lead agencies with discretionary approval authority over future developments to ensure such projects would not expose people or structures to significant risk from wildland fires. The potential impact from implementation of the Energy Code updates would be less than significant.

Required Mitigation Measures: None

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4.7 Utilities and Service Systems

This section describes the project’s environmental and regulatory setting and discusses impacts associated with the 2022 amendments to the Energy Code specific to utilities and service systems. The 2022 amendments would not approve specific construction projects or otherwise regulate the rate of building construction. The 2022 amendments would have no impacts on water, wastewater treatment, storm water drainage, or telecommunication facilities, and will have less than significant impacts on electric power and natural gas facilities.

4.7.1 Environmental Setting

The environmental setting includes the existing statewide utility infrastructure that provides electrical power, natural gas, water, and telecommunications services to residential and non-residential buildings. The setting includes the utility infrastructure expected to be available in 2023, the initial year the 2022 amendments would take effect and be incorporated into the design of buildings in California. To focus on any foreseeable infrastructure changes that would be attributable to the project, this section considers the current conditions within the state as well as the potential for increases in statewide utilities and service system impacts from the proposed 2022 amendments compared to the existing utilities and service system impacts associated with buildings in California under the current building design and construction requirements of the 2019 Energy Code. For electricity, the infrastructure includes power generation facilities, substations, poles and wires, and other components of the grid. For natural gas, the infrastructure includes storage facilities, pipes, and pump stations. For water resources the infrastructure includes reservoirs, dams, pipes, pump stations, treatment plants, evaporations ponds and storage tanks. For telecommunications, infrastructure includes poles, wires, cable, data centers, internet and other related equipment.

Specific to energy utilities in 2018, California has approximately 80,000 MW of electric generation capacity installed across the state amongst more than 1,500 power plants utilizing a broad array of technologies.⁹⁰ Total installed renewable generation capacity by 2019 is over 34,000 MW with 13,000 MW from solar and 6,000 MW from wind.⁹¹ Large hydroelectric power plants, considered a zero-carbon resource, provide an additional 12,000 MW of capacity while natural gas-fired power plants make up 41,000 MW or about half of the state's total generating capacity in 2018.⁹²

90 CEC. [2018 Total System Electric Generation webpage](https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation/2018) at <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation/2018>.

91 CEC. [California Energy Commission Renewable Energy Tracking Progress](https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf. p.6.

92 Ibid.

4.7.2 Regulatory Background

State

Warren-Alquist Act. Public Resources Code section 25402(a)-(b), requires the CEC to adopt regulations “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including energy associated with the use of water, in new residential and new nonresidential buildings, and to manage energy loads to help maintain electrical grid reliability.” The CEC accomplishes this in large part through the adoption to building standards and appliance efficiency standards. The building standards are adopted every three years as part of the California Building Standards Commission’s triennial update cycle, whereas appliance efficiency standards are adopted on an ad hoc basis. Both sets of standards are required to be technically feasible and cost-effective.

2019 Building Energy Efficiency Standards (2019 Energy Code). The 2019 Building Energy Efficiency Standards, in California Code of Regulations, Title 24, Part 6, establish a range of mandatory and prescriptive energy efficiency measures for newly constructed residential and nonresidential buildings, as well as additions and alterations to existing buildings, to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption and related supporting utilities, prudently conserving energy resources, and assuring that statewide environmental, public safety, and land use goals are met.

SB 350. Clean Energy and Pollution Reduction Act (SB 350, de León, Chapter 547, Statutes of 2015) establishes a target to achieve a cumulative doubling of energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030 through energy efficiency and conservation by 2030. It does not impose any specific regulatory requirement.

SB 1078. California Renewable Portfolio Standards Program (SB 1078, Chapter 516, Statutes of 2002) established the RPS for electricity supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility’s retail sales. By 2030, this requirement increases to 60 percent of each utility’s retail sales. The RPS affects the impacts of the Energy Code by increasing the percentage of renewable generation consumed in the state, which has a different operational and environmental profile than non-renewable sources.

SB 100. The 100 Percent Clean Energy Act of 2018 increases the target procurement of electricity from renewable sources to 60 percent by 2030 from the previous target of 50 percent identified in SB 350, the Clean Energy and Pollution Reduction Act of 2015. Additionally, SB 100 targets 100 percent of electricity sold in California come from eligible renewable energy resources and zero-carbon resources by 2045.

The adoption of SB 100 will impact the implementation of electric power facilities through 2045. The SB 100 Joint Agency Report: Charting a path to a 100 percent Clean Energy Future, estimates an increased utility-scale capacity of 145 GW by 2045, which includes in state and out of state renewable sources and energy storage.⁹³

AB 758. The California Energy Efficiency Action Plan (AB 758, Skinner, Chapter 470, Statutes of 2009) requires the CEC to develop and periodically update an action plan to increase energy efficiency savings in existing buildings. On December 11, 2019, the CEC adopted the California 2019 Energy Efficiency Action Plan (2019 Action Plan) to serve as the state’s most recent policy map for increasing energy efficiency. The 2019 Action Plan includes strategies for achieve a statewide doubling of energy efficiency savings from electricity and natural gas end uses by 2030. It also addresses financing mechanisms, resiliency, multifamily building energy efficiency, building decarbonization, industrial and agricultural energy efficiency, use of energy data to better design and target efficiency, demand response measures, and barriers and opportunities to expand low-income and rural residents’ access to energy efficiency and renewable energy. AB 758 does not impose specific regulatory requirements

Executive Order N-79-20. On September 23, 2020, Governor Gavin Newsom signed Executive Order N-79-20 requiring sales of all new passenger vehicles to be zero-emission by 2035, all medium-and heavy-duty vehicles by 2045 for all operations where feasible, and drayage trucks by 2035. The executive order also pushes for acceleration in the deployment of affordable fueling and charging options for ZEVs.

Integrated Energy Policy Report. SB 1389 (Chapter 568, Statutes of 2002) requires the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC uses these assessments and forecasts to develop and evaluate energy policies and programs that conserve resources, protect the environment, ensure energy reliability, enhance the state’s economy, and protect public health and safety.⁹⁴ The CEC includes these energy policy recommendations in its biennial IEPR that is issued in odd-numbered years with update reports in even-numbered years.

The 2018 IEPR Update provides an assessment of energy issues facing California which will require action for the state to meet climate, energy, air quality, and other environmental goals. The assessment identifies building GHG emissions as one potential issue and indicates that building decarbonization through building codes and standards should be considered.

93 CEC, CPUC, CARB. 2021. [California Energy Commission SB 100 Joint Agency Report Achieving 100 Percent Clean Electricity in California: An Initial Assessment. Report.](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100) p. 75. TN#237167. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100>.

94 Pub. Resources Code, § 25301(a).

The 2019 IEPR, adopted on February 20, 2020, summarizes priority energy issues currently facing the state, outlining strategies and recommendations to further the state's goal of ensuring reliable, affordable, and environmentally responsible energy sources. Energy topics covered in the 2019 IEPR include, but are not limited to, electricity sector trends and building decarbonization and energy efficiency.

The 2020 IEPR provides policy recommendations in to ensure a clean, affordable, and reliable energy system. In the area of zero emission vehicles (ZEV), the IEPR has identified an increase use in the use of ZEVs, including plug-in electric vehicles, and a subsequent need for increased vehicle charging stations and associated infrastructure. Recommendations for incentives and policies to manage charging patterns to benefit the grid are included in the 2020 IEPR. These recommendations may also have an effect on the California electric grid due to the increased electric demand from charging facilities and possible vehicle grid integration.

Executive Order B-55-18. This executive order signed by former Governor Edmund Brown provides a goal of statewide carbon neutrality by 2045 and net negative emissions thereafter.

4.7.3 Environmental Impacts and Mitigation Measures

Appendix G of the CEQA Guidelines establishes that a project would result in a potentially significant impact on the environment related to utility services if it would:

- Result in the relocation or construction of new or expanded utilities;
- Result in insufficient water supplies to the project and other reasonably foreseeable projects;
- Result in insufficient wastewater treatment capacity;
- Generate solid waste in excess of state and local standards or in excess of capacities at receiving infrastructures; or
- Not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

a. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The 2022 amendments have no impact on the state's water supplies, the generation of wastewater, or generation of storm water drainage because the project does not approve any building construction, regulate the rate of construction, or otherwise cause any consumption or generation of water, wastewater, or storm water drainage in a manner that could result in the construction or relocation of facilities causing significant environmental effects. The project also does not change the ability for local jurisdictions

to limit construction based on regional water supply constraints or to require waste reduction protocols and best management practices at future site-specific development proposals. For the same reasons, the project has no impacts on telecommunication infrastructure, as there are no direct impacts or reasonably foreseeable indirect impacts on telecommunications infrastructure that could result from the 2022 amendments. Therefore, the project would have no impacts on the relocation or construction of these facilities, and no further analysis is necessary.⁹⁵

Implementation of the 2022 amendments may result in increased electrification of certain types of new buildings while reducing the use of natural gas within the state by providing a mix of requirements and incentives for builders to install electric appliances. Therefore, the project does have a potential to indirectly impact the mix of energy supply in the state or impact corresponding energy-related utility infrastructure serving new and altered buildings in California compared to the current 2019 Energy Code. While certain types of buildings may increase electricity use, on a statewide basis, the 2022 amendments will reduce electricity usage compared to the current 2019 Energy Code. (See **Table 4.7-1.**)

Specifically, revisions to the prescriptive compliance path and “standard design” building model to include heat pump technologies, in specific circumstances, may result in an increase in electric power needs and subsequent decrease in or elimination of natural gas needs, and related utility infrastructure, in future newly constructed or altered buildings. However, heat pump technologies are not a requirement of the 2022 amendments in these circumstances. Additionally, integration of energy reduction measures required by the 2022 amendments will counterbalance the potential increase from use of heat pumps. Finally, the installation of heat pump technologies as a result of compliance with the 2022 amendments would be distributed throughout the state. Therefore, any potential increases in demand and electricity usage will also be distributed and highly dependent on location and seasonal conditions. The current capacity of in-state electricity generation is expected to meet any near-term potential increase in electrical usage from heat pump technologies with minimal expansion of existing electrical infrastructure.

The energy reduction measures in the 2022 amendments include increases in building envelope performance, equipment efficiencies, and new solar PV and battery requirements for specified nonresidential and high-rise residential buildings, which build on existing residential solar PV requirements in the current 2019 Energy Code.

95 Pub. Resources Code, § 21100(c) (EIRs shall “contain a statement briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report.”); Cal. Code Regs., tit. 14, § 15128 (“An EIR shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR.”).

Increased efficiency and standards pertaining to lighting, space conditioning equipment, and various process load equipment will also reduce energy usage and the need to rely on infrastructure to provide electricity and natural gas to the buildings.⁹⁶ Improvements to solar PV efficiency standards in residential buildings and new requirements for solar PV systems in specified nonresidential and high-rise residential building types will reduce reliance on utility-scale electricity generation through the generation of electricity at the building. Updates to battery requirements and operational efficiencies will also reduce the effect of building electricity use on electric generation infrastructure by allowing energy to be generated and stored for later use at building sites.⁹⁷

Overall, 2022 amendments are expected to indirectly reduce electricity and natural gas usage, and corresponding reliance on utility infrastructure, when compared to continued implementation of the current 2019 Energy Code requirements. Increased energy and electricity demand usage from specific heat pump measures will be distributed and offset by other measures. Therefore, the project will result in little to no relocation or construction of new electric power infrastructure to accommodate the increase in electricity for some buildings and the overall statewide reduction in electricity. (See **Table 4.7-1.**) Likewise, the project will not result in the relocation or construction of natural gas infrastructure. In fact, because the overall natural gas demand of new and altered buildings in the state is projected to be reduced due to the 2022 amendments, it is more likely that fewer buildings in California will require gas service lines, meters, and other utility infrastructure under the 2022 amendments than under the current 2019 Energy Code. The 2020 California Gas Report is already projecting an annual decline in natural gas demand due to energy efficiency programs, including building efficiency, and GHG emission reduction goals.⁹⁸

In the long term, the strategies being pursued by the state of California to attain SB 100 objectives will ensure any near-term increases in utilization of current electricity infrastructure capacity will be offset by renewable energy and other zero carbon energy sources.

96 See Lerner 2020, p. 22; Worth 2020 p. 18; and Johnson 2020 p. 14.

97 Athalye, 2021 p. xi.

98 California Gas and Electric Utilities p. 4.

Table 4.7-1
2022 Energy Code Heat Pump Measure Savings Compared to All Other Measures

Building Types and Measures	Therms	kWh	TDV, kBTU
Single Family Heat Pump Measures	12,685,939	-125,227,444	531,549
Multifamily Heat Pump Measures	696,820	-6,715,355	38,181,271
Nonresidential Heat Pump Measures	2,003,424	-15,451,367	90,885,902
All Other 2022 Measures	17,917,545	1,496,063,691	44,948,539,596
Grand Totals – All Measures, All Buildings	33,303,728	1,348,669,525	45,078,138,318

Positive numbers represent energy savings relative to compliance with 2019 Energy Code requirements, negative numbers represent additional energy use.

Source: Appendix B

As described more fully in **Chapter 3 Project Description**, this EIR utilizes a modeled baseline for four technical areas that incorporates the impacts of the 2019 Energy Code in 2023, when the requirements of the proposed 2022 amendments would take effect. This modeled baseline forecasts the number of anticipated building construction starts for year 2023 and the anticipated consumption of energy from those new buildings, which would be subject to the 2019 Energy Code if the project is not approved. The results of the forecast are then compared to the anticipated consumption of energy resources from the new buildings constructed in 2023 under the 2022 Energy Code to provide information about the overall statewide reduction in electricity, and the reductions in natural gas consumption, if the project is approved. These findings, which are detailed further in **Appendix B** to this document, provide evidence in support of the lack of significant environmental impacts from the project related to utilities and service systems.

Independent of the proposed project, utility infrastructure is already undergoing a transformation to accommodate the shift to renewable energy and greater use of electricity in transportation and other sectors, as identified in the requirements and policies noted in the regulatory setting above. These include increasing the amount of renewable and zero carbon energy sources through SB 100, and the RPS requirements as well as electrification of transportation. SB 100 and transportation policies are expected to be the main driver of continued and accelerated transformations of the grid and expansion of renewable electric power facilities. This includes increases to facilities for generation, transmission, and energy storage.

The RPS requires LSEs in the state to achieve escalating procurement targets. LSEs were required to procure increasing amounts of renewable electricity each year ramping up to achieve at least 33 percent of retail sales by December 31, 2020 increasing to 60 percent by 2030. After 2030, the 60 percent RPS requirement continues along with the added SB 100 goal to supply renewable and zero-carbon resources for the remaining 40 percent of California delivered electricity by 2045.⁹⁹ As sources of electric power generation become more reliant on renewable and zero-carbon sources, stability and reliability of the electric grid must also be considered. The use of emerging technologies such as offshore wind, hydrogen, and load flexibility strategies have been identified as electricity sources for complementing solar generation.¹⁰⁰

The utility system will also need to provide energy for an increased number of ZEVs adopted as part of state goals. This includes approximately 566,000 existing ZEVs currently in use in California and a targeted 5 million ZEVs in use in California by 2030 as a result of various executive orders.¹⁰¹

Transmission expansion plays a vital role in enabling the interconnection and deliverability of renewable energy to meet demand and support load-serving entities in meeting the state's RPS requirements. The California ISO conducts its transmission planning process annually to identify system upgrades needed to meet grid reliability requirements, projects that could bring economic benefits to consumers, and projects needed for policy reasons, such as to meet California's renewable and clean energy goals. Transmission constraints inhibit the ability of California to export excess generation, like midday solar, or import generation, such as afternoon wind from out of state. Both actions help balance regional resources during steep afternoon ramp periods when demand grows and solar generation declines.

Battery energy storage is another tool that can maximize the benefits of renewable energy resources and help ensure the reliability of the electric grid. Energy storage technologies capture potential energy, electricity, or heat for later use, which can be particularly helpful to balance times when there is too much or not enough electricity to meet demand. The state is seeing significant growth in the installation of battery energy storage systems at large generation facilities, commercial sites, and even homes. The variety of battery energy storage technologies in commercial use or in the research and development phase is also growing. Grid-connected battery storage is also growing for many of the same reasons. In July 2019, Los Angeles Department of Water and Power

99 CEC. [California Energy Commission Renewable Energy Tracking Progress](#) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf. p. 3

100 CEC, CPUC, CARB. 2021. [California Energy Commission SB 100 Joint Agency Report Achieving 100 Percent Clean Electricity in California: An Initial Assessment. Report](#). p. 10. TN#237167. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100>.

101 Ibid at p. 32.

announced the intent to approve a 400 MW solar and 300 MW battery storage project¹⁰². Future planned storage facilities have even higher energy storage nameplate capacities (from the single digits of MWs to the 1000s of MW—including one rated/estimated up to 1,800 MW).¹⁰³ As sources of electric power generation become more reliant on renewable and zero-carbon sources, utility infrastructure will continue evolve accommodate the statewide transition. Increasing distributed and utility-scale battery energy storage can help bridge the gap between variable renewable generation and grid energy demands.

For the reasons discussed above, the 2022 amendments would result in less than significant impacts to the environment from the relocation or construction of electric utility infrastructure. As noted, the grid is already transforming to accommodate existing policies that encourage electrification and renewable energy. Implementation of the 2022 amendments would benefit California's current electric utility infrastructure by reducing overall energy usage and supporting the grid transition described above by facilitating the deployment of greater quantities of distributed battery energy storage and solar PVs.¹⁰⁴

The 2022 amendments would also result in less than significant impacts to the environment from the relocation or construction of new natural gas infrastructure. Implementation of the 2022 amendments would result in an overall reduction in the use of natural gas and could lead to fewer buildings being built in California that will require gas service lines, meters, and other utility infrastructure than under the current 2019 Energy Code. In the case of buildings that would have been built with natural gas infrastructure under the current 2019 Energy Code but choose to shift to full electrification of their building under the 2022 amendments, natural gas infrastructure would no longer be needed to serve the building. For buildings that continue to use natural gas for various end uses, the reduction in natural gas usage due to implementation of the 2022 amendments would have minimal effects on the infrastructure needed to deliver natural gas to existing buildings and would not result in the relocation or construction of new infrastructure.

Required Mitigation Measures: None

102 John, Jeff St. July 1, 2019. "[L.A. Looks to Break Price Records With Massive Solar-Battery Project.](https://www.greentechmedia.com/articles/read/ladwp-plans-to-break-new-low-price-records-with-massive-solar-battery-proje)" News article. Green Tech Media. Available at <https://www.greentechmedia.com/articles/read/ladwp-plans-to-break-new-low-price-records-with-massive-solar-battery-proje>.

103 Ibid. at p. 13

104 CEC. [California Energy Commission Renewable Energy Tracking Progress](https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf) at https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf. p. 13.

b. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

This project focuses on updating regulatory standards related to energy efficiency and is not approving any type of specific construction project, water allocation, or otherwise impacting the rate of water use in the state or limiting the ability of local jurisdictions to curtail development in response to regional water supply. Revisions to the prescriptive compliance path and "standard design" building model to include heat pump technologies in specific circumstances may result indirectly in reduced water usage due to reliance on refrigerant in place of hydronic systems. Improved energy efficiency standards for commercial and industrial process loads, specifically towards steam traps, are expected to also result in indirect reduction of water usage due to reduction in steam loss. Therefore, the project would have less than significant impacts on water supplies in the state, and all foreseeable impacts would be beneficial, so no further analysis is necessary.

Required Mitigation Measures: None

c. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The 2022 amendments are regulatory changes to energy efficiency standards and do not approve any specific construction project, regulate the pace of construction, or result in the occupancy of buildings or the generation of wastewater. The 2022 amendments have no impact on the ability of the local jurisdictions to limit construction based on wastewater treatment capacity. Additionally, some of the measures in the Energy Code update, such as revisions to the prescriptive compliance path and "standard design" building model to include heat pump technologies in specific circumstances and the steam trap requirements, may result in reductions in water usage and consequently the amount of wastewater generated by affected buildings. Therefore, the project would have less than significant impacts on wastewater treatment in the state, and all foreseeable impacts would be beneficial, so no further analysis is necessary.

Required Mitigation Measures: None

d. Would the project generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

The 2022 amendments are regulatory changes to energy efficiency standards and do not approve any specific construction project or directly result in the generation of solid waste. While the project itself does not generate any solid waste, there may be slight changes in indirect waste generation from affected buildings. Foreseeable decreases in

solid waste generation would be a result of decreases in materials and equipment used to comply with the 2022 amendments, however the broad discretion that builders have to specify equipment and materials both at design and during construction combined with the nature of Energy Code requirements as a set of minimum performance requirements means that the actual types and quantities of materials used by specific buildings to meet or exceed energy efficiency standards are too speculative for staff to analyze.

Foreseeable long-term increases in solid and hazardous waste indirectly generated by the 2022 amendments pertaining to battery energy storage are discussed in **Chapter 4, Section 4.6 Hazards and Hazardous Materials** and would not be generated in exceedance of state or local capacity or standards.

Overall, the project would have less than significant indirect impacts on the generation of solid waste and would not impair the attainment of state or local solid waste reduction goals or exceed the capacity of local infrastructure to handle accommodate solid waste associated with buildings built or altered in compliance with the 2022 amendments.

Required Mitigation Measures: None

e. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The California Integrated Waste Management Act of 1989 (AB 939) requires local jurisdictions in California to reduce, by 50 percent, the amount of solid waste disposed of in landfills by the year 2000 and beyond. The 2022 amendments are regulatory changes to energy efficiency standards and do not approve any specific construction project or result in the direct generation of any solid waste and are not subject to any federal, state, and local management and reduction laws related to solid waste. As discussed above under question d., the 2022 amendments may result indirectly in the reduction of some solid wastes and the generation of other solid wastes at new and altered buildings, compared to the continuation of the current 2019 Energy Code, however the specific types and quantities of materials ultimately selected by builders for inclusion in buildings to meet or exceed energy efficiency standards are too speculative for staff to analyze. These indirect changes in waste would not affect the ability of building owners and occupants to comply with all federal, state, and local management and reduction statutes and regulations related to solid waste, including the California Integrated Waste Management Act of 1989. The project will have less than significant impacts on compliance with waste management reduction laws.

