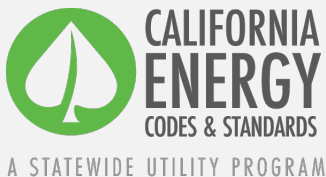


Energy Equity and Environmental Justice Summary Report



Energy Equity and Environmental Justice
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Energy Solutions

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Executive Summary

The Codes and Standards Enhancement (CASE) Initiative presents recommendations to support the California Energy Commission (CEC) efforts to update the California Energy Code (Title 24, Part 6) with new requirements or to upgrade existing requirements for various technologies. Three California investor-owned utilities (IOUs) — Pacific Gas and Electric Company, San Diego Gas & Electric, and Southern California Edison — and two publicly owned utilities — Los Angeles Department of Water and Power and Sacramento Municipal Utility District (herein referred to as the Statewide CASE Team when including the CASE Author) — sponsored this effort. The program goal is to prepare and submit proposals that would result in cost-effective enhancements to improve energy efficiency and energy performance in California buildings.

The Statewide CASE Team submits code change proposals to the CEC, the state agency that has authority to adopt revisions to Title 24, Part 6. The CEC evaluates proposals submitted by the Statewide CASE Team and other stakeholders and may revise or reject proposals. Please see the CEC’s [2025 Title 24 website](#) for information about the rulemaking schedule and how to participate in the process.

This report reviews what the Statewide CASE Team has done during the 2025 Code Cycle to keep equity an integral consideration throughout the code development process. It presents the Statewide CASE Team’s equity framework and reviews stakeholder engagement activities. The report also consolidates discussions on how code change proposals, as presented in published Final CASE Reports,¹ could potentially impact disproportionately impacted populations (DIPs).² The sections of code change proposals presented within this report are a part of the effort to integrate and prioritize equity alongside the efforts to develop technical and cost-effectiveness information for proposed requirements on building energy-efficient design practices and technologies.

¹ Final CASE Reports can be found here: <https://title24stakeholders.com/2025-cycle-case-reports/>.

² While the term disadvantaged communities (DACs) is often used in the energy industry and state agencies, the Statewide CASE Team chose to use terminology that is more acceptable to and less stigmatizing for those it seeks to describe (DC Fiscal Policy Institute, 2017). Similar to the California Public Utilities Commission (CPUC) definition, DIPs refer to the populations throughout California that “most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes, as well as high incidence of asthma and heart disease” (CPUC). DIPs also incorporate race, class, and gender since these intersecting identity factors affect how people frame issues, interpret, and experience the world.

Energy equity and environmental justice (EEEJ) is a newly emphasized aspect of the Statewide CASE Team’s process.³ The Statewide CASE Team recognizes, acknowledges, and accounts for a history of prejudice and inequality in DIPs and the role this history plays in the environmental justice issues that persist today. The Statewide CASE Team is committed to integrating and prioritizing equity into the work done to support updates to the energy code.

For the 2025 code cycle, the Statewide CASE Team established relationships with stakeholders to help the Statewide CASE Team understand the potential equity impacts of energy codes. This work could not be done without the participation and engagement of the EEEJ stakeholders, who bring a critical perspective, expertise in equity, and often lived experience. This report consolidates discussions on how code change proposals, as presented in Final CASE Reports, could potentially impact DIPs.

To achieve this end, the Statewide CASE Team prioritized the following activities:

- Identification and outreach to relevant and interested CBOs
- Informing and educating CBOs about Title 24, Part 6
- Soliciting feedback from CBOs on general potential impacts as well as select code change proposals
- Developing a 2025 EEEJ Summary Report
- Compensating CBOs for providing their input and expertise

The Statewide CASE Team’s EEEJ efforts will continue after the 2025 code cycle comes to an end. In future code cycles, the Statewide CASE Team is committed to furthering relationships with CBOs and inviting feedback on proposed code changes with a goal of engagement with these organizations representing DIPs throughout the code cycle. Several strategies for future code cycles are being considered, and more detail can be found in Section 2.2.

³ The CEC defines energy equity as “the quality of being fair or just in the availability and distribution of energy programs” (CEC, 2018). American Council for an Energy-Efficient Economy (ACEEE) defines energy equity as that which “aims to ensure that disadvantaged communities have equal access to clean energy and are not disproportionately affected by pollution. It requires the fair and just distribution of benefits in the energy system through intentional design of systems, technology, procedures and policies” (ACEEE). Title 7, Planning and Land Use, of the California Government Code defines environmental justice as “the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (State of California)). Housing justice is a critical component of EEEJ and is defined in Section 3.3.

Summary of Potential Impacts on DIPs

The Statewide CASE Team evaluated proposals for potential equity impacts, focusing on key criteria such as health, cost, resiliency, and comfort. These criteria represent the most significant areas where code change proposals can impact the lives of DIPs.

Potential Impacts on DIPs in Multifamily and Single Family Buildings

Section 3 reviews the potential impacts proposed code changes could have on DIPs that reside in multifamily and single family buildings. The beginning of the section covers broader impacts, focusing on health and cost impacts specific to residential buildings, such as energy burden and rent protection. Details on potential resiliency and comfort impacts can be found throughout Sections 3.1 through 3.5. Section 3.6 contains excerpts from the corresponding EEEJ sections of Final CASE Reports.

Insights by potential impact:

Health Impacts: Several of the potential negative health impacts from buildings on DIPs are addressed by energy efficiency (Norton R. A., 2014.; Cluett, 2015; Rose, 2020). For example, indoor air quality (IAQ) improvements through ventilation or removal of combustion appliances can lessen the incidents of asthma, chronic obstructive pulmonary disease (COPD), and some heart problems.

Energy Efficiency and Energy Burden: Because low-income households have a higher energy burden, defined as the percent of income spent on energy, than average households, energy efficiency measures can benefit them more acutely compared to other households.

First Cost and New Construction: One potential negative consequence to DIPs of building code efficiency improvements is the potential for increased housing costs for new construction. However, a study found that increased construction costs do not have a statistically significant impact on home prices, as prices in the new home market are driven overwhelmingly by demand.

Cost and Energy Bill Impacts for Renters: Tenants with local rent stabilization have the strongest protections, but they can still experience unintended negative consequences. Potential policy solutions that can protect renters include: prohibiting pass-through costs on renters, capping rents for 5–15 year periods, limiting evictions, and holding property owners accountable in the case of noncompliance (Kirk, 2023). DIP renters can also benefit from home energy efficiency improvements that reduce utility bills and relieve energy burden for renters. However, the utility bill impacts of energy efficiency in subsidized affordable housing is less clear.

Relevant Multifamily CASE Reports

- [Multifamily Domestic Hot Water](#)

- Low-income Californians are 39 percent more likely to live in multifamily housing than the general population, and low-income multifamily residents would be uniquely impacted by proposed measures. The proposals impact construction costs, energy costs, hot water delivery performance, and several other topics.
- Low-income renters make up more than half of the 17 million Californians who rent their residences, making it the second-largest renter state in the US (Kirk, 2023). Should any additional costs be passed down to building occupants, lower income renters will need additional protections, some of which are mentioned in Section 3.4.
- Several of the measures would result in reduced on-site combustion of natural gas, either by increased efficiency of the domestic hot water system or by reducing the barriers to a future retrofit to heat pump water heaters (HPWH). These reductions in natural gas use impact air quality and have health benefits unique for DIPs as described in detail in Section 2.1 of the Final CASE Report.
- [Multifamily Envelope](#)
 - The measures would result in Long-term Systemwide Cost (LSC)⁴ savings through reduced heating and cooling energy from improvements to the requirements for cool roof, wall insulation, and windows.
 - The measures proposed help to maintain temperature through extreme weather and in the event of a power outage without the use of air conditioning or heat. In addition to reducing the potential for extreme heat fatalities or hospitalization, these measures are also beneficial from an energy bill perspective and for providing improved comfort.
- [Multifamily Indoor Air Quality](#)
 - While the proposed change would impact all residents of multifamily dwelling units, several DIP communities that have increased asthma incidences or experience more asthma symptoms should uniquely benefit. As described in Section 3.2 of the Final CASE Report, the measure should reduce the concentration of pollutants that can exacerbate asthma.

⁴ LSC savings, formerly known as Time Dependent Value (TDV), are calculated using hourly energy cost metrics for electricity and natural gas provided by the CEC. They incorporate the hourly cost of marginal generation, transmission and distribution, and other factors in order to quantify cost impacts (and therefore savings) of electricity and natural gas consumption that go beyond the simple cost per kilowatt hour or cost per therm.

- Multifamily residents that live in the areas identified by CalEnviroScreen as Disadvantaged Communities (DACs) should benefit from the proposed measure. These residents live in areas that are “disproportionately affected by environmental pollution and other hazards,” which include higher outdoor (ambient) PM_{2.5} and traffic (CALEPA, 2022). As described in Section 3.2 of the Final CASE Report, the proposed measure should decrease the penetration of outdoor PM_{2.5} and reduce traffic noise.
- [Multifamily Restructuring](#)
 - The proposed measures affecting insulation and inspection may benefit DIPs through improved IAQ, as it may prevent mold by reducing condensation issues on the ground floor of buildings. They may also lower exposure to outdoor air pollution, dry rot, and moisture problems.

Multifamily and Single Family CASE Reports with Few Expected Impacts

The Statewide CASE Team found that some of the multifamily and single family Final CASE Reports, and some of the measures they covered, would likely not have significant impacts on DIPs. The general equity impacts and potential impacts on DIPs as listed in Section 2 and Section 3 are still relevant at a broader level, and these reports may still be relevant to stakeholders, DIPs, and other concerned groups.

Multifamily

- [Multifamily Swimming Pool and Spa Heating](#)
- [Multifamily Residential HVAC Performance](#)
- [Residential HVAC Performance](#)

Single Family

- [Residential HVAC Performance](#)
- [Single Family High-Performance Envelope](#)

Potential Impacts on DIPs in Nonresidential Buildings

Section 4 presents the potential impacts proposed code changes could have on DIPs that may occupy nonresidential buildings. Sections 4.1 through 4.4 cover broader impacts and the four key criteria used for evaluation, while Section 4.5 discusses potential differences in impact broken down by building type. Section 4.6 contains excerpts from the corresponding EEEJ sections of Final CASE Reports.

Insights by criteria:

Health: Any potential health burdens from proposals could more severely affect DIPs that can have limited access to healthcare and live in areas affected by environmental and other health burdens. For example, Black and Latinx people are 56 percent and 63 percent more likely to be exposed to dangerous air pollution than White people, respectively (Tessum, et al., 2019). Health impacts for nonresidential buildings primarily apply to DIP building occupants, rather than building owners.

Cost: People historically impacted by poverty and other historic systems of wealth distribution can be affected more severely by the incremental first cost of proposed code changes. Costs can also create an economic burden for DIPs that does not similarly affect other populations. In the case of nonresidential buildings, these cost impacts are more applicable to DIP building owners rather than DIP building occupants.

Resiliency: DIPs are more vulnerable to the negative consequences of natural disasters, extreme temperatures, wildfires, floods, and other weather events due to climate change. As an example, Black Americans are 40 percent more likely to currently live in areas with the highest projected increases in extreme heat related mortality rates, compared to other groups (EPA, 2021). Proposals that improve nonresidential buildings' resiliency to natural disasters and extreme weather could positively impact DIPs, since buildings such as hospitals, community centers, and churches can offer shelter in times of crisis.

Comfort: Thermal comfort and proper lighting are important considerations for any building where people work, though impacts are not proportional across all populations. DIPs are at a greater risk for heat illnesses due in part to socioeconomic factors. Studies have shown that not only do the effects of urban heat islands lead to higher mortality during heat waves, but those in large buildings are disproportionately affected (Smargiassi, 2008; Laaidi, 2012).

Insights by nonresidential building type:

Strip Malls: Strip malls often serve as affordable business centers for DIPs, and some shop owners indicate strip mall stores feel like “the center of social life” (Ramanathan, 2017). Strip malls can offer a relatively inexpensive location for starting a business, which can be important as small and minority owned businesses face challenges such as discrimination, difficulty in securing funding, and a lack of social capital that impact start-up costs and ability to secure business locations. Increases in cost could disrupt these DIP-owned businesses even more.

Mixed-use Retail: DIPs use mixed-use retail buildings more frequently than other populations, so there is a possibility of uneven impacts. Historically, small and minority owned businesses face challenges in securing business locations (Morelix, 2016). Impacts on health, resiliency, or comfort are not anticipated to be disproportionate.

