California Environmental Quality Act Greenhouse Gas Emissions Thresholds and Guidance

Final Report

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1 Introduction

1.1 GHG Emissions Analyses Under CEQA

The California Environmental Quality Act (CEQA) requires discretionary plans and projects to undergo an environmental review process, which includes an evaluation of plan- or project-related contribution of greenhouse gas (GHG) emissions.[1] Section 15183.5 of the CEQA Guidelines establishes a framework for developing a *qualified*[2] Greenhouse Gas Reduction Plan to cumulatively reduce GHG emissions and allow lead agencies to analyze and mitigate the effects of plan- and project-level GHG emissions. This GHG Thresholds and Guidance Document is intended to provide methodological guidance and quantitative thresholds of significance for use by City planners, applicants, consultants, agencies, and members of the public in the preparation of GHG emissions analyses under CEQA for plans and projects located within Hayward.

The City of Hayward (City) prepared a CEQA Guidelines Section 15183.5-consistent Climate Action Plan (CAP) Update anticipated to be adopted January 9, 2024 with the goal of achieving a 46 percent reduction in per capita GHG emissions compared to 1990 levels by 2030 and carbon neutrality by 2045.[3] While the City Council, City staff, and community will continue to develop an approach to the longer-term goal of carbon neutrality, the CAP includes specific actions to achieve the shorter-term communitywide emissions reduction target of 46 percent below 1990 per capita emissions (or 3.11 metric tons of carbon dioxide equivalents [MT of CO_2e][4] per person) by 2030. This is consistent with California's goal of reducing GHG emissions to 40 percent below 1990 levels by 2030 (consistent with California Senate Bill [SB] 32). The City has also adopted a goal to achieve carbon neutrality by 2045, consistent with California Assembly Bill (AB) 1279. Therefore, implementation of the Hayward CAP measures and actions would result in GHG emissions reduction in both total and per capita emissions within Hayward in a manner that meets the State 2030 goal. See Figure 1 for a representation and comparison of the Hayward and State GHG emissions reduction targets.

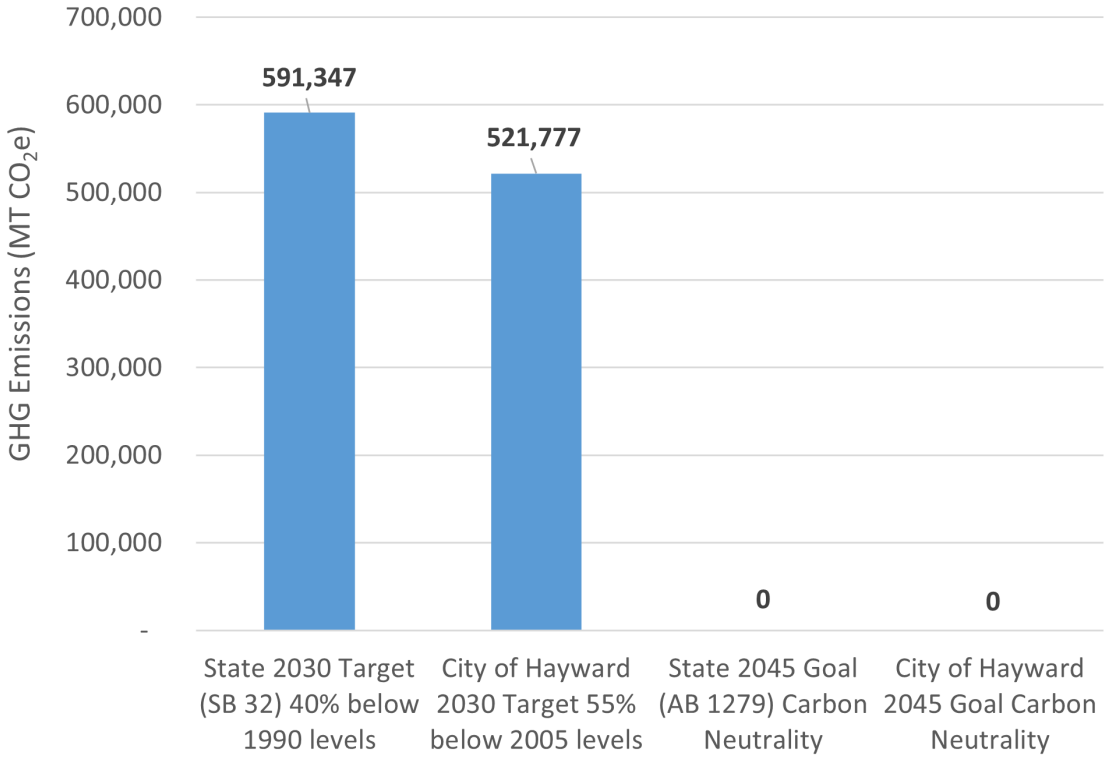
[1] Refer to Appendix A for an overview of GHG emissions and climate change.

[2] To be a qualified CAP, a CAP must meet the requirements of CEQA Guidelines Section 15183.5, as further discussed in Section 1.2.

[3] Carbon neutrality is defined as net zero carbon emissions, which is achieved either by balancing carbon emissions with carbon removal or by completely eliminating carbon emissions.

[4] Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas, CO_2, is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as carbon dioxide equivalent (CO_2e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 25, meaning its global warming effect is 25 times greater than CO_2 on a molecule per molecule basis (Intergovernmental Panel on Climate Change 2007).

Figure 1 Hayward 2030 and 2045 GHG Emissions Targets



Hayward's 2030 GHG emissions target was developed to provide substantial progress towards Hayward's longer-term carbon neutrality target and contribute substantial progress toward meeting the State GHG reduction goals identified in SB 32 and AB 1279. Consistent with this process, the Hayward CAP includes procedures to evaluate Hayward's emissions in light of the trajectory of the CAP's targets to assess its "substantial progress" toward achieving long-term reduction targets identified in the CAP and State legislation and Executive Orders. The CAP also includes commitments and mechanisms to achieve further GHG emissions reduction necessary to avoid interference with, and make substantial progress toward, long-term City and State goals. This approach is important, because these targets have been set at levels that achieve California's fair share of international emissions reduction targets that will stabilize global climate change effects and avoid the adverse environmental consequences of climate change.

To support progress toward Hayward's longer-term carbon neutrality goal, plans and projects within Hayward that undergo CEQA review will need to demonstrate consistency with targets in the CAP, which is a Qualified GHG Emissions Reduction Plan (consistent with CEQA Guidelines Section 15183.5) upon adoption of its CEQA review document, specifically the CAP Initial Study-Negative Declaration (IS-ND), and approval of the CAP by City Council. Chapter 2, *Climate Action Plan Summary*, provides an overview of the CAP and the associated GHG emissions inventories, reduction strategies, and forecasts included therein. In addition, Chapter 3, *Regulatory and Legal Setting*, offers an overview of relevant regulations and case law pertaining to the analysis of GHG emissions consistent with CEQA and the CEQA Guidelines.

Plans and projects that are consistent with the CAP demographic (i.e., residents and employees) projections and land use assumptions, which are Association of Bay Area Governments (ABAG) Plan

Bay Area 2040 (PBA 2040) projections and in alignment with the Hayward 2040 General Plan, will be able to tier from the adopted CAP IS-ND pursuant to CEQA Guidelines Section 15183.5. To streamline this CEQA GHG emissions analysis process, the City has a CEQA GHG Emissions Analysis Compliance Checklist that can be utilized in plan- and project-level CEQA review documents to ensure that such proposed plans and projects are consistent with the CAP GHG emissions reduction strategy. Chapter 4, *Determining Consistency with* , includes guidance on how to navigate this consistency determination process.

For plans or projects that exceed the CAP's demographic projections and land use assumptions, a different methodology and assessment utilizing quantitative thresholds of significance would be necessary to evaluate GHG emissions impacts. Chapter 5, *Utilizing Quantitative CEQA GHG Thresholds*, includes guidance on how to utilize the quantitative thresholds that were developed for purposes of evaluating the level of significance of GHG emissions impacts.[5] Furthermore, Chapter 6, *Quantifying GHG Emissions*, provides direction regarding how to quantify a plan or project's GHG emissions for comparison to the applicable threshold of significance.

The CAP acknowledges that additional actions beyond those identified in the plan will be required to achieve its long-term goal of carbon neutrality by 2045. As a result, the plan provides a mechanism for monitoring CAP progress, providing City Council with an annual update on progress, conducting regular GHG emission inventories at minimum every three years, and preparing a new CAP by 2030 (with opportunities to adjust as needed based on CAP progress) in order to incorporate new strategies and technologies that will further move the City toward meeting its longer-term carbon neutrality target. Chapter 7, *Moving into the Future*, offers further explanation of how CEQA review of plans and projects could be affected by future updates and/or iterations of the Hayward CAP.

1.2 Qualified GHG Emissions Reduction Plan

According to CEQA Guidelines Section 15183.5, project-specific environmental documents can tier from, or incorporate by reference, the existing programmatic review in a qualified GHG emissions reduction plan, which allows for project-level evaluation of GHG emissions through the comparison of the project's consistency with the GHG emissions reduction strategy included in the qualified GHG emissions reduction plan. To meet the requirements of CEQA Guidelines Section 15183.5, a qualified GHG emissions reduction plan must include the requirements shown in Table 1.

[5] In compliance with CEQA Guidelines Section 15064.7(b), this guidance document and the quantitative thresholds contained herein will be presented to the City Council for formal adoption via resolution, which includes a public input opportunity.

Table 1 CAP Consistency with CEQA Guidelines Section 15183.5(b)(1) for 2030

CEQA Guidelines Section 15183.5(b)(1) Requirement[1]	Climate Action Plan Consistency
1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.	**Consistent.** The CAP includes a communitywide GHG emissions inventories for years 2005, 2010, 2015, 2017, 2018, and 2019 and forecasts GHG emissions for years 2025, 2030, 2035, 2040 and 2045.
2. Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.	**Consistent**. A key aspect of a qualified GHG emissions reduction plan is substantial evidence that the identified GHG emissions reduction target establishes a threshold where GHG emissions are not cumulatively considerable. The AEP (2016) Beyond Newhall and 2020 white paper identifies this threshold as being a local target that aligns with the State legislative targets. The CAP establishes a long-term aspirational goal of carbon neutrality by 2045, and as discussed in Section 2.3, *GHG Emissions Forecast*, implementation of the plan will achieve a 46 percent reduction in per capita emissions compared to 1990 emissions levels by 2030. Therefore, this local target is more stringent than the State targets of a 40 percent emission reduction in 1990 levels by 2030.
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.	**Consistent.** The CAP breaks down its inventories and forecasts into sectors including transportation (passenger, non-passenger, off-road equipment, transit, etc.), residential energy (electricity and natural gas), non-residential energy (electricity and natural gas), water and wastewater, and solid waste.
4. Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.	**Consistent.** The CAP specifies measures and actions that the City will enact and implement between 2023 and 2030 to meet its 2030 GHG emissions target. As discussed in Section 2.3, *GHG Emissions Forecast*, implementation of the plan will achieve a 46 percent reduction in 1990 emissions levels per capita by 2030, which is more stringent than the State target of a 40 percent emission reduction in 1990 levels by 2030 and demonstrates substantial progress by 2030 toward achieving the City's longer-term goal of carbon neutrality by 2045.
5. Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels.	**Consistent.** Section 4, *Implementation*, of the CAP includes a process to complete community GHG emissions inventories every three years, with the first inventory to be completed for calendar year 2023. The inventories will allow the City to measure progress towards meeting the CAP goals. If an inventory indicates that the City is not on track to meet the CAP GHG emissions goals, additional measures may be required at that time to increase emissions reduction strategies and maintain the CAP status as a CEQA qualified GHG emissions reduction plan.
6. Be adopted in a public process following environmental review.	**Consistent.** The City prepared an IS-ND for the CAP that was circulated for public review and comment and adopted prior to approval of the CAP and CEQA GHG Emissions Thresholds and Guidance by City Council.