4.7.4 References

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4.8 Wildfire

This section describes the environmental and regulatory setting, and discusses impacts associated with the project specific to wildfire.

4.8.1 Environmental Setting

State Responsibility Areas (s) are locations where the state of California is responsible for wildfire protection¹⁰⁵ and Local Responsibility Areas are locations where the responding agency is the county or city. The Department of Forestry and Fire Protection (Cal Fire) identifies and maps areas of significant fire hazard based on fuels, terrain, and other relevant factors.¹⁰⁶ Wildfire risks in State Responsibility Areas (SRAs) are called Fire Hazard Severity Zones (FHSZ) and are grouped into unzoned, moderate, high, and very high zones.¹⁰⁷ Wildfire risks designated by a local agency that is not an SRA are called Local Agency Very High Fire Hazard Severity Zones.¹⁰⁸

The CPUC categorizes fire threat areas as Tier 1, Tier 2, or Tier 3.¹⁰⁹ A Tier 1 area (or CAL FIRE Zone 1) encompasses High Hazard Zones (HHZ) on the United States Forest Service (USFS-CAL FIRE) joint map of Tree Mortality HHZ. This tier represents areas where tree mortality directly coincides with critical infrastructure such as communities, roads, and utility lines, and are a direct threat to public safety. Tier 2 consists of areas where there is an elevated risk (including likelihood and potential impacts on people and property) from wildfires associated with overhead utility power lines or overhead utility power-line facilities also supporting communication facilities. Tier 3 consists of areas where there is an extreme risk (including likelihood and potential impacts on people and property) from wildfires associated with overhead utility power lines or overhead utility power-line facilities also supporting communication facilities.

The 2022 amendments are a set of regulations that would apply statewide and require energy efficient designs, features, equipment, and practices in new construction and certain additions and alterations to buildings within California. Though the 2022 amendments do not have a specific location, the requirements could apply to newly constructed and certain renovated buildings located in or near an SRA or a very high FHSZ, or land classified as having a fire threat by the CPUC or other entity, including potentially at wildland-urban interfaces,¹¹⁰ the area where homes and wildlands

105 See Cal. Code Regs, tit. 24, § 702A (definition of "State Responsibility Area").

106 Office of the State Fire Marshall. [Fire Hazard Severity Zones Maps webpage](https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/) at <https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>. Last visited May 13, 2021.

107 See Cal. Code Regs, tit. 24, § 702A (definition of "fire hazard severity zones").

108 See Cal. Code Regs, tit. 24, § 702A (definition of "local agency very high fire hazard severity zone").

109 CPUC. [CPUC FireMap website](https://ia.cpuc.ca.gov/firemap/). Last visited May 14, 2021. Available at <https://ia.cpuc.ca.gov/firemap/>.

110 See Cal. Code Regs, tit. 24, § 701A (definition of "wildland-urban interface fire area").

intermix where there is significant risk from wildfires. Therefore, to focus on changes that would be attributable to the project, this section evaluates the potential for increases in statewide wildfire impacts from the 2022 amendments compared to the existing state of wildfire impacts associated with buildings in California under the current building design and construction requirements of the 2019 Energy Code.

4.8.2 Regulatory Setting

Federal

Federal Register Communities at Risk List. High risk communities identified within the wildland-urban interface, the area where homes and wildlands intermix, were published in the Federal Register in 2001. At the request of Congress, the Federal Register notice only listed those communities neighboring federal lands. With California's extensive urban Wildland-Urban Interface situation, the list of communities extends beyond just those adjacent to federal lands. Beginning on August 17, 2001, no more updates were being made to the Federal Register with states assuming responsibility for continued updates to their own lists. The Cal Fire Director has taken the responsibility for managing the list.

State

Fire Hazard Severity Zones.¹¹¹ The purpose of this code section is to provide for the classification of lands within SRAs in accordance with the severity of fire hazard present and identify measures to be taken to retard the rate of spreading and to reduce the potential intensity of uncontrolled fires that threaten to destroy resources, life, or property.

CPUC General Order 166: Standards for Operation, Reliability, and Safety during Emergencies and Disasters. CPUC GO 166 covers the standards which require all electric utilities to be prepared for emergencies and disasters in order to minimize damage and inconvenience to the public which may occur as a result of electric system failures, major outages, or hazards posed by damage to electric distribution facilities.

4.8.3 Environmental Impacts and Mitigation Measures

Appendix G of the CEQA Guidelines provides that a project would result in a significant impact related to hazards and hazardous materials if the project is located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan;

¹¹¹ Pub. Resources Code, §§ 4201-4204; Cal. Code Regs, tit. 14, § 1280.01.

- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

The 2022 amendments' potential for significant direct or foreseeable indirect environmental impacts related to each of these questions is discussed in order below.

The 2022 amendments do not approve specific construction projects or regulate the pace or location of future construction. The 2022 amendments would improve existing residential and non-residential energy efficiency standards for building construction and design. As such, any effects of the 2022 amendments would be indirect, occurring only as a result of buildings being constructed in compliance with the 2022 amendments after they have taken effect.

The 2022 amendments would add prescriptive solar PV and battery requirements for high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater / auditorium / convention center buildings. The battery storage systems expected to result from the 2022 amendments would be located inside of or adjacent to buildings and would not easily contribute to wildfires. Chapter 4, Section 4.6 Hazards and Hazardous Materials contains additional discussion of less than significant impacts related to fire risk from battery energy storage systems that would be associated with the project because battery storage systems are subject to a variety of electrical and fire safety requirements imposed on the manufacturer of the batteries, as well as during installation (See **Table 4.6-1**).

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

a. Substantially impair an adopted emergency response plan or emergency evacuation plan?

As with the existing Energy Code, the 2022 amendments would apply to buildings that are constructed or located in or near an SRA or a very high FHSZ, or land classified as having a fire threat by the CPUC. However, the amendments do not directly or indirectly increase the likelihood that future projects would be built in these zones or in such a way to cause impacts.

As such, the project is not expected to bring a large number of people to any particular areas in California and therefore is not expected to increase emergency response demand during a potential small or large-scale evacuation effort. Thus, the project would not substantially impair an adopted emergency response plan or emergency evacuation plan.

There would be no impact to an adopted emergency response plan or emergency evacuation plan from the 2022 amendments.

Required Mitigation Measures: None

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The 2022 amendments would apply to projects that are constructed or located in or near an SRA or a very high FHSZ, or land classified as having a fire threat by the CPUC. The 2022 amendments would apply to future construction in a variety of areas with various slope types and wind zones. However, the 2022 amendments do not make it more likely that projects would be built in these areas or in such a way as to exacerbate wildfire risks or expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

As such, there would be no impact to exacerbate wildfire risk due to slope, prevailing winds, and other factors from the 2022 amendments.

Required Mitigation Measures: None

c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

The 2022 amendments apply to projects that are constructed or located in or near an SRA or a very high FHSZ, or land classified as having a fire threat by the CPUC. However, the 2022 amendments do not make it more likely that projects would be built or occupied in these zones or in such a way as to exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.

The 2022 amendments include battery storage requirements for certain nonresidential buildings, which may partially supplant more volatile equipment in the absence of battery energy storage, such as portable fossil fuel backup generators. So, the wildfire ignition risks associated with the exclusion of battery storage from new and existing buildings could be greater under existing conditions for buildings in SRAs and very high FHSZs (Generator Safety, Honda Power Equipment; Moench, 2019).

There would be a less than significant impact to exacerbated fire risk due to installation or maintenance of associated infrastructure from the 2022 amendments.

Required Mitigation Measures: None.

d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The 2022 amendments apply to projects that are constructed or located in or near an SRA or a very high FHSZ, or land classified as having a fire threat by the CPUC. The 2022 amendments would apply to projects built in a variety of slope types and drainage areas. However, the 2022 amendments do not make it more likely that projects would be built in these zones or areas or in such a way as to expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

Therefore, the 2022 amendments would have no impact to exposure of people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

Required Mitigation Measures: None

4.8.4 References

Office of the State Fire Marshall. [Fire Hazard Severity Zones Maps webpage](https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/) at <https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>. Last visited May 13, 2021.

Honda. [Generator Safety, Honda Power Equipment webpage](https://powerequipment.honda.com/generators/generator-safety) at <https://powerequipment.honda.com/generators/generator-safety>. (discussing fire, electrocution, and carbon monoxide poisoning risks associated with the misuse or misplacement of portable fossil fuel generators). Last accessed May 7, 2021.

Moench, Mallory. 2019. "[During PG&E outages, generators caused fires, carbon monoxide poisoning.](https://www.sfchronicle.com/california-wildfires/article/During-PG-E-outages-generators-caused-fires-14833601.php)" News article. San Francisco Chronicle. Available at <https://www.sfchronicle.com/california-wildfires/article/During-PG-E-outages-generators-caused-fires-14833601.php>.

4.9 Technical Areas Not Affected

As discussed in **Chapter 3 Project Description**, the overall purpose of the proposed amendments to the Energy Code is to employ technically feasible and economic methods “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability” consistent with the express statutory direction in the Warren-Alquist Act. The 2022 amendments were prepared with these considerations and the project objectives in mind and are intended to introduce new and emerging measures and technologies that reduce existing environmental impacts associated with buildings. To achieve this, the 2022 amendments include several measures that are designed to reduce existing environmental impacts that occur statewide and would continue unless these measures are implemented. Although this EIR discusses these benefits in some areas in order to differentiate the project’s potential impacts from existing conditions that the project will improve upon, the full range environmental benefits associated with this project are not required to be analyzed under CEQA, which only requires disclosure, analysis, and mitigation of significant adverse environmental impacts in this EIR.¹¹²

Based on a review of the 2022 amendments, CEC staff has determined that there is no substantial evidence that the amendments would cause any environmental impacts associated with the technical areas discussed below. For each of these technical areas, this EIR provides a brief statement of the reasons for concluding the 2022 amendments would not result in environmental impacts, using questions derived from Appendix G of the CEQA Guidelines.¹¹³

112 Pub. Resources Code, § 21068 (“Significant effect on the environment” means a substantial, or potentially substantial, adverse change in the environment.).

113 Pub. Resources Code, § 21100(c) (EIRs shall “contain a statement briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report.”); Cal. Code Regs., tit. 14, § 15128 (“An EIR shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR.”).

4.9.1 Agriculture and Forestry Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the CARB.

Would the project:

-
- a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

 - b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

 - c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

 - d. Result in the loss of forest land or conversion of forest land to non-forest use?

 - e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

Would the project:

- a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?**

The 2022 amendments would not incentivize or induce new construction to occur in such a way that would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the Farmland Mapping and Monitoring Program Map to non-agricultural use.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

California Planning and Zoning Law codified in California Government Code, section 65000 et seq. provides that "...each county and city shall adopt a comprehensive, long term general plan for the physical development of the county or city, and of any land outside its boundaries..."¹¹⁴ Counties and cities may adopt ordinances that regulate: use of buildings, structures, and land; location, height, bulk, number of stories, and size of buildings and structures; the percentage of a lot which may be occupied by a building or structure; the size and use of lots, yards, courts, and other open spaces; the intensity of land use; signs and billboards.¹¹⁵

California Land Conservation Act of 1965, as amended, enables local governments to enter contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. Landowners receive substantially reduced property tax assessments in return for enrollment under a contract.

The 2022 amendments would not induce or incentivize regulated building projects to be sited, designed, or constructed in such a way that they would conflict with existing zoning for agricultural use or Williamson Act contracts, as the project does not direct or incentivize where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

Section 12220(g) of the Public Resources Code defines forest land as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

"Timberland" is land owned by the federal government and designated by the State Board of Forestry and Fire Protection as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees.

114 Gov. Code, § 65300.

115 Gov. Code, § 62850.

Government Code section 51104(g) defines "Timberland Production Zone" (TPZ) as land used for growing and harvesting timber and compatible uses.

The 2022 amendments do not include any provisions or exceptions specific to forest land, timberland, or TPZ land. The amendments do not incentivize or otherwise increase the likelihood that future building projects would be sited, designed, or constructed in such a way that would conflict with existing zoning for, or cause rezoning of, forest land, timberland, or TPZ land as the amendments would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

d. Result in the loss of forest land or conversion of forest land to non-forest use?

Cal Fire's Forest Practice Geographical Information System (GIS) captures current and historic timber harvesting activities for over 4 million acres of California timberland. The Forest Practice Watershed Mapper is a web-based mapping application allowing users to identify the status of a specific planning watershed regarding anadromous salmonids, 303.d waterbodies, Forest Districts, and average rainfall, all in the context of past and present timber harvesting activities.

The 2022 amendments do not include any provisions or exceptions specific to forest land that incentivizes or otherwise increases the likelihood that future building projects would be sited, designed, or constructed in such a way as to result in the loss of forest land or conversion of forest land to non-forest use compared to building projects under the current or prior Energy Codes as the amendments would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

The provisions of the Energy Code apply either to internal features of the building (inclusive of installed components such as HVAC, lighting, and water heating equipment) or to specific outdoor improvements such as outdoor parking areas, outdoor lighting, and PVs.

The 2022 amendments do not induce or incentivize regulated building projects to be sited in such a way that they result in conversion of Farmland as defined to non-agricultural use or conversion of forest land as defined to non-forest use as they would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.2 Cultural and Tribal Cultural Resources

CULTURAL RESOURCES

Would the project:

-
- a. Cause a substantial adverse change in the significance of a historical resource pursuant to section 15064.5?

 - b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to section 15064.5?

 - c. Disturb any human remains, including those interred outside of dedicated cemeteries?

TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

-
- a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

 - b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

CEQA requires lead agencies to assess potential impacts on various cultural resources: historical resources, unique archaeological resources, and tribal cultural resources. These resources are physical aspects of California's heritage and history and generally are at least 45 years old.¹¹⁶

A historical resource is:

¹¹⁶ Office of Historic Preservation, *Instructions for Recording Historical Resources*. Sacramento, CA: Office of Historic Preservation, March 1995, p. 2.

- A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (California Register),
- A resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting specific requirements,¹¹⁷ or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record.¹¹⁸

A *Unique archaeological resources* is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.¹¹⁹

Tribal cultural resources are either of the following:

Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

- Included or determined to be eligible for inclusion in the California Register
- Included in a local register of historical resources as defined in the Public Resources Code section 5020.1(k).

A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in the Public Resources Code section 5024.1(c). In applying these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.¹²⁰

In addition:

117 Pub. Resources Code § 5024.1(g).

118 Cal. Code Regs., tit. 14, 15064.5(a).

119 Pub. Resources Code, § 21083.2(g).

120 Pub. Resources Code, § 21074(a).

A cultural landscape that meets the criteria of Public Resources Code, section 21074(a), is a tribal cultural resource to the extent that the landscape is geographically defined in terms of its size and scope.¹²¹

A Historical resource, unique archaeological resource, or a non-unique archaeological resources, as defined at Pub. Resources Code, §§ 21084.1, 21083.2(g), and 21083.2(h), respectively may also be a tribal cultural resource if it conforms to the criteria of Public Resources Code section 21074(a).¹²²

For the purposes of this section, a substantial adverse change is any physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource or tribal cultural resource would be materially impaired.¹²³

CULTURAL RESOURCES

Would the project:

a. Cause a substantial adverse change in the significance of a historical resource pursuant to section 15064.5?

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to adversely change the significance of a historical resource. In addition, the Scope of the Energy Code provides an express exception to “[q]ualified historic buildings, as regulated by the California Historic Building Code (Title 24, Part 8).”

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to section 15064.5?

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to adversely change the significance of a unique archaeological resource.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

c. Disturb any human remains, including those interred outside of dedicated cemeteries?

121 Pub. Resources Code, § 21074(b).

122 Pub. Resources Code, § 21074(c).

123 Pub. Resources Code, § 21084.2; Cal. Code Regs., tit. 14, § 15064.5(b).

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to disturb human remains.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to adversely change the significance of a listed tribal cultural resource.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

CEQA requires lead agencies to consult with all California Native American tribes that have traditional and cultural affiliation with the geographic area of a project, and that have previously requested consultation. To invoke an agency's requirement to consult under CEQA, a tribe must first send the lead agency a written request for formal notification of any projects within the geographic area with which they are traditionally and culturally affiliated.¹²⁴ Because this rulemaking is state-wide in scope, all tribes (18 tribes) that have sent formal notifications to the CEC were invited to consult on this rulemaking.

In addition, and consistent with the CEC's tribal consultation policy,¹²⁵ CEC staff contacted the Native American Heritage Commission (NAHC) to request a search of the Sacred Lands File and a list of California Native American tribes that might be interested

¹²⁴ Pub. Resources Code, § 21080.3.1(b).

¹²⁵ California Energy Commission, *Tribal Consultation Policy*. CEC-700-2017-002-D. Sacramento, CA, revised December 2017.

in the proposed project. The NAHC responded on June 25, 2020 and provided a state-wide contact list of all California Native American tribes. CEC staff mailed initial consultation letters to all listed California Native American tribes on March 15, 2021. Those letters provided a brief project description, invited consultation, provided a link to the project docket, and provided contact information for lead staff.

CEQA affords tribes 30 days to respond to agency invitations to consult. The CEC determined that the 30-day response period expired on April 18, 2021. Within that 30-day period two tribes responded. One tribe, the Elk Valley Rancheria requested formal consultation, the second tribe, the Nor-Rel-Muk Wintu Tribe response indicated they were not interested in formal consultation but were interested in following the rulemaking process. A project scoping meeting was held on April 9, 2021, and all tribes, including the two mentioned above, were sent a notice encouraging those interested to attend the scoping meeting, and to subscribe to the project list serve that provides routine updates to the docket.

CEC staff contacted the Elk Valley Rancheria and conducted a virtual meeting on April 14, 2021. CEC staff provided a brief overview of the objectives for achieving greater energy efficiencies through the rulemaking process. A discussion was held concerning the use of heat pumps in relation to tribal development that might be subject to the state building code standards. Staff informed the Elk Valley Rancheria that staff's preliminary analysis concluded that the rulemaking would not impact tribal cultural resources. The Tribe did not identify any impacts to tribal cultural resources at the meeting, and stated that they would consider responding at a later time and upon conducting their own review of the docket, including the draft EIR, if they identify any potential impacts at a later time.

Consultation with California Native American tribes has not resulted in the identification of impacts to tribal cultural resources. The amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to adversely change the significance of a tribal cultural resource.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.3 Geology and Soils

GEOLOGY AND SOILS

Would the project:

-
- a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
-
- i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
-
- ii. Strong seismic ground shaking?
-
- iii. Seismic-related ground failure, including liquefaction?
-
- iv. Landslides?
-
- b. Result in substantial soil erosion or the loss of topsoil?
-
- c. Be located on geologic units or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?
-
- d. Be located on expansive soil, as defined in Section 1803.5.3 of the California Building Code (2010), creating substantial direct or indirect risks to life or property?¹²⁶
-
- e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?
-
- f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Would the project:

- a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:**
- i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence**

¹²⁶ Geology and Soils question (d) reflects the current 2013 California Building Code (CBC), effective January 1, 2014, which is based on the International Building Code (2009).

of a known fault? Refer to Division of Mines and Geology Special Publication 42.

The 2022 amendments do not include any provisions that would directly or indirectly cause proposed building projects to be more likely to be sited on or near earthquake faults.

ii. Strong seismic ground shaking?

The 2022 amendments do not include any provisions that would directly or indirectly cause proposed building projects to be more likely to be sited on or near earthquake faults and subject to ground shaking.

iv. Seismic-related ground failure, including liquefaction?

The 2022 amendments do not include any provisions that would increase the likelihood for buildings constructed in California of having an increased vulnerability to seismic-related ground failure.

v. Landslides?

The 2022 amendments do not include provisions that would increase the likelihood of buildings constructed in California to cause landslides or have an increased vulnerability to landslides.

No impacts would occur; therefore, these issues are not evaluated further in this EIR.

b. Result in substantial soil erosion or the loss of topsoil?

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to cause increased erosion or topsoil loss relative to buildings constructed under the 2019 Energy Code or earlier Energy Codes.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

c. Be located on geologic units or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The 2022 amendments do not induce or incentivize building projects to be sited on unstable soil or designed in such a way as to cause stable soil to become unstable relative to buildings constructed under the 2019 Energy Code or earlier Energy Codes.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

d. Be located on expansive soil, as defined in Section 1803.5.3 of the California Building Code (2010), creating substantial direct or indirect risks to life or property?

The 2022 amendments do not induce or incentivize building projects to be sited on expansive soil.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

The 2022 amendments do not induce or incentivize building projects to be sited where sewers are not available and soils do not support use of septic tanks or alternative disposal systems.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The 2022 amendments do not include any provisions that would cause building projects to be sited or designed in such a way as to destroy paleontological resources or sites, or unique geologic features relative to buildings constructed under the 2019 Energy Code or earlier Energy Codes.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.4 Hydrology and Water Quality

HYDROLOGY AND WATER QUALITY

Would the project:

-
- a. Violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

 - b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

 - c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces in a manner which would:
 - i. result in substantial erosion or siltation, on- or offsite;

 - ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

 - iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

 - iv. impede or redirect flood flows?

 - d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

 - e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Would the project:

a. Violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to cause water quality or waste discharge requirements to be violated or to otherwise substantially degrade surface or ground water quality.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The 2022 amendments do not induce or incentivize regulated building projects to deplete groundwater supplies or interfere more greatly with groundwater

recharge. Future projects constructed consistent with the proposed 2022 Energy Code would remain subject to all laws governing sustainable groundwater management.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces in a manner which would:

i. result in substantial erosion or siltation, on- or offsite;

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to cause erosion or siltation.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to alter existing drainage patterns or increase surface runoff.

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to cause drainage system capacities to be exceeded or result in substantial additional sources of runoff.

iv. impede or redirect flood flows?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to impede or redirect flood flows.

No impacts would occur; therefore, these issues are not evaluated further in this EIR.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited in flood hazard, tsunami, or seiche zones, or designed in such a way as to risk release of pollutants within these areas.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The 2022 amendments do not include any provisions that would cause building projects to be designed in conflict with or obstruct a water control plan or sustainable groundwater management plan.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.5 Land Use and Planning

LAND USE AND PLANNING

Would the project:

a. Physically divide an established community?

b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Would the project:

a. Physically divide an established community?