Schools (Small and Large): Proposals that impact health, resiliency, and comfort all have the potential to disproportionately impact those who attend or work in majority DIP schools, as those schools can less often afford those criteria ((United States Government Accountability Office , 2018).

Hotel: While the costs may increase for this nonresidential building type, the burden of that cost is unlikely to be disproportionate.

Assembly: While proposals to most assembly buildings will not have a disproportionate impact, some of the buildings such as places of worship, community or recreation centers, homeless shelters used for temporary housing, and libraries, for example could more significantly affect DIPs (Pew Research Center, 2023).

Hospital: Proposed measures that impact health and resiliency have the potential to disproportionately impact those who seek services from or work in hospitals.

Restaurant: Proposals that have high incremental costs and health effects could have notable impacts on DIPs, particularly those who work in the foodservice industry, own a small business that is a restaurant, or rely on restaurants for food, especially those living in food deserts, meaning areas that lack access to healthy and affordable food (Chapple)). Many of California’s restaurants are owned by DIPs, and even more are staffed by DIPs.

Enclosed Parking Garage: Over time in an enclosed parking garage, accumulated pollutants become more concentrated and daily exposure to this concentration is a serious IAQ issue (Oh, 2020). Anyone spending extensive time in an enclosed parking garage, including unhoused people, would be impacted by this air quality danger.

Grocery: Proposals that impact incremental cost, health, resiliency, and comfort all have the potential to disproportionately impact those working in grocery buildings or relying on them as one of their only food sources in a food desert. An estimated 23.5 million Americans live in food deserts (Chapple)).

Refrigerated and Non-refrigerated Warehouse: Proposals that impact health, especially thermal comfort or air quality impacts, have the potential to disproportionately impact those working in warehouses, many of whom are from DIPs. While the costs may increase for this nonresidential building type, the burden of that cost is unlikely to be disproportionate for DIP building occupants, but rather for DIP building owners.

Relevant Nonresidential CASE Reports

- [Commercial Kitchens](#)
 - The measures proposed in this CASE Report could help improve air quality by easing the replacement of natural gas fired cooklines with

electric equivalents and by improving the overall air quality and reducing ambient noise levels through demand-controlled ventilation systems. Another benefit of the proposed measures could include possible reduced heat strain of works in workers in kitchens (Haruyama, et al., 2009).

- Studies show that DIPs are disproportionately negatively impacted by unhealthy IAQ (Katz, 2012). Although the proposed code change may not have significant energy use reductions, it has the potential to benefit DIPs, especially those in areas with poor ambient (outdoor) air quality.
- Cooling Tower Efficiency
 - The proposed measure would not impact the health or comfort of building occupants, and it is not expected to affect building resiliency to extreme weather events. While the measure has the potential to save energy, it is unlikely the utility bill energy savings would be passed to DIPs.
 - Two of the three major cooling tower manufacturers are located in Madera, CA, a DIP area.⁵ Impacts on these plants could potentially affect jobs in these communities. The Statewide CASE Team has worked to mitigate these concerns by reducing the stringency of the proposed requirements to reduce potential impacts to manufacturers and employment.
 - The Statewide CASE team also has environmental justice concerns about these factories. The manufacturing industry is often linked with pollution, environmental damages, and health hazards to the surrounding populations. Studies show that “exposure from an area with heavy industry was related to a significantly lower lung function in school children” (Bergstra, Brunekreef, & Burdorf, 2018). The presence of these factories in DIP areas like Madera is of note as well. Black, Latinx, and other DIPs tend to live in areas with high levels of pollution from such industries.
- Controlled Environment Horticulture
 - Some hazards that may exist in the cannabis industry and CEH facilities in general include, but are not limited to, hazardous IAQ, exposure to harmful and/or flammable materials, electrical hazards,

⁵ Madera, CA is identified as a disadvantaged community under the SB 535 map: <https://experience.arcgis.com/experience/1c21c53da8de48f1b946f3402fbae55c/page/SB-535-Disadvantaged-Communities/>

and heat illness (California Department of Industrial Relations, n.d.). The proposed code changes would not adversely impact occupational health or safety or the ability for CEH facilities to comply with Cal/OSHA requirements.

- Historic federal and state drug policies, commonly referred to as the War on Drugs, led to the passage of penalties giving the courts the right to imprison individuals for nonviolent drug offenses and increased the number of primarily Black inmates (St. Mary's College of Maryland, 2015). Today, some tax revenue from the cannabis industry benefits those disproportionately affected by past and federal state drug policies. The Youth Community Access Grant Program, for example, applies 60 percent of tax revenue generated by legal recreational cannabis sales to support cultural and natural resources for DIPs (California Natural Resources Agency, 2023).
- The Statewide CASE Team has determined that there will likely not be significant tax revenue increases due to the CEH lighting proposal. If the proposed CEH lighting systems result in increased yield, then there would be potential increases in tax revenue. There are no definitive studies showing increased yield due to the proposed CEH lighting systems at the time this report was published.
- [HVAC Space Heating](#)
 - Overall, the space heating measures are expected to benefit DIPs. The measures are geared toward improving efficiency, reducing on-site gas usage, which will bring IAQ benefits, and in the case of electric resistance heating, providing a low upfront cost option for electric space heating.
 - This proposal is cost-effective and in addition, the initial costs for an electric resistance heating system are expected to be lower than compared to a hydronic system. The system being described in this measure is also simpler than a hydronic space heating system. The proposal is likely to induce projects to select electric heating systems instead of gas boiler systems, which would result in a decrease in on-site pollution emissions, benefiting all building occupants including DIPs.
- [Process Load Pipe Insulation](#)
 - The Statewide CASE Team assessed the potential impacts of the proposed measure and found that most factory workers are low-income (U.S. Bureau of Labor Statistics, 2022). The mean annual wage for production workers in California is \$42,310, which for the

majority of the state's counties is low income (U.S. Bureau of Labor Statistics, 2022; U.S. DEPARTMENT OF HUD, 2023). The presence of pipe insulation often results in less extreme temperatures, which leads to more comfortable working conditions, especially in unconditioned spaces. This measure would thus work to bolster existing OSHA standards that protect workers against burns or freezes.

- Factories and industrial facilities are often located in low-income areas, with one study showing Black people as statistically more likely to live within a mile of a polluting industrial facility than White people (Mohai, Lantz, Morenoff, & Mero, 2009). The measure would have a secondary impact at reducing local greenhouse gas (GHG) emissions due to lower energy losses from reduced process heating or cooling needs.

Nonresidential CASE Reports with Few Expected Impacts

The Statewide CASE Team found that some of the nonresidential Final CASE Reports, and some of the measures they covered, would likely not have significant impacts on DIPs. The general equity impacts and potential impacts on DIPs as listed in Sections 2 and 4 are still relevant at a broader level, and these reports may still be relevant to stakeholders, DIPs, and other concerned groups.

- [Daylighting](#)
- [HVAC Controls](#)
- [Laboratories](#)
- [Nonresidential Envelope](#)

1. Introduction

The Codes and Standards Enhancement (CASE) initiative presents recommendations to support the California Energy Commission’s (CEC’s) efforts to update California’s Energy Code (Title 24, Part 6) to include new requirements or to upgrade existing requirements for various technologies. The three California investor-owned utilities (IOUs) — Pacific Gas and Electric Company, San Diego Gas & Electric, and Southern California Edison – and two publicly owned utilities — Los Angeles Department of Water and Power and Sacramento Municipal Utility District (herein referred to as the Statewide CASE Team when including the CASE Author) — sponsored this effort. The program goal is to prepare and submit proposals that would result in cost-effective enhancements to improve energy efficiency and energy performance in California buildings. This report and the code change proposal presented herein are a part of the effort to develop technical and cost-effectiveness information for proposed requirements on building energy-efficient design practices and technologies.

The Statewide CASE Team submits code change proposals to the CEC, the state agency that has authority to adopt revisions to Title 24, Part 6. The CEC evaluates proposals submitted by the Statewide CASE Team and other stakeholders and may revise or reject proposals. See the CEC’s [2025 Title 24 website](#) for information about the rulemaking schedule and how to participate in the process.

The Statewide CASE Team recognizes, acknowledges, and accounts for a history of prejudice and inequality in disproportionately impacted populations (DIPs) and the role this history plays in the environmental justice issues that persist today. The Statewide CASE Team is committed to integrating and prioritizing equity into the work done to support updates to the energy code. Energy equity and environmental justice (EEEJ) is a newly emphasized aspect of the Statewide CASE Team’s process.⁶ For the 2025 Code Cycle, the Statewide CASE Team used a systematic approach to ensure that each code change proposal considered how underrepresented communities might be affected. This included establishing relationships with stakeholders who have equity expertise and who helped the Statewide CASE Team understand the impact of energy

⁶ The CEC defines energy equity as “the quality of being fair or just in the availability and distribution of energy programs” (CEC, 2018). American Council for an Energy-Efficient Economy (ACEEE) defines energy equity as that which “aims to ensure that disadvantaged communities have equal access to clean energy and are not disproportionately affected by pollution. It requires the fair and just distribution of benefits in the energy system through intentional design of systems, technology, procedures and policies” (ACEEE). Title 7, Planning and Land Use, of the California Government Code defines environmental justice as “the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (State of California). Housing justice is a critical component of EEEJ and is defined in Section 3.3.

codes as well as how best to engage underrepresented populations more effectively. The Statewide CASE Team is committed to sustaining the work representing EEEJ perspectives and priorities for the 2025 Code Cycle and all future code cycles.

While the term disadvantaged communities (DACs) is often used in the energy industry and state agencies, the Statewide CASE Team chose to use terminology that is more acceptable to and less stigmatizing for those it seeks to describe (DC Fiscal Policy Institute, 2017). Similar to the California Public Utilities Commission (CPUC) definition, DIPs refer to the populations throughout California that “most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes, as well as high incidence of asthma and heart disease” (CPUC). DIPs also incorporate race, class, and gender since these intersecting identity factors affect how people frame issues, interpret, and experience the world.⁷

The objective of this EEEJ Summary Report is to review what the Statewide CASE Team has completed during the 2025 Code Cycle to keep equity as an integral consideration throughout the code development process. It presents the Statewide CASE Team’s equity framework and stakeholder engagement activities. The report also consolidates discussions on how code change proposals, as presented in Final CASE Reports, could potentially impact DIPs.⁸

The following summarizes the contents of this report:

- Section 2 – Addressing Energy Equity and Environmental Justice
 - Section 2.1 – General Equity Impacts provides a broad overview of the Statewide CASE Team’s equity framework and approach to evaluating potential equity impacts of code change proposals on DIPs.
 - Section 2.2 – Procedural Equity and Stakeholder Engagement covers the stakeholder engagement activities the Statewide CASE Team conducted, as well as the Statewide CASE Team’s outreach goals for future code cycles.
- Section 3 – Potential Impacts on DIPs in Multifamily and Single Family Buildings reviews the potential impacts proposed code changes could have on DIPs that reside in multifamily and single family buildings. The beginning

⁷ Environmental disparities have been shown to be associated with unequal harmful environmental exposure correlated with race or ethnicity, gender, and socioeconomic status. For example, chronic diseases, such as respiratory diseases, cardiovascular disease, and cancer, associated with environmental exposure have been shown to occur in higher rates in the LGBTQ+ population than in the cisgender, heterosexual population (Goldsmith & Bell, 2021). Socioeconomic inequities, climate, energy, and other inequities are inextricably linked and often mutually reinforcing.

⁸ Final CASE Reports: <https://title24stakeholders.com/2025-cycle-case-reports/>

- of the section covers broader impacts, while Section 3.6 contains excerpts from the corresponding EEEJ sections of Final CASE Reports.
- Section 4 – Potential Impacts on DIPs in Nonresidential Buildings presents the potential impacts proposed code changes could have on DIPs that may occupy nonresidential buildings. The beginning of the section covers broader impacts, while Section 4.6 contains excerpts from the corresponding EEEJ sections of Final CASE Reports.
 - Section 5 – Bibliography presents the resources that the Statewide CASE Team used when developing this report.

The California IOUs offer free energy code training, tools, and resources for those who need to understand and meet the requirements of Title 24, Part 6. Building codes are one of the most effective pathways to achieve energy savings and greenhouse gas (GHG) reductions from buildings. Well-informed industry professionals and consumers, including EEEJ stakeholders, are essential to making codes effective. With that in mind, the California IOUs provide tools and resources to help both those who enforce the code, as well as those who must follow it. Readers can visit EnergyCodeAce.com to learn more and to access content, including a glossary of terms.