Source: Compiled by Rincon in 2023

Table 1 summarizes the consistency of the CAP with these requirements for year 2030 (the next State milestone target year for GHG emissions reduction). As shown in Table 1, upon adoption of the IS-ND and approval of the plan by City Council, the Hayward CAP will meet the requirements of a qualified GHG emission reduction plan per CEQA Guidelines Section 15183.5(b)(1) for projects with buildout years through 2030.

Development projects can demonstrate consistency with a qualified GHG emissions reduction plan if they are consistent with the plan's assumptions regarding future growth projections and consistent

with the plan's GHG emissions reduction strategies.[6] Projects consistent with the qualified GHG reduction plan, including conformance with performance strategies applicable to the project, would not require additional GHG emissions analysis or mitigation under CEQA Guidelines Sections 15064(h) and 1513.5(b)(2). The City has developed the CEQA GHG Emissions Analysis Compliance Checklist to assist with determining project consistency with the CAP. The checklist is intended to provide individual projects the opportunity to demonstrate that they are minimizing GHG emissions while ensuring new development achieves its proportion of emissions reduction consistent with the assumptions of the CAP. Project consistency with a GHG emissions reduction plan can also be demonstrated through a quantitative analysis that demonstrates the project will not impede (or will facilitate) the City's ability to meet its GHG emissions reduction targets.

[6] CAPs typically utilize growth projections from the local jurisdiction's General Plan or applicable Metropolitan Planning Organization's regional demographic forecast.

2 Climate Action Plan Summary

The following sections provide an overview of the Hayward CAP, including the 2019 communitywide GHG emissions inventory, the communitywide GHG emissions forecast, and the proposed GHG emission reduction strategy.

2.1 Communitywide GHG Emissions Inventories

The City has completed a communitywide GHG emissions inventory for the years 2005, 2010, 2015, 2017, 2018, and most recently 2019. Hayward's targets have been set based on the 2005 baseline inventory. The 2005 and most recent 2019 inventory are summarized in Table 2. Table 2 also provides estimated 1990 emissions levels, as back-casted from 2005 emission levels. As shown therein, absolute communitywide GHG emissions declined by approximately 30 percent between 2005 and 2019, exceeding the City's target of reducing emissions by approximately 15 percent below baseline 2005 levels by 2020 (equivalent to the State's target of reducing emissions to 1990 levels under Assembly Bill 32).[7] The most notable changes occurred in the energy sector driven primarily by increasing percent of consumers using carbon-free electricity from East Bay Community Energy rather than PG&E and from decarbonization of the PG&E electricity fuel mix.[8]

Table 2 Hayward 1990, 2005, and 2019 Communitywide GHG Emissions Levels

Sector	1990 [1] (MT of CO_2e)	2005 (MT of CO_2e)	2019 (MT of CO_2e)	Percent Change from 2005 to 2019
On-road Transportation	N/A	520,768	417,862	-20%
Off-road Transportation	N/A	14,889	24,287	63%
Public Transit[2]	N/A	8,548	4,855	-43%
Building Energy	N/A	375,531	189,116	-50%
Water & Wastewater	N/A	2,585	2,088	-19%
Solid Waste	N/A	50,924	46,187	-9%
Mass Emissions	**827,257**	**973,244**	**684,395**	**-30%**
Emissions per Capita	**5.9**	**6.9**	**4.3**	**-38%**

MT = metric tons; CO_2e = carbon dioxide equivalents

Note: Numbers are rounded to the nearest ten.

[1] 1990 GHG emissions were estimated by back-casting Hayward's total 2005 GHG emissions based on the change in the State's GHG emissions between 2005 and 1990. 1990 GHG emissions were not estimated at the individual sector level.

[2] Public transit encompasses emissions from BART and AC Transit.

Source: Hayward, City of. 2022. Hayward 2005 Community GHG Inventory.

[7] California Air Resources Board. 2008. Climate Change Scoping Plan.

[8] Hayward, City of. 2022. Hayward 2019 Community Greenhouse Gas Emissions Inventory.

2.2 GHG Emission Reduction Strategy

To achieve Hayward's long-term aspirational goal of carbon neutrality by 2045, the Hayward CAP includes a series of measures and actions that are intended to reduce communitywide GHG emissions by approximately 46 percent below 1990 levels by 2030. This provides substantial progress toward meeting the City's longer-term carbon neutrality goal while also meeting the State's 2030 target. The CAP acknowledges that additional actions beyond those identified in the plan will be necessary to achieve the long-term aspirational goal of carbon neutrality and therefore, provides a mechanism for tracking performance over time, reporting annual progress to the City Council, conducting inventory updates at minimum every three years, and adopting a new CAP by 2030 (with the ability to adjust as needed based on progress), in order to incorporate new strategies and technologies that will further the City toward meeting its long-term aspirational goal of carbon neutrality.

As part of the CAP process, the City has developed a set of measures reducing communitywide GHG emissions in all sectors to achieve the City's climate action targets. Each measure is supported by a set of actions that provide a measurable GHG emissions reduction that is supported by substantial evidence. The City has also developed measures and supportive actions for offsetting GHG emissions through carbon sequestration. Measures and actions are organized according to the following hierarchy:

1. **Sectors:** Sectors define the GHG emissions category in which the GHG emissions reduction will take place and include Building Energy, Transportation, Water, Waste, and Carbon Sequestration.
2. **Measures:** Measures identify specific goals (i.e., activity data targets by 2030 and 2045) to address GHG emissions in each sector. A single measure generally addresses a subsector; for example, three strategies may be established under the Transportation sector to address active transportation, shared/public transportation, and single-passenger vehicles.
3. **Actions:** Actions identify the programs, policies, funding pathways, and other specific commitments that the City will implement. Each strategy contains a suite of actions, which together have been designed to accomplish the measure goal.

Table 3 summarizes the GHG emissions reduction that are anticipated to be achieved by 2030 by the identified measures in the CAP, in addition to State laws and programs. As shown therein, implementation of State laws and programs as well as the CAP measures would reduce 2030 communitywide emissions to approximately approximately 46 percent below 1990 per capita levels.

Table 3 Hayward GHG Emissions Reduction by 2030

Source	Absolute Annual Emissions Reductions (MT of CO_2e)	Per capita Annual Emissions Reductions (MT of CO_2e/per capita)
1990 Baseline Emissions[1]	827,257	5.89
Business-as-Usual 2030 Emissions[2]	748,520	4.47
State Laws/Programs	(106,034)	(0.63)
Buildings & Energy Strategies	(44,732)	(0.27)
Transportation Strategies	(37,558)	(0.22)
Waste Diversion Strategies	(35,924)	(0.21)
Water & Wastewater Strategies	(35)	(<0.01)
Natural Systems Strategies	(3,293)	(0.02)
Total Emissions Reduction (from BAU)	**(227,577)**	**(1.36)**
Remaining 2030 Emissions	**520,943**	**3.11**
Percent Reduction below 1990 Levels[3]	**N/A**	**46%**

( ) denotes a negative number; numbers in table may not add to the total exactly due to rounding.

MT = metric tons; CO_2e = carbon dioxide equivalents

[1] See Table 2.

[2] See Figure 2 and Figure 3.

[3] Targets are based on per capita levels.

Source: City of Hayward *Draft Climate Action Plan Update* and *GHG Emissions Reduction Measure Quantification and Evidence Appendix*

2.3 GHG Emissions Forecast

Figure 2, Figure 3, and Table 4 summarize the communitywide GHG emissions forecast under three scenarios: 1) business-as-usual, 2) implementation of State laws and programs, 3) implementation of State laws and programs and the CAP measures and actions.

As shown therein, under the business-as-usual scenario, communitywide GHG emissions are forecasted to increase by approximately 15 percent between 2019 and 2045 based on economic and population growth. However, with implementation of State laws and programs, communitywide GHG emissions would decline by approximately 9 percent between 2019 and 2045. Furthermore, full implementation of the CAP alongside State laws and programs would reduce per capita communitywide GHG emissions by approximately 46 percent below 1990 per capita levels by 2030 and by approximately 81 percent below 1990 levels by 2045.[9]

[9] This represents significant progress towards the City's long-term goal of carbon neutrality by 2045. The City will rely on new measures in the form of regular CAPs, new state legislation and new technological advances to achieve this target.