The 2022 amendments do not induce or incentivize building projects to be sited such that they divide communities as the amendments would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

California Planning and Zoning Law codified in California Government Code, section 65000 et seq. provides that "...each county and city shall adopt a comprehensive, long term general plan for the physical development of the county or city, and of any land outside its boundaries..."¹²⁷ Pursuant to this section, counties and cities may adopt ordinances that regulate: use of buildings, structures, and land; location, height, bulk, number of stories, and size of buildings and structures; the percentage of a lot which may be occupied by a building or structure; the size and use of lots, yards, courts, and other open spaces; the intensity of land use; signs and billboards.¹²⁸

The proposed amendments to the Energy Code do not induce or incentivize regulated building projects to be sited in such a way that they would conflict with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating environmental effects as they would not direct where new buildings would be constructed. Local agencies are also empowered to make changes to their own building codes to deviate from the California Building Code and impose more restrictive building standards, including but not limited to green building standards, when reasonably necessary for

127 Gov. Code, § 65300.

128 Gov. Code, § 65850.

local climatic, geological, or topographical conditions, provided they make those findings required by state building standards law.¹²⁹

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.6 Mineral Resources

MINERAL RESOURCES

Would the project:

-
- a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

 - b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Would the project:

a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to result in loss of availability of a known mineral resource. Also, the amendments would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to result in loss of availability of a locally important mineral resource recovery site. Also, the amendments would not direct where new buildings would be constructed.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

129 See Health & Saf. Code, §§ 18941.5, 17958.5, and 17958.7 and Cal. Code of Regs., tit. 24, Part 1, §§ 1.1.8 and 1.8.6.

4.9.7 Noise

NOISE

Would the project result in:

- a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

- b. Generation of excessive ground borne vibration or ground borne noise levels?

- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Would the project result in:

- a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

The 2022 amendments would not increase the level of noise expected to occur during construction or occupancy of regulated buildings.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

- b. Generation of excessive ground borne vibration or ground borne noise levels?**

The 2022 amendments would not increase the level of groundborne noise or vibration expected to occur during construction or occupancy of regulated buildings.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?**

The 2022 amendments do not include any provisions that would cause proposed building projects to be more likely to be sited near airports or within airport land use plans. In cases where proposed projects are sited near airports or within plan areas, the proposed amendments to the Energy Code would not cause those projects to expose people residing or working in the project area to excessive noise levels.

No impact would occur; therefore, this issue is not evaluated further in this EIR

4.9.8 Population and Housing

POPULATION AND HOUSING

Would the project:

-
- a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

 - b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Would the project:

- a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?**

The 2022 amendments affect the minimum levels of efficiency of new buildings statewide, but they do not induce or incentivize additional building or infrastructure projects or action that would induce population growth. The amendments apply equally to new development statewide, and they do not propose any new homes or businesses or indirectly induce population growth in the state through the extension of new infrastructure to a specific region of the state.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

- b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?**

The 2022 amendments do not induce or incentivize regulated building projects to be sited in such a way that they displace existing housing or people or necessitate the construction of replacement housing elsewhere in California. Also, the amendments would not direct where new buildings would be constructed.

In response to the Notice of Preparation, two commenters expressed concerns about the amendments causing possible increases in construction costs and housing occupancy costs, such as energy bills. While these considerations were the subject of extensive discussion during the pre-rulemaking process and are addressed in measure proposals from Vertiv, the Statewide Codes and Standards Enhancement (CASE) initiative, and CEC staff reports, economic considerations such as this are beyond the scope of the CEQA analysis required to be conducted in this EIR. CEQA Guidelines, section 15131(a) states that "[e]conomic or social effects of a project shall not be treated as significant effects on the environment," although section 15131(b) states

that “[e]conomic or social effects of a project *may be* used to determine the significance of physical changes caused by the project” (emphasis added). Even assuming commenters are correct that some level of increase in housing construction or occupancy costs may be foreseeable in some future housing development projects under the 2022 Energy Code amendments, such costs are purely economic effects which would be associated with the specific future building design decisions of developers—and the specific use and behavior patterns of those building occupants—which would not be attributable to physical changes in the environment resulting from the amendments. The commenters have not submitted substantial evidence that the project is likely to result in potential economic effects or social changes on so great a scale that they would result in adverse physical changes *to the environment*, such as blight or urban decay.¹³⁰ Without a resulting substantial adverse physical effect on the environment, these are appropriately classified purely economic cost-impacts which would be absorbed by developers, occupants, and other market participants. Under CEQA, lead agencies are not required to reach a determination of significance based on such an assertion.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

130 See CEQA Guidelines, § 15384 (“Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.”) See, e.g., *Bakersfield Citizens for Loc. Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1213; *Chico Advocs. for a Responsible Econ. v. City of Chico* (2019) 40 Cal.App.5th 839, 847-49 (discussing *City of Bakersfield* and related cases involving social and economic concerns raised by petitioners).

4.9.9 Public Services

PUBLIC SERVICES

Would the project:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

i. Fire protection?

ii. Police Protection?

iii. Schools?

iv. Parks?

v. Other public facilities?

Would the project:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

i. Fire protection?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to require additional fire protection relative to buildings constructed under the 2019 Energy Code or earlier Energy Codes, nor do they incentivize construction such that provision of services would be affected.

ii. Police Protection?

The 2022 amendments do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to require additional police protection under the 2019 Energy Code or earlier Energy Codes, nor do they incentivize construction such that provision of services would be affected.

iii. Schools?

The 2022 amendments do not incentivize siting, design, or construction such that provision of educational services would be affected.

iv. Parks?

The 2022 amendments do not incentivize siting, design, or construction such that availability or utilization of parks would be affected.

v. Other public facilities?

The 2022 amendments do not incentivize siting, design, or construction such that availability or utilization of other public facilities would be affected.

No impacts would occur; therefore, these issues are not evaluated further in this EIR.

4.9.10 Recreation

RECREATION

Would the project:

-
- a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

 - b. Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Would the project:

- a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?**

The 2022 amendments do not incentivize siting, design, or construction in such a way that availability or utilization of recreational facilities would be affected.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

- b. Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?**

The 2022 amendments do not incentivize siting, design, or construction in such a way that availability or utilization of recreational facilities would be affected.

The amendments do not require the construction or expansion of recreational facilities or otherwise cause them to be included in building projects.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.11 Transportation

TRANSPORTATION

Would the project:

-
- a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

 - b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

 - c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

 - d. Result in inadequate emergency access?

Would the project:

- a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?**

The 2022 amendments do not induce or incentivize regulated building projects to be sited or designed in such a way that they would conflict with transit, roadway, bicycle, or pedestrian facilities, nor do they include provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to decrease performance or safety of such facilities.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

- b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?**

Public Resources Code section 15064.3 defines “vehicle miles traveled” as the amount and distance of automobile travel attributed to a project. The 2022 amendments would not induce construction or operation-generated VMT or incentivize future development to exceed applicable transportation thresholds but would rather improve upon the existing 2019 Energy Code for new construction of, and additions and alterations to, residential and nonresidential buildings. Furthermore, the project does not propose construction of new facilities or indirectly increase or decrease the potential VMTs that might be associated with the construction or occupancy of buildings meeting the proposed 2022 Energy Code requirements. Therefore, the project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

No impact would occur; therefore, this issue is not evaluated further in this EIR.

c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The 2022 amendments do not induce or incentivize regulated building projects to be sited or designed in such a way that they increase hazards due to design features or incompatible uses.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

d. Result in inadequate emergency access?

The 2022 amendments do not induce or incentivize regulated building projects to be sited or designed in such a way that they result in inadequate emergency access.

No impact would occur; therefore, this issue is not evaluated further in this EIR.

4.9.12 References

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Chapter 5

OTHER CEQA DISCUSSIONS

Other CEQA Discussions

5.1 Environmental Justice (EJ)

This section analyzes the project’s potential impacts on EJ populations. While EJ is not a technical area needed to be analyzed under CEQA, the CEC is including this analysis as part of its evaluation of potential environmental impacts. All departments, boards, commissions, conservancies and special programs of the California Natural Resources Agency must consider EJ in their decision-making process if their actions have an impact on the environment, environmental laws, or policies, including adopting regulations. The 2022 amendments do not approve any particular construction project or impact local zoning and therefore this analysis can only consider broadly what effects the 2022 amendments could have on a statewide basis and whether there may be a disproportionate environmental impact on certain segments of the population.

5.1.1 Environmental Setting

The Energy Code updates cover the entire state. For purposes of this analysis, all EJ communities within the state are considered.

5.1.2 Regulatory Setting

The Office of Planning and Research is the state’s coordinating agency for EJ programs. State law defines “environmental justice” as “the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.”¹³¹ The California Natural Resources Agency recognizes that EJ communities are commonly identified as those where residents are predominantly minorities or live below the poverty level; where residents have been excluded from the environmental policy setting or decision-making process; where they are subject to a disproportionate impact from one or more environmental hazards; and where residents experience disparate implementation of environmental regulations, requirements, practices, and activities in their communities.¹³² EJ efforts attempt to address the inequities of environmental protection in these communities.

An EJ analysis is composed of the following:

- Identification of areas potentially affected by various emissions or impacts from a proposed project;
- Providing notice in appropriate languages (when possible) of the proposed project and opportunities for participation in public meetings to EJ communities;

131 Gov. Code, § 65040.12(e)(1); see also Pub. Resources Code, §§ 71110-71118.

132 Office of Planning and Research. 2003. [Resources Agency Environmental Policy](https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf). Pp 59-61. Available at https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf.

- A determination of whether there is a comparatively larger population of minority persons, or persons below the poverty level, living in an area potentially affected by the proposed project; and
- A determination of whether there may be a significant adverse impact on a population of minority persons or persons below the poverty level caused by the proposed project alone, or in combination with other existing and/or planned projects in the area.¹³³

The Office of Planning and Research is the state’s coordinating agency for EJ programs. EJ is defined as “the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.”¹³⁴ As noted above, all departments, boards, commissions, conservancies and special programs of the California Natural Resources Agency must consider EJ in their decision-making process. Such actions that require EJ consideration may include:

- Adopting regulations;
- Enforcing environmental laws or regulations;
- Making discretionary decisions or taking actions that affect the environment;
- Providing funding for activities affecting the environment; and
- Interacting with the public on environmental issues.¹³⁵

CalEnviroScreen

CalEnviroScreen is a science-based mapping tool used by CalEPA to identify disadvantaged communities pursuant to SB 535.¹³⁶ CalEnviroScreen data is based on Census tracts. CalEPA has defined disadvantaged communities as the top 25 percent scoring census tracts, plus census tracts that score in the highest 5 percent of CalEnviroScreen’s Pollution Burden. (CalEPA 2017).

As required by SB 535, disadvantaged communities are identified based on geographic, socioeconomic, public health, and environmental hazard criteria. CalEnviroScreen identifies communities most burdened by pollution from multiple sources and most

133 Office of Planning and Research. 2003. [Resources Agency Environmental Policy](https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf). Pp 59-61. Available at https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf.

134 Gov. Code, § 65040.12; Pub. Resources Code, §§ 71110-71118.

135 Office of Planning and Research. 2003. [Resources Agency Environmental Policy](https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf). Pp 59-61. Available at https://cawaterlibrary.net/wp-content/uploads/2018/01/OPR_EJ_Report_Oct2003.pdf.

136 Stats. 2012, Ch. 830, § 2.

vulnerable to its effects, taking into account socioeconomic and health status of people living in those communities (OEHHA 2017, pg. 1).

Using data from federal and state sources, the tool consists of four components in two broad groups. The Exposure and Environmental Effects components comprise a Pollution Burden group, and the Sensitive Populations and Socioeconomic Factors components comprise a Population Characteristic Group. The four components are made up of environmental, health, and socioeconomic data from 20 indicators.

Table 5.1-1 lists the indicators that go into the Pollution Burden score and the Population Characteristics score to form the final CalEnviroScreen score. These indicators are used to measure factors that affect the potential for pollution impacts in communities.

**TABLE 5.1-1
COMPONENTS THAT FORM THE CALENVIROSCREEN 3.0 SCORE**

Pollution Burden

Pollution Burden Exposure Indicators	Pollution Burden Environmental Effects Indicators
Diesel PM emissions	Cleanup sites
Drinking water contaminants	Groundwater threats
Ozone concentrations	Hazardous waste
PM 2.5 concentrations	Impaired water bodies
Pesticide use	Solid waste sites and facilities
Toxic releases from facilities	
Traffic density	

Population Characteristics

Sensitive Population Indicators	Socioeconomic Factors Indicators
Asthma emergency department	Educational attainment
Cardiovascular disease (emergency department visits for heart attacks)	Housing burdened low income households
Low birth-weight infants	Linguistic isolation
	Poverty
	Unemployment
Exposure Indicators	Environmental Effects Indicators

Diesel PM emissions	Cleanup sites
Drinking water contaminants	Groundwater threats
Ozone concentrations	Hazardous waste
PM 2.5 concentrations	Impaired water bodies
Pesticide use	Solid waste sites and facilities
Toxic releases from facilities	
Traffic density	

Population Characteristics

Sensitive Population Indicators	Socioeconomic Factors Indicators
Asthma emergency department	Educational attainment
Cardiovascular disease (emergency department)	Housing burdened low income households
Low birth-weight infants	Linguistic isolation
	Poverty
	Unemployment

Notes: PM= particulate matter. PM 2.5= fine particulate matter 2.5 microns or less.
Source: OEHHA 2017

This draft EIR analyzes three technical areas that, combined with CalEnviroScreen indicators, could have potential adverse environmental impacts on EJ populations. These technical areas include: Air Quality, Hazards and Hazardous Materials, and Utilities and Service Systems. The CalEnviroScreen indicators relevant to each of the three technical areas are:

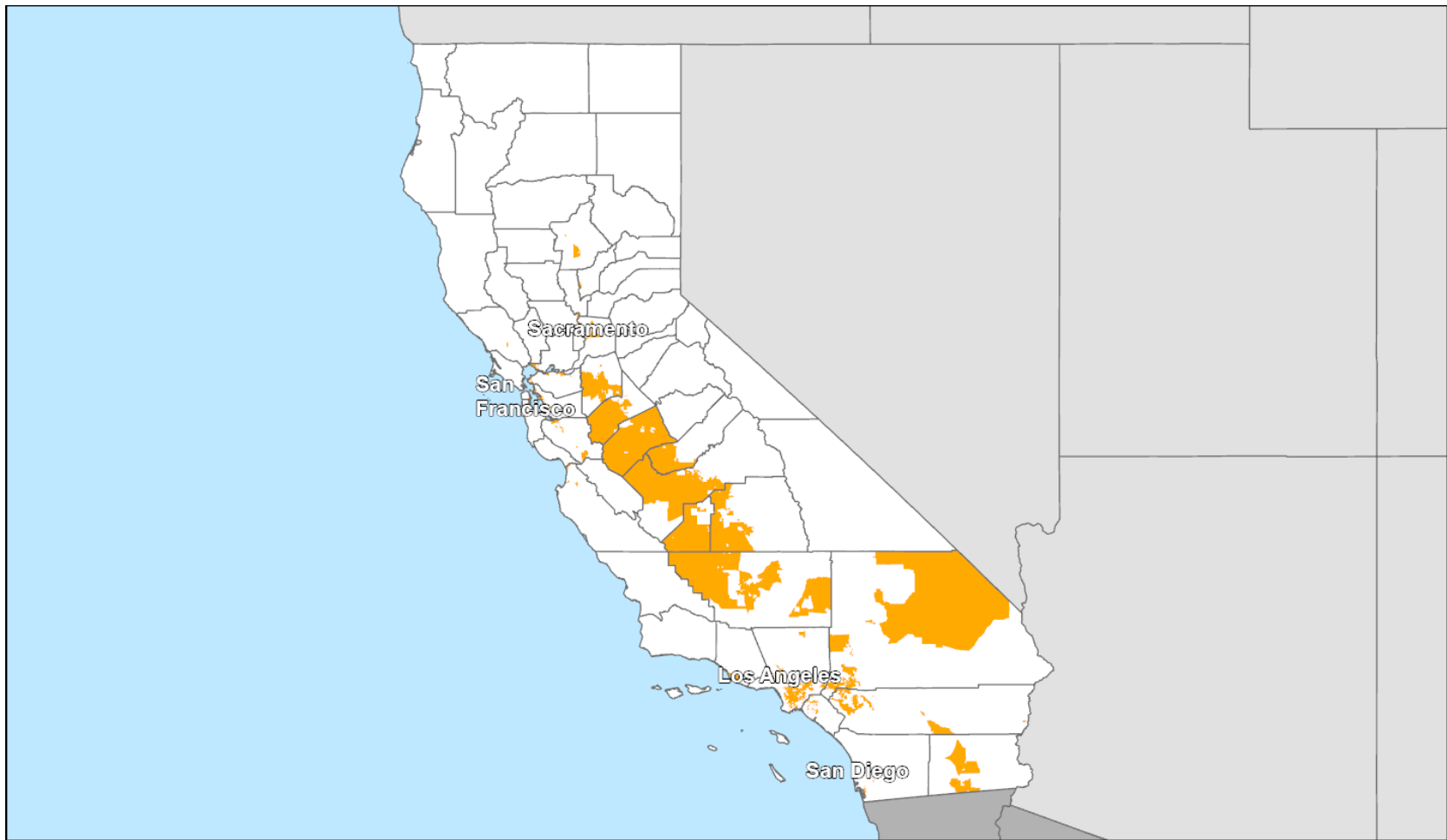
- For air quality, these indicators are: asthma, cardiovascular disease, diesel PM emissions, low birth-weight infants, ozone concentrations, pesticide use, PM2.5 concentrations, toxic releases from facilities, and traffic density.
- For hazards and hazardous materials, the indicator is cleanup sites.
- For utilities and service systems, these indicators are: cleanup sites, hazardous waste, and solid waste sites and facilities.

CalEnviroScreen 3.0 was used to identify disadvantaged communities in the state of California and gather information about the population potentially impacted by the Energy Code updates. The CalEnviroScreen indicators are used to measure factors that affect the potential¹³⁷ for pollution impacts in communities (OEHHA 2017).

Figure 5.1-2 presents the CalEnviroScreen 3.0 data for the state of California. As the figure shows, the disadvantaged communities are generally in the Central Valley, and

137 Cal. Code Regs., tit. 14, § 15130(a)(1).

eastern San Bernardino County, with a few small clusters around the port of Los Angeles and Long Beach.



75 - 100 Percentile CalEnviroScreen 3.0



**Figure 5.2-2
Disadvantaged Communities**

Source: CalEnviroScreen 3.0 CalEPA 2018

5.1.3 Environmental Impacts and Mitigation Measures

This EIR identified potentially significant impacts in the areas of Aesthetics, Air Quality, Biological Resources, Energy, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Utilities and Service Systems, and Wildfire. As noted above, only three of these areas – Air Quality, Hazards and Hazardous Materials, and Utilities and Service Systems, combined with CalEnviroScreen indicators, could have potential adverse environmental impacts on EJ populations. For the other technical areas, the EIR did not identify any significant adverse impacts, and they are not further evaluated for EJ issues. The 2022 amendments do not incentivize or induce new construction to occur in a specific location, however they create a benefit when new buildings are built serving disadvantaged communities and when existing buildings in disadvantaged communities are updated to meet newer code requirements, due to increased efficiency of the buildings, and reduced area sources of air pollution.

Air Quality

No sectors of the population, including the EJ populations, would experience an adverse air quality impact due to the proposed amendments. As shown in **Tables 4.2-2, 4.2-3 and 4.2-4**, annual criteria pollutant and hazardous air pollutant emissions would decrease. As stated in **Section 4.2 Air Quality**, there is a potential for some seasonal increased emissions from power plants during wintertime as heating sources switch from on-site fossil fuel to electricity, a portion of which is generated from fossil fuels. However, any seasonal increases would be within permit limits for the power plants that have likely been subject to offset requirements as part of the permitting process, and would moreover be reduced as the electricity system transitions to increased production of electricity from non-fossil sources of electricity. Thus, there would also not be any disproportionate impacts to any EJ communities.

Hazards and Hazardous Materials

The project would require the use of battery energy storage systems that could contain hazardous materials such as lithium ion batteries. However, there is a comprehensive system of regulatory requirements under federal, state, and local law that would ensure that any potential impact due to the transportation, installation, and use of these types of storage systems would be less than significant. For this reason, the EIR concludes that any impacts associated with these systems is less than significant. Therefore, the potential impact to EJ populations would be less than significant and would not be disproportionate.

Utilities and System Services

The project would have less than significant impact on the state's water supplies, the generation of wastewater or generation of storm water drainage because the project does not approve any building construction or influence the rate of construction or otherwise cause any consumption of water or materials and corresponding waste.

Similarly, the project would have no impacts on telecommunication infrastructure. Therefore, the project would have no impacts on the relocation or construction of these facilities. Therefore, the project would not have any impacts related to water supply, generation of wastewater or wastewater treatment capacity, generation of storm water, or telecommunication services for the general public or the EJ communities.

With respect to energy systems, the 2022 amendments may cause an increase in demand due to the incentivizing of heat pump technology. However, as discussed in the Utilities and Service Systems analysis above, any such increase can be accommodated with existing resources, and would not cause any impairment of grid reliability. There is no significant impact on utilities and services systems and therefore no impact on EJ populations. In terms of solid waste generation and disposal capacity, the project may result indirectly in reduction of solid waste due to the decreased materials used when meeting Energy Code requirements, and therefore there would be no impact to the general public or the EJ communities and thus no disproportionate impact.

5.1.4 References

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5.2 Growth Inducing Impacts

Public Resources Code section 21100(b)(5) requires an agency to include in an EIR a detailed statement setting forth the growth-inducing impact of the proposed project. Section 15126.2(e) of the CEQA Guidelines address growth inducing impacts with the following guidance:

Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct or indirect growth-inducing potential. The most direct growth inducement is construction of new housing, which would bring new population to an area.

Indirect growth inducement can result from a project that involves, for instance, if any of the following:

- Substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- Substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; or
- Removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

As indicated throughout this EIR, the Energy Code updates are regulatory and not an approval of any specific construction project. The 2022 amendments do not change any local zoning requirements, land use planning goals, urban growth boundaries; increase the rate of new construction; or direct the types of buildings to be built or their location. If approved, the proposed amendments will result in increased energy efficiency for any buildings constructed, but what is built, where it is built, and what infrastructure is necessary to support any development, is a matter for local jurisdictions to decide.