2. Addressing Energy Equity and Environmental Justice

2.1 General Equity Impacts

To minimize the risk of perpetuating inequity, code change proposals were developed with intentional consideration, and through research and CBO stakeholder input, of the unintended consequences of proposals on DIPs. The Statewide Case Team recognizes that the potential impacts identified may not be comprehensive. The Statewide CASE Team will continue to build relationships with CBOs to improve the identification of potential impacts for future code cycles and is open to additional resources that can contribute to this effort.

The Statewide CASE Team identified four criteria that were used to evaluate the potential equity impacts of proposed code changes on DIPs: cost, health, resiliency, and comfort. These criteria represent the most significant areas of impact where code change proposals can affect the lives of DIPs. When applying the criteria to analyzing impacts for residential buildings, the Statewide CASE Team focused primarily on health and cost impacts that are specific to residential buildings, such as energy burden and cost impact on renters, for example. More details on potential resiliency and comfort impacts found in residential buildings can be found embedded throughout Sections 3.1 through 3.5.

When analyzing impacts for nonresidential buildings, the Statewide CASE Team reviewed each nonresidential building type through the lens of the four criteria. Some building types have unique environmental justice concerns due to their common uses, location, or other factors. More details for the nonresidential potential impacts can be found in Section 4 of this report.

2.2 Procedural Equity and Stakeholder Engagement

Including impacted communities in the decision-making process, ensuring that the benefits and burdens of the energy sector are evenly distributed, and facing the unjust legacies of the past all serve as critical steps to achieving energy equity. This work could not be done without the participation and engagement of the EEEJ stakeholders, who bring a critical perspective, expertise in equity, and often lived experience. During this code cycle, the Statewide CASE Team focused on building relationships with CBOs and representatives of DIPs across California. The Statewide CASE Team prioritized the following activities:

- Identification and outreach to relevant and interested CBOs

- Informing and educating CBOs about Title 24, Part 6
- Soliciting feedback from CBOs on general potential impacts as well as select code change proposals
- Developing a 2025 EEEJ Summary Report
- Compensating CBOs for providing their input and expertise

The Statewide CASE Team worked with the following EEEJ community-based organizations (CBOs):⁹

- Climate Action Campaign
- Strategic Actions for a Just Economy (SAJE)
- Self-Help Enterprises

Connecting with the CBOs was done primarily via email and virtual meetings. The Statewide CASE Team is currently soliciting feedback on any process improvement recommendations from CBOs for future code cycles.

2.2.1 CBO Feedback on General Potential Impacts

This code cycle, the CBOs reviewed the content discussing key criteria and general impacts of proposed code changes on DIPs in residential and nonresidential buildings, found at the beginning of Sections 3 and 4. The CBOs provided valuable and insightful feedback that was used to update the language taken from the Final CASE Reports. The Statewide CASE Team shared an updated draft of the language in this report with the CBOs to ensure feedback was addressed.

CBOs advocated for an additional focus on housing justice, found in Section 3.3 and within the definition of environmental justice. Section 3.1 was updated based on CBO advice to highlight the health effects of inadequate housing on renters, and the potential dangers of deferred maintenance. Sections 3.4.1 was updated to include content drafted by CBOs to ensure that relevant rent stabilization plans and construction regulations were addressed. CBOs also recommended referencing extreme heat, wildfires, and other natural disasters in the Statewide CASE Team’s discussion of resilience in Section 4.3.

2.2.2 CBO Feedback on Potential Measure-Specific Impacts

The Statewide CASE Team worked with the CBOs to identify which select CASE Reports best overlapped with their interests and expertise, as well as would have the most significant potential impacts. This also helped ensure CBOs’ capacity constraints

⁹ Special thanks to Common Spark Consulting, an EEEJ partner organization, for early guidance on EEEJ outreach and strategy.

were considered. The following is a list of feedback received and how it was incorporated into the following sections on specific measures:

- Commercial Kitchens
 - CBOs advised further investigation into indoor air quality (IAQ) benefits from the proposed measures and provided a study on exposure to pollution in restaurants from gas stoves. They also highlighted the potential positive health impacts of reduced indoor air temperatures in kitchens to mitigate thermal strain.
 - Restaurant workers, who are predominantly from DIPs, would also experience positive health impacts from changes in ventilation and electric stoves.
 - The Statewide CASE Team conducted additional research and incorporated more information on health benefits from improved IAQ and reduced thermal strain in commercial kitchens.
- HVAC Space Heating
 - CBOs inquired why electric resistance heating was suggested rather than heat pumps.
 - The Statewide CASE Team added clarifying language explaining that while heat pumps are recommended for many instances, there are certain scenarios where electric resistance heating is an optimal cost-effective solution that still reduces dependency on gas systems.
- Multifamily Domestic Hot Water
 - CBOs expanded on low-income DIP renters and the potential harm that added costs can present for renters. CBOs also suggested potential policy solutions that can protect renters, which the Statewide CASE Team included in the report.
 - A mention of rooftop solar was also included per feedback from CBOs.
- Multifamily Envelope
 - CBOs provided comments on the measures in this report that could potentially trigger remodels. Remodels can lead to renters losing their residence. CBOs described the inadequate tenant protections that aim to protect renters during remodels.
 - The Statewide CASE Team included this valuable contribution in Section 3.4 to add to the general discussion of cost impacts on renters since issues mentioned were applicable to all proposals impacting tenants.

- Multifamily Indoor Air Quality
 - CBOs did not have any feedback.
- Multifamily Restructuring
 - CBOs did not have any feedback.
- Residential HVAC Performance
 - CBOs did not have any feedback.
- Single Family High-Performance Envelope
 - CBOs did not have any feedback.

2.2.3 Future Stakeholder Engagement

The Statewide CASE Team also reached out to a broader range of CBOs and EEEJ partner organizations who were interested in participating but lacked capacity to contribute this code cycle. The Statewide CASE Team aims to grow EEEJ stakeholder engagement efforts and outcomes in future code cycles by developing strong relationships built on trust, providing adequate compensation, and iterating on effective engagement formats co-created with EEEJ stakeholders. Further details about the timeline and stakeholder engagement activities can be found on <https://title24stakeholders.com/energy-equity-and-environmental-justice/>.

In future code cycles, the Statewide CASE Team is committed to furthering relationships with CBOs and inviting feedback on proposed code changes with a goal of engagement with these organizations representing DIPs throughout the code cycle. Several strategies for future code cycles are being considered, including:

- Creating an advisory board of trusted CBOs that may provide consistent feedback on code change proposals throughout the development process.
- Establishing a robust compensation structure that enables participation from CBOs and DIPs in the Statewide CASE Team’s code development process.
- Holding equity-focused stakeholder meetings to solicit feedback on code change proposals that seem more likely to have strong potential impacts.

3. Potential Impacts on DIPs in Multifamily and Single Family Buildings

To assess potential inequity of proposals for residential buildings, the Statewide CASE Team considered the criteria of cost, health, resiliency, and comfort and evaluated the potential impacts related to the following areas among DIPs.

3.1 Health Impacts

Understanding the influences that vary by demographics, location, or type of housing is critical to developing equitable code requirements. For example, residents in market rate apartments will have different air quality concerns than those in single family homes, or even those in subsidized multifamily housing where smoking and other potential contaminants are closely regulated and monitored. DIPs are more likely to live in substandard or “inadequate” housing, that is, housing with one or more significant physical problem affecting livability (Martín, 2020). Nine percent of all low-income renters live in inadequate housing (Martín, 2020). Deferred maintenance requests for these homes only make the inadequacy worse, with potential issues like mold growth or damaged wires causing respiratory problems and fires (Norton, Lewis, Klinger, & Goldmann, 2021). Older buildings are more likely to have deferred maintenance issues and also to be occupied by Black, Brown, and limited-income individuals, thus representing inequitable health and safety risks (Norton R. A., 2014.). These deferred maintenance issues may contribute to existing disparities and crises in the housing market, especially in the wake of the COVID 19 pandemic, by reducing the quality of available housing, which can make the still available housing less affordable (De La Campa, Reina, & Herbert, 2021). DIPs carry the burden of inadequate housing including subsequent health impacts.

Several of the potential negative health impacts from buildings on DIPs are addressed by energy efficiency (Norton R. A., 2014.; Cluett, 2015; Rose, 2020). For example, IAQ improvements through ventilation or removal of combustion appliances can lessen the incidents of asthma, chronic obstructive pulmonary disease (COPD), and some heart problems. Water heating and building shell improvements can lower stress levels associated with energy bills by lowering utility bill costs. Better insulation and tighter building envelopes can reduce the health impacts from intrusion of dampness and contaminants, as well as providing a measure of resilience during extreme conditions. Electrification can reduce the health consequences resulting from NO_x, SO₂, and PM_{2.5}. Studies have shown that not only do the effects of urban heat islands, “urbanized areas that experience higher temperatures than outlying areas” lead to higher mortality during heat waves, but those in large buildings are disproportionately affected (Smargiassi,

2008; Laaidi, 2012; U.S. EPA, 2023). These residents tend to be the elderly, people of color, and low-income households (Drehobl, 2020; Blankenship, 2020; IEA, 2014).

3.2 Energy Efficiency and Energy Burden

Because low-income households have a higher energy burden (percent of income spent on energy) than average households, energy efficiency alone can benefit them more acutely compared to other households. Numerous studies have shown that low-income households spend a much higher proportion of their income on energy—two to five times—than the average household (Power, 2007; Norton R. A., 2014.; Rose, 2020). Highly energy burdened households pay more than six percent of their income on energy bills, and severely energy burdened households pay more than 10 percent (Correra, 2023). Energy burden is even higher for renters, and even higher still for Black and Latinx people, the elderly, and people with disabilities at an average of 19 percent (Correra, 2023). Each Final CASE Report has a section with an estimate of energy cost savings from the current proposals. Moreover, utility cost stability is typically more important to these households compared to average households; for households living paycheck to paycheck, an unexpectedly high energy bill can keep that household cyclically impoverished (Drehobl, 2020). Energy burdened households are 175 to 200 percent more likely to remain impoverished for longer than households not experiencing energy burden (Drehobl, 2020). The impact of a rate increase or weather-related spike is more easily handled the greater the efficiency of the home. The cost impacts of efficiency and renewables can be significantly different for those in subsidized housing where the total of rent plus utilities is controlled versus those in single family homes or market rate multifamily buildings.

3.3 First Cost and New Construction

The housing crisis and energy equity are not separate entities, Chapman University researchers assert that “...by almost every metric—from rents to home prices—Golden State residents suffer the highest burden for shelter of any state in the continental U.S.” as California’s housing prices are nearly double or triple the cost of other comparable states (Cox & Kotkin, 2023). According to the Urban Institute, housing justice is “...ensuring everyone has affordable housing that promotes health, well-being, and upward mobility by confronting historical and ongoing harms and disparities caused by structural racism and other systems of oppression” (Urban Institute, 2023).

One potential negative consequence to DIPs of building code efficiency improvements is the potential for increased housing costs for new construction. However, a study found that increased construction costs do not have a statistically significant impact on home prices, as prices in the new home market are driven overwhelmingly by demand (Stone, Nickelsburg, & Yu, 2018). According to a peer-reviewed study done for the

California Tax Credit Allocation Committee (CTCAC), land costs and developer characteristics (size, experience, and profit structure of the firm) have the most significant effect on affordable housing costs (CTCAC, 2014). The 2014 study echoes the same findings in CTCAC’s cost study prepared in 1996 as well as the 2015 study by Stone, et al (Stone, Nickelsburg, & Yu, 2015). Similarly, developers of market-rate apartments conduct studies to investigate rent history and other information for comparable multifamily properties, which informs rent levels for specific projects.¹⁰

3.4 Cost Impacts for Renters

While Title 24, Part 6 applies primarily to new construction, it also can apply to major construction work in existing housing. As such, it’s necessary to consider the impact on renters. Risks posed to tenants when a property owner undertakes renovation work, include: costs of renovation work being passed onto tenants through existing cost recovery programs, construction work being carried out in a manner that threatens health and safety, and tenants facing eviction for substantial remodel work (Kirk, 2023). Potential policy solutions that can protect renters include: prohibiting pass-through costs on renters, capping rents for 5–15 year periods, limiting evictions, and holding property owners accountable in the case of noncompliance (Kirk, 2023).