Figure 2 Hayward Total GHG Emissions Forecast, 2019 to 2045

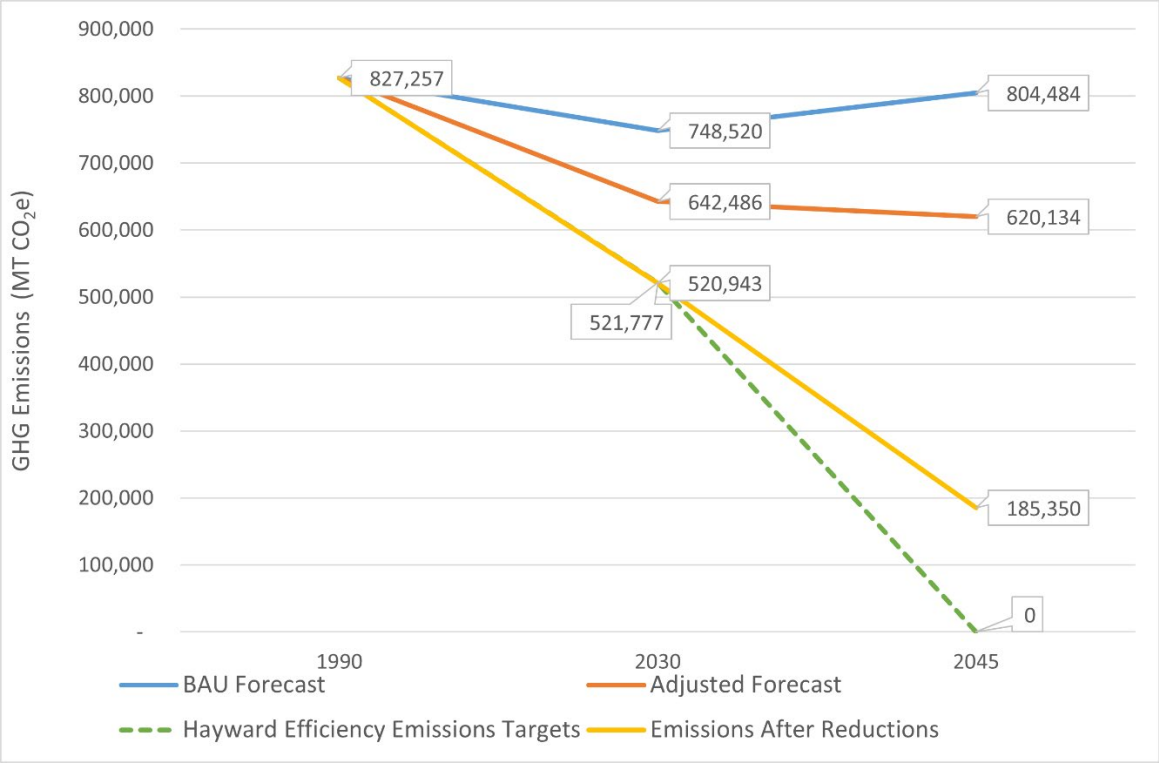


Figure 3 Hayward Per Capita GHG Emissions Forecast, 2019 to 2045

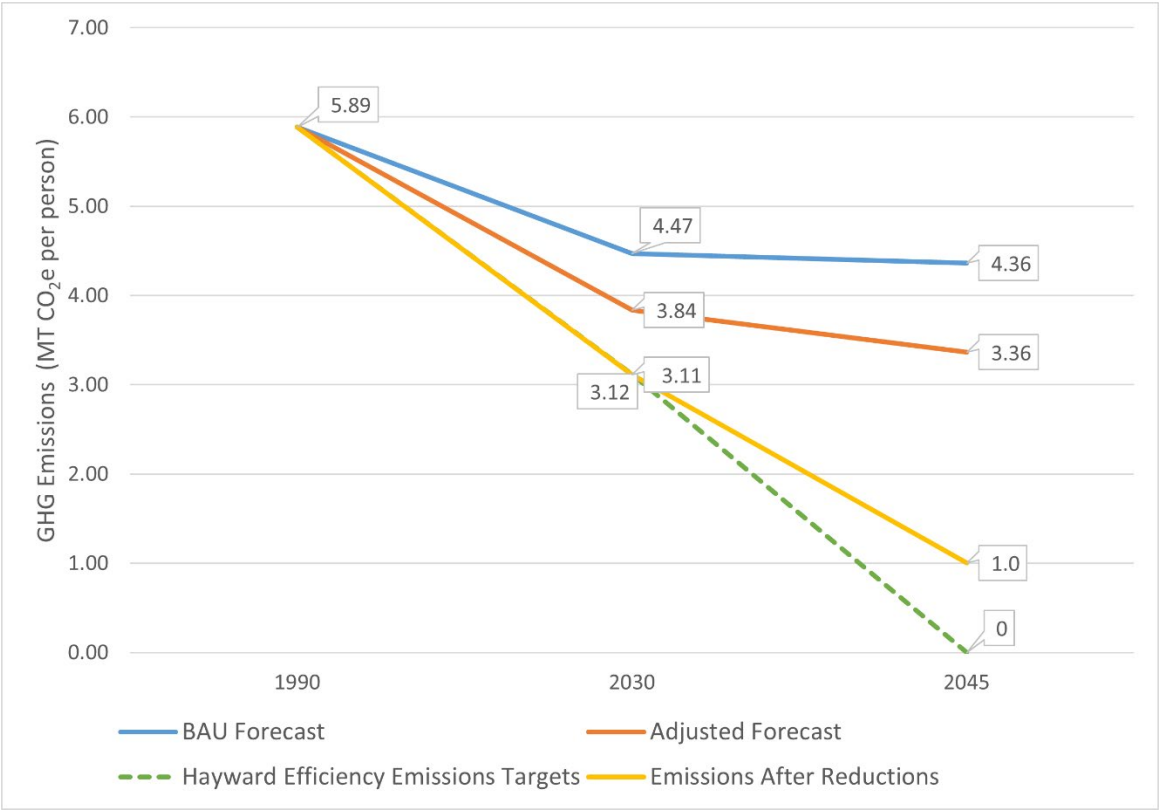


Table 4 Hayward GHG Emissions Forecast Through 2045

Sector	2019 (MT of CO_2e/person)	2019 (MT of CO_2e)	2030 (MT of CO_2e/person)	2030 (MT of CO_2e)	2045 (MT of CO_2e/person)	2045 (MT of CO_2e)
Business-as-Usual GHG Emissions						
Transportation	2.79	447,004	2.97	496,828	2.89	533,270
Electricity	0.08	12,467	0.08	13,258	0.08	14,235
Natural Gas	1.10	176,649	1.13	188,353	1.10	202,243
Water & Wastewater	0.01	2,088	0.01	2,183	0.01	2,403
Solid Waste	0.29	46,187	0.29	47,899	0.28	52,334
Total	**4.27**	**684,395**	**4.47**	**748,520**	**4.36**	**804,484**
GHG Emissions After Implementation of State Laws/Programs[1]						
Transportation	2.79	447,004	2.38	397,797	1.98	364,861
Electricity	0.08	12,467	0.04	7,134	0.00	0.00
Natural Gas	1.10	176,649	1.12	187,641	1.09	200,981
Water & Wastewater	0.01	2,088	0.01	2,015	0.01	1,959
Solid Waste	0.29	46,187	0.29	47,899	0.28	52,334
Total	**4.27**	**684,395**	**3.84**	**642,486**	**3.36**	**620,134**
GHG Emissions After Implementation of State Laws/Programs and Hayward CAP						
Transportation	2.79	447,004	2.15	360,239	0.99	182,293
Electricity	0.08	12,467	0.01	2,331	0.00	0.00
Natural Gas	1.10	176,649	0.88	147,711	0.00	0.00
Water & Wastewater	0.01	2,088	0.01	1,980	0.01	1,959
Solid Waste	0.29	46,187	0.07	11,975	0.03	5,233
Carbon Sequestration	NA[1]	NA[1]	(0.02)	(3,293)	(0.02)	(4,136)
Total	**4.27**	**684,395**	**3.11**	**520,943**	**1.01**	**185,350**

( ) denotes a negative number

[1] The 2019 Hayward GHG Inventory and Forecasts do not include carbon sequestration; however, the CAP has quantitative measures to increase carbon sequestration.

MT = metric tons; CO_2e = carbon dioxide equivalents

State laws and programs include State vehicle fuel efficiency standards, the Renewable Portfolio Standard, and triennial updates of Title 24.

Source: Hayward, City of. 2022.Hayward Forecasts through 2045.

At this time, the State has codified a target of reducing emissions to 40 percent below 1990 emissions levels by 2030 SB 32) and has developed the 2022 Climate Change Scoping Plan to demonstrate how the State will achieve the 2030 target and make substantial progress toward the 2045 goal of carbon neutrality established by AB 1279.

While State and regional regulations related to energy and transportation systems, along with the State's Cap and Trade program, are designed to be set at limits to achieve most of the GHG emissions reduction needed to achieve the State's long-term targets, local governments can do their fair share toward meeting the State's targets by siting and approving projects that accommodate planned population growth and projects that are GHG-efficient. The Association of Environmental Professional (AEP) Climate Change Committee recommends that CEQA GHG analyses evaluate project emissions in light of the trajectory of State climate change legislation and assess their

"substantial progress" toward achieving long-term reduction targets identified in available plans and legislation.

The City has adopted a longer-term goal of achieving carbon neutrality by 2045 and has proposed the CAP as a pathway to make progress toward this goal. Implementation of the CAP would achieve an approximately 46 percent reduction in per capita communitywide GHG emissions below 1990 levels (3.11 MT of CO_2e per person) by 2030[10] and an approximately 81 percent reduction in per capita communitywide GHG emissions below 1990 levels by 2045. Therefore, the City's longer-term target of carbon neutrality and the associated CAP establish a trajectory that provides GHG emissions reductions equal to or greater than those required by SB 32 for 2030. Because SB 32 is considered an interim target toward meeting the State's long-term goals, implementation of the Hayward CAP would make substantial progress toward meeting the State's long-term goal. Avoiding interference with, and making substantial progress toward, these long-term State targets is important because these targets have been set at levels that achieve California's fair share of international emissions reduction targets that will stabilize global climate change effects and avoid the adverse environmental consequences described in Appendix A (AB 1279).

[10] (5.89 MT of CO_2e per capita – 3.11 MT of CO_2e per capita) / 5.89 MT of CO_2e per capita = 46 percent reduction

3 Regulatory and Legal Setting

The following regulations, executive orders, and case law pertain to the analysis of GHG emissions consistent with CEQA and the CEQA Guidelines.

3.1 Relevant CEQA Guidelines Sections

Pursuant to the requirements of SB 97, the California Natural Resources Agency has adopted amendments to the CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG emissions and climate change impacts.

Based on Appendix G of the CEQA Guidelines, impacts related to GHG emissions generated by a proposed plan/project would be significant if the plan/project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

The vast majority of individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a plan/project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a plan/project are limited. As discussed in Appendix A, the adverse environmental impacts of cumulative GHG emissions, including sea level rise, increased average temperatures, more drought years, and more large forest fires, are already occurring. As a result, cumulative impacts related to GHG emissions and climate change are significant. Therefore, per CEQA Guidelines Section 15064.4(b), the analysis of GHG emissions under CEQA typically involves an analysis of whether a plan or project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines Section 15064[h][1]).

The following sections of the CEQA Guidelines pertain to the creation of significance thresholds and the analysis of a plan/project's GHG emissions.

CEQA Guidelines Section 15064(b)

(1) The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.

(2) Thresholds of significance, as defined in Section 15064.7(a), may assist lead agencies in determining whether a project may cause a significant impact. When using a threshold, the

lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant. Compliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant.[11]

CEQA Guidelines Section 15064.4

(a) The determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to

(1) Quantify GHG emissions resulting from a project; and/or

(2) Rely on a qualitative analysis or performance-based standards.

(b) In determining the significance of a project's GHG emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to Statewide, national or global emissions. The agency's analysis should consider a timeframe that is appropriate for the project. The agency's analysis also must reasonably reflect evolving scientific knowledge and State regulatory schemes. A lead agency should consider the following factors, among others, when determining the significance of impacts from GHG emissions on the environment:

(1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting.

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

(3) The extent to which the project complies with regulations or requirements adopted to implement a Statewide, regional, or local plan for the reduction or mitigation of GHG emissions (see, e.g., section 15183.5[b]). Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

(c) A lead agency may use a model or methodology to estimate GHG emissions resulting from a project. The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. The lead agency must support its selection of a

[11] 2023 CEQA Guidelines. Available at: https://www.califaep.org/docs/CEQA_Handbook_2023_final.pdf

model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use.[12]

CEQA Guidelines Section 15064.7

(a) A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.

(b) Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. Lead agencies may also use thresholds on a case-by-case basis as provided in Section 15064(b)(2).

(c) When adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

(d) Using environmental standards as thresholds of significance promotes consistency in significance determinations and integrates environmental review with other environmental program planning and regulation. Any public agency may adopt or use an environmental standard as a threshold of significance. In adopting or using an environmental standard as a threshold of significance, a public agency shall explain how the particular requirements of that environmental standard reduce project impacts, including cumulative impacts, to a level that is less than significant, and why the environmental standard is relevant to the analysis of the project under consideration. For the purposes of this subdivision, an "environmental standard" is a rule of general application that is adopted by a public agency through a public review process and that is all the following:

(1) a quantitative, qualitative or performance requirement found in an ordinance, resolution, rule, regulation, order, plan or other environmental requirement;

(2) adopted for the purpose of environmental protection;

(3) addresses the environmental effect caused by the project; and,

(4) applies to the project under review.[13]

CEQA Guidelines Section 15183.5

(a) Lead agencies may analyze and mitigate the significant effects of GHG emissions at a programmatic level, such as in a general plan, a long-range development plan, or a separate plan to reduce GHG emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of GHG emissions as provided in section 15152 (tiering), 15167 (staged EIRs) 15168 (program EIRs),

[12] Ibid.

[13] Ibid.

15175–15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).

(b) Plans for the Reduction of GHG Emissions. Public agencies may choose to analyze and mitigate significant GHG emissions in a plan for the reduction of GHG emissions or similar document. A plan to reduce GHG emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.

(1) Plan Elements. A plan for the reduction of GHG emissions should:

(A) Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;

(B) Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;

(C) Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area;

(D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;

(E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

(F) Be adopted in a public process following environmental review.

(2) Use with Later Activities. A plan for the reduction of GHG emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a GHG reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable, notwithstanding the project's compliance with the specified requirements in the plan for the reduction of GHG emissions, an EIR must be prepared for the project.

(c) Special Situations. As provided in Public Resources Code sections 21155.2 and 21159.28, environmental documents for certain residential and mixed use projects, and transit priority projects, as defined in section 21155, that are consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in an applicable sustainable communities strategy or alternative planning strategy need not analyze global warming impacts resulting from cars and light duty trucks. A lead agency should consider whether such projects may result in GHG emissions resulting from other sources, however, consistent with these Guidelines.[14]

[14] Ibid.