Whatever obstacles to population growth currently exist in each community, whether insufficient wastewater treatment capacity, lack of infrastructure access, lack of economic opportunity, city zoning laws, or other barriers, the 2022 amendments do not change these barriers, or could they. Public Resources Code section 25402(a)-(b) requires the CEC to adopt regulations to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy in buildings. The CEC has no statutory authorization to control local land use planning or to direct or encourage building construction and population growth in specific areas.

The 2022 amendments do not have an effect that may attract people into the community or remove conditions that lessen the desirability of living in a given place (e.g., traffic congestion, over-crowded schools, poor employment prospects). Therefore, the project would not have any growth inducing impacts.

5.3 Mandatory Findings of Significance

Under the CEQA Guidelines section 15065(a), a lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that any of the following conditions identified below will occur. In this case, since an EIR was prepared, this section is not being used as a screening tool to determine the type of environmental document to prepare, but as a forum for additional analysis on project impacts.

- a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?**

Biological Resources

Potential impacts related to habitat of fish or wildlife species were discussed in **Section 4.3 Biological Resources**.

The 2022 amendments to the Energy Code would build on existing building design and construction requirements in the 2019 Energy Code and support the state's clean energy goals, policies, and mandates. The 2022 amendments will increase the deployment of on-site renewable energy generation, reduce carbon emissions from new buildings, reduce growth in energy demand, increase energy demand flexibility, and ensure that California buildings are as energy efficient as is found to be technically feasible and cost-effective.

The project does not entail the approval of any construction project, nor does it streamline or otherwise affect the CEQA review requirements for future discretionary construction projects to be reviewed by local lead agencies or increase the rate of construction. The 2022 amendments would not substantially degrade the quality of the environment, reduce the existing habitat of any fish or wildlife species, cause any fish or wildlife population to drop below self-sustaining levels, threaten to eliminate any plant or animal community, or substantially reduce the number or restrict the range of an endangered, threatened, or rare plant or animal.

These 2022 amendments would not degrade the quality of the environment but result in a benefit as they would reduce overall energy use and the pollution-associated with electricity generation from combustion of fossil fuels, including nitrogen deposition and other environmentally harmful emissions that adversely affect flora and fauna. Therefore, the proposed measures would yield a positive environmental impact.

In addition, the project will have no potential to eliminate important examples of the major periods of California history or prehistory.

b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Section 15130(a) of the CEQA Guidelines requires a discussion of the cumulative impacts of a project when the project’s incremental effect is cumulatively considerable. Cumulatively considerable, as defined in CEQA Guidelines section 15065(a)(3), means that the “incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.” The CEQA Guidelines section 15355 defines a cumulative impact as two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.¹³⁸

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, “but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects that do not contribute to the cumulative impact.”¹³⁹

Cumulative impacts are generally assessed using a two-step analysis. The first question is whether the combined effects from both the proposed project and other projects would be cumulatively significant. If yes, the second question is whether the proposed project’s incremental effects are cumulatively considerable.¹⁴⁰

CEQA Guidelines section 15130 states that either of the following two elements are necessary to an adequate discussion of cumulative impacts: the use of a list of past, present, and probable future projects; or the use of adopted projections from a general

138 Cal. Code Regs., tit. 14, § 15130(a)(1).

139 Cal. Code Regs., tit. 14, §15130(b).

140 *Communities for a Better Environment v. California Resources Agency* (3d Dist. 2002) 103 Cal.App.4th 98, 120; see also Cal. Code Regs., tit. 14, § 15064(h)(1).

plan, other regional planning document, or a certified EIR for such a planning document.

Because the project is not a discrete localized ground disturbing project but is a set of regulatory changes to the state's building Energy Code, there are no specific projects to comprise the cumulative environment. Thus, this cumulative analysis examines types of projects that could be incentivized by state policies and laws and that might, in combination with the 2022 amendments, cumulatively impact the environment. A list of relevant policies and laws, along with a qualitative description of expected changes as a result of those policies and law are discussed in each section below.

No impacts were identified for the topics of Agriculture and Forestry, Cultural and Tribal Cultural Resources, Geology and Soils, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, and Transportation, therefore there can be no cumulative contribution and further discussion of these topics is not required.

Less than significant impacts were identified for the topics of Aesthetics, Air Quality, Biological Resources, Energy, GHGs, Hazards and Hazardous Materials, Utilities and Service Systems, and Wildfire. The remainder of this analysis will discuss whether identified incremental impacts, although less than significant, may combined with similar effects from other projects resulting in a cumulatively significant impact, and if so whether the proposed project's incremental effects are cumulatively considerable

Aesthetics

Analysis contained in the section on Aesthetics (4.1) is evidence that the 2022 amendments to the Energy Code would induce an increase in the number of surfaces that could cause glare in the state as the 2022 amendments include the new prescriptive solar PV requirements for newly constructed nonresidential buildings. Most additional PV systems would be installed on the buildings' roof tops.

This cumulative analysis section considers the impacts from the 2022 amendments in combination with other laws and policies that increase the deployment of solar PV and potentially increase glare from the built environment. The existing 2019 standards already include a requirement for PV to be included in the construction of certain buildings, the 2022 amendments to the Energy Code expand this requirement to other newly constructed building types including: high-rise multifamily, hotel-motel, unleased tenant spaces, offices, medical offices or clinics, restaurants, grocery stores, retail stores, schools, and theater/auditorium/convention center buildings. This analysis thus, considers the cumulative impact from the addition of PV to these types of buildings if constructed under the 2022 amendments.

Actions that could affect cumulative impacts associated with glare from PV installation include projects that are incentivized by policies that promote the deployment of PV projects. SB 1078 (Chapter 516, Statutes of 2002) established the RPS for electricity

supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales.

SB 100, the 100 Percent Clean Energy Act of 2018 increases the target procurement of electricity from renewable sources to 60 percent by 2030 from the previous target of 50 percent identified in SB 350, the Clean Energy and Pollution Reduction Act of 2015. Additionally, SB 100 targets 100 percent of electricity sold in California come from eligible renewable energy resources and zero-carbon resources by 2045.

Both these laws are likely to result in the continuing increase in the deployment of renewable energy generation, including medium to large utility scale PV generation.

As a result of these factors, the combined effects from the 2022 amendments to the Energy Code and projects incentivized by the above listed laws and policies would not result in cumulatively significant impacts due to glare.

The 2022 amendments do not direct the construction of non-residential commercial buildings in any place resulting in significant glare. Glare is a localized impact requiring proximity and a direct line of sight to the source and as noted in Section 4.1, any glare emitted from a source is typically transient as the source, sun or observer moves. There is no substantial evidence that construction of high-rise multifamily, hotel-motel, unleased tenant spaces, offices, medical offices or clinics, restaurants, grocery stores, retail stores, schools, and theater/auditorium/convention center buildings with rooftop PV, as a result of the amended Energy Code, will contribute to any existing or future potential glare impacts which could amplify or combine with glare originating from the medium to larger scale PV facilities driven by existing state laws.

These larger industrial projects tend to be sited in different areas; thus, combined effects are unlikely. For example, large utility scale solar PV projects are ground based and tend to be in remote desert locations away from population centers where commercial buildings are typically constructed. PV systems installed due to the 2022 amendments are typically small-scale roof top systems with varying orientations among a development, some may not even be observable from the ground, depending on building height and design. Based on the analysis set forth in Section 4.1, it is unlikely glare from a PV system installed due to the 2022 amendments to the Energy Code will combined with glare from other PV installations in a manner that would cause a significant impact; thus, there are no cumulative impacts and no further analysis is necessary.

Air Quality

Section 4.2 sets forth the full Air Quality analysis. Air quality impacts are inherently cumulative, as current emission levels and attainment status are a result of past and present activities. Typically, for an air quality cumulative assessment, the reference air basin is where the project would be constructed and emissions from the project are considered in combination with the existing level of pollution in the basin and whether the basin is in attainment or non-attainment for a criteria pollutant. Because the 2022 amendments to the Energy Code do not result in the construction of any buildings or change the rate of construction in any particular place, there is no specific air basin to consider the project's contribution of emissions.

As detailed in Section 4.2, the 2022 amendments are expected to reduce annual electricity and fossil fuel natural gas (and propane) use when compared to continued use of existing Energy Code requirements. The 2022 amendments, on a statewide basis, would annually save approximately 33 million therms of fossil fuel natural gas and 1.3 billion kWh of electricity, which result in net reductions of NO_x and SO_x emissions as a result of the 2022 amendments.

There could be a potential for seasonal air pollutant criteria emissions to increase from portions of the electricity generation sector, even if the 2022 amendments result in an annual net decrease in electricity consumption for the new and altered buildings. The increased electricity used due to the replacement of on-site fossil fuel with electric heat pumps for space heating in the cooler months of the year may result in new peaks of electricity demand and generation in those months. In the near term, existing in-state under-utilized electric sector capacity, which may include fossil generation, is projected to be available to meet an increase in winter demand when zero carbon emitting capacity is unavailable.¹⁴¹ The additional operations of these facilities would be within permitted emissions limits, and therefore accounted for in each air district's attainment plan.

At the same time any increases in electricity demand this project creates also increases the eligible retail sales for which California utilities will need to procure renewable generation in order to comply with the RPS targets. Considering the long-term impacts of this project, SB 100 objectives will ensure any seasonal near-term increases in utilization of current carbon emitting capacity will be offset by renewable energy and other zero carbon energy sources.

As a result of these factors, the combined effects from the 2022 amendments to the Energy Code will not result in cumulatively significant impacts to air quality. The 2022 amendments create an overall reduction in emissions, which would be a positive impact

141 CEC Staff. 2020. [Thermal Efficiency of Natural Gas-Fired Generation in California: 2019 Update](#). Staff report. TN#233380. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=233380&DocumentContentId=65895>.

and would not contribute to pollution levels in the state's air basins or otherwise result in a cumulative considerable net increase of any criteria pollutant. The potential seasonal increases in criteria pollutant emissions are speculative and likely to be very small, if they occur at all. Moreover, any increases that do occur will be impossible to estimate as their location, their source, and their duration cannot be reasonably ascertained. As discussed in **Chapters 4, Sections 4.2 Air Quality**, the 2022 amendments to the Energy Code would also improve indoor air quality associated with cooking within enclosed spaces such as kitchens and there would be no cumulatively considerable impacts. Because there is no adverse cumulative impact, no further analysis is necessary.

Biological Resources

Analysis contained in the Biological Resources Section (4.3) and Air Quality Section (4.2) evidences that the 2022 amendments to the Energy Code would reduce pollutants such as NO_x which would benefit biological resources. The 2022 amendments may also induce an increase in the number of surfaces that could, depending on their location, impact birds, bats and other species in the state as the 2022 amendments include new prescriptive PV requirements for newly constructed nonresidential buildings. The majority of these additional PV systems would be installed on the buildings' roof tops. For this analysis, the cumulative setting is the state of California.

While utility-scale projects are well documented to have various adverse impacts on biota (Kosciuch et al. 2020), outside of opinion pieces (e.g., Audubon 2017) and "gray literature" (anecdotal or non-peer-reviewed literature), little scientific data is available on impacts of distributed PV, such as rooftop solar. Siting of utility-scale projects frequently aims to avoid locating projects in ecologically rich areas, and rooftop solar has been proposed as a means of minimizing adverse avian impacts (Hathcock 2018). While the 2022 amendments will likely increase the deployment of small PV systems on roofs, they do not include provisions that would make it more likely for new buildings to be sited, designed, or constructed in such a way as to introduce new or additional adverse effects on candidate, sensitive, or special-status species. This cumulative analysis section considers the impacts from the 2022 amendments in combination with projects that may be incentivized by other laws and policies that increase the deployment of solar PV in the environment.

SB 1078 (Chapter 516, Statutes of 2002) established the RPS for electricity supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales.

SB 100, the 100 Percent Clean Energy Act of 2018 increases the target procurement of electricity from renewable sources to 60 percent by 2030 from the previous target of 50 percent identified in SB 350, the Clean Energy and Pollution Reduction Act of 2015. Additionally, SB 100 targets 100 percent of electricity sold in California come from eligible renewable energy resources and zero-carbon resources by 2045.

Both these laws are likely to result in the continuing increase in the deployment of renewable energy generation, including medium to large utility scale PV generation.

As a result of these factors, the combined effects from the 2022 amendments to the Energy Code and the above listed laws and policies will not result in cumulatively significant impacts to biological resources. Installation of rooftop PV systems due to the 2022 amendments would not be expected near the types of utility scale PV facilities developed under RPS and renewable energy laws. Construction of new buildings in 2023 with rooftop PV will not contribute to any existing or future potential biological impacts originating from the medium to larger scale PV facilities because these large industrial projects tend to be sited in different areas, thus combined effects are unlikely. The available literature on small distributed systems is scant and does not indicate that marginal additional small systems would be expected to create a significant adverse impact (cumulative or otherwise). As noted in the cumulative aesthetics section above, large utility scale solar PV projects are ground based and tend to be in remote desert locations away from population centers where residential and commercial buildings are typically constructed. PV systems installed due to the 2022 amendments are typically small-scale roof top systems with varying orientations among a development. Because there will be no combination with other expected medium to large scale PV projects, there are no cumulative impacts, and no further analysis is necessary.

Energy

As detailed in Section 4.4 covering Energy, the 2022 amendments do not result in inefficient, wasteful, and unnecessary consumption of energy. The 2022 amendments would result in energy savings when compared to the continued use of the 2019 standards. Specifically, there is an energy savings of 46 billion-time dependent valuation (kTDV) in 2023. TDV is the “common currency” adopted first by the CEC in 2003 as a result of the 2000 electricity crisis; it is updated every Energy Code cycle to reflect changes to energy systems resulting from adopted state energy policy. This enables time dependent valuation of all fuel types (natural gas, propane, and electricity) for the building standards, combining hourly increases and decreases in each of these fuel types into one overall energy metric. TDV creates the means to determine the value for all measures addressed by the standards, including efficiency, generation, storage, and demand response measures.

While PV and battery storage systems, envelope efficiency measures, and covered process load improvements reduce the use of natural gas, electricity, and TDV energy across all building types, the new prescriptive and performance standards for heat

pump technology for water and space heating will result in a modest increase in the total electricity consumed in affected buildings. However, as analyzed in section 4.4, the increase in electricity resulting from heat pumps would be more than offset by the natural gas savings in the same buildings as shown by the TDV savings.

Because the 2022 amendments result in significant energy savings, there is no contribution to any existing inefficient, wasteful, and unnecessary consumption of energy within the state, and no further discussion is required.

Greenhouse Gas Emissions

Chapter 4, Section 4.5 sets forth the full GHG analysis. As with air quality, GHG impacts are inherently cumulative, as current emission levels are a result of past and present projects. For this cumulative analysis, statewide emissions are considered.

The 2022 amendments are expected to cause a change in the source of power for water and space heating in new construction. Currently, natural gas and propane are often used for these purposes. Under the 2022 amendments, electric heat pumps for space heating in some building applications and climate zones in California and for water heating in building applications and other climate zones are expected to be the primary method used to comply with the amended building standards. This change in fuel source would decrease natural gas and propane consumption in new construction while correspondingly increasing electricity consumption across all resource technologies and fuels. As discussed in section 4.5 the evidence indicates that the 2022 amendments will result in a statewide reduction in GHG emissions from 2025 through 2050 as compared to the existing standards.

As a result of these factors, the combined effects from the 2022 amendments and the existing levels of GHG would not result in cumulatively significant impacts.

With an overall reduction in emissions, the impacts from the 2022 amendments would be positive and would not contribute to GHG levels or otherwise result in a cumulative considerable net increase of GHG emissions. Because there is no adverse cumulative combination, no further analysis is necessary.

Hazards and Hazardous Materials

Section 4.6 sets forth the full analysis of Hazards and Hazardous Materials. This cumulative analysis section considers the impacts from the 2022 amendments in combination with other laws and policies that will expand the use of battery systems to electrify transportation and provide stationary energy storage, potentially resulting in a significant increase in hazards and hazardous materials associated with batteries utilizing current chemistries.

SB 100, the 100 Percent Clean Energy Act of 2018 increases the target procurement of electricity from renewable sources to 60 percent by 2030 from the previous target of 50 percent identified in SB 350, the Clean Energy and Pollution Reduction Act of 2015. Additionally, SB 100 targets 100 percent of electricity sold in California come from

eligible renewable energy resources and zero-carbon resources by 2045. It is expected that the adoption of California SB 100 will result in greater deployment of battery storage options to achieve the identified goals.

Executive Order N-79-20 by Governor Gavin Newsom sets ZEV sales goals for California, obligating dramatic expansion of all-electric vehicles. This EO calls for 100 percent of in-state sales of new passenger cars and trucks to be all-electric by 2035, medium- and heavy-duty vehicles by 2045. The executive order also pushes for acceleration in the deployment of affordable fueling and charging options for ZEVs. The transition to electric vehicles will result in increased battery deployment during the time period relevant to the proposed amended regulations.

These laws result in the continuing encouragement of storage systems, which use lithium-ion batteries and have the potential to create impacts due their use of hazardous materials.

As discussed in Section 4.6, the proposed Energy Code changes would incorporate battery storage systems into specific high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings. (See Table 140.10-B, section 140.10). Battery storage equipment relies most commonly on use of lithium ion batteries for their operation.¹⁴² Currently, the Energy Code does not require battery storage for these kinds of buildings, although some buildings in California are being built with lithium ion battery storage in absence of any requirements to incorporate this technology.

The 2022 amendments' requirement to include these systems in specified buildings can be reasonably anticipated to result in marginal increases in production of lithium ion batteries and routine transport of lithium ion batteries to such construction projects, and recycling or disposal of batteries after their useful life. This would also likely result in a slight increase in generation of hazardous waste, statewide, which could potentially increase the incidence of exposure to battery-related hazardous wastes.

The 2022 amendments do not approve specific construction projects or regulate the pace or location of future construction. As such, any effects of the 2022 amendments would be indirect, occurring only as a result of buildings being constructed in compliance with the 2022 amendments after they have taken effect. As noted above, the main foreseeable indirect potential impacts derived from the 2022 amendments relate to the increase in battery storage systems installed at a specific subset of newly constructed buildings including certain nonresidential, high-rise residential, hotels, motels, and other listed buildings (See Table 140.10-B, Section 140.10).

142 Bowen et al. 2019. [Grid Scale Battery Storage, Frequently Asked Questions](https://www.nrel.gov/docs/fy19osti/74426.pdf) National Renewable Energy Laboratory. Available at <https://www.nrel.gov/docs/fy19osti/74426.pdf>.

The forecasted demand for batteries for electric vehicles in California is significantly greater than those needed for stationary structure applications and required by the project.¹⁴³ The 2022 amendment's new battery storage requirement is expected to result in a total of 300 MW of battery storage installed from 2023-2025 (CEC 2021).¹⁴⁴ The marginal increase in lithium ion batteries for energy storage systems required by the 2022 amendments could result in an incremental, but ultimately insignificant, increase in potential exposure to lithium, which is considered a hazardous material.

As a result of these factors, the combined effects from the 2022 amendments and the existing laws and policies increasing battery usage would not result in cumulatively significant impacts related to hazards or hazardous materials.

As discussed in Section 4.6, compliance with the existing comprehensive regulatory framework at the federal, state, and local level would ensure foreseeable potential combined effects related to operational hazards from the 2022 amendments and other projects stemming from laws and policies encouraging the use of battery storage would be less than significant. The lead or local governing agency would be responsible—through CEQA, building inspections, and other means—for ensuring any health and safety hazards from specific future project sites are mitigated if necessary, and for ensuring that buildings with Li-ion batteries are operated in a manner that is safe for that location and does not put the public at risk from battery related hazards.

Regarding increases in hazardous materials, it is California policy to reduce, reuse, and recycle wherever possible. It is anticipated lithium ion batteries will be repurposed for a second life, and stationary battery storage systems are a potential second life destination for electric vehicle batteries.¹⁴⁵ In addition, due to an increased demand for limited cobalt supply, rates and volume of lithium-ion battery recycling has increased (USGS, 2017a). At present, recycling activities for lithium-ion batteries primarily serve to conserve cobalt, which by comparison, is a rarer material (U.S. EPA, 2013). While not all lithium-ion batteries use cobalt, the additional volume of batteries using other metal

143 Steward et al.2019. [Economics and Challenges of Li-Ion Battery Recycling from End-of-Life Vehicles](#). National Renewable Energy Laboratory. Available at www.sciencedirect.com.

144 Athalye, Rahul, John Arent, Roger Hedrick, Nikhil Kapur, Axaule Sultanova, Ben Lalor, Silas Taylor, et al. 2021. [Building Energy Efficiency Measure Proposal to the California Energy Commission for the 2022 Update to the California Energy Code, Title 24, Part 6 Building Energy Efficiency Standards Nonresidential PV and Battery Storage](#). Report. Prepared by NORESO and E3. TN#237776. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237776&DocumentContentId=71014>.

145 [From plug-in cars to plug-in homes – EV batteries get a second life | Automotive World](#). February 14, 2018; accessed May 10, 2021. Available at <https://www.automotiveworld.com/articles/plug-cars-plug-homes-ev-batteries-get-second-life/>.

combinations combined with consumer products and stationary batteries may provide economies of scale and thus further incentive for recycling. Recycling would also help address social-justice issues associated with the cobalt industry.

As discussed in Section 4.6, the demand for lithium batteries for electrification of the transportation sector (Steward et al. 2019) is much greater than the demand for batteries that would be used for building construction. Infrastructure development which is already underway to meet the transportation sector demand could also be used to accommodate any new demand created by the Energy Code updates. The 2022 amendments would also be implemented over time as new or remodel construction is approved by the local agencies and buildings subject to the Energy Code's prescriptive requirements for battery storage systems are constructed in 2023 and beyond. This would delay the need for recycling and disposal of lithium batteries for the period of the equipment's life and provide time to plan and develop battery recycling facilities needed to meet demand. In addition, growth in the lithium-ion recycling market is expected¹⁴⁶.