3.4.1 Potential Displacement and Rent Burden Risks

The measures in Final CASE Reports that impact existing buildings undergoing substantial remodel work that would trigger requirements to meet the Title 24 standards could lead to negative impacts for renters. Almost 17 million Californians rent their residences, making it the second-largest renter state in the US (Kirk, 2023). Over half of these renter households are low-income as defined by the U.S. Department of Housing and Urban Development (Castleman, 2023). Additionally, there is a statewide shortfall of 1.3 million affordable homes for low-income renters (California Housing Partnership, 2023). Meanwhile, median rent prices have surged by 38 percent since 2000, while median renter household income has risen by only 7 percent (Mazzella, 2023). As a result, 79 percent of extremely-low-income renter households in California spend more than half of their wages on housing costs, compared to 6 percent of moderate-income renter households (California Housing Partnership, 2023).

Across the state, renters are protected by a patchwork of regulations based on factors such as location, building age, and ownership. Consequently, tenants are unevenly impacted by this type of work. Tenants in the private rental market, i.e., who live in properties owned by private individuals or companies, typically fall under one of two renter-protection categories: a local rent stabilization ordinance or the statewide rent

¹⁰ Examples include Yardi-Matrix (Yardi Matrix, 2023), HCA (HCA, 2020), and Foley & Puls (Foley & Puls, Inc., 2017), which all conduct market studies.

stabilization law, AB 1482, also known as the Tenant Protection Act of 2019. Some tenants, especially those who reside in buildings that are less than 15 years old, have no protections at all (Kirk, 2023). The impacts on renters protected by local rent stabilization and AB 1482 are described below.

3.4.1.1 Impact on Tenants Protected by Local Rent Stabilization

Approximately 30 cities in California have passed rent stabilization ordinances stronger than the State's rent stabilization law (Kirk, 2023). These laws establish rent caps and just cause eviction protections, however, typically special carve outs are made for building upgrades. In most cities, landlords are allowed to pass the cost of building upgrades on to tenants with increases up to 10 percent of rent, which is in addition to existing rent caps. These rent stabilization ordinances have also suffered from poor implementation (Kirk, 2023).

3.4.1.2 Impact on Tenants Protected by the State's Tenant Protection Act (AB1482)

Statewide rent-regulation law AB 1482 applies to most residential rental properties more than 15 years old that are not already protected by local rent stabilization ordinances. It establishes rent caps by limiting annual rent hikes to five percent of the current rent plus consumer price index (CPI), up to a maximum of ten percent. The law also requires landlords provide just-cause reasons for evicting tenants who have resided at the property for at least 12 months. Exceptions apply to single-family homes and condominiums that are not owned by corporate entities and to duplexes where the owner occupies one of the units.

Potential for Eviction

Whereas under most local rent stabilization ordinances, substantial renovation work requires the landlord to temporarily relocate tenants, AB 1482 includes an exception that allows landlords to temporarily displace tenants if they plan to remodel the unit for more than 30 days and it is unsafe for the tenant to stay. Building decarbonization retrofits, which may take months to complete, could lead to informal, coerced evictions under this loophole (Cantong, 2022). While evictions are a legal process with specific regulations, loopholes like this one can be used to enforce a de facto displacement. Tenants who are displaced because of renovation work are entitled to relocation assistance equal to the amount of one month's rent, but this is not enough to cover the costs associated with moving and securing alternative housing, especially for DIPs (Kirk, 2023). Even if upgrades can be done quickly and easily, a landlord might deceive tenants and city agencies by exaggerating the timeline or scope of work or prolonging the process deliberately to trigger a coerced eviction.

3.4.1.3 Additional Unintended Negative Consequences

Tenants protected under local rent stabilization and AB 1482 have the strongest protections but can still experience unintended negative consequences. Two important factors include construction regulations and allowable rent increases under cost recovery programs.

Lack of Strong Construction Regulations

Construction noise, dust, and other hazards may make living conditions so unbearable and harmful to health and safety that tenants feel pressured to leave. This tactic circumvents eviction protections and can leave tenants without recourse or alternative housing options. Any potential required renovation work could exacerbate this problem, motivating landlords to indirectly, effectively displace tenants and see a quicker return on investment or capitalize on value-add to their properties.

Allowable Rent Increases Under Cost Recovery Programs

Many local rent stabilization ordinances include exemptions for rent increases due to capital improvements. These exemptions allow landlords to recoup the costs of building upgrades by raising rents.

3.5 Impact on Energy Bills

Renters benefit from home energy efficiency improvements. Increased energy efficiency retrofits can reduce utility bills and relieve energy burden for renters. However, the utility bill impacts of energy efficiency in subsidized affordable housing is less clear, since CTCAC staff regularly review tax credit properties to assure that affordable housing renters pay utility bills virtually equal to the utility cost estimates that were used when establishing rents (Internal Revenue Service, Treasury, 2011). Utility allowances need to “reflect savings from energy efficiency improvements in a manner that is fair to tenants, financially feasible for owners, and reduces long-term public subsidy expenditures” for if utility allowances aren’t accurately updated, there’s a risk of leaving the cost to building owners who end up raising rents to make up the difference (CHPC, National Housing Law Project, 2016). Renters of market rate housing seldom ask about energy efficiency and utility bills,¹¹ so efficiency has little impact on rents, whereas it can have a large impact on utility bills (NMHC, 2022).

¹¹ According to manager and renter surveys conducted by the Multi-Housing Council in 2022, residents are interested in internet connectivity, package delivery services, gyms, and similar amenities. Smart thermostats were the only energy related feature they reported as essential or nearly so.

3.6 2025 Multifamily CASE Reports

The following reports covered proposed changes to multifamily buildings. These reports were deemed to have potential significant impacts on DIPs.

- Multifamily Domestic Hot Water
- Multifamily Envelope
- Multifamily Indoor Air Quality
- Multifamily Restructuring

3.6.1 Multifamily Domestic Hot Water

The Statewide CASE Team examined how the multiple proposed measures in the Multifamily Domestic Hot Water Final CASE Report might specifically impact DIPs. Details for measure impacts can be found in the measure-specific Sections 3.6, 4.6, 5.6, 6.6, 7.6, 8.6, 9.6, and 10.6 of the [Final CASE Report](#). Select examples of impacts include lower construction costs, lower energy costs, and improved hot water delivery performance.

Potentially Impacted Populations

- Populations are potentially impacted by multiple proposed measures. Low-income Californians are 39 percent more likely to live in multifamily housing than the general population, and low-income multifamily residents would be uniquely impacted by proposed measures. This is because the proposals impact construction costs, energy costs, and hot water delivery performance to name a few.
- For projects with gas water heaters, multiple measures would result in slight reductions of gas energy use and associated combustion by-products. The reduction of combustion by-products would benefit multifamily residents that live in the areas identified by CalEnviroScreen as “DACs”, since these residents live in areas that are “disproportionately affected by environmental pollution and other hazards”, which include higher outdoor (ambient) PM_{2.5} and traffic (CALEPA, 2022).

Impacts on Construction Costs

As shown in Table 1, some of the measures would result in lower construction costs for new construction, while others would increase construction costs. These impacts on construction costs for new construction may be offset by higher rents or the purchase price of the dwelling units, putting a higher burden on low-income households and residents in low-income census tracts. If these cost savings are passed on to building occupants as lower rent or purchase price, there could be a positive impact on low-income households and residents in low-income census tracts. If these additional costs

are passed on to building occupants as higher rent or purchase price, there could be a negative impact on low-income households and residents in low-income census tracts.

More details on cost impacts for renters, including potential displacement and rent burden risks, can be found in Section 3.4.

3.6.1.1 Reduction in Energy Costs

Most of the measures result in energy cost savings, which would provide a higher benefit to people in low-income households and low-income census tracts who spend a higher percentage of their income on energy than the general population.

3.6.1.2 Improved Hot Water Delivery Performance

Several of the measures result in improved hot water delivery performance, reducing excess water use and risk of waterborne pathogens, which would provide a higher benefit to the people in low-income households and low-income census tracts who spend a higher percentage of their income on utilities than the general population and may have increased healthcare costs.

3.6.1.3 Increased Resilience

With electrification, buildings can be connected to microgrids with solar, rooftop solar, wind generation, and battery storage. This can be beneficial during periods of power outages and natural disasters. Most new gas appliances rely on electricity to operate, and gas systems can also be affected during natural disasters, therefore debunking the myth that gas appliances are more reliable in case of an outage. By combining building electrification with clean generation from a microgrid and backup storage, all-electric homes can continue to operate and provide power to life-sustaining equipment during a grid outage.

Methane gas, a by-product of natural gas production, often harms DIPs through its extraction, transportation, and combustion processes. The siting of methane gas super emitters has been shown to significantly affect DIPs, with one study showing “for every 10 percent increase in non-Hispanic Black residents, the odds of exposure increased by 10 percent” (Casey, Cushing, Depsky, & Morello-Frosch, 2021). Natural gas also poses a major fire risk during earthquakes, with natural gas contributing between 20 percent and 50 percent of post-earthquake fires (California Seismic Safety Commission, 2001).

Furthermore, as wealthier customers leave the gas grid, this could leave DIPs even more vulnerable as utilities must decide if they want to continue investing in expanding and maintaining a system that is becoming underused and expensive to operate.

3.6.1.4 Improved Air Quality

Several of the measures would result in reduced on-site combustion of natural gas, either by increased efficiency of the domestic hot water system, or by reducing the

barriers to future retrofit to HPWH. These reductions in gas use impact air quality and have unique health benefits for DIPs as described in detail in Section 2.1 of the Final CASE Report .

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report. These sections describe any measure impacts that were not mentioned previously.

Table 1: Measure Impacts for Multifamily Domestic Hot Water

Measure Name	CASE Report Section	Potential Impacts
CPC Appendix M Pipe Sizing	3.6	This measure would result in lower construction costs, a reduction in energy costs, and improved hot water delivery performance as discussed above.
Pipe Insulation Enhancement	4.6	This measure would result in higher construction costs, a reduction in energy costs, and improved hot water delivery performance as discussed above.
Thermostatic Balancing Valves	5.6	This measure would result in lower construction costs, a reduction in energy costs, and improved hot water delivery, as discussed above.
Master Mixing Valves	6.6	This measure would result in higher construction costs, a reduction in energy costs, and improved hot water delivery as discussed above.
Central HPWH Cleanup	7.6	Heat Pump Water Heaters (HPWHs) are an important technology in multifamily construction for low-income housing. This is because HPWHs reduce utility costs and allow the developer to take advantage of various electrification incentive programs. In its assessment of this measure’s impact on DIPs, the Statewide CASE Team determined that the proposed

		Central HPWH requirements have a positive impact.
Individual HPWH Ventilation	8.6	This measure would result in a small increase in construction costs and a larger reduction in energy costs. Other potential impacts include improved hot water availability and longer equipment life. Inadequate ventilation results in significant compressor short cycling, which leads to early equipment failure. This measure avoids this early replacement by ensuring adequate ventilation. The measure also protects hot water availability by requiring electric resistance backup heat when the compressor cutout temperature is above the local winter median of extremes.
Individual DHW Electric Ready	9.6	This measure would result in positive effects on DIPs, based on future adoption of heat pump water heating equipment as a result of the electric ready requirements that increase resiliency and positive health impacts.
Central DHW Electric Ready	10.6	This measure would result in positive effects on DIPs, based on future adoption of heat pump water heating equipment as a result of the electric ready requirements that increase resiliency and positive health impacts.

3.6.2 Multifamily Envelope

The Statewide CASE Team anticipates the proposed measures to have the following potential impacts to DIPs. Details for measure impacts can be found in measure Sections 3.6, 4.6, and 5.6 of the [Final CASE Report](#).

3.6.2.1 Reduction in Energy Costs

The measures would result in Long-term Systemwide Cost (LSC)¹² savings through reduced heating and cooling energy from improvements to the requirements for cool roof, wall insulation, and windows. This would provide a higher benefit to people in low-income households and low-income census tracts who spend a higher percentage of their income on energy and rent than the general population.

3.6.2.2 Temperature and Comfort Maintenance

Many Americans die each year from overheating, and extreme heat disproportionately impacts low-income residents and people of color (Shivaram, 2021), the Statewide CASE Team considered the impact of this measure on cooling needs during heat waves. As described below, the measures proposed in this report better maintain temperature through weather extremes, without use of air conditioning or heating. These measures are beneficial from an energy bill perspective and improved comfort, in addition to reducing the potential for extreme heat fatalities or hospitalization.

- The cool roof reduces cooling needs by reflecting radiant heat and preventing transfer through the building envelope.
- The minimum wall insulation measure reduces conductive heat transfer between indoor and outdoor environments, reducing heating and cooling needs.
- The improved windows performance would reduce heat gain/loss and would also improve thermal comfort for people in the rooms with windows. This measure also includes changes to RSHGC (relative solar heat gain coefficient), which would allow for beneficial heat transfer during heating season and may impact cooling loads during the cooling season.