CEQA Guidelines Section 15126.4(c)

Consistent with section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of GHG emissions. Measures to mitigate the significant effects of GHG emissions may include, among others:

(1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;

(2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F of the CEQA Guidelines;

(3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;

(4) Measures that sequester GHGs;

(5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of GHG emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.[15]

3.2 Relevant State and Regional GHG Reduction Targets

Executive Order S-03-05

On June 1, 2005, the governor issued EO S-03-05, which established a statewide goal of reducing GHG emissions to 1990 levels by 2020 and created the Climate Action Team. The 2020 GHG reduction target contained in EO S-03-05 was later codified by Assembly Bill (AB) 32.

Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the State's goal of reducing Statewide GHG emissions to 1990 levels by 2020 and requires the California Air Resources Board (CARB) to prepare a Scoping Plan that outlines the main State strategies for reducing GHG emissions to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of Statewide GHG emissions. Based on this guidance, CARB approved a 1990 Statewide GHG level and 2020 limit of 427 million metric tons (MMT) of CO_2e. The Scoping Plan was approved by CARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.[16]

[15] Ibid.

[16] CARB. 2008. *Climate Change Scoping Plan*. December 2008. https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 Statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use. [17]

Senate Bill 32

On September 8, 2016, the governor signed SB 32 into law, extending AB 32 by requiring the Statewide reduction of GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). In November 2022, CARB published California's 2022 Scoping Plan for Achieving Carbon Neutrality (Third Update). This update extends the previous Scoping Plans and lays out a path to achieve carbon neutrality no later than 2045, as directed by AB 1279. The previous 2017 Scoping Plan lays out a technologically feasible and cost-effective path to achieve the 2030 GHG reduction target by leveraging existing programs such as the Renewables Portfolio Standard, Advanced Clean Cars, Low Carbon Fuel Standard, Short-Lived Climate Pollutant (SLCP) Reduction Strategy, Cap-and-Trade Program, and Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration. The 2022 Scoping Plan looks toward the 2045 climate goals and the deeper GHG reductions needed to meet the state's statutory carbon neutrality target specified in AB 1279 and EO B-55-18.[18]

Senate Bill 375

SB 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan (RTP). Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. The Association of Bay Area Governments (ABAG) was assigned targets of a 7 percent reduction in GHGs from transportation sources by 2020 and a 15 percent reduction in GHGs from transportation sources by 2035. ABAG adopted the 2050 RTP (Plan Bay Area 2050) in October 2021, which includes the region's SCS and meets the requirements of SB 375.[19]

Assembly Bill 1279

AB 1279, signed in September 2022, builds upon EO B-55-18, which originally established California's 2045 goal of carbon neutrality and tasked CARB with including a pathway toward the EO B-55-18 carbon neutrality goal in the 2022 Scoping Plan. AB 1279 codified the Statewide carbon

[17] CARB. 2014. *First Update to the Climate Change Scoping Plan*. May 15, 2014. Available at: https://ww3.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

[18] CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. Available at: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

[19] Association of Bay Area Governments. October 2021. Plan Bay Area 2050.

neutrality goal into a legally binding requirement for California to achieve carbon neutrality no later than 2045 and ensure 85 percent[20] GHG emissions reduction under that goal. This goal is in addition to the existing Statewide GHG emission reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

Senate Bill 100

Adopted in September 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

Senate Bill 1383

Adopted in September 2016, SB 1383 (Lara, Chapter 395, Statutes of 2016) requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. SB 1383 requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery, in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

3.3 Relevant GHG Emissions Analysis Case Law

Friends of Oroville v. City of Oroville (Case No. 070448)

The Third District Court of Appeal decision in the *Friends of Oroville v. City of Oroville* case was published on August 19, 2013. This decision evaluated the methodology used to analyze GHG emissions in an Environmental Impact Report (EIR) prepared for a Wal-Mart Supercenter development project that included replacing an existing Wal-Mart store with a Wal-Mart Supercenter in Oroville in Butte County. The EIR used consistency with the AB 32 emissions reduction target as its significance threshold for evaluating the project's GHG emissions and compared the magnitude of the proposed project's emissions to statewide 2004 emission levels as part of the analysis. The Court found that EIR applied "a meaningless, relative number to determine insignificant impact" rather than evaluating the project's emissions in light of the AB 32 emissions reduction target. The Court also found that the EIR "misapplied the [AB] 32 threshold-of-significance standard by [1] failing to calculate the GHG emissions for the existing Wal-Mart and [2] failing to quantitatively or qualitatively ascertain or estimate the effect of the Project's mitigation measures on GHG emissions." The Court determined that the EIR could and should have performed these quantifications to adequately evaluate the project's GHG emissions using the AB 32 emissions reduction target.

[20] To achieve carbon neutrality, the remaining 15 percent of GHG emissions would be achieved through carbon capture and sequestration efforts.

Sierra Club v. County of San Diego (Case No. 37-2018-00043084-CU-TT-CTL)

The Fourth District Court of Appeal decision in the *Sierra Club v. County of San Diego* case was published on October 29, 2014. This decision evaluated the adequacy of the CAP prepared by the County of San Diego to satisfy Mitigation Measure CC-1.2 of the program EIR prepared for its 2011 General Plan. To reduce GHG emissions impacts of the 2011 General Plan to a less-than-significant level, Mitigation Measure CC-1.2 required the preparation of a CAP that would include "more detailed GHG emissions reduction targets and deadlines" and that would "achieve comprehensive and enforceable GHG emissions reduction of 17 percent (totaling 23,572 MT of CO_2e) from County operations from 2006 by 2020 and 9 percent reduction (totaling 479,717 MT of CO_2e) in community emissions from 2006 by 2020." The Court found the CAP did not include enforceable and feasible GHG emission reduction measures that would achieve the necessary emissions reduction; therefore, the CAP did not meet the requirements of Mitigation Measure CC-1.2 and would not ensure that the mitigation measure would reduce GHG emissions to a less-than-significant impact. In addition, the Court found that the County failed to evaluate the environmental impacts of the CAP and its associated thresholds of significance under CEQA.

Center for Biological Diversity v. California Department of Fish and Wildlife (Case No. 217763)

The California Supreme Court's decision in the *Center for Biological Diversity v. California Department of Fish and Wildlife* case was published on November 30, 2015. This decision evaluated the methodology used to analyze GHG emissions in an EIR prepared for the Newhall Ranch development project that included approximately 20,885 dwelling units with 58,000 residents on 12,000 acres of undeveloped land in Los Angeles County. The EIR used a business-as-usual approach to evaluate whether the project would be consistent with the AB 32 Scoping Plan. The Court found there was insufficient evidence in the record of that project to explain how a project that reduces its GHG emissions by the same percentage as the business-as-usual reduction identified for the State to meet its Statewide targets supported a conclusion that project-level impacts were below the level of significance.

The California Supreme Court suggested regulatory consistency as a pathway to compliance by stating that a lead agency might assess consistency with the State's GHG reduction goals by evaluating for compliance with regulations designed to reduce GHG emissions. This approach is consistent with CEQA Guidelines Section 15064.4(b), which provides that a determination of an impact is not cumulatively considerable to the extent to which the project complies with regulations or requirements implementing a Statewide, regional, or local plan to reduce or mitigate GHG emissions. The Court also found that a lead agency may rely on numerical and efficiency-based thresholds of significance for GHG emissions, if supported by substantial evidence.

Golden Door Properties, LLC v. County of San Diego/Sierra Club, LLC v. County of San Diego (Case No. 072406)

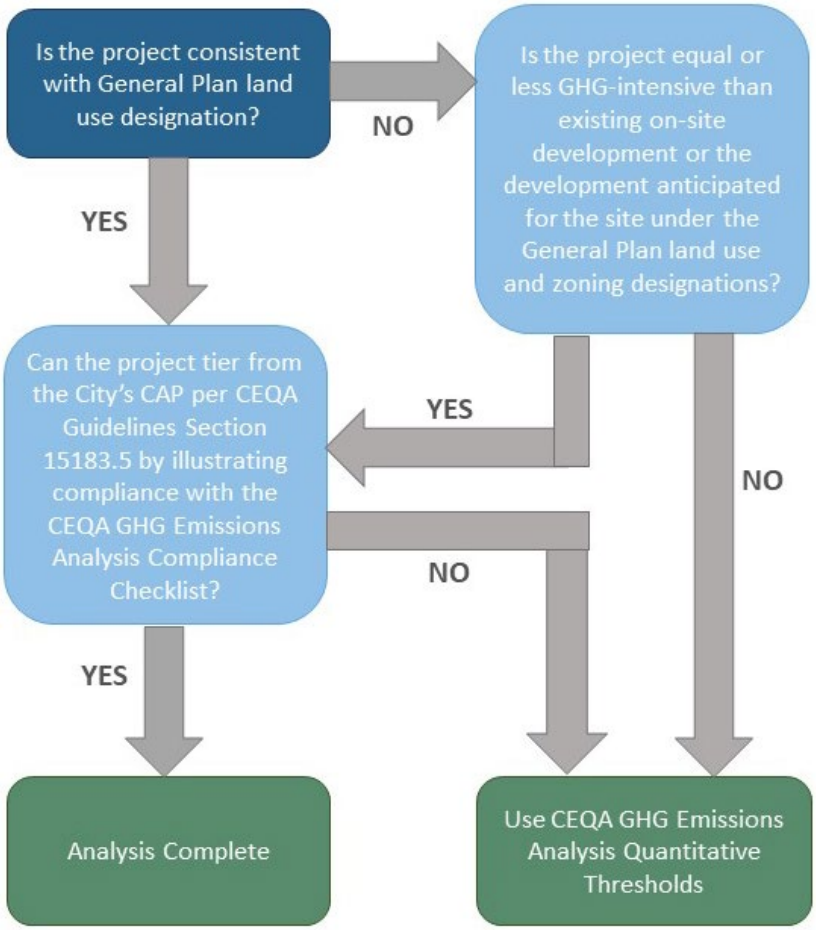
The Fourth District Court of Appeal decision in the *Golden Door Properties, LLC v. County of San Diego* case (published on September 28, 2018) evaluated the County of San Diego's 2016 Guidance Document's GHG efficiency metric, which establishes a generally applicable threshold of significance for proposed projects. The Court held that the County of San Diego is barred from using its 2016 Guidance Document's threshold of significance of 4.9 MT of CO_2e per service person per year for GHG analysis. The Court stated that the document violated CEQA because it was not adopted formally by ordinance, rule, resolution, or regulation through a public review process per CEQA

Guidelines Section 15064.7(b). The Court also found that the threshold was not supported by substantial evidence that adequately explained how a service population threshold derived from Statewide data could constitute an appropriate GHG metric to be used for all projects in unincorporated San Diego County. Nevertheless, lead agencies may make plan- or project-specific GHG emissions threshold determinations.

4 Determining Consistency with the CAP

As discussed in Chapter 2, *Climate Action Plan Summary*, the CAP is a qualified GHG emission reduction plan per the requirements of CEQA Guidelines Section 15183.5 for year 2030 and can, therefore, be utilized to streamline the GHG emissions analysis for plans and projects with buildout years through 2030. Projects that are consistent with the demographic forecasts and land use assumptions in the CAP can utilize the City's CEQA GHG Checklist to demonstrate consistency with the CAP GHG emissions reduction strategy, and if consistent, can tier from the environmental review contained in the CAP IS-ND. In doing so, these projects would result in less-than-significant GHG emissions and not result in a cumulatively considerable GHG emissions impact. The following process (see Figure 4) shows how to demonstrate a plan/project's consistency with the CAP's GHG emissions reduction strategy and, thereby, tier from the IS-ND for the CAP. This approach is consistent with the recommendations of the AEP Climate Change Committee for tiering from qualified GHG reduction plans that demonstrate substantial progress toward meeting the next milestone Statewide planning reduction target (i.e., a 40 percent reduction below 1990 levels by 2030 as set forth by SB 32).