In the unlikely event batteries cannot be recycled, they can be disposed in landfills. Disposal of lithium ion batteries within the state must comply with California law, including but not limited to the Hazardous Waste Control law and implementing regulations which includes the Universal Waste Rule. This rule requires used batteries to be managed as hazardous waste and prohibits the disposal of used batteries to solid waste landfills. There are two hazardous waste landfills in California that have some limited remaining capacity for disposal. They are Chemical Waste Management - Kettleman Hills and Clean Harbors Buttonwillow facilities. As discussed in **Chapters 4, Sections 4.6 Hazards and Hazardous Materials**, there are also other out of state facilities that are currently in use, primarily in Nevada, Arizona, and Utah, for other hazardous waste disposal that could accommodate the disposal of the relatively small proportion of lithium ion batteries that would be needed to accommodate the forecasted increase in waste attributable to the Energy Code updates. These landfills are designed and operate in accordance with governing state and federal laws for hazardous waste disposal.

The current and expected ability to either recycle or dispose of lithium ion batteries and the existing compliance framework for handling hazardous material would ensure the batteries installed due to the 2022 amendments would not result in significant cumulative impacts. The project's contribution reflects only a minimal shift from existing conditions, and recycling infrastructure developed to address EV recycling will be

146 Markets and Markets. 2020. "[Lithium-ion Battery Recycling Market by Battery Chemistry \(Lithium-nickel Manganese Cobalt, Lithium-iron Phosphate, Lithium-Manganese Oxide, LTO, NCA,LCO\), Industry \(Automotive, Marine, Industrial, and Power\), and Region – Global Forecast to 2030](https://www.marketsandmarkets.com/Market-Reports/lithium-ion-battery-recycling-market-153488928.html#:~:text=Key%20Market%20Players,lithium%2Dion%20battery%20recycling%20market)." Report. Available at <https://www.marketsandmarkets.com/Market-Reports/lithium-ion-battery-recycling-market-153488928.html#:~:text=Key%20Market%20Players,lithium%2Dion%20battery%20recycling%20market>. Last Accessed April 17, 2020.

available to accommodate the small incremental increase for storage devices at the end of their life.

Utilities and Service Systems

Analysis contained in the section on Utilities and Service Systems (4.7) evidences that the 2022 amendments may increase electrification of certain types of new buildings while reducing the use of natural gas within the state by providing requirements and incentives for builders to install electric appliances especially heat pumps. Overall, on a statewide basis, electricity use will be reduced compared to the existing Energy Code. But the project does have a potential to indirectly impact the mix of energy supply and related utility infrastructure.

This cumulative analysis section considers the impacts from the 2022 amendments in combination with projects incentivized by other laws and policies that are part of a broader effort to meet state goals relating to the reduction of GHGs and to increase the deployment of renewable energy. One way to achieve these goals is to expand energy efficient electrification in not just buildings but in other areas such as transportation and increase the capacity of renewable generation to meet increased electrification.

SB 350: Clean Energy and Pollution Reduction Act

The Clean Energy and Pollution Reduction Act of 2015, (SB 350, de León, Chapter 547, Statutes of 2015) establishes a target to achieve a cumulative doubling of energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030 through energy efficiency and conservation by 2030.

SB 1078 (Chapter 516, Statutes of 2002) established the RPS for electricity supply. The RPS required that retail sellers of electricity, including publicly owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. As of 2020, utilities in California are required to demonstrate procurement of renewable energy resources sufficient to meet 33 percent of each utility's retail sales. By 2030, this requirement increases to 60 percent of each utility's retail sales.

SB 100, the 100 Percent Clean Energy Act of 2018 increases the target procurement of electricity from renewable sources to 60 percent by 2030 from the previous target of 50 percent identified in SB 350, the Clean Energy and Pollution Reduction Act of 2015. Additionally, SB 100 targets 100 percent of electricity sold in California come from eligible renewable energy resources and zero-carbon resources by 2045.¹⁴⁷

147 CEC, CPUC, CARB. 2021. [California Energy Commission SB 100 Joint Agency Report Achieving 100 Percent Clean Electricity in California: An Initial Assessment. Report](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100). p. 75. TN#237167. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-SB-100>.

AB 758 (Skinner, Chapter 470, Statutes of 2009) requires the CEC to develop and periodically update an action plan to increase energy efficiency savings in existing buildings. On December 11, 2019, the CEC adopted the California 2019 Energy Efficiency Action Plan (2019 Action Plan) to serve as the state's most recent policy map for increasing energy efficiency. The 2019 Action Plan includes strategies to achieve a statewide doubling of energy efficiency savings from electricity and natural gas end uses by 2030. It also addresses financing mechanisms, resiliency, multifamily building energy efficiency, building decarbonization, industrial and agricultural energy efficiency, use of energy data to better design and target efficiency, demand response measures, and barriers and opportunities to expand low-income and rural residents' access to energy efficiency and renewable energy. AB 758 does not impose specific regulatory requirements

Executive order N-79-20 by Governor Gavin Newsom sets ZEV sales goals for California, obligating dramatic expansion of all-electric vehicles. This EO calls for 100 percent of in-state sales of new passenger cars and trucks to be all-electric by 2035, medium- and heavy-duty vehicles by 2045. The executive order also pushes for acceleration in the deployment of affordable fueling and charging options for ZEVs.

SB 1389 (Chapter 568, Statutes of 2002) requires the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC uses these assessments and forecasts to develop and evaluate energy policies and programs that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. (Pub. Resources Code, § 25301(a).) The CEC includes these energy policy recommendations in its biennial IEPR that is issued in odd-numbered years with update reports in even-numbered years.

The 2018 IEPR Update provides an assessment of energy issues facing California which will require action for the state to meet climate, energy, air quality, and other environmental goals. The assessment identifies building GHG emissions as one potential issue and indicates that building decarbonization through building codes and standards should be considered.

The 2019 IEPR, adopted on February 20, 2020, summarizes priority energy issues currently facing the state, outlining strategies and recommendations to further the state's goal of ensuring reliable, affordable, and environmentally responsible energy sources. Energy topics covered in the 2019 IEPR include, but are not limited to, electricity sector trends and building decarbonization and energy efficiency.

The 2020 IEPR provides policy recommendations in to ensure a clean, affordable, and reliable energy system. In the area of ZEV, the IEPR has identified an increase use in the use of ZEVs, including plug in electric vehicles, and a subsequent need for increased vehicle charging stations and associated infrastructure. Recommendations for incentives and policies to manage charging patterns to benefit the grid are included in the 2020

IEPR. These recommendations may also have an effect on the California electric grid due to the increased electric demand from charging facilities and possible vehicle grid integration. Amendments to the Energy Code are not expected to conflict with recommendations from the 2020 IEPR. Increases to building efficiency, renewable generation and energy storage are expected to reduce the need for energy generation for buildings.

Executive Order B-55-18. This executive order signed by former Governor Edmund Brown provides a goal of statewide carbon neutrality by 2045 and net negative emissions thereafter. Amendment to the Energy Code are not expected to conflict with this executive order. Rather, amendments promoting the shift of natural gas usage to electric usage will promote decarbonization at the building site.

Together, these laws and policies could have a significant effect on both the electrical transmission and distribution systems, which may be further affected by the increased use of electricity, demand response, and on-site renewable generation that the 2022 amendments are likely to contribute to. Independent of the proposed project, California's utility infrastructure is already undergoing a transformation to accommodate the shift from fossil fuels to renewable energy and the greater use of electricity to address climate change and ensuing wildfire risks. This shift is, in part, driven by the increasing amount of renewable and zero-carbon energy sources required through SB 100, and the state's RPS requirements as well as electrification of transportation. Utility infrastructure, including the electricity grid, is a dynamic system constantly being updated and changed in response to many factors as demand changes over time, technology changes and the location of loads shift. Utility infrastructure is also subject to reliability requirements, determined by actual projected aggregated demand from all sources, not just the buildings subject to the 2022 amendments.

The multiple laws and policies listed, as well as the 2022 amendments to the Energy Code, are purposely increasing electrification as a primary tool to increase energy efficiency and reduce the state's GHG emissions over the next 24 years. Given the strategy and phased time period, substantial evidence supports the conclusion that the state's utility infrastructure will continue to transition.¹⁴⁸

Because the grid is already transforming to accommodate projects meeting policies that encourage efficient electrification with renewable energy, implementation of the 2022 amendments would benefit the utility electric infrastructure by reducing overall energy usage, encouraging efficient and cost-effective heat pumps, and contributing to energy storage options due to battery storage requirements. Also, as stated in **Chapter 4**,

148 See [letter from PG&E TN#237100](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-03) at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-03>; See also [SB 100 report](https://www.energy.ca.gov/sb100#anchor_report) pp. 105-111, https://www.energy.ca.gov/sb100#anchor_report.

Section 4.4 Energy, existing powerplant capacity is sufficient to accommodate the shifted peaks without the need for additional development.

As a result of these factors, the combined effects from the 2022 amendments and projects incentivized by the above listed laws and policies would not result in cumulatively significant impacts to utility infrastructure. It is likely the listed laws and policies, without considering the 2022 amendments, over the next 24 years will result in the relocation or construction of transmission and distribution equipment, renewable electric power and storage facilities, the construction or relocation of which could cause cumulatively significant environmental effects. However, this project's incremental effect is not cumulatively considerable.

As detailed in Section 4.7, the proposed project is expected to indirectly reduce electricity and natural gas usage on a statewide basis when compared to continued use of existing Energy Code requirements. In addition, the current capacity of in-state electricity generation is sufficient to meet the near term expected potential increase in electrical usage from heat pump technologies in certain buildings, as a result of the project.

As discussed in Section 4.7, the grid is transforming due to other laws and policies independent of the 2022 amendments. Steps that predate the implementation of the 2022 amendments, to ensure adequate utility resources, have already been taken through the CPUC's reliability proceedings. These proceedings include a 10-year-ahead look at system needs (reliability needs of the overall electric system); local needs (reliability needs specific to areas with transmission limitations); and flexibility needs (such as the resources needed to integrate renewables).¹⁴⁹ Given that these planning processes have already considered and accommodated the states' near-term infrastructure and electrification directives, the project is not expected to have any direct or indirect effect on utility infrastructure and therefore will not be cumulatively considerable.

Wildfire

Section 4.8 sets forth the full analysis relating to wildfire risks to very high FHSZ and SRA. Also, in relation to fires, Section 4.6 sets forth the full analysis of Hazards and Hazardous Materials, with specific discussion of wildland fires in section (g). The 2022 amendments would add prescriptive solar PV and battery requirements for certain buildings, including high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings.

The main foreseeable impact related to wildfires derived from the 2022 amendments relates to the increase in battery storage systems installed in certain newly constructed

¹⁴⁹ [Pub. Util. Code §§ 454.51 and 454.52](https://www.cpuc.ca.gov/irp/), available at <https://www.cpuc.ca.gov/irp/>.

buildings including certain nonresidential, high-rise residential, hotels, motel buildings. This cumulative analysis section considers the impacts from these battery storage systems in combination with other wildfire threats potentially resulting in a significant increase in wildfire risk. However, the battery storage systems expected to result from the 2022 amendments would be located inside of or adjacent to buildings and would not easily contribute to wildfires even for those buildings near land classified for high wildfire risk. Moreover, the 2022 amendments do not make it more likely that projects would be built in these zones in such a way to cause impacts.

As a result of these factors, the combined effects from the proposed 2022 amendments to the Energy Code and existing threats for causing wildfire, such as transmission lines, would not result in cumulatively significant impacts related to wildfire. The 2022 amendments do not result in the approval of any particular project with features that result in significant impacts in regard to wildfire. The project does not require or otherwise encourage development in areas prone to wildfires. While batteries are electrical and can potentially spark a fire, there is no evidence any battery system installed under the 2022 amendments presents wildfire risk that can be combined with other existing wildfire risks, such as transmission lines or other electrical infrastructure that may spark a wildfire.

As noted in Section 4.8, the battery systems installed under the 2022 amendments would be located inside the building or inside a structure near the building. This will limit the potential for there to be any combined effects between the battery system and some other risk in inducing a wildfire. Besides a physical barrier, there are a number of standards to ensure proper operations of a battery system.

Table 4.6-1 identifies standards and codes related to the safety and performance of lithium ion batteries. Battery safety and reliability systems include voltage and current protection via software controls, physical protection via component isolation, and fire alarm and suppression systems. Depending on the battery design, there are cell, module, rack, and enclosure and control system level standards that also ensure safe operation.

Battery cells must pass abuse tests according to UL Standard 1642 for lithium batteries. This standard includes protocols for several tests designed to reduce the risk of fire or explosion, including electrical tests, mechanical tests, environmental tests, and fire exposure tests.

Given these safety measures and that the 2022 amendments would not result in additional electrical infrastructure construction, there is no substantial evidence that the operation of an enclosed lithium battery system presents a risk of inducing a wildfire that can combine with other risks, to create a cumulative impact. Therefore, further analysis is not necessary.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

As detailed in the analysis set forth in Chapter 4, as well as summarized in Table 1.1, the project will not have any substantial adverse effects on human beings. The 2022 amendments directly increase the energy efficiency of buildings that will be constructed under the code. This efficiency will provide positive impacts for humans by reducing criteria air pollutants due to a reduction in power generation. The 2022 amendments will also improve kitchen air quality by setting standards for kitchen ventilation which also benefits humans. Finally, the 2022 amendments will incentivize the reduction in use of natural gas for water and space heating, which will also improve air quality and lower GHG emissions.¹⁵⁰

Commenters also raised concerns regarding the effects of flicker in light sources and the potential limit of application of existing flicker standards to not apply to types of color-changeable lighting that were not considered when the standard was adopted. Staff is modifying the project to eliminate this potential impact, specifically by maintaining the existing scope of application of minimum flicker standards.

5.3.1 References

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¹⁵⁰ For a detailed analysis of the air quality and GHG benefits from the project see sections 4.2 Air Quality and 4.5 GHGs.

Chapter 6

Alternatives

Alternatives

6.1 Introduction and Summary Conclusions

This section evaluates a reasonable range of alternatives to the 2022 amendments. Alternatives selected for analysis are limited to those that could feasibly meet most of the project's basic objectives while reducing or avoiding any of the project's significant effects. In this Draft EIR, because no significant adverse effects on the environment would result from the project, alternatives were selected that could reduce the reasonably foreseeable but less than significant impacts that could result from the project. Alternatives considered but not evaluated in detail are discussed below, including the reasons for their dismissal from detailed consideration.

Review of information in this Draft EIR led staff to select four project alternatives for analysis and comparison to the proposed project in addition to the No Project Alternative:

- No Prescriptive Solar Alternative
- No Prescriptive Battery Storage Alternative
- No Removal of Prescriptive Compliance Path Options Alternative
- Heat Pump-Based Space Heating and Water Heating Alternative

6.2 CEQA Requirements

The CEQA Guidelines require that an EIR consider and discuss alternatives to the proposed project. Section 15126.6 of the CEQA Guidelines provides that the alternatives analysis must:

- describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project;
- evaluate the comparative merits of the alternatives;
- focus on alternatives that would avoid or substantially lessen any significant effects of the project, even if these alternatives would impede to some degree attainment of the project objectives, or would be more costly; and
- describe the rationale for selecting alternatives to be discussed and identify alternatives that were initially considered but then rejected from further evaluation.

CEQA requires that an EIR "consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation."¹⁵¹ Alternatives may be eliminated from detailed consideration by the lead agency if they

¹⁵¹ CEQA Guidelines, § 15126.6(a).

fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects.¹⁵² The range of potentially feasible alternatives selected for analysis is governed by a “rule of reason,” requiring evaluation of only those alternatives “necessary to permit a reasoned choice.”¹⁵³

An EIR is not required to consider alternatives that are infeasible.¹⁵⁴ In addressing feasibility of alternatives, factors that may be taken into account are site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site.¹⁵⁵ An EIR “need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.”¹⁵⁶

The lead agency is also required to evaluate the “no project” alternative along with its impacts. Analyzing a “no project” alternative allows decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.¹⁵⁷ “The ‘no project’ analysis shall discuss the existing conditions at the time the notice of preparation is published...as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. If the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.”¹⁵⁸

6.3 Project Objectives and Alternatives Screening

The overall purpose of the 2022 amendments is to employ technically feasible and cost-effective technologies and measures “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability” consistent with the statutory direction in the Warren-Alquist Act (e.g., Public Resources Code section 25402).

In furtherance of the project’s overall purpose, the CEC has identified the following four specific project objectives as guiding these 2022 amendments:

152 Ibid.

153 CEQA Guidelines, § 15126.6(f).

154 CEQA Guidelines, § 15126.6(a).

155 CEQA Guidelines, §§ 15126.6(f)(1), 15364.

156 CEQA Guidelines, § 15126.6(f)(3).

157 CEQA Guidelines, § 15126.6(e)(1).

158 CEQA Guidelines, § 15126.6(e)(2).

Objective 1: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy via the deployment of technically feasible and cost-effective technologies and measures;

Objective 2: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by increasing deployment and utilization of distributed, on-site renewable energy equipment and increasing the percentage of energy consumption from new residential and nonresidential buildings which is able to be served by renewable energy equipment;

Objective 3: Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy by ensuring that newly constructed buildings designed for use of natural gas equipment include wiring and other design features necessary to allow future use of electric equipment when it becomes cost-effective and technically feasible to do so; and

Objective 4: Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by improving the ability of buildings to engage in and benefit from energy storage and load management.

6.4 Alternatives Selected for Analysis

The following alternatives are evaluated in this EIR:

- 6.4.1 – No Project Alternative
- 6.4.2 – No Prescriptive Nonresidential Solar Alternative
- 6.4.3 – No Prescriptive Battery Storage Alternative
- 6.4.4 – No Removal of Prescriptive Compliance Path Options Alternative
- 6.4.5 – Heat Pump-Based Space Heating and Water Heating Alternative

Other than the No Project Alternative, because no significant adverse effects on the environment would result from the project, project alternatives were developed that could feasibly avoid or lessen the proposed project's potentially less than significant impacts. A comparative impact analysis is followed by an assessment of the extent to which each alternative could meet the basic project objectives and a discussion of potential feasibility issues. The alternatives selected for analysis in this Draft EIR represent options that would incrementally increase or decrease requirements relative to the 2022 amendments. The comparative analysis that follows is based on the analysis of the technical areas evaluated in **Chapter 4, sections 4.1 through 4.8** of this document.

6.4.1 No Project Alternative

Description

The purpose of a no project alternative is to provide decision makers with comparative information regarding the effect of approving the project versus not approving the project.¹⁵⁹ A no project alternative considers existing environmental conditions, as well as what would reasonably be expected to occur in the foreseeable future if a project were not approved, based on current plans and other available information about expected future conditions.¹⁶⁰ When a project is the revision of an existing regulatory plan, then the no project alternative will be the continuation of the existing plan into the future.¹⁶¹

Here, the no project alternative is that the CEC does not adopt the 2022 amendments; under this alternative, the existing 2019 Energy Code would remain in effect with its existing building design and construction requirements.

The 2022 amendments would encourage builders to install efficient and cost-effective electric heat pumps for space heating or water heating in particular newly constructed building types in particular climate zones in California. Implementation of these amendments would shift some fraction of building end uses away from using fossil fuel—natural gas or propane—for water and space heating. As discussed in **Chapters 4, Sections 4.2 Air Quality, 4.4 Energy, and 4.5 Greenhouse Gas Emissions**, this would shift fossil fuel consumption patterns compared to the continuation of the 2019 Energy Code. Overall, on an annual basis the project is expected to reduce electricity and fossil fuel use compared to the existing 2019 Energy Code. Thus, under the no project alternative, the shifts from fossil fuel to efficient electricity usage anticipated under the proposed project, and the overall reductions in annual electrical and fossil fuel use anticipated under the proposed project, would not be expected to occur.

The measures included within the 2022 amendments are by their nature modular: they apply to separate building types and systems and, with some exceptions, their feasibility and cost-effectiveness generally are not dependent on one another. As a consequence, the project could be modified to take no action in a specific area while pursuing 2022 amendments in other areas. To account for this, consideration of the no project alternative (taking no action at all) is followed by an analysis of several narrower alternatives, which are derivatives of the no project alternative that would preserve some elements of the 2022 amendments and remove other elements.

159 CEQA Guidelines, § 15126.6(e)(1).

160 CEQA Guidelines, § 15126.6(e)(2).

161 CEQA Guidelines, § 15126.6(e)(3)(A).

Aesthetics

As identified in **Chapter 4, Section 4.1 Aesthetics**, the project would require increased deployment of solar panels that would have less than significant aesthetic impacts related principally to daytime glare from the panels. The no project alternative would not lead to the increased deployment of solar panels expected under the project and would instead maintain the existing level of PV deployment due to the 2019 Energy Code, thus avoiding the potential for any new effects from increased glare from the proposed project. However, as noted in **Section 4.1 Aesthetics**, “[m]odern PV panels reflect as little as 2 percent of incoming sunlight, about the same as water,” and “[a]ny perceived glare would be temporary (a few minutes) as the reflected beam of the sun moves.” It should also be noted that a fraction of nonresidential buildings already install solar PV systems at or after construction (i.e., without being required to do so by the Energy Code) and that low-rise residential buildings are currently subject to solar PV requirements, making the aesthetic appearance of solar panels increasingly commonplace. The impact is therefore less than significant. Based on this, the no project alternative would not avoid a significant adverse impact of the project related to aesthetics.

Air Quality

As identified in **Chapter 4, Section 4.2 Air Quality**, the project would cause a less than significant impact on air quality by increasing the number of new buildings that will be equipped with electric heat pumps instead of fossil fuel appliances for space or water heating, and by reducing electricity and fossil fuel use overall through the introduction of new efficiency measures and new onsite renewables and energy storage requirements.

The anticipated shift to electric heat pumps resulting from the project would reduce air pollutant emissions from fossil fuel heating appliances onsite at new and certain altered buildings. But because California’s generation resources mix currently includes a proportion of fossil fuel generation, the increased electricity use by heat pumps would consequently increase air pollutant emissions from portions of the electricity generation sector for heating. Specifically, the buildings’ use of heat pumps for space heating could result in small increases of electricity peak demand and generation during cooler months. However, as discussed in **Chapter 4, Section 4.2 Air Quality**, the increase in electricity demand will have no significant adverse impacts because the project will decrease annual energy use compared to the existing 2019 Energy Code and thus decrease net criteria pollutant and toxic air contaminant emissions statewide.