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report. These sections describe any measure impacts that were not already mentioned previously.

¹² LSC savings, formerly known as Time Dependent Value (TDV), are calculated using hourly energy cost metrics for electricity and natural gas provided by the CEC. They incorporate the hourly cost of marginal generation, transmission and distribution, and other factors in order to quantify cost impacts (and therefore savings) of electricity and natural gas consumption that go beyond the simple cost per kilowatt hour or cost per therm.

Table 2: Measure Specific Impacts for Multifamily Envelope

Measure Name	CASE Report Section	Potential Impacts
Cool Roof	3.6	<p>This measure slightly impacts general comfort in the building, but the benefit would likely be felt unevenly in the building as would the savings. The energy savings benefit is calculated per unit, equally across all the units in the prototype buildings, but the cool roof benefit would mostly be felt on the top floor of multifamily housing, where it may have significant comfort and energy benefit for occupants.</p>
Improved Minimum Wall Insulation	4.6	<p>This measure should not have a large direct impact on DIPs. The proposed measure updates mandatory requirements that result in a change to the minimum envelope insulation requirements backstop for the performance compliance method. There is also an existing prescriptive requirement that is more stringent than the mandatory requirement.</p> <p>One benefit to this proposal is that it can impact people over time. If higher building performance is secured in the wall envelope, then the benefit continues for the duration of the building's existence. Since exterior walls are rarely impacted during any renovation activity, it ensures that the durable shell of the building would perform better throughout the life of the building and the somewhat less permanent building mechanical systems, in particular, the HVAC system, would gain improvements over time that would further raise the building performance,</p>

		<p>aided by the higher performance in the wall insulation.</p> <p>This is a long-term benefit that would ensure an energy savings benefit for the occupants throughout the life of the building.</p>
<p>High Performance Windows</p>	<p>5.6</p>	<p>This measure should have a positive impact on DIPs. The proposed change improves window performance, which has a positive impact on energy consumption. Since DIPs pay disproportionately higher percentage of their income toward energy costs, this would result in a slight reduction in these bills.</p> <p>There is an additional benefit of higher performance windows; the windows would improve the thermal comfort properties of the space by making sun lighting less impactful inside in cooling-dominated climate zones, reducing the need to turn on the air conditioner.</p> <p>Lower U-factor windows would also produce an additional benefit in heating situations by reducing the heat loss out of the building. This impact can be felt by people sitting near a window. Since thermal comfort affects state of mind, the better performing windows can have a positive impact on a person’s well-being and sense of satisfaction with their environment, which can have a positive, but indirect, impact on their stress level and other human health factors.</p>

3.6.3 Multifamily Indoor Air Quality

The Statewide CASE Team examined how the proposed measure in the Multifamily Indoor Air Quality Report might specifically impact DIPs. Details for predicted impacts can be found in the [Final CASE Report](#).

3.6.3.1 Research Methods and Engagement

The Statewide CASE Team reviewed literature to identify how the MF IAQ measure could impact DIPs, including:

- Data from the [CalEnviroScreen website](#) indicating how DIPs may be disproportionately affected.
- Studies showing how DIPs may be more susceptible to health and quality of life impacts, including (The Greenlining Institute, 2023) and other studies.
- Interviews with market actors that are active in affordable housing.

The Statewide CASE Team’s interviews included 16 multifamily market actors that are active in designing, constructing, verifying, or researching multifamily buildings, many of whom work on affordable multifamily buildings.¹³ They included subject matter experts (SME), architects (Arch), raters (Rtr), general contractors (GC), mechanical engineers (ME), and developers (Dev). On average, the market actors interviewed reported that 71 percent of the multifamily projects they work on are affordable, as shown in Table 3. As part of the interviews, many of these stakeholders described how the proposed measure would impact residents of affordable multifamily dwelling units.

Table 3: Percent of Affordable Multifamily Projects that Interviewees Designed, Constructed, or Verified

% of Market Actor Multifamily Projects	SME (n=1)	Arch (n=3)	Rtr (n=3)	GCs (n=4)	ME (n=2)	Dev (n=3)	Total (n=16)
% of projects that are affordable	95%	73%	60%	56%	70%	100%	71%
% of projects that are market rate	5%	27%	40%	44%	30%	0%	29%

3.6.3.2 Potentially Impacted Populations

While the proposed change would impact all residents of multifamily dwelling units, several DIP communities should uniquely benefit because they have increased asthma incidences or experience more asthma symptoms. As described in Section 3.2 of the Final CASE Report, the measure should reduce the concentration of pollutants that can exacerbate asthma. Consequently, the proposed measure could uniquely impact the following DIPs:

¹³ The Statewide CASE Team conducted 25 total interviews, but 5 of these were with subject matter experts whose expertise includes energy modeling in multifamily buildings, but who do not conduct market research, so they could not report on typical practices or impacts to residents.

- Low-income Californians are 39 percent more likely to live in multifamily housing than the general population, and low-income multifamily residents should uniquely benefit from the proposed measure since asthma rates were found to be higher among low-income families (American Lung Association, 2018). Children aged 5–17 years were also found to have significantly higher rates of asthma (CDPH, 2017), and low-income children may also spend more time at home than non-low-income children (Zhu, Connolly, Lin, Mathews, & Wang, 2020), which increases their exposure time to pollutants.
- Multifamily residents who are Black or Native American should uniquely benefit because these populations have higher rates of asthma than the general population (Meng, Babey, Hastert, & Brown, 2007).
- Multifamily residents that live in the areas identified by CalEnviroScreen as Disadvantaged Communities (DACs) should benefit from the proposed measure. These residents live in areas that are “disproportionately affected by environmental pollution and other hazards,” meaning there is higher outdoor (ambient) PM_{2.5} and traffic (CALEPA, 2022). As described in Section 3.2 of the Final CASE Report, the proposed measure should decrease the penetration of outdoor PM_{2.5} and reduce traffic noise.
- Smoking rates are also higher in some DIP communities, including adults who are receiving federal housing assistance. A study found that “smoking rates among adults receiving federal housing assistance are almost twice the rate of the general population, and secondhand smoke exposure is almost twice as high among Black people as White people (Hernández, Swope, Azuogu, Siegel, & Giovencoa, 2019). While secondhand smoke exposure primarily includes exposure within a dwelling unit, studies have documented secondhand smoke transfer between dwelling units (Bohac, Hewett, Hammond, & Grimsrud, 2011).
- The proposed measure could impact all multifamily residents, including DIPs, in that additional construction costs could be passed on to residents. For example, multifamily developers may increase the sales price of condominiums, and multifamily building owners may increase rental prices. On the other hand, the measure would reduce energy bills through lower heating and cooling needs.

The next section describes anticipated impacts.

3.6.3.3 Potential Impacts

The Statewide CASE Team anticipates the following impacts to DIPs.

Reduction in pollutants that can exacerbate asthma

In general, compartmentalization should reduce many of the pollutants that can exacerbate asthma. Through the combination of filtered outdoor air and compartmentalization, the measure should reduce chronic exposure to PM_{2.5}, which affects both the respiratory and cardiovascular systems and results in negative health impacts, including an increased incidence of all-cause mortality and stroke (Bowe, 2019). Additionally, compartmentalization should reduce exposure to gaseous pollutants such as formaldehyde, NO₂, and benzene in secondhand smoke from neighboring units (Modera, et al., 2023). NO₂ and secondhand smoke are associated with asthma (Anenberg, et al., 2022); (U.S. Center for Disease Control, 2022) and formaldehyde is a respiratory irritant, Studies have found an association between exposure to these pollutants and cancer (U.S. EPA, n.d.).

The Greenlining Institute set a goal of cutting the number of asthma-induced emergency room visits in half, and IAQ measures are an important step towards that goal (The Greenlining Institute, 2023; U.S. EPA, n.d.).

One potential concern is that compartmentalization can increase pollutant concentrations released within occupants' own units if they do not operate their local exhaust, particularly their kitchen fans (Modera, et al., 2023). This highlights the importance of resident education, and 2022 Title 24, Part 6 Section 10-103(b)4 requires that residents be trained on the ventilation equipment they must operate. A recent survey of 142 California residents found that about two-thirds reported using their range hood most of the time (37 percent) or always (30 percent), and another one-quarter (27 percent) reported using it sometimes (TRC Advanced Energy, 2022). The results found that non-White respondents were more likely to report using their hood most of the time or always (75 percent) compared to White respondents (56 percent), but there were no other significant differences by race, ethnicity, or income (TRC Advanced Energy, 2022). These results are an increase compared to previous research and may indicate that range hood use is increasing over time.

Noise reduction, contribution to a peaceful environment, and pest control

Compartmentalization reduces noise transfer from the exterior and from neighboring units. One subject matter expert who designs affordable housing noted that a source of mechanical ventilation with compartmentalization is important because these units are quieter while providing fresh air. They are often sited in dense areas next to highways. "To be able to close the door and have quiet in your unit is huge."

Two interviewees who design affordable housing noted that compartmentalization reduces pest transfer between units, which can be a particular concern in affordable multifamily housing.

Reduction in LSCs

The measure would result in LSC Savings in the majority of climate zones through reduced heating and cooling energy from compartmentalization. This would provide a higher benefit to people in low-income households and low-income census tracts who spend a higher percentage of their income on energy and rent than the general population.

Higher construction costs have potential to be passed on as higher rent or purchase price

The measure results in higher construction costs for new construction, which may be offset by higher rents or the purchase price of the dwelling units, putting a higher burden on low-income households and residents in low-income census tracts. The Statewide CASE Team also conducted outreach to learn more from those in the industry. Two interviewees who were developers of affordable multifamily projects were generally in favor of the proposed measure, but they raised concern over costs, since this could reduce the total number of dwelling units constructed. One recommended that financiers provide additional funding to affordable developers to offset the additional cost. Another developer of affordable multifamily projects was against the proposed measure because of cost concerns for switching from exhaust-only to balanced ventilation. As discussed in Section 6, one reason the Statewide CASE Team proposes to require compartmentalization at a maximum value of 0.3 cfm50/ft² instead of 0.2 cfm50/ft² is cost concerns, particularly for affordable housing.

Competing effects on cooling needs during heat waves

Many Americans die each year from overheating, and extreme heat disproportionately impacts low-income residents and people of color (Shivaram, 2021). The Statewide CASE Team considered the impact of this measure on cooling needs during heat waves. As described below, the measure package has competing impacts on cooling needs.

- The requirement for balanced or supply-only ventilation would increase the amount of outdoor air provided to dwelling units on average, which increases overall cooling loads.
- Because of the prescriptive HRV requirement, the proposed measure should generally reduce cooling needs in Climate Zones 1, 2, 4, 11–14, and 16 because the HRV/ERV would precool incoming supply air. An HRV could increase cooling needs in Climate Zones 3, 5–10, and 15 due to the mild climates in these regions, where cooler outside air would be unnecessarily heated by the HRV during shoulder seasons.
- Compartmentalization reduces the amount of air that infiltrates through the building envelope. This has a mixed impact on cooling loads during the

cooling season. When it is hotter outdoors than indoors, compartmentalization reduces cooling loads. When it is cooler outdoors than indoors, compartmentalization increases cooling loads. However, residents could reduce this impact by opening windows or balcony doors when it is cooler outside.

Many existing dwelling units do not have air conditioning, but the proposal does not affect alterations.

Competing effects on residents' ability to control their own IAQ

The proposed measure is likely to have competing impacts on residents' ability to control their own IAQ. By reducing the transfer of pollutants from their neighbors, compartmentalization allows each resident to have more control over their unit's IAQ. However, supply or balanced ventilation may be provided centrally or through a system that may not be visible or controllable by the occupant. One architect who works primarily on affordable housing noted the simplicity of an exhaust-only approach for ventilation. Two interviewees reported that operable windows and easily accessible controls are important. However, one architect who builds 100 percent affordable housing and one rater who primarily verifies affordable housing indicated that many of their units are close to highways and thus saw the filtration connected to dedicated supply air through supply-only or balanced ventilation as a benefit to the occupants.

3.6.3.4 Evolution of the Code Change Proposal and Future Opportunities

The potential increase in rent or purchase price and its impact on DIPs is one reason why the Statewide CASE Team proposes a compartmentalization limit of 0.3 cfm50/ft² instead of 0.2 cfm50/ft², which was the Statewide CASE Team's original proposal and which aligns with ASHRAE Standard 62.2-2022. In interviews, market actors reported that it is more expensive to compartmentalize to a lower (tighter) value, resulting in higher construction costs. While only a few interviewees provided cost estimates on compartmentalization, the few estimates collected and the qualitative interview results indicate that costs increase steeply as compartmentalization tightens, as documented in Section 6.3.2 of the Final CASE Report. Several interviewees who design, build, or verify affordable housing agreed that compartmentalization should be required, but they recommended requiring 0.3 instead of 0.2 cfm50/ft² for feasibility and cost reasons. Section 3.2 of the Final CASE Report discusses the monetized health benefits of improved IAQ.