Figure 4 Determining Consistency with the Hayward CAP



Step 1: Consistency with Demographic Forecasts and Land Use Assumptions

The demographic forecasts of the CAP are based on both a City-provided tool, the Hayward Forecaster Tool, which utilizes Association of Bay Area Governments (ABAG) demographic forecasts and the growth projected in the City (2040) General Plan. If a plan/project is consistent with the existing 2040 General Plan land use of the plan area/project site as identified in the Hayward General Plan, then the plan/project is consistent with the Business as Usual (BAU) demographic forecasts and land use assumptions of the CAP and can move on to Step 2. In such cases, the plan/project's associated GHG emissions were accounted for in the GHG emissions forecasts included in the CAP and, therefore, are within the scope of this plan's analysis of communitywide GHG emissions. Accordingly, the analysis of the plan/project's GHG emissions in its CEQA document should include a reference to the plan/project's consistency with the existing (2040) General Plan land use of the plan area/project site and should explain the aforementioned connection between the existing (2040) General Plan land use and the GHG emissions forecasts in the CAP. Then, proceed to Step 2. Note that this general methodology can also be utilized for projects with a post-2030 buildout year; however, the CEQA GHG thresholds would need to be updated to match the latest, adopted General Plan land use designations as well as the latest, adopted CAP.

If a plan/project is not consistent with the existing (2040) General Plan land use of the plan area/project site but would result in equivalent or fewer GHG emissions as compared to existing on-site development or the development anticipated for the site under the City's existing (2040) General Plan, then the plan/project would still be within the demographic forecasts and land use assumptions of the CAP and can move on to Step 2. To provide substantial evidence for this determination, GHG emissions generated under existing conditions/existing (2040) General Plan buildout and the proposed project need to be quantified and included in the CEQA analysis. See Chapter 6, *Quantifying GHG Emissions*, for guidance on quantifying GHG emissions for existing conditions/existing (2040) General Plan buildout and the proposed plan/project. In this case, the analysis of the plan's/project's GHG emissions in its CEQA document should include a quantitative comparison of the proposed plan's/project's GHG emissions and GHG emissions generated by existing on-site development, or the development anticipated for the site under the City's existing (2040) General Plan. The analysis should clearly explain how the plan/project's emissions are equivalent or less than those generated by existing on-site development, or the development anticipated for the site under the City's existing (2040) General Plan. Then, proceed to Step 2.

If a plan/project is not consistent with the existing (2040) General Plan land use of the plan area/project site and would result in either new development of undeveloped land or redevelopment with higher GHG emissions than existing on-site development or than the development anticipated for the site under the City's existing (2040) General Plan, the plan/project cannot use the CEQA GHG Emissions Analysis Compliance Checklist to tier from the adopted IS-ND for the CAP. Instead, the plan/project's GHG emissions can be evaluated using the quantitative GHG thresholds described in Chapter 5, *Utilizing Quantitative CEQA GHG Thresholds*, to evaluate the significance of the plan/project's GHG emissions.

Step 2: Consistency with CEQA GHG Emissions Analysis Compliance Checklist

The City has prepared the CEQA GHG Emissions Analysis Compliance Checklist for plans and projects to ensure they are consistent with the strategies of the CAP. A project applicant can utilize the checklist to show that a plan/project includes all applicable strategies of the CAP. Projects that use the CEQA GHG Emissions Analysis Compliance Checklist are not required to quantify reductions

from the strategies included on the checklist, because the reductions from applicable strategies have already been quantified at a programmatic level in the CAP.

If a plan/project is consistent with the applicable strategies on the CEQA GHG Emissions Analysis Compliance Checklist, then the plan/project can streamline from the plan/project-level CEQA GHG emissions analysis utilizing the programmatic GHG emissions environmental review included in the adopted IS-ND for the CAP pursuant to CEQA Guidelines Section 15183.5(b)(1).

A plan/project that is consistent with all applicable strategies of the CEQA GHG Emissions Analysis Compliance Checklist would result in less-than-significant GHG emissions and would not result in a cumulatively considerable impact related to GHG emissions and climate change. In this case, the analysis of a plan or project's GHG emissions in its respective CEQA review document should include a qualitative summary of the plan/project's consistency with applicable measures of the CEQA GHG Emissions Analysis Compliance Checklist and an explanation with substantial evidence of why any strategies in the checklist are not applicable to the plan/project.

5 Utilizing Quantitative CEQA GHG Thresholds

As discussed in Chapter 4, *Determining Consistency with* , if a plan/project is not consistent with the existing (2040) General Plan land use of the plan area/project site or has a post-2030 buildout year or is not consistent with all applicable GHG reduction strategies of the CAP as listed in the CEQA GHG Emissions Analysis Compliance Checklist, then that plan/project cannot utilize the CEQA GHG Emissions Analysis Compliance Checklist to streamline its project/plan-level GHG emissions analysis in a qualitative manner. Instead, the significance of that plan/project's GHG emissions can be evaluated using quantitative GHG thresholds derived from the assumptions of the CAP. If that plan's/project's GHG emissions are at or below the applicable quantitative threshold, the plan/project, if it has a pre-2030 buildout year, can determine that the project/plan would result in a less-than-significant GHG emissions impact or, if a CAP-specific project, can tier from the existing programmatic environmental review contained in the adopted programmatic IS-ND for the CAP. In doing so, such plans/projects would result in less-than-significant GHG emissions and would not result in a cumulatively considerable impact related to GHG emissions and climate change. In addition, plans/projects with post-2030 buildout year and GHG emissions at or below the quantitative thresholds for 2045, which equate to net zero MT of CO_2e per year, would be considered less-than-significant and would not result in a cumulatively considerable GHG emissions impact. Note that the CEQA GHG thresholds will need to be updated for consistency when new General Plan land use designations and CAPs are adopted. The following sections provide an explanation of the methodology used to calculate the quantitative GHG emissions thresholds, guidance on how to utilize the thresholds, and justification for use of the thresholds.

5.1 Thresholds Calculation Methodology

CEQA Guidelines Section 15064.4 does not establish a specific quantitative threshold of significance for evaluating GHG emissions associated with a proposed plan or project. Lead agencies have the discretion to establish significance thresholds for their respective jurisdictions, and in establishing those thresholds, a lead agency may appropriately look to thresholds developed by other public agencies, or suggested by other experts, as long as the threshold chosen is supported by substantial evidence (CEQA Guidelines Section 15064.7[c]). The following methodology is consistent with guidance provided by the AEP Climate Change Committee in 2016 for establishing GHG emissions efficiency thresholds using the local jurisdictional GHG inventory and demographic forecasts.[21]

An efficiency threshold is a threshold expressed as a per-person metric (e.g., per resident, per employee, or per service person). Efficiency thresholds are calculated by dividing the allowable GHG emissions inventory in a selected calendar year by the residents, employees, or service population in that year. The efficiency threshold identifies the quantity of GHG emissions that can be generated on a per-person basis without significantly impacting the environment.

Locally appropriate, plan- and project-specific GHG emissions efficiency thresholds were derived from the GHG emissions forecasts calculated for the CAP. These thresholds were created to comply with CEQA and the CEQA Guidelines and interpretive GHG emissions analysis case law, which are

[21] AEP. 2016. Final White Paper Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California. https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf.

summarized in Chapter 3, *Regulatory and Legal Setting*. The City of Hayward GHG emissions efficiency thresholds were calculated using the emissions forecasts with all emissions sectors included, because plans and projects would generate vehicle trips and equipment use, consume energy and water, and produce wastewater and solid waste, thereby generating emissions in all categories. Efficiency thresholds were calculated for the year 2030 to provide GHG emissions thresholds for new development in line with the State's next milestone target for year 2030.

GHG emissions efficiency thresholds would be used during the CEQA review process for new residential, non-residential, and mixed-use plans and projects. Therefore, forecasted GHG emissions in the CAP were disaggregated into residential and non-residential development for the threshold year to calculate thresholds specific to residential, non-residential, and mixed-use projects. Forecasted GHG emissions are sometimes also disaggregated between new and existing development for the threshold year. For the City of Hayward, a GHG threshold disaggregated between new and existing development places a disproportionately high emphasis on GHG emissions reduction from existing development, given the CAP measures. This necessitated applying the CAP emissions reduction across both new development and existing development to produce per capita GHG thresholds for residential projects, non-residential projects, and mixed-use projects. The results of the disaggregation of the GHG emissions forecast are presented in Figure 5, which summarizes the total amount of GHG emissions expected to be generated by existing, new residential, and new non-residential development for threshold year 2030.

Figure 5 Allowable GHG Emissions from Existing and New Development in 2030

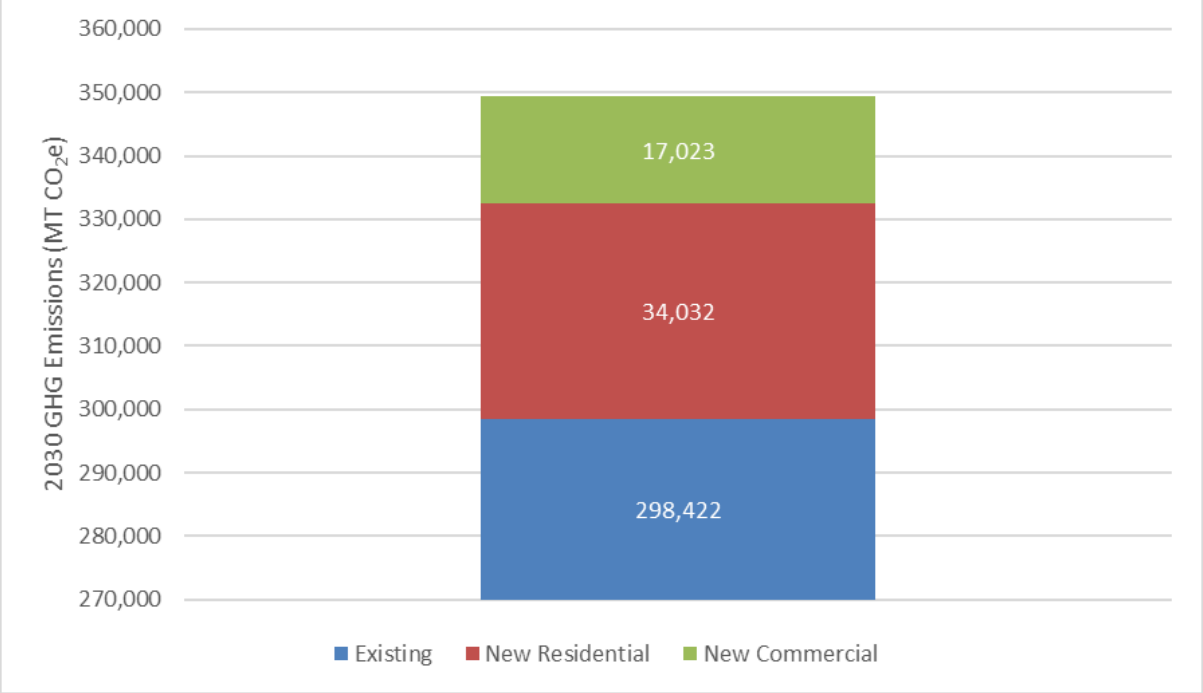


Table 5 summarizes the demographic projections for the City of Hayward that were used in calculating GHG efficiency thresholds for the year 2030. As shown in the table, the numbers of residents, employees, and service persons are all anticipated to increase between 2019 and 2030.

Table 5 Hayward Demographic Projections

Metric	2019 Estimate	2030 Forecast	Net Increase from New Development (2019-2030)
Residents	160,197	167,425	7,228
Employees	70,739	72,073	1,335
Service Population[1]	230,936	239,498	8,563

[1] The service population is equal to the residential population plus the number of employees.

Source: Hayward, City of. 2023. *2019 Community GHG Emissions Inventory and 2030 GHG Emissions Forecast*.

Table 6 shows how the remaining GHG emissions for existing and new development after implementation of CAP measures are reaggregated to create communitywide emissions thresholds for 2030, using the demographic projections from Table 5. The resulting GHG thresholds are specified in Table 6 while the allowable 2030 GHG emissions are specified in Table 7.