The no project alternative could avoid small seasonal increases in air pollutant emissions from portions of the electricity generation sector, but it would prevent the overall statewide net decrease in air pollutant emissions anticipated to result from the project. Based on this and the fact that the proposed project will not create any

significant adverse impacts, the no project alternative would not avoid a significant adverse impact of the project related to air quality.

Biological Resources

As identified in **Chapter 4, Section 4.3 Biological Resources**, the project could have less than significant impacts on biological resources. The project would cause increased deployment of solar PV panels that could conceivably result in indirect future impacts to biological resources, such as avian injury and mortality, depending on the location, size, and design of the facility. However, the project would cause overall reductions in air pollutants statewide that would benefit biological resources, primarily by reducing nitrogen deposition and other toxic air contaminants relative to minimum compliance with the 2019 Energy Code and therefore to the no project alternative. Under the no project alternative, the potential for foreseeable but less than significant indirect impacts related to the expanded PV deployment would be avoided (as would the benefits to biological resources from an overall reduction in air pollutants). Therefore, the no project alternative would not avoid a significant adverse impact of the project related to biological resources.

Energy and Energy Resources

As identified in **Chapter 4, Section 4.4 Energy**, the project would cause less than significant energy impacts by encouraging builders to construct buildings that use electric heat pumps instead of fossil fuel (natural gas and propane) appliances for space and/or water heating depending on the climate zone. The buildings' use of efficient heat pumps would decrease fossil fuel consumption in newly constructed buildings and consequently increase electricity consumption for heating. However, the project would result in an overall reduction in the use of both electricity and natural gas, as the electricity savings from measures for both newly constructed buildings and alterations to existing buildings would strongly outweigh the relatively small increase in electricity used by heat pumps. The buildings' use of heat pumps for space heating could shift peaks in electricity consumption in newly constructed buildings during certain cooler seasons, relative to what would have been built under the existing building standards. Existing in-state under-utilized generation capacity is projected to be available to meet an increase in demand.

The "no project" alternative could avoid small seasonal increases in peak electricity demand, which may be more pronounced in some areas of the state than others, but it would prevent the overall reduction in the use of both electricity and natural gas causing it to fail to satisfy Objective 1. Because the project does not create a significant effect on energy and energy resources, the "no project" alternative would not avoid a significant impact.

Greenhouse Gas Emissions

As identified in **Chapter 4, Section 4.5 Greenhouse Gas Emissions**, the project would reduce GHG emissions at the building site while increasing them on an increasingly clean grid by encouraging builders to construct buildings that use electric heat pumps instead of fossil fuel appliances for space or water heating, and would reduce electricity and fossil fuel use overall. The shift to electric heat pumps would reduce GHG emissions from fossil fuel heating appliances onsite at newly constructed buildings. But because California's generation resources mix currently includes a proportion of fossil fuel generation, then the increased electricity use by heat pumps would consequently increase GHG emissions from portions of the electricity generation sector for heating. However, the net effect of the project is a statewide reduction in GHG emissions, and the adverse effects of GHG emissions are not dependent on geographical location of the source of the emissions. Because GHG emission impacts are global rather than local, local or seasonal increases do not create an impact when overall GHG emissions are reduced. Therefore, the project will not create an adverse impact related to GHG emissions and the "no project" alternative would not avoid a significant impact related to GHG emissions (and would instead prevent the beneficial statewide reduction in GHG emissions that would result from the project).

Hazards and Hazardous Materials

As identified in **Chapter 4, Section 4.6 Hazards and Hazardous Materials**, the project would cause less than significant hazardous materials impacts by requiring inclusion of battery storage systems in certain newly constructed nonresidential buildings, the vast majority of which are reasonably anticipated to use lithium ion batteries for this purpose. The project would cause a marginal increase in production, transportation, use, and disposal of lithium ion batteries compared to what would already be expected to meet the demands of the transportation and utility sectors. Comprehensive federal, state, and local laws relating to the transport, use, and disposal of lithium ion batteries would ensure that any incremental increase in risk to the public and environment from the use of lithium ion batteries resulting from the Energy Code updates would be less than significant.

The project's use of these batteries would ensure greater self-utilization of energy generated by installed solar PV systems and, in so doing, minimize or eliminate the building's impacts on daily peak energy demands while also improving building resiliency and self-reliance by reducing its dependence on grid-delivered energy. Increased self-utilization also reduces the total amount of power provided from the grid. Lastly, battery storage systems can in most cases provide power during grid outages,

enhancing building resiliency and reducing the effects of outages on building occupants.¹⁶²

Because the project will not cause a significant hazards impact, the “no project” alternative would not avoid a significant hazards and hazardous materials impact associated with the increased use of lithium ion batteries. The no project alternative would, however, increase adverse impacts relative to the project in emissions and use of energy resources.

Utilities and Service Systems

As identified in **Chapter 4, Section 4.7**, the project would cause less than significant impacts to utilities and service systems by increasing electrification of certain types of newly constructed buildings while reducing the use of natural gas. Overall, increased energy and demand usage from specific heat pump measures are offset by other measures so the 2022 amendments are expected to indirectly reduce electricity and natural gas usage when compared to continued use of 2019 Energy Code requirements. Implementation of the 2022 amendments would benefit the utility electric infrastructure by reducing overall energy usage and lessen the need for infrastructure expansion by contributing to energy storage options due to battery storage requirements. Seasonal increases in demand for electricity for building heating can be met with current in-state electricity generation capacity. Because the project will not cause a significant impact on utilities and service systems, the “no project” alternative would not lessen or avoid a significant impact on the state’s utility infrastructure. The no project alternative would, however, prevent the state from achieving greater energy efficiency in buildings, and therefore forgo the overall reduction of energy usage in the state.

Wildfire

As identified in **Chapter 4, Section 4.8**, the project could cause less than significant wildfire impacts by requiring inclusion of battery storage systems in certain newly constructed nonresidential buildings in SRA or very high FHSZ. The industry standards and compliance with laws such as the fire code that would be required to install and operate a battery system would ensure that the risks of battery fault or failure are managed and that there is an insignificant likelihood of harm to the environment and to public safety.

162 Athalye, Rahul, John Arent, Roger Hedrick, Nikhil Kapur, Axaule Sultanova, Ben Lalor, Silas Taylor, et al. 2021. [Building Energy Efficiency Measure Proposal to the California Energy Commission for the 2022 Update to the California Energy Code, Title 24, Part 6 Building Energy Efficiency Standards Nonresidential PV and Battery Storage](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237776&DocumentContentId=71014). Report. Prepared by NORESO and E3. TN#237776. Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237776&DocumentContentId=71014>.

The no project alternative avoids the possibility of impacts associated with requiring installation of lithium ion batteries in future specified nonresidential buildings in SRAs and very high FHSZs, though it is worth noting that battery storage systems will remain available to be incorporated into the design of newly constructed buildings in California, at the discretion of the building owner, and will receive credit for their effects on overall building energy efficiency under the existing 2019 Energy Code's performance compliance approach. That is, while the number of such systems installed is likely to be substantially smaller under the 2019 Energy Code than under the proposed project, and installation of these systems will not be compelled by the Energy Code but would instead be an elective compliance choice of a given builder, the number of systems installed in California will not be zero¹⁶³ and the Energy Code will continue to incentivize installation of these systems by appropriately modeling their energy benefits. Furthermore, in the absence of a battery energy storage system installed at construction under the project alternative, building owners and occupants may turn to more volatile sources of backup generation such as portable fossil fuel backup generators, and in such cases, the potential wildfire, electrocution, and carbon monoxide poisoning risks associated with certain new nonresidential buildings in SRAs and very high FHSZs could increase.¹⁶⁴

Because the project will not cause a significant wildfire impact, the "no project" alternative would not avoid a significant wildfire impact associated with the increased use of lithium ion batteries. The continuation of the 2019 Energy Code that would occur under the no project alternative would result in a greater total demand for energy. While the likelihood of either the existing 2019 Energy Code or 2022 amendments being a direct or indirect causal or exacerbating factor in a wildfire is extremely remote in both the project and no project alternatives, available evidence does not indicate that potential wildfire impacts are likely to be lower for the no project alternative.

Feasibility and Attainment of the Project Objectives

163 As noted in Chapter 4, Section 4.6 Hazards and Hazardous Materials, California is on track to meet its AB 2514 target of procuring 1,325 MW of energy storage capacity, including distributed energy storage resources, by 2024 even under a no project alternative scenario.

164 Honda. [Generator Safety, Honda Power Equipment webpage](https://powerequipment.honda.com/generators/generator-safety) at <https://powerequipment.honda.com/generators/generator-safety>. (discussing fire, electrocution, and carbon monoxide poisoning risks associated with the misuse or misplacement of portable fossil fuel generators). Last accessed May 7, 2021; See also Moench, Mallory. 2019. "[During PG&E outages, generators caused fires, carbon monoxide poisoning.](https://www.sfchronicle.com/california-wildfires/article/During-PG-E-outages-generators-caused-fires-14833601.php)" News article. San Francisco Chronicle. Available at <https://www.sfchronicle.com/california-wildfires/article/During-PG-E-outages-generators-caused-fires-14833601.php>.

Although the project does not approve any construction projects or regulate the rate and quantity of new building construction, the reasonably foreseeable implementation and compliance actions taken in response to the 2022 amendments would meet all of the project objectives. These amendments include requirements and measures, such as ensuring that California buildings are as energy efficient as is found to be technically feasible and cost-effective, increasing the deployment of onsite renewable energy generation, reducing growth in energy demand, and increasing energy demand flexibility and grid reliability. The project would also have environmental benefits such as reducing carbon emissions from new buildings. These benefits are analyzed in the measure proposals submitted through the statewide CASE initiative, Vertiv, and CEC staff reports listed in **Appendix D**.

The no project alternative would not attain any of the project objectives identified above in **Section 6.3**. As the existing 2019 Energy Code would not be altered, the no project alternative would not further reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, would not deploy additional feasible and cost-effective technologies and measures, would not increase deployment and utilization of distributed, on-site renewable energy equipment, would not increase the percentage of energy consumption from new buildings that can be served by renewable energy equipment, would not ensure that newly constructed buildings designed for use of natural gas equipment include design features to allow future use of electric equipment, and would not improve the ability of buildings to engage in and benefit from energy storage and load management.

6.4.2 No Prescriptive Nonresidential Solar Alternative (Section 140.10(a))

An alternative to the project as proposed would be to forego adopting a minimum level of solar PV equipment as a requirement for newly constructed nonresidential buildings of the specified types; this alternative would mean not adding Section 140.10(a) or its subsections¹⁶⁵ while pursuing the remaining amendments. Doing so avoids the possibility of impacts associated with glare (aesthetics), and avian harm and mortality (biological impacts) that could be associated with the installation of solar PV panels, as discussed above in the discussion of the No Project alternative. The absence of nonresidential solar PV systems means that the quantity of electricity expected to be sourced from the on-site panels would instead be sourced from the grid.

In the near term, this marginal additional grid-sourced electricity would be produced using the current and future mix of generation resources, which includes natural gas power plants as well as renewables in varying quantities depending on where the electricity is consumed in California, what time of the day and year it is, and other

165 Cal. Code of Regs., tit. 24, Part 6, § 140.10(a).

factors. Relative to the project, this alternative impairs achievement of the project objectives, which include increasing grid reliability through increased deployment of renewable energy and reducing emissions from power plants. It also would greatly reduce GHG emissions benefits of the project.

Because the project will not cause significant environmental impacts, the No Prescriptive Nonresidential Solar Alternative not to require solar PVs on certain nonresidential buildings would not lessen or avoid significant environmental impacts. In addition, this alternative would fail to meet Objective 2, as it would not “increase deployment and utilization of distributed, on-site renewable energy equipment.” The alternative does not avoid any significant adverse impacts. For this reason, staff did not find this alternative to be superior to the project.

6.4.3 No Prescriptive Nonresidential Battery Storage Alternative (Section 140.10(b))

An alternative to the project as proposed would be to forego adopting requirements for a minimum capacity battery storage system as a requirement for newly constructed nonresidential buildings for which minimal solar PV systems are required. Specifically, this alternative would remove the project’s addition of Section 140.10(b)¹⁶⁶ to the Energy Code while pursuing all remaining amendments. Doing so would avoid the less than significant impacts associated with hazardous materials.

The absence of a system for capturing generation from the solar PV array in excess of the moment-to-moment needs of the building has two primary consequences. First, the fraction of the energy generated by on-site solar PV equipment that could not immediately be used on-site would be exported to the grid. Consequently, the renewably generated electricity produced by the panels that could potentially be captured by an on-site storage system for later use is exported to the grid at times when the grid may be flush with renewable resources.

Second, the building will require grid-sourced electricity during those hours where the on-site solar PV system is not providing electricity and where a battery storage system would have been able to be discharged to serve building loads, including during daily ramp up and peak periods where marginal demand comes at the highest cost both in emissions and dollars.

The documents relied upon for the proposed requirement show that pairing battery storage with solar PV systems is feasible, cost-effective, extends the benefits of on-site generation by allowing the building to meet more of its own loads, and helps lessen grid impacts of newly constructed buildings both with regards to hourly exports and peak demands. As a result, pursuing this alternative would fail to achieve Objectives 2 and 4, as it would not “improve the ability of buildings to engage in and benefit from energy

166 Cal. Code of Regs., tit. 24, Part 6, § 140.10(b).

storage and load management” nor would it “increase[] the percentage of energy consumption from new residential and nonresidential buildings which is able to be served by renewable energy equipment” by capturing excess generation during the middle of the day and using it to meet demands during non-generating periods, including peak demand periods. It also would greatly reduce GHG emissions benefits of the project. The alternative does not avoid any significant adverse impacts. For these reasons, staff did not find this alternative to be superior to the no project alternative.

6.4.4 No Change to Prescriptive Compliance Path for Natural Gas Alternative

An alternative to the project as proposed would be to forego the removal of inefficient fossil fuel-reliant prescriptive compliance options, thereby allowing a “business as usual” approach to the builder’s ability to select between electric and mixed-fuel building designs when seeking project approval. Doing so avoids less than significant impacts associated with increased electricity demand (See **Chapter 4, Section 4.4 Energy Resources**) and potential increased refrigerant use (See **Chapter 4, Sections 4.2 Air Quality and 4.5 Greenhouse Gas Emissions**) potentially attributable to the incentivizing provisions in the project. It also would allow buildings to be able to avoid beneficial impacts associated with reductions in fossil fuel combustion resulting from the use of efficient heat pumps for setting the performance target for buildings.

However, the potential adverse environmental impacts associated with the more stringent performance baseline and the incentivization of electric design via the removal of mixed fuel prescriptive options are found to be less than significant. Moreover, this alternative fails to achieve Objectives 1, 2, and 4, as it does not “reduce the wasteful, uneconomic, inefficient or unnecessary consumption of energy via the deployment of technically feasible and cost-effective technologies,” specifically heat pump technologies, nor does it “increase the percentage of energy consumption from new residential and nonresidential buildings which is able to be served by renewable energy equipment”, including onsite and grid-level solar PV equipment and other sources of renewable electricity. It also would greatly reduce GHG emissions benefits of the project. The alternative does not avoid any significant adverse impacts. It is therefore not superior to the no project alternative.

6.4.5 Heat Pump-Based Space Heating and Water Heating Alternative

An alternative to the proposed project would be to use heat pump equipment for both the prescriptive and performance-based compliance approaches for all space and water heating end uses in all newly constructed buildings, in addition to pursuing all other proposed amendments. This change would be expected to substantially increase the number of newly constructed buildings that would install heat pumps for both of these heating end uses during the 2023, 2024 and 2025 time period due to the Energy Code. As discussed below, this alternative would cause the change to heat pump technology

for space and water heating end uses to occur precipitously without the opportunity for a transition for market and industry adoption.

This alternative would also result in increased demand for electricity by newly constructed buildings compared to the project and a corresponding decrease in on-site fossil fuel use by newly constructed buildings, representing a shift in associated combustion emissions from occurring on-site to occurring at utility generation facilities. As explained in **Chapter 4, Sections 4.2 Air Quality, 4.4 Energy Resources, and 4.5 Greenhouse Gas Emissions**, the project will not adversely impact the environment because it will cause a net decrease in annual energy demand and associated emissions. Because the project will not cause significant environmental impacts, the heat pump space and water heating alternative would not avoid significant environmental impacts.

It should be noted that although this alternative results in a reduction of on-site combustion gases, exposure to on-site combustion is not an impact of the project; rather, it is a characteristic of the existing regulatory setting for newly constructed buildings which would continue if the project were not approved. Therefore, it is inaccurate to characterize the beneficial effects not realized under this alternative as an adverse impact caused by the project, because a decision to not adopt this alternative is equivalent to “the continuation of the existing plan, policy or operation into the future,” meaning the existing 2019 Energy Code and its existing level of allowance of mixed fuel construction.¹⁶⁷

Separate from environmental impacts, the absence of a transition period where mixed-fuel buildings remain allowed under the performance approach to compliance could be expected to cause sizeable economic and market impacts, which contribute to the infeasibility of this alternative at this time. The current market penetration of heat pump space and water heating equipment is low: data from the CHEERS registry¹⁶⁸ shows that for residential buildings permitted under the 2013 and 2016 Building Standards Code (meaning building permits requested between January 1, 2014 and January 1, 2020), the statewide rate of adoption of electric water heating of all types (not solely

167 CEQA Guidelines, § 15126.6(e)(3)(A). See also *Lake Norconian Club Found. v. Dep't of Corr. & Rehab.* (2019) 39 Cal.App.5th 1044, 1051 (“[T]he failure to act is not itself an activity, even if, as may commonly be true, there are consequences, possibly including environmental consequences, resulting from the inactivity.”).

168 CHEERS. [CHEERS website](https://www.cheers.org/) at <https://www.cheers.org/>. (“CHEERS is an online verification platform where building industry professionals register projects for California energy code compliance.” CHEERS is an approved Home Energy Rating Service (HERS) Provider under California Code of Regulations, title 20, sections 1670-75.)

heat pump) was less than two percent, and that the prevalence of all-electric construction tracked very closely with use of electric water heating. Electric space heating fared better in isolation, particularly for low rise multifamily: nearly half of low-rise multifamily units were served by electric space heating equipment of some kind, though this level falls to eight percent of proposed designs and four percent of final installs for single family construction, as seen in **Appendix C**.

An immediate shift to requiring that 100 percent of the market be served by heat pump equipment for these end uses could potentially result in equipment and labor shortages.¹⁶⁹ Prices could rise significantly, and construction projects could be delayed in cases where equipment and/or skilled installers cannot be acquired. Also, stakeholders have stated that a rapid transition away from natural gas can leave insufficient time for retraining of natural gas plumbing installation professionals, potentially resulting in increased unemployment.¹⁷⁰

Part of the rationale for selection of the project over a combined heat pump space and water heating alternative is the avoidance of these economic impacts. Although this rationale is distinct from environmental impacts, “economic viability” and the “availability of infrastructure” are “[a]mong the factors that may be taken into account when addressing the feasibility of alternatives.”¹⁷¹ Taken as a whole, these impacts raise concerns that an immediate transition to the sole use of electric heat pump equipment for the prescriptive and performance standards may not be economically feasible.

There are also technical limitations on the ability to replace central boiler systems in newly constructed, multi-family and nonresidential buildings with currently, primarily experimental central heat pump systems.¹⁷² The market penetration for this use as of now is effectively zero percent, with a total of no more than one hundred installations

169 CEC staff. 2021. [Approaches to Zero Net Energy Cost-Effectiveness in New Homes](#). California Energy Commission. Publication Number: CEC-500-2021-025. Available at <https://ww2.energy.ca.gov/2021publications/CEC-500-2021-025/CEC-500-2021-025.pdf>.

170 2022 Energy Code Update Pre-Rulemaking, [19-BSTD-03](#), TN# 237095.
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-03>

171 CEQA Guidelines, § 15126.6(f)(1).

172 Hoeschele, M. and E. Weitzel. 2017. [Multifamily Heat Pump Water Heater Evaluation](#). Report. Alliance for Residential Building Innovation. Available at https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/66430.pdf

statewide of which CEC staff are aware.¹⁷³ This means a dearth of laboratory and field performance data by which a reliable performance model for estimating energy and emissions could be established, hampering the ability to evaluate energy costs and cost-effectiveness or even to create performance-based compliance approaches for these buildings. Use of ganged small water heaters to provide a function equivalent to a large boiler is still novel and exploratory, and very few products are designed to support this configuration.¹⁷⁴ Similarly, there are open questions regarding the efficacy of using equipment designed to provide domestic hot water to also provide space heating. Lastly, there is a relative absence of design standardization regarding use of centralized heat pump equipment compared to central boiler products and system designs. The lack of real world projects with documented equipment and installation costs also inhibits cost-effectiveness analysis, and likely would lead to premium costs that would be prohibitive to mainstream applications.

The combined effect of these limitations is to inject an amount of uncertainty into project designs and expectable outcomes, impairing staff's ability to state with certainty that central system heat pump designs are technically feasible, will result in energy savings and will be cost-effective to install. Neither the CBECC nor EnergyPlus building energy modeling software possess a software model for heat pump driven central systems, meaning that CEC staff are not able to make determinations that energy consumption and associated costs would be lower than for central natural gas equipment or that these reductions would be enough to offset any construction cost increases and support the finding of cost-effectiveness required by the CEC's statutory authority. Although the situation is expected to change as the market for these types of systems evolves, the current lack of performance and technical feasibility data means this alternative cannot be determined to be energy efficient or cost-effective.

There also are similar issues related to the use of heat pump space heating in climates with winter temperatures below 40° F. At these temperatures heat pumps lose capacity to extract heat from the outside air.¹⁷⁵ Conventional heat pumps switch from heat

173 Pande, Abhijeet, Jingjuan (Dove) Feng, Julianna Yun Wei, Mia Nakajima. [All-Electric Multifamily Compliance Pathway](#). Report. Prepared by TRC. TN#237692. Available at https://title24stakeholders.com/wp-content/uploads/2021/04/2022-T24-Final-CASE-Report_MF-All-Electric_updated_V2.pdf.