While this research gathered input from stakeholders such as affordable housing developers that work directly with DIPs, the Statewide CASE Team did not gather feedback directly from impacted residents. One consideration for a future opportunity would be to gather feedback directly from DIPs that are affected by multifamily code change proposals for high-level insights. This could take the form of focus groups or a

survey to gather feedback on residents' concerns and priorities for housing conditions, as well as to understand how residents rank low energy bills and health compared with higher incremental housing costs. The focus groups or survey could include questions on several multifamily topics, and they could collect responses from one or more of the following groups aligned with multifamily properties in DIPs: residents, maintenance staff, resident support specialists, and property owners. Affordable housing owners, housing advocacy groups, environmental justice groups, and other organizations could potentially provide contacts for focus groups or survey respondents. While this data collection is unlikely to provide insights in time to affect the Title 24 2025 Code Cycle, results could provide broad insights for future cycles.

3.6.4 Multifamily Restructuring

The Statewide CASE Team examined how the multiple proposed measures in the Multifamily Domestic Hot Water Final CASE Report might specifically impact DIPs. Details for measure impacts can be found in the measure specific Sections 3.6, 4.6, 5.6, 6.6, 7.6, 8.6 and 9.6 of the [Final CASE Report](#).

The measures in this CASE Report apply to all multifamily buildings. Low-income households are more likely to live in multifamily housing. Low-income households range from 38 to 66 percent of all multifamily households for the three major investor-owned utilities and nearly half of all low-income households live in multifamily housing (Elkind and Lamm 2019). Low-income multifamily residents experience higher energy burden (5.0 percent) than the median energy burden in California (3.5 percent) and spend a disproportionate amount of their income on utility bills. According to a study conducted by the American Council for an Energy-Efficient Economy (ACEEE), 5.5 percent of low-income customers in California experienced disconnections for nonpayment as compared with 2.9 percent of non-low-income customers (Ross 2016). Minority households in California, including African American and Latino residents, also experience higher energy burdens (5.4 and 4.1 percent, respectively) than the median according to the ACEEE study.

The measures proposed in this report will result in energy cost savings, which will provide a higher benefit to people in low-income households who spend a higher percentage of their income on energy and rent. Lower utility bills will also decrease the number of customers likely to experience disconnections due to nonpayment.

Measures in this report may benefit DIPs through improved IAQ, sound insulation and thermal comfort, as described in the report.

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report. These sections describe any measure impacts that were not already mentioned previously.

Table 4: Measure Specific Multifamily Restructuring

Measure Name	CASE Report Section	Potential Impacts
Slab Perimeter Insulation	3.6	The Statewide CASE Team assessed the potential impacts of the proposed measure, and based on a preliminary review, the measure is unlikely to have significant impacts on energy equity or environmental justice outside of any impacts discussed above, therefore reducing the impacts of disparities in DIPs. The measure may benefit DIPs through improved IAQ, as it may prevent mold by reducing condensation issues on the ground floor of buildings. See Section 2 of the Final CASE Report for further information.
Visible Transmittance (VT)	4.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above. This measure does not have notable energy or environmental impacts.
Skylight Properties	5.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above. This measure is a cleanup measure and does not have notable energy or environmental impacts.
Multifamily Quality Installation Inspection	6.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above. The measure may benefit DIPs through improved indoor air quality, as improved cavity air sealing through multifamily quality insulation

Measure Name	CASE Report Section	Potential Impacts
		installation may lower exposure to outdoor air pollution, dry rot, and moisture problems.
Central Ventilation Shaft Sealing	7.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above. The measure may benefit DIPs through improved IAQ, as improved duct sealing through central ventilation shaft sealing would reduce air leakage between dwelling units, limiting transfer of smoke and contaminants like carbon monoxide from adjacent units.
Verification Clean-up	8.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice. The verification clean-up measure addresses performance compliance options only and does not impact the overall energy budget allowance for code compliance.
Additions and Alterations Clean-up	9.6	Because this is a clean-up measure and does not result in changes to code requirements, The Statewide CASE Team does not anticipate impacts on energy equity or environmental justice.

3.7 2025 Multifamily and Single Family CASE Reports with Few Expected Impacts

The Statewide CASE Team found that some measures from multifamily and single family Final CASE Reports would not likely have significant impacts on DIPs. The general equity impacts and potential impacts on DIPs as listed in Sections 2 and 3 of the Final CASE Reports are still relevant at a broader level, and these reports may still be relevant to stakeholders, DIPs, and other concerned groups.

Multifamily

- [Multifamily Swimming Pool and Spa Heating](#)
- [Multifamily Residential HVAC Performance](#)
- [Residential HVAC Performance](#)

Single Family

- [Residential HVAC Performance](#)
- [Single Family High-Performance Envelope](#)

4. Potential Impacts on DIPs in Nonresidential Buildings

To assess potential inequity of proposals for nonresidential buildings the Statewide CASE Team considered key criteria of cost, health, resiliency, and comfort, examined which building types are used by DIPs most frequently, and evaluated the allocation of impacts related to the following areas among all populations.

4.1 Health Impacts

Any potential health burdens from proposals could more severely affect DIPs that may have limited access to healthcare and live in areas affected by environmental and other health burdens. Several of the potential negative health impacts from buildings on DIPs are addressed by energy efficiency (Norton R. A., 2014.; Cluett, 2015; Rose, 2020). For example, IAQ improvements through ventilation or removal of combustion appliances can lessen the incidents of asthma, chronic obstructive pulmonary disease (COPD), and some heart problems. Black and Latinx people are 56 percent and 63 percent more likely to be exposed to dangerous air pollution than White people, respectively (Tessum, et al., 2019). Water heating and building shell improvements can reduce stress levels associated with energy bills by lowering utility bill costs. Electrification can reduce the health consequences resulting from NO_x, SO₂, and PM_{2.5}. Health impacts for nonresidential buildings primarily apply to DIP building occupants, rather than building owners.

4.2 Cost Impacts

People historically impacted by poverty and other historic systems of wealth distribution can be affected more severely by the incremental first cost of proposed code changes. Costs can also create an economic burden for DIPs that does not similarly affect other populations. See the Cost and Cost Effectiveness sections of the appropriate Final CASE Reports for an estimate of energy cost savings from the current proposals. In the case of nonresidential buildings, these cost impacts are more applicable to DIP building owners rather than DIP building occupants.

4.3 Resiliency Impacts

DIPs are more vulnerable to the negative consequences of natural disasters, extreme temperatures, wildfires, floods, and other weather events due to climate change. Black Americans are 40 percent more likely to currently live in areas with the highest projected increases in extreme heat related mortality rates, compared to other groups (EPA,

2021). Similarly, natural disasters affect DIPs differently. Race and wealth affect the ability to evacuate for a natural disaster, as evidenced during Hurricane Harvey wherein White and wealthy residents were overrepresented by 19.8 percent among evacuees (Deng, et al., 2021). Proposals that improve buildings' resiliency to natural disasters and extreme weather could positively impact DIPs, since buildings such as hospitals, community centers, churches, etc. can offer shelter in times of crisis. Additionally, buildings with more insulation and tighter envelopes can reduce the health consequences of infiltration of poor quality air, reduce risk of moisture damage and related health impacts (mildew and mold), and help maintain thermal comfort during extreme weather events.

4.4 Comfort Impacts

Thermal comfort and proper lighting are important considerations for any building where people work, though impacts are not proportional across all populations. Thermal comfort can also have serious health effects as heat related illness is on the rise in California. DIPs are at a greater risk for heat illness due in part to socioeconomic factors. From 2005 to 2015 the number of emergency room visits for heat related illness in California rose 67 percent for Black people, 53 percent for Asian-Americans, and 63 percent for Latinx people (Abualsaud, Ostrovskiy, & Mahfoud, 2019). Studies have shown that not only do the effects of urban heat islands lead to higher mortality during heat waves, but those in large buildings are disproportionately affected (Smargiassi, 2008; Laaidi, 2012). These residents tend to be the elderly, people of color, and low-income households (Drehobl, 2020; Blankenship, 2020; IEA, 2014). Comfort is not only a nice quality to have in workplaces, schools, etc., but it also has real world impacts on people's health. Comfort impacts for nonresidential buildings primarily apply to DIP building occupants, rather than building owners.

4.5 Potential Impacts by Building Type

Proposals for the following building types would not have disproportionate impacts because all populations use the buildings with the same relative frequency. While there may be impacts on costs, health, resiliency, or comfort, DIPs would not be affected more or less than any other population. It is unlikely that DIPs would pay a disparate share of the incremental first costs.

- Office buildings of all sizes
- Retail buildings of all sizes
- Laboratories
- Open air parking garage
- Vehicle service

Below is a description of how the proposed code changes might impact DIPs by building type.

4.5.1 Strip Mall

Proposals for the strip mall building type have the potential to create disproportionate impacts. The benefits of strip malls are complex and vary based on factors such as location, economic conditions, and community needs. Rents in strip malls are often more affordable than they would be in heavily trafficked or more upscale areas. Strip malls often serve as affordable business centers for DIPs. Some shop owners indicate strip mall stores feel like “the center of social life” (Ramanathan, 2017). Historically, small and minority owned businesses face challenges such as discrimination, difficulty in securing funding, and a lack of social capital that impact start-up costs and ability to secure business locations. Black entrepreneurs are almost three times more likely to lose profitability due to start-up costs compared to White entrepreneurs (Morelix, 2016). Increases in cost could disrupt these DIP-owned businesses even more.

4.5.2 Mixed-Use Retail

DIPs use mixed-use retail buildings more frequently than other populations, so there is a possibility of uneven impacts. Rents are often higher in mixed-use retail. Historically, small and minority owned businesses face challenges such as discrimination, difficulty in securing funding, and a lack of social capital that impact start-up costs and ability to secure business locations (Morelix, 2016). Impacts on health, resiliency, or comfort are not anticipated to be disproportionate.

4.5.3 Schools (Small and Large)

Incremental costs could have a larger impact on DIPs than the general population because school funding is linked with race and income in the United States (U.S.). Jurisdictions with lower income populations where the tax base, funding, and capital improvement budgets may be more constrained may find it more challenging to accommodate the incremental first costs. Costs can affect educational quality, as incremental costs present a significant burden for schools with lower budgets. Analysis from the U.S. Government Accountability Office shows that students in poorer and smaller schools tend to have less access to college-prep courses and 80 percent of the students in these poorest schools were Black and Latinx (United States Government Accountability Office , 2018). Incremental costs can deepen these educational inequalities by burdening schools with low budgets. Proposals will impact individuals attending and working at schools including those from DIPs. Proposals that impact health, resiliency, and comfort all have the potential to disproportionately impact those who attend or work in majority DIP schools, as those schools can less often afford considerations for those criteria.

4.5.4 Hotel

Proposals that impact health and resiliency have the potential to disproportionately impact those working or residing in hotels. California has used hotels for temporary housing, and many unhoused people rely on these buildings for shelter on a regular basis and during extreme weather events. California's Project Roomkey offered temporary hotel housing for more than 42,000 unhoused Californians in the COVID-19 crisis (California Governor's Office of Emergency Services, 2021). More than 1.6 million people are employed year-round in accommodation and food services with more than 49 percent of that industry identifying as Black, Asian American, or Latinx (U.S. Bureau of Labor Statistics, 2023). While the costs may increase for this nonresidential building type, the burden of that cost is unlikely to be disproportionate.

4.5.5 Assembly

While proposals to most assembly buildings will not have a disproportionate impact, some of the buildings such as places of worship, community or recreation centers, homeless shelters used for temporary housing, and libraries, for example could more significantly affect DIPs. Places of worship can be valuable community fixtures for DIPs. Forty-seven percent of Black people and 39 percent of Latinx people report attending religious services weekly, compared to only 32 percent for White people (Pew Research Center, 2023). Churches and other community assembly buildings serve as significant spaces for spiritual, cultural, and economic resources for DIPs. Specifically, building types that provide shelter in times of extreme weather events; aid in disaster preparedness; or provide shelter, food, or other resources to those in need would be more likely to result in disproportional impacts. Shelters and churches serve DIP populations. While the costs may increase for this nonresidential building type, the burden of that cost is unlikely to be disproportionate.