Table 6 Hayward 2030 CAP-Adjusted Emissions and Communitywide GHG Thresholds

	Residential (Existing & New)	Non-Residential (Existing & New)	Mixed-Use[1] (Existing & New)
CAP-Adjusted 2030 Emissions (MT CO_2e)	332,454	188,488	520,943
Demographic Metric	167,425 residents	72,073 employees	239,498 service people[2]
GHG Efficiency Threshold (MT CO_2e per demographic metric per year)	1.99 per resident	2.62 per employee	2.18 per service person[2]

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

[1]It is not practical to disaggregate CAP-adjusted emissions forecasts into mixed-use, residential, and non-residential due to data constraints. The combined residential and non-residential emissions are used along with service population to calculate a mixed-use GHG threshold.

[2] The service population is equal to the residential population plus the number of employees.

Source: Appendix B, CEQA GHG Thresholds Calculations

5.2 Thresholds and Use

The GHG efficiency thresholds for residential, non-residential, and mixed-use projects built prior to December 31, 2030 are presented in Figure 6 and Table 7. If a plan or project's emissions do not exceed the applicable threshold, then it is considered consistent with the Hayward CAP and its GHG emissions impacts (both project- and cumulative-level) would not result in a cumulatively considerable impact related to GHG emissions and climate change and would, therefore, be less than significant. If a plan's or project's emissions exceed the applicable threshold, then mitigation measures must be identified, and respective GHG emissions reduction calculations included within the respective CEQA review document in order to reduce plan or project GHG emissions to at or below the applicable threshold level. These thresholds are applicable to the following plan and project types proposed in Hayward:

- **Residential.** Single-family dwellings, multi-family dwellings, accessory dwelling units, boarding house, caretaker quarters, fraternities and sororities, high-occupancy residential uses, continuing care communities, mobile-home parks, residential care facilities, supportive and/or transitional housing, or any combination of these uses.
- **Non-residential.** All commercial uses (including office and retail uses), all lodging uses, all public and quasi-public uses, elderly and long-term care, hospice in-patient facilities, family day cares, sports and entertainment assembly facilities, all industry, manufacturing & processing, and wholesaling uses that are not subject to BAAQMD stationary source permitting or the State cap-and-trade program, or any combination of these uses.
- **Mixed-use.** A combination of at least one residential and at least one non-residential land use specified above.

Figure 6 Hayward GHG Efficiency Thresholds

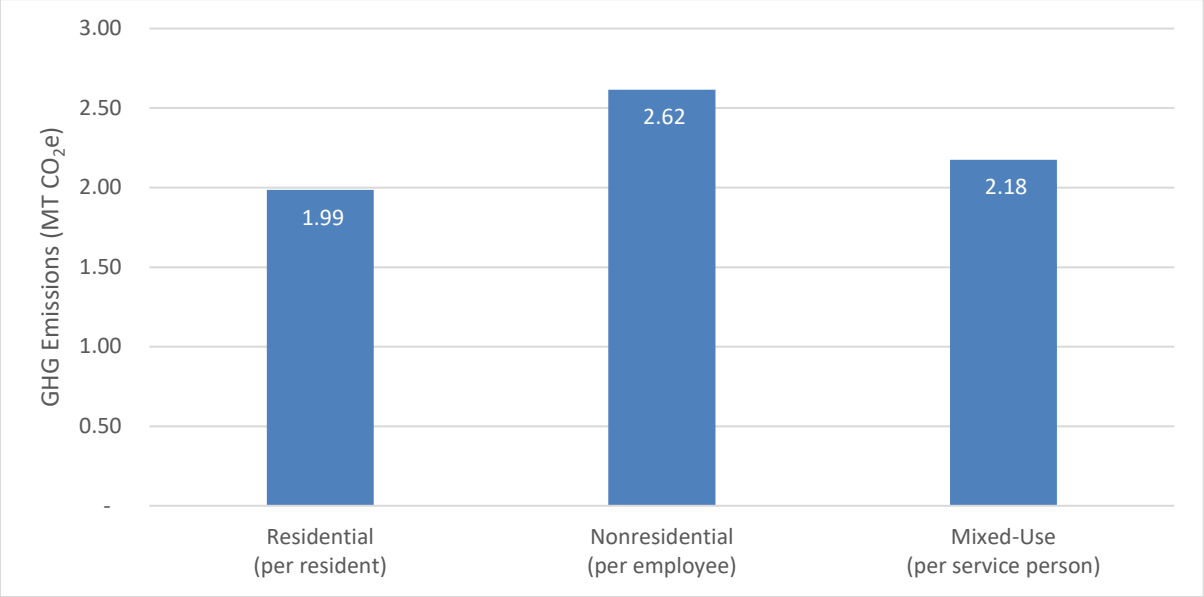


Table 7 Hayward Locally Applicable Plan/Project CEQA GHG Emissions Thresholds

	2030 New Development		
	New Residential	New Non-Residential	New Mixed-Use[2]
GHG Emissions Forecasted (new MT CO_2e)[1]	43,437	20,689	64,125
Demographic Metric	7,228 new residents	1,335 new employees	8,563 new service people[3]
GHG Efficiency Threshold (MT CO_2e per demographic metric per year)	1.99 per resident	2.62 per employee	2.18 per service person[3]

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

[1] GHG Emissions Forecasted represent the new GHG emissions forecasted between 2019 and 2030. This also represents the allowable GHG emissions for each sector.

[2] GHG emissions from new mixed-use development would count against the total remaining GHG emissions budget for both new residential and new non-residential development rather than as a function of the number of new service people expected in 2030. This avoids double counting.

[3] The service population is equal to the residential population plus the number of employees.

Source: Appendix B, CEQA GHG Thresholds Calculations

5.3 Justification for Thresholds

Per CEQA Guidelines Section 15064(b)(1), "the determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." In addition, CEQA Guidelines Section 15064(b)(2) states, "When using a threshold, the lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant." Furthermore, CEQA Guidelines Section 15064.7(b) states "Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence." Therefore, the key considerations when developing thresholds of significance are 1) the thresholds' basis on scientific and factual data; 2) demonstration of how compliance with the thresholds reduces project impacts to a less-than-significant level; 3) support of the thresholds by substantial evidence; and 4) adoption of the thresholds by ordinance, resolution, rule, or regulation, and developed through a public review process. The following subsections address these four key considerations.

Basis of Scientific and Factual Data

As discussed in Section 5.1, *Threshold Calculation Methodology*, the quantitative thresholds were developed using data from the City's 2019 communitywide GHG inventory and the GHG emissions forecasts for year 2030. The inventory and forecasts were developed by the City in compliance with all relevant protocols and guidance documents, including the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, the Global Protocol for Community Scale GHG Emissions, and the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories. Furthermore, the inventory and forecasts are based on locally appropriate data for Hayward provided by East Bay Community Energy (EBCE), Pacific Gas & Electric (PG&E), Google Environmental Insights Explorer, CARB, Bay Area Rapid Transit (BART), the City of Hayward, East Bay Municipal Utility District, and California Department of Resources Recycling and Recovery (CalRecycle).[22] Therefore, the GHG emission inventory and forecast data underlying the thresholds is both scientific and factual.

As discussed in Section 2.3, *GHG Emissions Forecast*, implementation of the Hayward CAP will achieve a 46 percent reduction in 1990 emissions levels by 2030. Therefore, this local target is aligned with the State's target of a 40 percent emission reduction in 1990 levels by 2030 and makes substantial progress toward achieving the State's long-term goal of carbon neutrality by 2045. The quantitative thresholds are tied directly to the level of GHG emissions anticipated for new development in the CAP for year 2030. As a result, because the CAP is consistent with the State's 2030 GHG emission target, the quantitative thresholds are also consistent with the next State milestone GHG emission reduction target for 2030. The State's GHG emission reduction targets for 2030 and 2045 are set at the levels scientists say are necessary to meet the Paris Agreement goals to reduce GHG emissions and limit global temperature rise below two degrees Celsius by 2100 in order to avoid dangerous climate change (CARB 2017; EO B-55-18). Therefore, the City's emission reduction targets that inform the CAP and the associated quantitative thresholds are based on scientific and factual data on the level of emissions reduction necessary to avoid a cumulatively considerable contribution to the cumulative impact of climate change.

[22] Hayward, City of. 2023. Community Greenhouse Gas Emissions Inventory and Forecast.

Reduction of Plan or Project Impacts to a Less-than-Significant Level

As discussed in Section 2.3, *GHG Emissions Forecast*, implementation of the Hayward CAP would achieve a 46 percent reduction in 1990 emissions levels by 2030. The quantitative GHG thresholds shown in Section 5.2 Thresholds and Use are tied directly to the level of GHG emissions anticipated for new development in the CAP for year 2030. Therefore, the thresholds are consistent with the City's local emission reduction target, which is consistent with the State's GHG emission reduction targets. As mentioned in the preceding subsection, the State's GHG emission reduction targets for 2030 and 2045 are set at the levels scientists say are necessary to meet the Paris Agreement goals to reduce GHG emissions and limit global temperature rise below two degrees Celsius by 2100 in order to avoid dangerous climate change (CARB 2017; EO B-55-18). Therefore, the quantitative thresholds are set at the level necessary to ensure the City does not have a cumulatively considerable contribution to the cumulative impact of climate change. As a result, plans and projects with GHG emissions at or below the quantitative thresholds would also not have a cumulatively considerable contribution to the cumulative impacts of climate change, and plan/project impacts would be less than significant.

Support of Substantial Evidence

Substantial evidence regarding the calculation of the quantitative GHG emissions thresholds is provided in Section 5.1, Thresholds Calculation Methodology. The following subsections provide additional evidence of how the GHG emissions thresholds are locally appropriate and plan- or project-specific and how the thresholds distinguish between existing and new development.

Use of Local Data

The quantitative thresholds were developed using the City's communitywide GHG emissions forecast for year 2030 and are therefore specific to the City of Hayward. The thresholds are directly tied to the population and employment growth anticipated by the Association of Bay Area Governments (ABAG) Plan Bay Area 2040 (PBA 2040) projections, and in alignment with the Hayward 2040 General Plan as well as to the City-specific GHG emission reduction measures that the City has proposed to reduce communitywide and per capita emissions. In addition, the magnitude of local GHG emission reduction achieved by State legislation/policies (i.e., vehicle fuel efficiency standards, the Renewable Portfolio Standard [RPS], and Title 24) was estimated based on City-specific growth and vehicle miles travelled (VMT) forecasts. As a result, these locally appropriate thresholds directly address the concerns raised in the *Golden Door Properties, LLC v. County of San Diego/Sierra Club, LLC v. County of San Diego* (2018) case, because they are based on local GHG emissions data rather than Statewide GHG emissions data.

Disaggregation of Existing versus New Development

For the City of Hayward, a GHG threshold disaggregated between new and existing development places a disproportionately high emphasis on emissions reduction from existing development, given the proposed CAP measures. This necessitated applying the emissions reduction across both new development and measures impacting existing development to produce per capita GHG thresholds. CAP-adjusted emissions for existing and new development were combined to create communitywide GHG emissions thresholds. This approach is more conservative than disaggregating by new versus existing development as it accounts for the relative ease for new development to be decarbonized and builds in some buffer for emissions reduction required of existing development to achieve CAP reductions. Therefore, these thresholds directly address the concerns raised in the

Center for Biological Diversity v. California Department of Fish and Wildlife (2015) case regarding the different rates of GHG emissions reduction anticipated for new development as compared to existing development in order to meet the specified GHG reduction target.