174 Pande, Abhijeet, Jingjuan (Dove) Feng, Julianna Yun Wei, Mia Nakajima. [All-Electric Multifamily Compliance Pathway](#). Report. Prepared by TRC. TN#237692. Available at https://title24stakeholders.com/wp-content/uploads/2021/04/2022-T24-Final-CASE-Report_MF-All-Electric_updated_V2.pdf.

175 Shen, Bo. 2016. [High Efficiency Cold Climate Heat Pump: 2016 Building Technologies Office Peer Review](#). Report. U.S. Department of Energy, Energy Efficiency and Renewable Energy. Available at https://www.energy.gov/sites/prod/files/2016/04/f30/32212_Shen_040616-1135.pdf.

pump mode to electric resistance at or about this temperature. As electric resistance becomes more dominant, the heat pump efficiency advantage is lost, along with the resulting emissions and energy cost reduction advantages. For this reason, the proposed 2022 amendments do not use heat pumps as the basis of the prescriptive and performance standards for some building types and some climate zones. There are national efforts to develop cold-climate heat pumps that will maintain the heat pump advantages at lower temperatures.¹⁷⁶

With evolution of heat pumps as replacements for central boiler-driven systems and technology advancements for improved cold-climate performance that may occur with further market exploration, information could become available necessary to show that this alternative could achieve the project objectives at a future Energy Code update cycle. However, the lack of existing data supports a conclusion that its implementation at this time cannot be deemed to be either cost-effective or technically feasible. Although not directly incorporated into the environmental analysis, additional risks and delays in construction of buildings, and new housing in particular, could impact California's goals relating to the availability of housing generally and affordable housing in particular,¹⁷⁷ separate from the project objectives applicable to this project. Because this alternative does not avoid any significant adverse impacts, cannot be determined to meet project objectives, and is not economically or technically feasible, this alternative is not environmentally superior to the project alternative.

6.5 Alternatives Considered and Not Evaluated Further

Some of the alternatives initially considered by CEC staff for this analysis were eliminated from detailed consideration because they could not feasibly be accomplished, would not avoid any significant impacts, or would fail to meet most of the basic project objectives.¹⁷⁸ The following discussions provide staff's reasons for eliminating these alternatives from further analysis and comparison to the project.

6.5.1 Alternative Not Evaluated Further: Natural Gas Equipment

176 Nelson, Carl, Jon Blaufuss, Christopher Plum, Josh Quinnell, Nick Brambilla, Elena Foshay, Jennifer Edwards, et al. 2018. [Minnesota Energy Efficiency Potential Study: 2020-2029](https://www.mncee.org/MNCEE/media/PDFs/MN-Potential-Study_Final-Report_Publication-Date_2018-12-04.pdf). Report. Prepared by Center for Energy and Environment, Optimal Energy and Seventhwave for the Minnesota Department of Commerce, Division of Energy Resources. Available at https://www.mncee.org/MNCEE/media/PDFs/MN-Potential-Study_Final-Report_Publication-Date_2018-12-04.pdf.

177 Office of Governor Gavin Newsom. 2020. [Governor Newsom Signs Legislation Boosting Housing Production in California to Fight Affordability Crisis](https://www.gov.ca.gov/2020/09/28/governor-newsom-signs-legislation-boosting-housing-production-in-california-to-fight-affordability-crisis/). News release. Available at <https://www.gov.ca.gov/2020/09/28/governor-newsom-signs-legislation-boosting-housing-production-in-california-to-fight-affordability-crisis/>

178 CEQA Guidelines, § 15126.6(c).

Prohibition Alternative

An alternative requested by a portion of the stakeholders for the project is to fully prohibit the use of natural gas equipment in newly constructed buildings. Under this alternative, the option to install natural gas equipment by using performance-based compliance would be removed, and buildings would be required to use heat pumps or other electric technologies, whether efficient or not, to meet building demands for space heating, water heating, residential cooking, clothes drying and other end uses.

Space and water heating represent upwards of 66 percent of natural gas loads in commercial buildings and 80 percent in residential buildings. Those end uses represent the major opportunity to save energy through efficiency and simultaneously achieve building decarbonization.¹⁷⁹ Once the market is able to transition to the effective integration of heat pumps in most applications, and there is progress on the challenging endeavor to develop acceptable and reliable alternatives to replace at least some central boiler-driven systems in multi-family and nonresidential buildings, most of that major opportunity for feasible and cost-effective energy savings will have been realized. The remainder offer only limited energy savings (e.g., residential cooking) or extremely low market acceptance (e.g., heat pump clothes dryers). It is not clear how other end uses could be addressed through feasible and cost-effective energy savings.

Moreover, this alternative was found not to be feasible as it risks exceeding the CEC's statutory authority and direction relating to establishing building energy efficiency standards. Whereas the proposed project establishes a performance baseline using prescriptive measures shown to result in an overall more efficient building, this alternative would ban the use of natural gas without regards to the efficiency of the proposed end uses and based on grounds outside of "reduc[ing] the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and [managing] energy loads to help maintain electrical grid reliability[.]" Without the ability to demonstrate that a measure saves energy and is cost-effective, there is no clear statutory authority that the CEC can rely on to bar efficient use of natural gas within buildings as part of a proceeding to adopt new and updated building energy efficiency standards.

6.5.2 Alternative Not Evaluated Further: Additional building efficiency measures

As a part of developing the list of building energy efficiency measures to include as amendments to the Energy Code, staff evaluated conceptual proposals submitted by

179 German, Alea, Bill Dakin, Joshua Pereira, Ben White, Vrushali Mendon, Elizabeth McCollum. 2020. [Residential Energy Savings and Process Improvements for Additions and Alterations](#). Report.

Prepared by Frontier Energy, Resource Refocus, TRC. Available at https://title24stakeholders.com/wp-content/uploads/2020/08/SF-Additions-and-Alterations_Final_-CASE-Report_Statewide-CASE-Team.pdf.

stakeholders for roughly 500 possible measures for their technical feasibility and cost-effectiveness. Of those, a list of 80 measures was selected for further development based on consideration of their anticipated level of benefit, their relative cost-effectiveness, and their likelihood of successful implementation if adopted as minimum standards. Development and refinement of these measure proposals occurred over a year-and-a-half long process, with close interactions between CEC staff, proposal drafters and other stakeholders. Staff also hosted topic-focused workshops and released a pre-rulemaking draft of proposed amendments to solicit additional input from stakeholders and the general public, and further refined the 2022 amendments based on this input.

The pursuit of additional possible energy efficiency measures is not further analyzed in this EIR. The selection of included measures represents those staff found to best meet project objectives, and for which there are complete and robust supporting analysis demonstrating technical feasibility. Additional measures would not avoid significant impacts, as no significant impacts have been identified for the project. Additional efficiency measures would be reasonably expected to have marginal incremental impacts (both beneficial and adverse). Because the Energy Code is updated triennially, many of the additional efficiency measures not selected at this time will be considered for future amendments to the Energy Code and included in the future amendments if available evidence indicates that they meet the project objectives for future amendments.

6.6 Environmentally Superior Alternative

CEQA requires that if “the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.”¹⁸⁰

Because the substantial evidence reviewed in the preparation of this EIR indicates that the project would not result in any significant environmental impacts, there is no clear environmentally superior alternative to the project. The proposed project best obtains the project objectives without creating significant adverse impacts. The project’s foreseeable impacts avoided by the alternatives are less than significant, and the alternatives’ infeasibility, failure to meet all or most of the project objectives, or both supports adoption of the proposed project.

6.7 References

Office of Governor Gavin Newsom. 2020. [Governor Newsom Signs Legislation Boosting Housing Production in California to Fight Affordability Crisis](#). News release. Available

180 CEQA Guidelines, § 15126.6(e)(2).

at <https://www.gov.ca.gov/2020/09/28/governor-newsom-signs-legislation-boosting-housing-production-in-california-to-fight-affordability-crisis/>

CEC staff. 2021. [Approaches to Zero Net Energy Cost-Effectiveness in New Homes](#). California Energy Commission. Publication Number: CEC-500-2021-025. Available at <https://ww2.energy.ca.gov/2021publications/CEC-500-2021-025/CEC-500-2021-025.pdf>.

Chapter 7

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Appendices

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Appendix A

Notice of Preparation and Public Comments

Notice of Preparation

[TN # 237212](#). Available at

<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237212&DocumentContentId=70393>

CALIFORNIA ENERGY COMMISSION

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CEC-057 (Revised 1/21)

**NOTICE OF PREPARATION****NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT
FOR THE 2022 AMENDMENTS TO THE ENERGY CODE**

The California Energy Commission (CEC) is the lead agency under the California Environmental Quality Act (CEQA) and will prepare an environmental impact report (EIR) for the proposed 2022 amendments to the Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (Energy Code).

In accordance with California Code of Regulations, Title 14, section 15082, the CEC has prepared this notice of preparation (NOP) to inform agencies and interested parties that an EIR will be prepared for the above-referenced project. The purpose of an NOP is to provide sufficient information about the project and its potential environmental impacts to allow agencies and interested parties the opportunity to provide a meaningful response related to the scope and content of the EIR, including mitigation measures that should be considered and alternatives that should be addressed (Cal. Code Regs., tit. 14, § 15082[b]).

The CEC has the exclusive authority to adopt energy efficiency standards for buildings, which are located in the Energy Code. Public Resources Code section 25402, subdivisions (a) and (b) establish that the CEC shall periodically prescribe, by regulation, statewide building energy efficiency standards to reduce wasteful, uneconomic, inefficient, or unnecessary consumption of energy. The Energy Code includes the energy efficiency requirements applicable to newly constructed buildings and additions and alterations to existing buildings.

Submitting Comments

Pursuant to California Code of Regulations, Title 14, section 15082(b), your response must be sent no later than 30 days after receipt of this notice, although you are encouraged to submit them sooner. You may submit [comments electronically](#) through the CEC's electronic commenting feature on the CEC's webpage at <https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-BSTD-03>.

A full name, email address, comment title, and either a comment or an attached document (.doc, .docx, or .pdf format) is mandatory. After a challenge response test used by the system to ensure that responses are generated by a human user and not a computer, click on the "Agree & Submit Your Comment" button to submit the comment to the CEC's Docket Unit.

You are encouraged to use the electronic filing system described above to submit comments. If you are unable or do not wish to submit electronically, a paper copy of your comments, including the docket number 21-BSTD-02 and indicating "2022 Energy Code Update CEQA Documentation" may be sent to:

Docket Unit
California Energy Commission
Docket No. 21-BSTD-02
1516 9th Street, MS-4
Sacramento, CA 95814

Or, email them to docket@energy.ca.gov

Please note that your e-comments, emails, written letters, any attachments, and associated contact information (for example, address, phone number, and email address) become part of the viewable public record. Additionally, this information may become available via internet search engines.

If you have any questions or need additional information on how to participate in CEC's review of the proposed project, please contact Peter Strait at peter.strait@energy.ca.gov.

The project location, description, and potential environmental effects are summarized below.

Project Description

The Warren-Alquist Act establishes the CEC as California's primary energy policy and planning agency. Public Resources Code sections 25213, 25402, 25402.1, 25402.4, 25402.5, 25402.8, and 25910 mandate and/or authorize that the CEC adopt rules and regulations, as necessary, to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy and water in new residential and new nonresidential buildings.

One of the ways the CEC satisfies this requirement is through the Energy Code. The Energy Code includes the energy efficiency requirements applicable to newly constructed buildings and permitted additions and alterations to existing buildings. The CEC updates the Energy Code on a three-year cycle as part of the California Building Standards Code.

The current project is the latest triennial update to the Energy Code. The proposed amendments, if adopted, would be incorporated into the 2022 edition of the Energy Code and become effective on January 1, 2023. The CEC is proposing the following amendments to the Energy Code:

- Revise the prescriptive compliance path available for building projects to include only heat pump technology in specific circumstances;
- Revise the “standard design” used for the modeling-based performance compliance path available for building projects to establish the performance baseline based on heat pump technologies in specific circumstances;
- Improve existing residential energy efficiency standards for solar photovoltaic systems, including battery storage, and associated compliance options;
- Add new prescriptive solar photovoltaic and battery requirements for the following newly constructed nonresidential building types: high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings;
- Add new requirements that mixed fuel buildings be electric ready, meaning that electrical connections and other features needed to allow use of non-combustion equipment options are installed at the time of initial construction;
- Establish new energy efficiency standards for lighting, envelope, and space conditioning systems serving controlled environment horticulture spaces;
- Improve energy efficiency standards for commercial and industrial process loads, including, computer room air conditioning, refrigerated areas, fan systems, compressed air systems, and steam traps;
- Improve nonresidential and multifamily efficiency standards for building envelopes (e.g., exterior walls, windows, roofs, and floors), fan and duct systems, HVAC controls, boilers and service water heating systems, indoor and outdoor lighting systems, and grid integration equipment such as demand responsive controls;
- Improve minimum standards for residential kitchen ventilation;
- Update and enhance requirements relating to duct sealing and ventilation; and
- Make numerous minor revisions to existing provisions to improve the clarity of the regulations.

Project Location

The project is a change to building design and construction requirements that are applicable statewide.

Potential Environmental Impacts

While the Energy Code relates to new construction, it does not cause new construction to occur within the state. The Energy Code also does not regulate where such construction occurs nor does it change the application of zoning laws, land use restrictions, or any other laws that affect the siting of specific building projects.

Rather, the Energy Code is a set of design and construction requirements that apply once a decision to begin a construction project has been made and a building permit requested (i.e.,

the Energy Code provides conditions attached to the permit to construct a given improvement). The Energy Code sets design and construction standards for specific building components to ensure the building achieves a minimum level of overall energy efficiency. For example, the Energy Code may require that installed HVAC equipment meet minimum federal standards for equipment efficiency and that associated ducting be appropriately sealed and insulated. As such, adopting amendments to Energy Code requirements does not directly cause any changes to the environment. Its effects are indirect, as builders and manufacturers respond to new requirements.

Rather, improvements in energy efficiency act to lower a building's wasteful use of energy, thus avoiding potentially negative impacts that would otherwise have occurred. The majority of efficiency improvements considered in the proposed amendments to the Energy Code do not increase the amount of ground disturbance needed for a given building nor change the type or character of equipment or materials installed into the building as a part of its construction. Nevertheless, CEC has identified three areas where a potentially significant environmental impact may exist:

- An increase in greenhouse gas emissions is theoretically possible but not expected. The proposed Energy Code encourages heat pump technology, which reduces on-site gas combustion for space and water heating equipment. Heat pump equipment relies on use of refrigerants for its operation, as do air conditioners. Many of the most common refrigerants have a high global warming potential (see <https://ww2.arb.ca.gov/resources/documents/high-gwp-refrigerants>), meaning that refrigerant leakage, should it occur during transport, installation, operation, or disposal, could result in increased greenhouse gas emissions. While mixed-fuel buildings will still be constructed using the performance compliance approach, the removal of gas alternatives in the prescriptive pathway and the need to achieve modified performance targets can be reasonably anticipated to incentivize additional use of heat pump technologies that would not otherwise occur, with an expected commensurate increase in the use of necessary refrigerants.

The use of refrigerants substitutes for continuous on-site combustion of gas during operation of space and water heating equipment, thus reducing combustion-related emissions and potentially increasing those from refrigerants. This substitution is not expected to lead to a significant increase in net greenhouse gas emissions attributable to building space heating and water heating needs, though staff acknowledges that there is a possibility that an environmental impact may nonetheless exist and intends to investigate this area in the EIR.

- Replacement of combustion of natural gas at the building site with heat pump technologies has a significantly lower emissions tradeoff than has historically been the case, making it reasonable to expect a net reduction in emissions. While use of utility-provided electricity means that overall fuel efficiency, inclusive of transmission losses,

can be lower than the fuel efficiency of on-site equipment, this is counterbalanced by the fact that heat pump equipment is more efficient than combustion equipment (having coefficients of performance of two and above, meaning that they provide twice or more energy as heating than they consume as electricity). Further, California has made (and is mandated to continue making) significant strides to decarbonize its electricity system by converting to renewable sources, such that it is reasonable to expect that the relative advantages of heat pump technologies will increase over time.

Staff is not aware of any substantial evidence that fuel substitution would have a direct or a cumulatively considerable environmental impact on criteria pollutant emissions or greenhouse gas emissions, though staff acknowledges that there is a possibility that an environmental impact may nonetheless exist and intends to investigate this area in the EIR.

Lastly, staff has also identified a possibility of a cumulative impact occurring as this project encourages transition to electric equipment serving new space and water heating needs at the same time that other projects encourage transition to electric equipment serving transportation needs. Staff intends to investigate whether this context creates any potentially significant impacts.

- A significant increase in hazards and hazardous materials is possible but not expected, because the proposed Energy Code would incorporate battery storage systems into nonresidential system requirements. Battery storage equipment relies most commonly on use of lithium ion batteries for their operation. The requirement to include these systems in specified buildings can be reasonably anticipated to require routine transport of lithium ion batteries to such construction projects. Lithium ion batteries are regulated as a hazardous material under the U.S. Department of Transportation's Hazardous Materials Regulations (HMR; 49 C.F.R., Parts 171-180). (See <https://www.phmsa.dot.gov/lithiumbatteries>.)

Lithium ion batteries are ubiquitous throughout consumer and commercial products, and compliance with existing federal laws allows them to be safely transported, used, and recycled. The marginal increase in routine transport, use, and disposal of such batteries needed to install building battery storage systems is not expected to lead to a significant increase in risk or to pose a significant hazard to the public or the environment, though staff acknowledges that there is a possibility that an environmental impact may nonetheless exist and intends to investigate this area in the EIR.

Staff has identified that this project will have either no or less-than-significant impacts in the following environmental topic areas: aesthetics, agriculture and forestry resources, biological resources, cultural resources, energy, geology and soils, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation,

transportation and traffic, utilities and other service systems, tribal cultural resources, and wildfire.

Responsible and Trustee Agencies

Any adoption of building standards by any state agency is subject to approval by the California Building Standards Commission, making them a responsible agency for this project.

Staff is not aware of any significant environmental impacts for which another California agency would be a trustee agency.

Alternatives

The EIR will consider a reasonable range of potentially feasible alternatives to the project. In addition to a no project alternative. The EIR will likely consider project alternatives that do not change provisions relating to use of heat pump equipment or add requirements for battery storage systems.

Public Comment Summary

- NOP Public Comment Letter 1: Earthjustice and Sierra Club
[TN #237462](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237462&DocumentContentId=70662>
- NOP Public Comment Letter 2: Holland & Knight
[TN #237496](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237496&DocumentContentId=70697>
- NOP Public Comment Letter 3: Jon McHugh, PE
[TN #237497](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237497&DocumentContentId=70695>
- NOP Public Comment Letter 4: Jim Stewart, PhD
[TN #237519](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237519&DocumentContentId=70719>
- NOP Public Comment Letter 5: Sierra Club CA
[TN #237523](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237523&DocumentContentId=70727>
- NOP Public Comment Letter 6: Southern California Gas Company
[TN #237493](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237493&DocumentContentId=70691>
- NOP Public Comment Letter 7: Native American Heritage Commission
[TN #237537](#). Available at
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=237537&DocumentContentId=70747>

Appendix B

Project Energy and Emissions Greenhouse Gas Impacts

[TN #237848](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237848&DocumentContentId=71090). Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237848&DocumentContentId=71090>

This appendix provides an overview of the workbook of spreadsheets used to compute the values reported in Tables 4.2-2, 4.2-3 and 4.2-4 in Chapter 4.2 and Tables 4.5-1 and 4.5-2 in Chapter 4.5. These spreadsheets consolidate data found in the documents identified in **Appendix D**. Building construction starts were determined following a methodology described in a memo to the CEC (see Chapter 3). A summary of each of the 12 tabs in the workbook follows:

1. Tab SF-HPSD

Single Family Heat Pump Standard Design (SF-HPSD). This spreadsheet is used to compute, depending on the climate zone, a heat pump water heating or heat pump space heating Standard Design energy budget in each of the 16 California climate zones for a newly constructed 2,100 square foot single family residence, a newly constructed 2,700 square foot single family residence and a weighted average of these two. This sheet computes values for the existing 2019 Energy Code, the proposed 2022 Energy Code, and the savings that accrue due to the proposed 2022 Energy Code. The analysis shows the amount of fossil fuel saved and the increased electricity consumption for this sector in each climate zone due to using heat pump water heaters and heat pump space heaters. Also included is an estimate of net carbon dioxide-equivalent emissions saved. The Standard Design is based on heat pump water heaters in climate zones 1, 2, 5-9, 11, 12, 15, and 16; the Standard Design is based on heat pump space heaters in climate zones 2, 3, 10, 13, and 14.

2. Tab MF-HPSD

Multifamily Heat Pump Standard design (MF-HPSD). This spreadsheet is used to compute a heat pump space heating Standard Design energy budget in each of the 16 California climate zones for a newly constructed 2-story multifamily residence (low rise), a newly constructed 3-story multifamily residence (low rise), a newly constructed 5-story multifamily residence (midrise), and a newly constructed 10-story multifamily residence (high rise) and a newly constructed "combined" building. This sheet computes values for the existing 2019 Energy Code, the proposed 2022 Energy Code, and the savings that accrue due to the proposed 2022 Energy Code. The analysis shows the amount of fossil fuel saved and the increased electricity consumption for this sector in each climate zone due to converting to heat pump water heaters and heat pump space heaters. Also included is an estimate of net carbon dioxide-equivalent emissions saved.

3. Tab NR-HPSD

Nonresidential Heat Pump Standard Design (NR-HPSD). This spreadsheet is used to compute an energy budget in each of the 16 California climate zones for

newly constructed “nonresidential” buildings. The analysis assumes that natural gas fueled space heaters are no longer used in selected nonresidential building types and climate zones; heat pump space heaters are used instead. Some Small school buildings use heat pumps both for space heating and domestic hot water (DHW) heating, as noted below. The affected building types include small offices (5,303 square feet); large retail spaces (240,023 square feet); medium retail spaces (24,566 square feet); small retail spaces (9,376 square feet); small schools (24,415 square feet), some with DHW; and warehouse space heating (2,550 square feet of office and 52,046 square feet of total space). This sheet computes values for the existing 2019 Energy Code, the proposed 2022 Energy Code, and the savings that accrue due to the proposed 2022 Energy Code. The analysis shows the amount of fossil fuel saved and the increased electricity consumption in this sector in each climate zone due to converting to heat pump water heaters and heat pump space heaters. Also included is an estimate of net carbon dioxide-equivalent emissions saved.