4.5.6 Hospital

Increased incremental costs for hospitals can present challenges to jurisdictions with lower income populations where the tax base, funding, and budgets may be more constrained. Proposed measures that impact health and resiliency have the potential to disproportionately impact those who seek services from or work in hospitals.

4.5.7 Restaurant

Proposals for restaurants could affect DIPs more significantly than the general population, particularly those who work in the foodservice industry, own a small business that is a restaurant, or rely on restaurants for food (especially those living in food deserts). An estimated 23.5 million Americans live in food deserts. Defined as an area with "limited access to a variety of healthy and affordable food" (Chapple)). In these food deserts, restaurants can play a role in providing access to more food for

DIPs. Access to restaurants with healthy food is also limited for many DIPs in food deserts. In South Los Angeles neighborhoods with a higher percentage of Black residents, only 27 percent of restaurants provided 5 or more healthy options, while in the more affluent West Los Angeles, 40 percent of restaurants offered 5 or more healthy options (Lewis, et al., 2005). Many of California's restaurants are owned by DIPs, and even more are staffed by DIPs. Of the 150,000 fast food employees in Los Angeles, 9 of 10 are people of color (UCLA Labor Center, 2022). Proposals that have high incremental costs and health effects could have notable impacts on DIPs.

4.5.8 Enclosed Parking Garage

Breathing the air in an enclosed parking garage can expose people to carbon monoxide, gasoline, or diesel engine exhaust. Over time in an enclosed parking garage, accumulated pollutants become more concentrated and daily exposure to this concentration is a serious IAQ issue (Oh, 2020). Anyone spending extensive time in an enclosed parking garage, including unhoused people, would be impacted by this air quality danger.

4.5.9 Grocery

Proposals for groceries could affect DIPs more significantly than the general population, particularly those who work in grocery buildings, own a small grocery business, or depend upon a specific grocery as a food source in a food desert. An estimated 23.5 million Americans live in food deserts (Chapple)). Defined as an area with "limited access to a variety of healthy and affordable food," food deserts put a significant health burden on DIPs. In California almost 1 million people live in food deserts (The Sarah Samuels Center for Public Health Research and Evaluation, 2016). Living in a food desert can raise the price of living and cause people to travel further for food. Nearly two-thirds of Californians have reported feeling "very concerned" about paying for their rent with the rising cost of living (Public Policy Institute of California 2022). Even higher prices due to proposed measures and longer distances for food have the potential to harm DIPs. Proposals that impact incremental cost, health, resiliency, and comfort all have the potential to disproportionately impact those working in grocery buildings or relying on them as one of their only food sources in a food desert.

4.5.10 Refrigerated and Non-refrigerated Warehouse

Proposals that impact health, especially thermal comfort or air quality impacts, have the potential to disproportionately impact those working in warehouses, many of whom are from DIPs. Thermal comfort and heat illness are a serious threat for DIPs. From 2005 to 2015 the amount of heat-related emergency department visits increased for Black and Latinx people by nearly double the rate of White people (Abualsaud, Ostrovskiy, & Mahfoud, 2019). While the costs may increase for this nonresidential building type, the

burden of that cost is unlikely to be disproportionate for DIP building occupants, but rather for DIP building owners.

4.6 2025 Nonresidential CASE Reports

The following reports covered changes to nonresidential buildings. These reports were deemed to have potential significant impacts on DIPs. They are included here to show, in summary, how each report may affect DIPs in California.

- Commercial Kitchens
- Cooling Tower Efficiency
- Controlled Environment Horticulture
- HVAC Space Heating
- Process Load Pipe Insulation

4.6.1 Commercial Kitchens

The Statewide CASE Team examined how the multiple proposed measures in the Commercial Kitchens Final CASE Report might specifically impact DIPs. Details for measure impacts can be found in the measure Sections 3.6, and 4.6 of the [Final CASE Report](#).

The measures proposed in this CASE Report could help improve air quality by easing the replacement of natural gas fired cooklines with electric equivalents and by improving the overall air quality and reducing ambient noise levels through demand-controlled ventilation systems. Another health benefit could include reduced heat strain of workers in kitchens (Haruyama, et al., 2009).

The DIPs most directly affected by this measure could include small businesses and foodservice workers. There are more than a million restaurant workers in California, with projections that expect this number of employees to grow (California Restaurant Association, n.d.) According to the National Restaurant Association, seven out of every ten US restaurants are single-unit operators, meaning that they only have one location and would therefore fall into the category of small business (National Restaurant Association, 2019). There is likely a need to provide funding and support for these small businesses to support measure implementation.

Studies show that DIPs are disproportionately negatively impacted by unhealthy IAQ (Katz, 2012). Although the proposed code change may not save a lot of energy, it has the potential to benefit DIPs, especially those in areas with poor ambient (outdoor) air quality. Workers at restaurants with gas stoves may experience increased exposure to mutagenic compounds in cooking fumes compared to workers at restaurants with electric stoves (Sjaastad, Jørgensen, & Svendsen, 2010). PM_{2.5} is especially

concerning for DIPs in commercial kitchens, since PM_{2.5} exposure can potentially lead to asthma, birth defects, increased risk of dementia, and fatalities (National Institute of Environmental Health Sciences, 2024). In one study, PM_{2.5} concentrations far exceeded the recommended amount in commercial kitchens (Lyu, et al., 2022). The potentially impacted populations would be all DIPs in California but especially those with higher rates of asthma, poor indoor air quality, and poor ambient (outdoor) air quality. Indoor air pollution also incurs socio-economic costs. The California Air Resource Board found that the combined fatal and non-fatal costs of indoor air pollution cost Californians at least \$45 billion per year (California Air Resources Board, 2005). Appendix F of the Commercial Kitchens report contains more details on this stakeholder outreach. It is likely that there would be positive changes to the workplace environment, including more comfortable temperatures and improved IAQ (Rashkin, 2016).

Additional impacts of the proposed code change include increased cost and potential future energy savings. The added up-front cost of the process of preparing to electrify commercial kitchens would mean more burden of entry without incentive programs; however, as shown in Section 3.4 of the Final CASE Report, the up-front cost of this electrical infrastructure is significantly less than the cost of a future retrofit. The measure incremental cost would be more demanding up front for DIPs, which could be mitigated by financial support programs. Energy savings would not be realized directly from this measure because this is an infrastructure measure with no energy savings. This measure does set the stage for future full electrification of the kitchen with these accompanying benefits. Section 3.4.2 of the Final CASE Report details the incremental cost of this measure.

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report. These sections describe any measure impacts that were not already mentioned previously.

Table 5: Measure Impacts Nonresidential Commercial Kitchens

Measure Name	CASE Report Section	Potential Impacts
Electrification Readiness	3.6	Studies show that DIPs are disproportionately negatively impacted by unhealthy IAQ (Katz 2012). Although the proposed code change may not save a lot of energy, it has the potential to benefit DIPs, especially those in areas with poor ambient (outdoor) air quality. In this case, the potentially impacted populations would

Measure Name	CASE Report Section	Potential Impacts
		<p>be all DIPs in California but especially those with higher rates of asthma, poor IAQ, and poor ambient (outdoor) air quality. Appendix F of the Final CASE Report contains more details on this stakeholder outreach. It is likely that there would be positive changes to the workplace environment, including more comfortable temperatures and improved IAQ (Rashkin 2016).</p>
<p>Demand Control Kitchen Ventilation (DCKV)</p>	<p>4.6</p>	<p>The review of this measure focused on the potential impact on three main DIPs identified: small businesses, public institutions, and foodservice workers.</p> <p>Given the 5000cfm threshold for DCKV to become a requirement, it is unlikely to have much impact on small businesses. Facilities that fall under the 5000-cfm threshold are likely to be quick service. In their interview with the Statewide CASE Team, Chipotle noted that their standard hood design only requires 3000cfm. Full-scale restaurants are likely to reach the 5,000cfm threshold, but small business owners running such restaurants may be less likely to pursue new construction. Facilities that are likely to reach the 5,000 cfm threshold and be new construction are generally institutional, such as cafeterias, hospitals, universities, hotels, schools, prisons, religious institutions, or facilities that provide meals to unhoused individuals.</p> <p>The proposed code change does affect larger institutions such as schools, which could impact publicly-funded institutions in</p>

Measure Name	CASE Report Section	Potential Impacts
		<p>lower-income communities. For schools located in lower-income communities that have a proportionately smaller tax base, this code change may negatively impact the number of schools that would be built or reduce incentives to upgrade schools if such alterations would trigger the code (Section 3.6.2 of the Final CASE Report), due to the added upfront cost of the unit. In this case, DIPs with existing schools or plans to build new schools may be negatively impacted by the proposed code change (Section 3.6.1 of the Final CASE Report). More support for these school districts, along with other multi policy interventions, could prove helpful to support this implementation (Section 3.6.4 of the Final CASE Report).</p> <p>The proposed code change would most directly impact foodservice workers, typically in lower-income brackets. Interviews with end users highlighted concerns about mandatory DCKV's impact on thermal comfort or air quality, but this should result in no change compared to the previous code, provided that the modern DCKV systems are working properly. In worst case scenario, the DCKV system can be manually overridden for the hood to perform at maximum airflow. The workplace environment should improve with the noise reduction associated with lower fan speeds during non-peak periods of production, which may also increase workplace safety accordingly, the details for which are still being researched.</p>

4.6.2 Cooling Tower Efficiency

The Statewide CASE Team examined how the multiple proposed measures in the Cooling Tower Efficiency Final CASE Report might specifically impact DIPs. Details for measure-specific impacts can be found in the measure specific Sections 3.6, and 4.6 of the [Final CASE Report](#).

Cooling towers are common on commercial and institutional facilities and would not impact energy equity or environmental justice in any specific way. The proposed measure would not impact the health or comfort of building occupants, and it is not expected to affect building resiliency to extreme weather events. While the measure has the potential to save energy, it is unlikely the utility bill energy savings would significantly impact DIPs since it's uncommon for this measure to apply in multifamily spaces. For details about nonresidential building impacts, refer to Section 2.1.2 of the Final CASE Report.

One manufacturer stakeholder did raise concerns over potential impacts to the cooling tower manufacturing facilities. Two of the three major cooling tower manufacturers are located in Madera, California, a DIP area.¹⁴ Impacts on these plants could potentially affect jobs in these communities. The Statewide CASE Team has worked to mitigate these concerns by reducing the stringency of the proposed requirements to reduce potential impacts to manufacturers and employment.

Keeping gainful employment opportunities for DIPs is valuable, however the Statewide CASE Team also has environmental justice concerns about these factories. Manufacturing industry is often linked with pollution, environmental damages, and health hazards to the surrounding populations. Studies show that “exposure from an area with heavy industry was related to a significantly lower lung function in school children” (Bergstra, Brunekreef, & Burdorf, 2018). The presence of these factories in DIP areas like Madera is of note as well. Black, Latinx, and other DIPs tend to live in areas with high levels of pollution from such industries. Analyses show the net gain from employment is outweighed by the environmental pollution. An investigation of industrial facilities showed that while Black employees held 10.4 percent of the jobs available, they also bore 17.4 percent exposure to the facility’s total potential chronic human health risk (Ash & Boyce, 2018). Latinx workers took on more than 15 percent of exposure to pollution while only holding 9.8 percent of the jobs, and furthermore only 6.8 percent of the higher paying jobs (Ash & Boyce, 2018). While jobs are important, the Statewide CASE team also questions the nature of these jobs. With more time and research, the Statewide CASE Team would seek to understand the terms of these jobs,

¹⁴ Madera, CA is identified as a disadvantaged community under the SB 535 map: <https://experience.arcgis.com/experience/1c21c53da8de48f1b946f3402fbae55c/page/SB-535-Disadvantaged-Communities/>

whether they are equitable, or pay a living and humane wage to workers in these communities.

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report. These sections describe any measure-specific impacts that were not already mentioned previously.

Table 6: Measure Specific Impacts Cooling Tower Efficiency

Measure Name	CASE Report Section	Potential Impacts
Cooling Tower Efficiency	3.6	<p>The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above.</p> <p>Cooling towers are common on commercial and institutional facilities and are not expected to impact energy equity or environmental justice in any specific way. The Statewide CASE Team evaluated the proposed measure with the four criteria mentioned in Section 2.1.2 of the Final CASE Report– cost, health, resiliency, and comfort. The proposed measure does not impact the health or comfort of building occupants, and it does not affect building resiliency to extreme weather events. While the measure has the potential to save energy, it is unlikely the utility bill energy savings would significantly impact DIPs since it’s uncommon for this measure to apply in multifamily spaces. For details about nonresidential building impacts, refer to Section 2.1.2. One stakeholder did raise concerns with impacts on the manufacturing facilities that two of the three major manufacturers have near Madera, CA. Impacts on these plants could affect jobs in these communities.</p>

Measure Name	CASE Report Section	Potential Impacts
		The CASE team has worked to mitigate these concerns by reducing the stringency of the proposed requirements to reduce these potential impacts on the manufacturer and employment levels.
Blowdown Controls	4.6	The proposed measure is unlikely to have significant impacts on energy equity or environmental justice other than those discussed above.