Selection of Sector-Specific Thresholds

The quantitative thresholds are separated into three categories – residential, non-residential, and mixed-use – which are intended to apply to the three main types of development projects in Hayward. These thresholds were calculated by disaggregating the City's business-as-usual GHG emissions forecasts for residential and non-residential development. The emissions reduction specific to residential and non-residential development achieved by State legislation/policies and the CAP were then subtracted from the business-as-usual forecast to determine "caps" of emissions for new residential and new non-residential development for year 2030. These emissions "caps" were then divided by the numbers of residents and employees forecast for the year 2030 to determine efficiency thresholds for residential and non-residential projects, respectively. For mixed-use development, the residential and non-residential emissions "caps" were summed, then divided by the service population forecast for 2030 to determine an efficiency threshold for mixed-use projects. As a result, these project-specific thresholds directly address the concerns raised in the *Center for Biological Diversity v. California Department of Fish and Wildlife* (2015) case, because they are specific to each development project type.

Adoption via Public Review Process

In compliance with CEQA Guidelines Section 15064.7(b), this guidance document and the quantitative thresholds contained herein will be presented to the City Council for formal adoption via resolution through a public review process, which will include an opportunity for public input. The public review process for these City of Hayward CEQA GHG Thresholds and Guidance will specifically occur via public availability to comment on the draft resolution item during a public meeting (i.e., City Council meeting) considering adoption of the CEQA GHG Thresholds and Guidance and CAP Draft IS-ND. This process directly addresses the concerns raised in the *Golden Door Properties, LLC v. County of San Diego/Sierra Club, LLC v. County of San Diego* (2018) case regarding formal adoption of new CEQA thresholds and how lead agencies should afford the opportunity for public review and input prior to adoption and use.

6 Quantifying GHG Emissions

There are a variety of analytical tools available to estimate project-level GHG emissions, including the California Emissions Estimator Model (CalEEMod),[23] which is a free, publicly available computer model developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with various air quality districts throughout the State. Alternative tools may be used to quantify emissions if they can be substantiated. In general, the most current version of CalEEMod should be used to calculate total emissions for discretionary development projects. The analysis should focus on carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), because these are the GHGs that most development projects would generate in the largest quantities. Fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides, should also be considered for the analysis. Emissions of all GHGs should be converted into their equivalent global warming potential in terms of CO_2 (CO_2e). Calculations should be based on the current methodologies recommended by the CAPCOA and the BAAQMD.[24, 25]

6.1 Construction GHG Emissions

Construction activities emit GHGs primarily though combustion of fuels (mostly diesel) in the engines of off-road construction equipment and in on-road construction vehicles and in the commute vehicles of the construction workers. Smaller amounts of GHGs are emitted indirectly through the energy required for water used for fugitive dust control and lighting for the construction activity. Every phase of the construction process, including demolition, grading, paving, and building, emits GHG emissions in volumes proportional to the quantity and type of construction equipment used. Heavier equipment typically emits more GHGs per hour than lighter equipment because of their engine design and greater fuel consumption.

BAAQMD recommends quantifying and disclosing construction related GHG emissions and making an impact level determination. CalEEMod generates a default construction schedule and equipment list based on the plan-/project-specific information, including land use, project size, location, and construction timeline.[26] In general, if specific applicant-provided information is unknown, the default construction equipment list and phase lengths are the most appropriate inputs. However, if more detailed site-specific equipment and phase information (i.e., data from the project applicant) is available, the model's default values can (and should) be overridden.[27]

[23] The most current available version of CalEEMod should be used. As of August 2023, CalEEMod version 2022.1 is the most current version and should be used to quantify project-level emissions.

[24] California Air Pollution Control Officers Association. 2008. *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA)*. January 2008.

[25] BAAQMD. 2022. "CEQA Thresholds and Guidelines Update." https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines.

[26] CAPCOA. 2022. California Emissions Estimator Model User Guide: Version 2022.1. Prepared by ICF in collaboration with Sacramento Metropolitan Air Quality Management District, Fehr & Peers, STI, and Ramboll. http://www.aqmd.gov/caleemod/user's-guide.

[27] Ibid.

6.2 Operational GHG Emissions

CalEEMod estimates operational emissions of CO_2, N_2O, and CH_4 generated by area sources, energy use, vehicle trips (i.e., mobile sources), waste generation, and water use and conveyance. Operational emissions should be calculated for the year 2030, rather than the plan/project buildout year, in order to provide an appropriate comparison of project emissions to the year 2030 threshold.

Area Source Emissions

Area sources include GHG emissions that would occur from the use of landscaping equipment, hearths, and woodstoves, which emit GHGs associated with the equipment's fuel combustion. The landscaping equipment emission values in CalEEMod are derived from CARB's Small Off-Road Engines Model v1.1 (SORE2020).[28] Emission rates for combustion of wood and natural gas for wood stoves and fireplaces are based on those published by the U.S. EPA. Typically, no adjustments to landscaping equipment inputs are necessary. The number of hearths and woodstoves should be adjusted in CalEEMod to reflect the project design.

Energy Use Emissions

GHGs are emitted on-site during the combustion of natural gas for cooking, space and water heating, and decorative uses and off-site during the generation of electricity from fossil fuels in power plants. CalEEMod estimates GHG emissions from energy use by multiplying average rates of residential and non-residential energy consumption by the quantities of residential units and non-residential square footage entered in the land use module to obtain total projected energy use. This value is then multiplied by electricity and natural gas GHG emission factors applicable to the plan/project location and utility provider. Building energy use is typically divided into energy consumed by the built environment and energy consumed by uses that are independent of the building, such as plug-in appliances. Non-building energy use, or "plug-in energy use," can be further subdivided by specific end-use (refrigeration, cooking, office equipment, etc.). In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting.

Electricity emissions are calculated by multiplying the energy use by the carbon intensity of the utility district per kilowatt hour.[29] Projects would be served either by EBCE or by PG&E. The specific energy intensity factors (i.e., the amount of CO_2, CH_4, and N_2O per kilowatt-hour) for the applicable utility should be used in the calculations of GHG emissions.

As of publication of this guidance document, the current iteration of Title 24 includes the 2022 Building Energy Efficiency Standards. In accordance with Section 150.1(b)14 of the 2022 Building Energy Efficiency Standards, all new residential uses three stories or less must install photovoltaic (PV) solar panels that generate an amount of electricity equal to expected electricity usage. The calculation method contained in Section 150.1(b)14 of the 2022 Building Energy Efficiency Standards should be utilized to estimate the number of kilowatts of PV solar panels that would be required for a residential project three stories or less. In addition, modeling should account for any local regulations pertaining to mandatory solar provisions. Online resources can be used to determine

[28] Ibid.
[29] Ibid.

the kilowatt-hours that would be generated per year by the required solar PV system.[30] The energy reduction achieved by on-site PV solar panels should be included in CalEEMod. Future updates to Title 24 as they relate to the Building Energy Efficiency Standards should be incorporated into CalEEMod as applicable.

Mobile Source Emissions

CalEEMod quantifies mobile source emissions generated by vehicle trips associated with the proposed plan/project. If available, plan/project-specific trip generation rates or VMT data should be input in CalEEMod.

Water and Wastewater Emissions

The amount of water used, and the amount of wastewater generated by a plan/project generate indirect GHG emissions. These emissions are a result of the energy used to supply, convey, and treat water and wastewater. In addition to the indirect GHG emissions associated with energy use, the wastewater treatment process itself can directly emit both CH_4 and N_2O.

CalEEMod calculates indoor residential water consumption based on per capita daily water use rates from the Residential End Uses of Water published by the Water Research Foundation in 2016. For non-residential land uses, indoor water use comes from the Pacific Institute's (2003) *Waste Not, Want Not: The Potential for Urban Water Conservation in California*.[31] Outdoor water use is based on the Maximum Applied Water Allowance Method established under the Model Water Efficient Landscape Ordinance. Wastewater generation is based on a reported percentage of total indoor water use.

Future updates to Title 24 as they relate to CALGreen water efficiency requirements should be incorporated into CalEEMod as applicable.

Solid Waste Emissions

The disposal of solid waste produces GHG emissions from the transportation of waste, anaerobic decomposition in landfills, and incineration. To calculate the GHG emissions generated by solid waste disposal, the total volume of solid waste is calculated using waste disposal rates identified by CalRecycle. The methods for quantifying GHG emissions from solid waste are based on the IPCC method, using the degradable organic content of waste. CEQA document preparers should contact the City's Environmental Services Division to obtain the City's most recent solid rate diversion rate to be included in the calculation of solid waste GHG emissions.

Plan or Project Design Features

CEQA document preparers should use the "Mitigation" tabs in CalEEMod to include project design features applicable to the plan/project.[32] These features often include increased density, improved destination accessibility, proximity to transit, integration of below market rate housing, unbundling of parking costs, provision of transit subsidies, implementation of alternative work schedules, use of

[30] Lane, Catherine. 2023." How much electricity does a solar panel produce?" Last updated: June 13, 2023. https://www.solarpowerrocks.com/solar-basics/how-much-electricity-does-a-solar-panel-produce/.

[31] CAPCOA. 2022. California Emissions Estimator Model User Guide: Version 2022.1. Prepared by ICF in collaboration with Sacramento Metropolitan Air Quality Management District, Fehr & Peers, STI, and Ramboll. http://www.aqmd.gov/caleemod/user's-guide.

[32] "Mitigation" is a term of art for the modeling input and is not equivalent to mitigation measures that may apply to the CEQA impact analysis.

energy- and/or water-efficient appliances, use of reclaimed and/or grey water, and installation of water-efficient irrigation system. Users should consider the applicability of these features to the plan/project and review the CAPCOA *Quantifying Greenhouse Gas Mitigation Measures* (2010) publication to ensure that the chosen features are relevant and feasible in light of the plan/project.[33]

Residents, Employees, and Service Populations

The quantitative thresholds presented in Chapter 5, *Utilizing Quantitative CEQA GHG* Thresholds, are expressed in terms of per resident for residential projects, per employee for non-residential projects, and per service person for mixed-use projects. Estimates of the resident, employee, or service population for a plan/project should be based on substantial evidence. Data provided by the applicant as well as the following resources may be utilized in estimating resident and employee populations:

- **Persons per Household.** Users should refer to the California Department of Finance website (https://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-5/) for the most recent estimate of persons per household in Hayward. This estimate can be multiplied by the number of proposed residential units to estimate a plan/project's resident population.
- **Proposed Number of Beds.** For projects such as group homes, assisted living facilities, nursing homes, or similar uses, the number of beds can be used to determine the resident population.
- **United States Green Building Council.** The United States Green Building Council has published a summary of building area per employee by business type. These rates, which are expressed in terms of square feet per employee, can be utilized to estimate the number of employees a plan/project would require. This document is included as Appendix C.

6.3 Modeling GHG Emissions from Existing Land Use

For a plan/project that would result in a change in the plan area/project's site General Plan land use designation, emissions anticipated for the existing (2040) General Plan land use designation must be calculated in conjunction with emissions for the proposed plan/project to demonstrate whether the plan/project would be more or less GHG-intensive than development anticipated for the existing (2040) General Plan land use designation for the site. In this case, GHG emissions should be reported for both the existing and proposed scenarios.

Emissions anticipated for the existing land use should be quantified using the methods described in Section 6.1, *Construction Emissions*, and Section 6.2, *Operational Emissions* with consistent assumptions between the two scenarios as applicable. Any emission reduction credits applied to the proposed plan/project scenario that are related to State legislation/policies (e.g., the RPS, vehicle standards, Title 24) or the plan area/project site location (e.g., proximity to transit, destination accessibility, etc.) should also be applied to the existing scenario.

Emission reduction credits that are specific to the proposed plan/project (e.g., use of recycled water, increased density, installation of energy and/or water-efficient appliances, integration of below market rate housing, etc.) should only be included for the proposed plan/project scenario. In addition, care should be taken to identify any emission reduction credits that might be unique to the existing land use designation that would not apply to the proposed plan/project. For example, if the

[33] CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August 2010. http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.

existing land use designation allows for single-family residences and the proposed land use designation would allow for only commercial uses, then the existing scenario should include the emission reduction credit associated with the 2022 Building Energy Efficiency Standards requirements for PV solar panels on residential uses that are three stories or less whereas the proposed plan/project scenario should not include this credit unless PV solar panels are included as a plan/project design feature.