4. Tab MF&NR-PV&BATT

Multifamily and Nonresidential PV and Battery Storage (MF&NR-PV&BATT). This spreadsheet is used to compute electricity and CO₂e emission savings for newly constructed multifamily and nonresidential buildings that install PV and battery storage systems. These include small office, medium office, large office, small retail, medium retail, large retail, small school, large school, warehouse, midrise multifamily, and high-rise multifamily buildings. This sheet computes values for the existing 2019 Energy Code, the proposed 2022 Energy Code, and the savings that accrue due to the proposed 2022 Energy Code. The analysis shows the amount of electricity saved in this sector in each climate zone due to converting to installation of PV and battery storage. Also included is an estimate of net carbon dioxide-equivalent emissions saved.

5. Tab MF-EE

Multifamily Energy Efficiency. This spreadsheet is used to compute the effect of energy efficiency measures for the same building types in Tab 2 MF-BL.

6. Tab EE-Alts

Energy Efficiency Alterations. This spreadsheet is used to compute the effect of making improvements to existing buildings. Approximately 7 percent of single-family residences and 3.6 percent of multifamily residences are assumed to be altered each year. Efficiency measures and sub-measures are included as follows:

Measure	Sub-Measure
Air Distribution	Duct Leakage Testing
	Fan Energy Index
	Fan Power Budget
Daylighting	Automatic Daylight Dimming to 10%
	Prescriptive to Mandatory Automatic Daylighting Controls in the Secondary SideLit Daylit Zone
Nonresidential Grid Integration	Communication Protocol Clean up
	Demand Responsive Lighting Systems
Nonresidential High Performance Envelope	Cool Roofs: Steep-Sloped
	Hotel/Motel Simplification
	Roof Recovers
	Roof Replacements
Nonresidential HVAC Controls	Dedicated Outdoor Air Systems (DOAS)
	Exhaust Air Heat Recovery
	Expand Economizer Requirements
	VAV Dead-band Airflow
Nonresidential Indoor Lighting	Lighting Power Densities
	Multi-zone Occupancy Sensing in Large Offices
Outdoor Lighting	Nonresidential Lighting Power Allowances for General Hardscapes
	Nonresidential Lighting Zone Reclassification
Reduce Infiltration	Air barrier verification all climate zones
	Require air barrier where not currently required (CZ1-9 all buildings; hotel/motel all CZs)

7. Tab Impact GWP by Building Type

Global Warming Potential. This spreadsheet is used to compute refrigerant leakage rates for single family, multifamily and nonresidential water heating and space heating heat pumps used in all 16 climate zones for newly constructed buildings. The space heating and water heating heat pumps would replace conventional natural gas-fueled equipment. The analysis computes the CO₂e emissions of these high global-warming potential gases.

a. Heat Pump Global Warming Potential Analysis

Heat pumps commonly use HFC refrigerants for heat transfer, which have a much higher GWP than CO₂. As a result, while heat pumps can reduce CO₂ emissions from heating and cooling due to their efficiency and source energy (increasingly clean electricity), they can also contribute to climate change when they leak or at the end of their useful life by emitting high-GWP refrigerants into the atmosphere. To understand the impact of heat pump refrigerants on Title 24 CO₂e savings, we estimated the GWP of installed heat pump equipment across the single family, multifamily, and nonresidential sectors. The following sections explain the methodology of the analysis. Table 1 provides a summary of key assumptions, and Table 2 provides the analytical inputs.

b. Explanation of Key Variables

i. Heat Pump Type and Size

The analysis varies across building sectors and climate zones, as the proposed Title 24 code prescriptive option calls for either heat

pump space heaters (HPSH) or heat pump water heaters (HPWH), depending on building type. The analysis assumes that single family homes are equipped with HPWHs in most climate zones, and HPSHs in other climate zones. For multifamily, HPSHs were applied in each individual dwelling unit. In the nonresidential sector, the analysis assumes that HPSHs are applied in all sub-sectors covered by the proposed code (small office, small, medium and large retail, small schools, and warehouses). In the small school scenario, one HPWH is added to each school, where water heating is used in the school's kitchen.

The analysis uses 3-ton units in 2100 ft² single family homes and 4-ton units in 2700 ft² single family homes. In studio and 1-bedroom apartments, 1.5-ton units were assumed; 2-ton units were assumed in 2-bedroom apartments, and 3-ton units were assumed in 3-bedroom apartments. In the non-residential sectors, specific charge sizes were modeled for each sub-sector and climate zone, consistent with the capacity requirements for each building category. In small schools an 80-gallon water heater is assumed to serve kitchen hot water demand.

In all sectors, the amount of refrigerant in the system is calculated using 2.73 pounds of refrigerant per ton of capacity for heat pumps and 2.5 pounds of refrigerant per ton of capacity for unitary air conditioners.

ii. Heat Pump Lifetime

Heat pump effective useful life (EUL) is approximately 15 years, and the building lifetime assumed in the analysis is 30 years. As a result, the heat pumps are replaced once in the lifecycle analysis. Because refrigerant regulations are becoming more stringent in California and in the U.S. at large, it was assumed that when the refrigerants are replaced at 15-years, they would be replaced with substances that have a lower GWP. More information about the application of specific refrigerants is provided in the next section.

iii. Refrigerants and Leakage

The analysis for air conditioning and space heating considers the effective date of January 1, 2025, for the CARB Refrigerant

Regulations.¹⁸¹ Prior to the effective date of those regulations, the analysis uses the refrigerant R-410a across all sectors.¹⁸² For 2025 for original installations and after 15-years for replacements, the refrigerant R-32 is used, which has a lesser GWP in compliance with regulations adopted by the CARB. For water heating, the analysis uses R-134a for original equipment, which is also replaced by R-32 after 13 years, reflecting demanding GWP reductions by the California Legislature and the U.S. Congress.¹⁸³ The analysis uses 20-year GWP values, which are far greater than 100-year GWP, to reflect the California Legislature's priority on Short Lived Climate Pollutants.¹⁸⁴

Refrigerants leak from heat pumps gradually over the course of the equipment lifetime and at the end of life, effectively resulting in most of the refrigerant being lost. The end-of-life leakage accounts for the majority of the refrigerant loss, so we annualize the end-of-life loss over the entire lifetime of the equipment to arrive at a generalized annual leak rate that takes into account both the gradual loss and the end-of-life loss (Table 2).

iv. Methodology

The average annual GWP of the applicable heat pump was calculated on a per-building (or dwelling unit) basis by the following steps:

- 1.** The effective percentage of refrigerant lost, based on the annual leakage plus the leakage of remaining refrigerant at the end of the equipment's EUL is calculated as:

181 CARB. 2020. [Proposed Amendments to Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols, Propellants, and Foam End-Use Regulation](https://ww3.arb.ca.gov/board/res/2020/res20-37.pdf). Resolution 20-37. Available at <https://ww3.arb.ca.gov/board/res/2020/res20-37.pdf>.

182 CARB. 2016. [California's High Global Warming Potential Gases Emission Inventory: Emission Inventory and Technical](https://ww3.arb.ca.gov/cc/inventory/slcp/doc/hfc_inventory_tsd_20160411.pdf). Support Document. Available at https://ww3.arb.ca.gov/cc/inventory/slcp/doc/hfc_inventory_tsd_20160411.pdf

183 House Resolution 133. Consolidated Appropriations Act, 2021. (Cuellar, 116th Congress); See also U.S. Environmental Protection Agency. 2021. [EPA Moves Forward with Phase Down of Climate-Damaging Hydrofluorocarbons](https://www.epa.gov/newsreleases/epa-moves-forward-phase-down-climate-damaging-hydrofluorocarbons). News release. Available at <https://www.epa.gov/newsreleases/epa-moves-forward-phase-down-climate-damaging-hydrofluorocarbons>

184 Senate Bill 605 (Laura, Chapter 523, Statutes of 2014); See also Senate Bill 1383 (Laura, Chapter 395, Statutes of 2016)

*Cumulative annual leakage (%) = (1 – annual leakage rate %) * equipment EUL (years)*

*End-of-life loss (%) = (1 – Cumulative annual leakage %) * end-of-life leak rate*

taking into account that the end-of-life leak rate applies *only* to the amount of refrigerant remaining in the system at the end of life.

2. The total annualized leak rate is calculated as:

Average annualized leak rate = (Cumulative annual leakage + End-of-life loss) / equipment EUL

3. The refrigerants used in the heat pumps depend on the year of installation, as discussed in the sections above. An average 20-year GWP factor is calculated to represent a) the mix of refrigerants used over the 30-year lifetime of the building (for example, replacement refrigerants will have a lower GWP), and b) the CARB refrigerant regulations that take effect on January 1, 2025 for HPSH, thus affecting newly constructed buildings in the last year of this code cycle. The average GWP is calculated as:

Original share = Share of GWP of original equipment = EUL of original equipment / 30-year building life

Replacement share = Share of GWP of replacement equipment = 1 – Original Share

*Average GWP = Original share * Original GWP (R-410a, R-134a, or R-32) + Replacement share * Replacement GWP (R-32)*

As explained above:

- For HPSH, the Original GWP is based on R-410a in 2023 and 2024 install years and Original GWP is based on R-32 in 2025. Replacement GWP is based on -R32.
- For HPWH, since CARB’s regulations do not apply to HPWHs, the Original GWP is based on R-134a in 2023, 2024, and 2025 install years. Replacement GWP is based on R-32.
- Equipment EUL of HPWH is 13 years
- Equipment EUL of HPSH is 15 years.

- GWP represents the average 20-year GWP potential of 1 lb. of refrigerant.
4. The average annual GWP of the applicable heat pump is calculated per-building:

$$\text{Average annual GWP} = \text{Average annualized leak rate} * \text{Average GWP} * \text{lbs of refrigerant for device}$$

Using the same method, the annual GWP of a baseline unitary air conditioner unit is also calculated. The increase in GWP due to the 2022 Energy Code is then taken as the difference between the GWP from refrigerants from the baseline air conditioner and the projected GWP assuming the building would use a heat pump rather than an air conditioner as follows:

The GWP is scaled to the statewide level by multiplying by the number of projected construction starts for each building category in each climate zone. In the non-residential sector, the change from conventional heating to heat pumps would occur only for specific building types, so the statewide scaling applies only to the applicable percentage of building starts (Table 1).

Table 1. California Title 24 Global Warming Potential Analysis Assumptions

Single Family	
Equipment Type	Assumptions
Equipment Type	Either a HPSH or HPWH depending on climate zone.
Equipment Size	2100 sqft: 3-ton HPSH 2700 sqft: 4-ton HPSH HPWH: 50-gallon water heater
Refrigerant Assumptions	Air Conditioner and Space heater: prior to 2025, R-410a, 20-year GWP 4340; 2025, R-32, 20-year GWP 2330; replacement after 15 years, R-32; charge scalar based on CARB data Water heating: R-134a; 20-year GWP 3830; replacement after 13 years, R-32; refrigerant charge scalar based on CARB data
Leakage Assumptions	Annualized leakage rate
Scaling Statewide	100% of single-family new construction assumed to have either HPSH or HPWH
Multifamily	
Equipment Type	2019 Design is for individual HPSH s for each apartment unit, with the size of the unit varying by apartment size.
Equipment Size	Studio, 1-br: 1.5-ton HPSH 2-br: 2-ton HPSH 3-br: 3-ton HPSH
Refrigerant Assumptions	Air Conditioner and Space heater: prior to 2025, R-410a, 20-year GWP 4340; 2025, R-32, 20-year GWP 2330; replacement after 15 years, R-32
Scaling Statewide	100% of multifamily new construction assumed to have a HPSH in each unit

Non-Residential	
Equipment Type	HPSH for small office, small, med and large retail, and warehouse office; all electric school included one 50-gallon HPWH.
Equipment Size	Unit sizes from CBEC simulations provided for small office, small, med and large retail, all electric school, and warehouse office.
Refrigerant Assumptions	Air Conditioner and Space heater: prior to 2025, R-410a, 20-year GWP 4340; 2025, R-32, 20-year GWP 2330; replacement after 15 years, R-32; charge scalar based on CARB data. Water heating (in school only): R134a; 20-year GWP 3830; replacement after 13 years, R-32; refrigerant charge scalar based on CARB data.
Scaling Statewide	GWP applied only to the portion of the market expected to take up heat pumps as a result of proposed code, as follows: 100% of retail 100% small office 60% of schools 4.9% of non-refrigerated warehouse

Table 2. California Title 24 Global Warming Potential Analysis Inputs

Technology:	Unitary AC ^(a)	HPSH	HPWH	15-year Replacement	Source
Refrigerant charge (lbs):	7.5	8.2	1.76	NA	CARB ^{1,2}
Annual leak rate (fraction):	0.05	0.053	0.02	NA	CARB ^{1,2}
End-of-life leak rate (fraction):	0.8	0.8	0.985	NA	CARB ^{1,2}
Replacement Lifetime (years):	15	15	13	NA	CARB ^{1,2,4}
Generalized annual leak rate (fraction):	0.06	0.06	0.08	NA	Calculation
Refrigerant type:	R-410A	R-410A	R-134a	R-32	CARB ^{1,2}
100-year GWP of refrigerant:	2088	2088	1430	675	CARB ^{1,2}
20-year GWP of refrigerant:	4340	4340	3130	2330	IPCC ³
Lbs/Ton of Unit Capacity Scalar	2.5	2.73	NA	NA	CARB ³

Notes:

^(a) A "unitary AC" is a self-contained (not built-up) air conditioner. Most or all of the basic components are assembled in a factory.

¹California Air Resources Board. Staff Report: Initial Statement of Reasons, Public Hearing to Consider the Proposed Amendments to the Prohibition of Certain Hydrofluorocarbons in Stationary refrigeration, Chillers, Aerosols-Propellants, and Foam End-uses Regulation, 2020.

² California Air Resources Board. California's High Global Warming Potential Gases Emissions Inventory: Emission inventory and Technical Support Document (2016). Retrieved From: https://ww3.arb.ca.gov/cc/inventory/sicp/doc/hfc_inventory_tsd_20160411.pdf

³IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

⁴NREL, 2013. National Renewable Energy Laboratory, "Comparison of Advanced Residential Water Heating Technologies in the United States", Jeff Maguire, Xia Fang, and Eric Wilson for NREL. Technical Report NREL/TP-5500-55475; May 2013. Available at: <https://www.nrel.gov/docs/fv13osti/55475.pdf>

8. Tab Combined All Buildings

This spreadsheet uses values computed in the tabs above to determine statewide totals of program savings and statewide annual carbon dioxide-equivalent, NOx and SOx emissions. The lower portion of this spreadsheet provides summary values reported in Tables 4.5-1, 4.2-2 and 4.2-3.

9. Tab Combined All Buildings—Compact

This spreadsheet provides a summary of program savings in a compact single page format.

10. Tab CO2 Emissions

This spreadsheet is used to compute year-by-year CO2e savings attributed to the 2022 Energy Code relative to "business-as-usual" as determined from the 2019 Energy Code. First, a "typical years' worth" of fossil fuel and electricity

consumption savings is computed, then this typical year is assumed to apply to compute program savings of CO₂e for 2023 through 2052, assuming no further building standards are implemented after 2022. The bottom portion of the spreadsheet summarizes these CO₂e savings and is used to develop the CO₂e values reported in Table 4.5-2.

11. Tab CO₂ Dollar Benefit

Time Dependent Valuation. This spreadsheet is used to compute total TDV benefits (from cap-and-trade benefits and economywide emissions reduction benefits) through the year 2052.

12. Tab Criteria Pollutants

This spreadsheet is used to compute annual NO_x and SO_x criteria pollutant emission reductions attributable to the 2022 Energy Code. First, a “typical years’ worth” of fossil fuel and electricity consumption savings is computed, then this typical year is assumed to apply to compute program savings of NO_x and SO_x for 2023 through 2052, assuming no further building standards are implemented after 2022. The bottom portion of the spreadsheet summarizes these criteria pollutant emission savings and is used to develop the values reported in Table 4.2-4.

Appendix C

HERS Registrations, 2013 and 2016 Energy Code Cycles

California Residential New Construction HERS Registrations (2016 & 2013 Code Cycles)

Electric Water Heating	%	Statewide Sample Size (Units)
Single Family (CF-1Rs)	3.43%	266,242
Single Family (CF-2Rs)	0.75%	191,731
Low-Rise Multifamily (CF-1Rs)	7.96%	63,641
Low-Rise Multifamily (CF-2Rs)	4.49%	46,447
All Low-Rise RNC (CF-2Rs)	1.48%	238,178

Electric Space Heating	%	Statewide Sample Size (Units)
Single Family (CF-1Rs)	8.47%	266,242
Single Family (CF-2Rs)	4.30%	191,731
Low-Rise Multifamily (CF-1Rs)	49.39%	63,641
Low-Rise Multifamily (CF-2Rs)	46.93%	46,447
All Low-Rise RNC (CF-2Rs)	12.61%	238,178

All-Electric New Construction	%	Statewide Sample Size (Units)
Single Family (CF-1Rs)	1.88%	266,242
Single Family (CF-2Rs)	0.48%	191,731
Low-Rise Multifamily (CF-1Rs)	7.76%	63,641
Low-Rise Multifamily (CF-2Rs)	4.43%	46,447
All Low-Rise RNC (CF-2Rs)	1.25%	238,178

Notes

This data was generated by Southern California Edison by analyzing multiple sources of CA HERS Registry Data and includes registrations from both the 2016 and 2013 Title-24 Code Cycles

CF-1Rs contain energy design intent for new construction projects and needed by building departments to pull permits. CF-2Rs are installation certificates for new construction projects.

Numbers for IOU territories are divided and estimated based on primary electric IOU serving each CA Climate Zone

All-electric construction is conservatively inferred based on registrations that have both electric water heating and space heating

Appendix D

Documents Relied Upon for 2022 Energy Code Rulemaking

The rulemaking for the 2022 update to the Energy Code includes numerous documents relied upon, the majority of which are in the form of code change proposals. These proposals and other documents contain descriptions and analysis of the anticipated effects of the proposed changes to regulation, including some descriptions of environmental effects. These documents are docketed into the [record of the rulemaking proceeding](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01) at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-01>.

The information in these documents was used by CEC staff in evaluating and describing the environmental impacts of the project.

Report Title	Docket Number and Link
<i>Code Change Proposals</i>	
Integrated Pumped Refrigerant Economizer for Computer Rooms	TN #237775 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237790&DocumentContentId=71031
Demand Management – Controlled Receptacles	TN #237775 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237775&DocumentContentId=71016
All-Electric Multifamily Compliance Pathway	TN #237692 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237692&DocumentContentId=70915
Multifamily Domestic Hot Water Distribution	TN #237696 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237696&DocumentContentId=70922
Multifamily Indoor Air Quality	TN #237702 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237702&DocumentContentId=70926
Market Analysis in Support of Single-family and Updated Multifamily	TN #237788 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?n=237788&DocumentContentId=71030

Multifamily Restructuring	TN #237697 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237697&DocumentContentId=70921
Residential Energy Savings and Process Improvements for Additions and Alterations	TN #237713 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237713&DocumentContentId=70934
Enhanced Air-to-Water Heat Pump Compliance Options	TN #237710 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237710&DocumentContentId=70937
Single Family Grid Integration	TN #237712 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237712&DocumentContentId=70935
Variable Capacity HVAC Compliance Software Revisions	TN #237711 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237711&DocumentContentId=70936
High Efficiency Boilers and Service Water Heating	TN #237777 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237777&DocumentContentId=71013
Controlled Environment Horticulture	TN #237699 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237699&DocumentContentId=70919
Pipe Sizing, Monitoring, and Leak Testing for Compressed Air Systems	TN #237701 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237701&DocumentContentId=70927
Nonresidential Computer Room Efficiency	TN #237707 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237707&DocumentContentId=70929
Nonresidential Daylighting	TN #237706 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237706&DocumentContentId=70930
Nonresidential Drain Water Heat Recovery	TN #237828 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237828&DocumentContentId=71070
Nonresidential Grid Integration	TN #237705 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237705&DocumentContentId=70931

Air Distribution: High Performance Ducts and Fan Systems	TN #237695 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237695&DocumentContentId=70923
Nonresidential Indoor Lighting	TN #237704 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237704&DocumentContentId=70924
Nonresidential High-Performance Envelope	TN #237698 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237698&DocumentContentId=70920
Nonresidential HVAC Controls	TN #237693 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237693&DocumentContentId=70914
Reduced Infiltration	TN #237691 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237691&DocumentContentId=70916
Nonresidential Outdoor Lighting Sources	TN #237709 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237709&DocumentContentId=70932
Refrigeration System Opportunities	TN #237708 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237708&DocumentContentId=70933
Steam Trap Monitoring	TN #237700 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237700&DocumentContentId=70928
<i>Additional Documents Relied Upon</i>	
Brett Singer comment in response to UCLA paper on Gas combustion in buildings	TN #237687 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237687&DocumentContentId=70908
Technical Memo on Updated Analysis from NO2 and PM25 Cooking Simulation	TN #237684 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237684&DocumentContentId=70911
Simulations of short-term exposure to NO2 and PM2.5 to inform capture efficiency standards	TN #237685 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237685&DocumentContentId=70910

Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas	TN #237686 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237686&DocumentContentId=70909
Development of a standard capture efficiency test method for residential kitchen ventilation	TN #237690 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237690&DocumentContentId=70917
Product Performance Certification Procedure (updated as of February 28, 2020)	TN #237694 . Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=237694&DocumentContentId=70918

Additional Code Change Proposal Reports:

Nonresidential PV and Battery Storage

[TN #237776](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237776&DocumentContentId=71014). Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237776&DocumentContentId=71014>

Heat Pump Baseline for Non-Residential and High-Rise Residential Buildings

[TN #237849](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237849&DocumentContentId=71091). Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237849&DocumentContentId=71091>

Residential Electric Baseline

[TN #237850](https://efiling.energy.ca.gov/GetDocument.aspx?tn=237850&DocumentContentId=71093). Available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=237850&DocumentContentId=71093>