4.6.3 Controlled Environment Horticulture

The Statewide CASE Team examined how the proposed measure in the Controlled Environment Horticulture CASE Report might specifically impact DIPs. Details for predicted impacts can be found in the [Final CASE Report](#).

Recognizing the importance of engaging DIPs and gathering their input to inform the code change process and proposed measures, the Statewide CASE Team is working to build relationships with community-based organizations (CBOs) to facilitate meaningful engagement with stakeholders and gather feedback on the proposed measures. The Statewide CASE Team sought input from CBOs and agricultural partners, however the contacted organizations did not have capacity to provide input on this measure for this code cycle. Some EEEJ considerations are discussed below.

The Statewide CASE Team is considering how the proposed code changes might impact the health and safety of people who work inside Controlled Environment Horticulture (CEH) facilities including members of DIPs. The California Department of Industrial Relations Division of Occupational Health and Safety (Cal/OSHA) maintains regulations to protect occupational health and safety in all settings including in the cannabis industry. Some hazards that may exist in the cannabis industry and CEH facilities in general include, but are not limited to hazardous IAQ, exposure to harmful and flammable materials, electrical hazards, and heat illness (California Department of Industrial Relations, n.d.). The proposed code changes would not adversely impact occupational health or safety or the ability for CEH facilities to comply with Cal/OSHA requirements.

Another consideration is related to how tax revenue from the cannabis industry benefits DIPs. Historic federal and state drug policies, commonly referred to as the War on Drugs, led to the passage of penalties giving the courts the right to imprison individuals

for nonviolent drug offenses and increased the number of primarily Black inmates (St. Mary's College of Maryland, 2015). In November 2016 California voters approved Proposition 64 (The Adult Use of Marijuana Act), which allowed people over the age of 21 to possess and use marijuana for recreational purposes. The proposition also created new taxes on the cannabis industry and specified how the new tax revenue be used including directing the Governor's Office of Business and Economic Development (GO-Biz) to administer the California Community Reinvestment Grants (CalCRG) program. The CalCGR program awards grants to local health departments and qualifying CBOs that offer specific services to DIPs that are "disproportionately affected by past federal and state drug policies." Grants support activities such as job placement, mental health treatment, substance use disorder treatment, and linkages to medical care (California Governor's Office of Business and Economic Development, n.d.). The proposition also directed a portion of tax revenue to support youth programs including drug education, prevention, and treatment. The Youth Community Access Grant Program, for example, applies 60 percent of tax revenue generated by legal recreational cannabis sales to support cultural and natural resources for DIPs (California Natural Resources Agency, 2023).

The Statewide CASE Team investigated whether the proposed code change could affect tax revenue from the cannabis industry, and, if so, whether there would be impacts on the availability of funding to support populations that were disproportionately impacted by historic and federal state drug policies including people of color. The Statewide CASE Team has determined that there will likely not be significant tax revenue increases due to the CEH lighting proposal. If the proposed CEH lighting systems result in increased yield, then there would be potential increases in tax revenue. There are no definitive studies showing increased yield due to the proposed CEH lighting systems at the time this report was published.

4.6.4 HVAC Space Heating

Overall, the space heating measures are expected to benefit DIPs. The measures are geared toward improving efficiency, reducing on-site natural gas usage, which will bring IAQ benefits, and in the case of electric resistance heating, providing a low upfront cost option for electric space heating. Refer to Sections 3.6, 4.6, and 5.6 of the [Final CASE Report](#) for further discussion of impacts by measure.

4.6.4.1 Hot Water Supply Limit

The intent of this measure is to facilitate all-electric space heating through the requirement of lower hot water supply temperatures (HWSTs), the overriding viewpoint is that this measure will positively impact all building occupants including DIPs through the reduction of on-site pollution emissions caused by gas combustion (refer to Section

3.5.2 of the HVAC Space Heating Final CASE Report for more information regarding greenhouse gas emissions impacts).

This measure would require lower hot water supply temperatures in hydronic space heating applications. The proposal would likely impact piping and pump first costs, but these costs would be offset by ongoing energy efficiency benefits through the reduction in thermal losses in the distribution network. As noted, the purpose of the measure is to facilitate all-electric space heating, which again, is viewed as having positive benefits to all building occupants.

There are incremental costs for the proposals. For example, larger diameter pipes and larger coils cost more and but were shown to be unnecessary. There are also energy efficiency benefits, such as reduced thermal losses through the hot water pipe network. Both these costs and energy cost savings benefits are relatively minor, and DIPs most likely will not be adversely impacted by this proposal.

Impacts may vary by building type. Offices of all sizes, for example, are expected to be used by all people equally and DIPs are not more or less likely to occupy office spaces than any other population. So, the proposed change is not expected to have an unequal impact on DIPs. The Statewide CASE Team identified schools and hotels as building types that may have disproportional impacts. The impacts of proposed measures on building types are discussed in more detail in Section 2.1.2 of the Final CASE Report.

4.6.4.2 Electric Resistance Heating

While heat pumps are the recommended technology for most scenarios, there are certain scenarios, such as a building zones with minimal heating loads, where electric resistance heating would mitigate the need for expensive infrastructure associated with a heat pump or boiler, thereby providing a cost-effective solution and still reducing the need to install natural gas hydronic systems. See Section 5.1.2.1 and 5.1.2.2 of the Final CASE Report for more details.

As noted throughout the Final CASE Report, this proposal is cost effective, and the initial cost for an electric resistance heating system is expected to be lower when compared to a hydronic system. The system being described in this measure is also simpler than a hydronic space heating system. The proposal is likely to induce projects to select electric heating systems instead of natural gas boiler systems, which would result in a decrease in on-site pollution emissions, which will benefit all building occupants, including DIPs.

A conceivable adverse impact to DIPs would be the potential for increased electricity consumption over the lifetime of the building, as noted throughout Section 5.5 of the Final CASE Report. Up-front costs, natural gas emissions, and system complexity are all anticipated to be reduced because of this proposal. Furthermore, this measure does not particularly target DIPs relative to other groups. For more details on how the

proposed code changes impact building types, see Section 2.1.2.1 of the Final CASE Report.

The cumulative effect of these factors leads the Statewide CASE Team to conclude that the measure will not adversely impact DIPs and if anything, will likely benefit them.

The following table describes the key takeaways of potential impacts on DIPs for each measure of the Final CASE Report.

Table 7: Measure Impacts HVAC Space Heating

Measure Name	CASE Report Section	Potential Impacts
<p>Hot Water Supply Temperature Limit</p>	<p>3.6</p>	<p>The intent of this measure is to facilitate all-electric space heating through the requirement of lower HWSTs. The overriding viewpoint is that this measure will positively impact all building occupants including DIPs through the reduction of on-site pollution emissions caused by natural gas combustion (refer to Section 3.5.2 in the Final CASE Report for more information regarding greenhouse gas emissions impacts).</p> <p>This measure would require lower hot water supply temperatures in hydronic space heating applications. The proposal would likely impact piping and pump first costs, but these costs would be offset by ongoing energy efficiency benefits through the reduction in thermal losses in the distribution network. As noted, the purpose of the measure is to facilitate all-electric space heating, which again, is viewed as having positive benefits to all building occupants.</p> <p>There are incremental costs for the proposals (e.g., larger diameter pipes and larger coils which cost more, though recall that our analysis showed that larger coils are not necessary), but there are also</p>

Measure Name	CASE Report Section	Potential Impacts
		<p>energy efficiency benefits (e.g., reduced thermal losses through the hot water pipe network). Both these costs and energy cost savings benefits are relatively minor, and DIPs most likely will not be adversely impacted by this proposal.</p> <p>Impacts may vary by building type. Offices of all sizes, for example, are expected to be used by all people equally and DIPs are not more or less likely to occupy office spaces than any other population. So, the proposed change is not expected to have an unequal impact on DIPs. The Statewide CASE Team identified schools and hotels as building types that may have disproportional impacts. The impacts of proposed measures on building types are discussed in more detail in Section 2.1.2 of the Final CASE Report.</p>
<p>Mechanical Heat Recovery and Thermal Energy Storage</p>	<p>4.6</p>	<p>The purpose of this code change is to guide mechanical designers toward efficient system configurations for all-electric designs in large buildings. Future revisions to the code language being proposed may target smaller buildings, but for this cycle, the Statewide CASE Team intends to only target the largest and most complex buildings being constructed. The new requirements of thermal energy storage and heat recovery are complex and major changes to current practice, but because it only impacts large buildings, this will reduce the impact on DIPs since there are relatively few large buildings constructed. Furthermore, our analysis shows that inclusion of thermal energy</p>

Measure Name	CASE Report Section	Potential Impacts
		<p>storage reduces upfront construction costs at the expense of a more complex system, which is a benefit to all practitioners, including DIPs.</p> <p>The proposal only applies to buildings that are already pursuing all-electric space heating, so the requirements will only apply to the largest all-electric buildings in the state. This gives the Statewide CASE Team reason to believe that DIPs will not be adversely impacted by this measure. The requirements in this measure are cost-effective and with the inclusion of thermal energy storage, also reduce first costs.</p> <p>Impacts may vary by building type. Offices of all sizes, for example, are expected to be used by all people equally and DIPs are not more or less likely to occupy office spaces than any other population. So, the proposed change is not expected to have an unequal impact on DIPs. The Statewide CASE Team identified schools and hotels as building types that may have disproportional impacts. The impact of the proposed code changes on building types are discussed in Section 2.1.2.1 of the Final CASE Report.</p>
Electric Resistance Heating	5.6	<p>This proposal is cost-effective and in addition, the initial costs for an electric resistance heating system is expected to be lower when compared to a hydronic system. The system being described in this measure is also simpler than a hydronic space heating system. The proposal is likely to induce projects to</p>

Measure Name	CASE Report Section	Potential Impacts
		<p>select electric heating systems instead of natural gas boiler systems, which would result in a decrease in on-site pollution emissions, benefiting all building occupants including DIPs.</p> <p>A conceivable adverse impact to DIPs would be the potential for increased electricity consumption over the lifetime of the building. Up-front costs, natural gas emissions, and system complexity are all anticipated to be reduced because of this proposal. Furthermore, this measure does not particularly target DIPs relative to other groups.</p> <p>The cumulative effect of these factors leads the Statewide CASE Team to conclude that the measure will not adversely impact DIPs and if anything, will likely benefit them.</p>

4.6.5 Process Load Pipe Insulation

The Statewide CASE Team examined how the proposed measure in the Process Load Pipe Insulation Final CASE Report might specifically impact DIPs. Details for predicted impacts can be found in the [Final CASE Report](#).

The Statewide CASE Team considered the impacts of the proposal on DIPs using four criteria: cost, health and safety, resiliency, and comfort. The Statewide CASE Team assessed the potential impacts of the proposed measure and found that most factory workers are classed as low-income (U.S. Bureau of Labor Statistics, 2022). The mean annual wage for production workers in California is \$42,310, which for the majority of the state’s counties is low income (U.S. Bureau of Labor Statistics, 2022; U.S. DEPARTMENT OF HUD, 2023).The presence of pipe insulation often results in less extreme temperatures, which leads to more comfortable working conditions, especially unconditioned spaces. This measure would thus work to bolster existing OSHA standards (4.3.3), which protects workers against burns or freezes.

Factories and industrial facilities are often located in low-income areas, with one study showing Black people as statistically more likely to live within a mile of a polluting

industrial facility than White people(Mohai, Lantz, Morenoff, & Mero, 2009). The measure would have a secondary impact at reducing local GHG emissions due to reduced process heating or cooling needs as a result of lower energy losses.

4.7 2025 Nonresidential CASE Reports with Few Expected Impacts

The Statewide CASE Team found that some of the nonresidential Final CASE Reports, and some of the measures they covered, would likely not have significant impacts on DIPs. The general equity impacts and potential impacts on DIPs as listed in Sections 2 and 4 are still relevant at a broader level, and these reports may still be relevant to stakeholders, DIPs, and other concerned groups.

- [Daylighting](#)
- [HVAC Controls](#)
- [Laboratories](#)
- [Nonresidential Envelope](#)

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