7 Moving into the Future

Full implementation of the Hayward CAP will reduce communitywide GHG emissions by approximately 46 percent below 1990 levels by 2030 and 81 percent by 2045, which would leave a gap of approximately 183,834 MT of CO_2e per year in 2045 that will need to be addressed to achieve carbon neutrality. This gap represents emissions that could be addressed by laws, regulations, policies, programs, and ordinances set forth by the federal and State governments, regional agencies, and local partners. The gap also represents the uncertainty that the City faces in taking a leadership role in addressing a challenge that has not been previously solved.

Hayward is committed to embracing that uncertainty, striving toward constant learning, engaging in systemic change using the tools and actions that local governments are uniquely suited to carry out, and positioning itself to take full advantage of future innovations, technologies, and policies and legislation that may be undertaken at the State and federal level. Technological innovation, clean-tech innovation, and changes to climate related policy and regulation occur rapidly. Several of the State's most successful environmental policy initiatives, including the Renewables Portfolio Standard (RPS), also had a gap between what was known at the time of adoption and eventual successful implementation. By committing to the ambitious target of carbon neutrality by 2045, Hayward intends to catalyze innovation, invite resources from funding sources and partners, and provide climate leadership.

The CAP acknowledges that additional actions beyond those identified in the plan will be necessary to achieve carbon neutrality and, therefore, provides a mechanism for updating and adopting a new CAP every five to ten years (with regular assessment of progress) in order to incorporate new measures and innovative technologies that will further Hayward toward meeting its goal of carbon neutrality. As the CAP is updated, the associated CEQA GHG Emissions Analysis Compliance Checklist will also be updated as needed to incorporate new measures and actions that discretionary development projects will need to incorporate, as applicable, to demonstrate consistency with the latest CAP. At the time at which the City identifies measures to achieve its carbon neutrality goal in totality, the City will adopt those measures in a public process following CEQA review, at which time that updated CAP will become a qualified GHG emission reduction plan for projects with post-2030 buildout years. However, the quantitative thresholds included in this guidance document will not need to be updated, because residential, non-residential, and mixed-use projects with post-2030 buildout years will still need to achieve GHG emissions equivalent to zero MT of CO_2e per year to demonstrate consistency with the Hayward CAP.

Finally, if future amendments or updates of the Hayward Land Use Element, Mobility Element, and/or Housing Element occur, then such amendments or updates will be incorporated into future updates of the Hayward CAP to ensure that project applicants can continue to utilize the streamlining process, which is partly dependent on a plan's/project's consistency with the demographic forecasts and land use assumptions based on the General Plan Land Use and Housing Elements to the greatest extent practicable.

Appendix A

Overview of GHG Emissions and Climate Change

Overview of GHG Emissions and Climate Change

Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey other changes in addition to rising temperatures. The baseline against which these changes are measured originates from historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate changes continuously, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed substantial acceleration in the rate of warming during the past 150 years. The United Nations Intergovernmental Panel on Climate Change (IPCC) expressed that the rise and continued growth of atmospheric CO_2 concentrations is unequivocally due to human activities in the IPCC's Sixth Assessment Report from 2021. Human influence has warmed the atmosphere, ocean, and land, which has led the climate to warm at an unprecedented rate in the last 2,000 years. It is estimated that between the period of 1850 through 2019, that a total of 2,390 gigatonnes of anthropogenic CO_2 was emitted. It is likely that anthropogenic activities have increased the global surface temperature by approximately 1.07 degrees Celsius between the years 2010 through 2019.[34] Furthermore, since the late 1700s, estimated concentrations of CO_2, methane, and nitrous oxide in the atmosphere have increased by over 43 percent, 156 percent, and 17 percent, respectively, primarily due to human activity.[35] Emissions resulting from human activities are thereby contributing to an average increase in Earth's temperature.

Gases that absorb and re-emit infrared radiation in the atmosphere are called GHGs. The gases widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and natural processes, such as oceanic evaporation, largely determine its atmospheric concentrations.

GHGs are emitted by natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are usually by-products of fossil fuel combustion, and CH_4 results from off-gassing associated with agricultural practices and

[34] Intergovernmental Panel on Climate Change (IPCC). 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)] Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

[35] United States Environmental Protection Agency (U.S. EPA). 2021. Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases. Last updated April 2021. https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases

landfills. Human-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6.[36]

Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 30, meaning its global warming effect is 30 times greater than CO_2 on a molecule per molecule basis.[37,38]

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effect of GHGs, the earth's surface would be about 33 degrees Celsius (°C) cooler.[39] However, since 1750, estimated concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity.[40] GHG emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, are believed to have elevated the concentration of these gases in the atmosphere beyond the level of concentrations that occur naturally.

Greenhouse Gas Emissions Inventories

Global Emissions Inventory

In 2015, worldwide anthropogenic GHG emissions totaled 47,000 MMT of CO_2e, which is a 43 percent increase from 1990 GHG levels. The largest source of GHG emissions were energy production and use (includes fuels used by vehicles and buildings), which accounted for 75 percent of the global GHG emissions. Agriculture uses and industrial processes contributed 12 percent and six percent, respectively. Waste sources contributed three percent. These sources account for approximately 96 percent.[41]

36 U.S. EPA. 2021. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. April 2021. https://www.epa.gov/system/files/documents/2022-02/us-ghg-inventory-2022-main-text.pdf

37 The IPCC's *Sixth Assessment Report* from 2021 determined that methane has a GWP of 30. However, the 2017 Climate Change Scoping Plan published by the California Air Resources Board uses a GWP of 25 for methane, consistent with the Intergovernmental Panel on Climate Change's *Fourth Assessment Report* from 2007. Therefore, this analysis utilizes a GWP of 25.

38 IPCC. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)] Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

39 World Meteorological Organization. 2020. "Greenhouse Gases." https://public.wmo.int/en/our-mandate/focus-areas/environment/greenhouse%20gases

40 Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland. 2007. Changes in Atmospheric Constituents and in Radiative Forcing. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf

41 U.S. EPA. 2023. Climate Change Indicators: Global Greenhouse Gas Emissions. Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-global-greenhouse-gas-emissions

United States Emissions Inventory

United States GHG emissions were 6,347.7 MMT of CO_2e in 2021 (or 5,593.5 MMT CO_2e after accounting for sequestration), a 6.8 percent increase from 2020 emissions. The increase from 2020 to 2021 was driven by an increase in CO_2 emissions from fossil fuel combustion which increased 7 percent relative to previous years and is primarily due to the economic rebounding after the COVID-19 pandemic. In 2020, the energy sector (including transportation) accounted for 81 percent of nationwide GHG emissions while agriculture, industrial and waste accounted for approximately 10 percent, 6 percent, and 3 percent respectively.[42]

California Emissions Inventory

Based on a review of the CARB California Greenhouse Gas Inventory for the years between 2000-2020, California produced 369.2 MMT of CO_2e in 2020, which is 35.3 MMT of CO_2e lower than 2019 levels. The 2019 to 2020 decrease in emissions is likely due in large part to the impacts of the COVID-19 pandemic. The major source of GHG emissions in California is the transportation sector, which comprises 37 percent of the state's total GHG emissions. The industrial sector is the second largest source, comprising 20 percent of the state's GHG emissions while electric power accounts for approximately 16 percent. The magnitude of California's total GHG emissions is due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions as compared to other states is its relatively mild climate. In 2016, the state of California achieved its 2020 GHG emission reduction target of reducing emissions to 1990 levels as emissions fell below 431 MMT of CO_2e.[43] The annual 2030 statewide target emissions level is 260 MMT of CO_2e.[44]

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past four decades has been warmer than all the previous decades in the instrumental record and the decade from 2011 through 2020 has been the warmest. The observed global mean surface temperature (GMST) for the decade from 2011 to 2020 was approximately 1.09°C (0.95°C to 1.20°C) higher than the average GMST over the period from 1850 to 1900. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, the latest IPCC report states that "human-induced climate change is already affecting many weather and climate extremes in every region across the globe."[45] These climate change impacts include climate change

[42] U.S. EPA. 2023. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2021. Available at: https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Main-Text.pdf

[43] CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. Available at: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

[44] CARB. 2017. California's 2017 Climate Change Scoping Plan. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

[45] IPCC. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)] Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

sea level rise, increased weather extremes, and substantial ice loss in the Arctic over the past three decades.

According to *California's Fourth Climate Change Assessment*, Statewide temperatures from 1986 to 2016 were approximately 0.6 to 1.1°C higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include reduced water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years.[46] In addition to Statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the State and regionally-specific climate change case studies.[47] However, while there is growing scientific consensus about the possible effects of climate change at a global and Statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. A summary follows of some of the potential effects that could be experienced in California as a result of climate change.

Hydrology and Sea Level Rise

Climate change could affect the intensity and frequency of storms and flooding.[48] Furthermore, climate change could induce substantial sea level rise in the coming century. Rising sea level increases the likelihood of and risk from flooding. The rate of increase of global mean sea levels between 1993 to 2020, observed by satellites, is approximately 3.3 millimeters per year, double the twentieth century trend of 1.6 millimeters per year.[49,50] Global mean sea levels in 2013 were about 0.23 meter higher than those of 1880.[51] Sea levels are rising faster now than in the previous two millennia, and the rise will probably accelerate, even with robust GHG emission control measures. The most recent IPCC report predicts a mean sea level rise of 11 to 21.5 inches by 2100 under the lowest emissions scenario and a rise of 25 to 40 inches by 2100 under the very high emissions scenario.[52]

A rise in sea levels could erode 31 to 67 percent of California beaches and cause flooding of approximately 370 miles of coastal highways during 100-year storm events. This would also jeopardize California's water supply due to saltwater intrusion and induce groundwater flooding and/or exposure of buried infrastructure.[53] Furthermore, increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

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[46] California, State of. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf

[47] Ibid.

[48] Ibid.

[49] World Meteorological Organization. 2013. A summary of current and climate change findings and figures: a WMO information note. March 2013. https://library.wmo.int/opac/index.php?lvl=notice_display&id=15892#.Wt9-Z8gvzIU

[50] National Aeronautics and Space Administration. 2020. "Global Climate Change – Vital Signs of the Planet – Sea Level." https://climate.nasa.gov/vital-signs/sea-level/

[51] Ibid.

[52] IPCC. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)] Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

[53] California, State of. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf

Air Quality

Scientists project that the annual average maximum daily temperatures in California could rise by 2.4 to 3.2°C in the next 50 years and by 3.1 to 4.9°C in the next century.[54] Higher temperatures are conducive to air pollution formation, and rising temperatures could therefore result in worsened air quality in California. As a result, climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. In addition, as temperatures have increased in recent years, the area burned by wildfires throughout the State has increased, and wildfires have occurred at higher elevations in the Sierra Nevada Mountains.[55] If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality could worsen. Severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains could tend to temporarily clear the air of particulate pollution, which would effectively reduce the number of large wildfires and thereby ameliorate the pollution associated with them.[56]

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future precipitation trends and water supplies in California. Year-to-year variability in Statewide precipitation levels has increased since 1980, meaning that wet and dry precipitation extremes have become more common.[57] This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The average early spring snowpack in the western U.S., including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 0.15 meter along the central and southern California coasts.[58] The Sierra snowpack provides the majority of California's water supply as snow that accumulates during wet winters is released slowly during the dry months of spring and summer. A warmer climate is predicted to reduce the fraction of precipitation that falls as snow and the amount of snowfall at lower elevations, thereby reducing the total snowpack.[59] Projections indicate that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050.[60]

[54] Ibid.

[55] Ibid.

[56] California Natural Resources Agency. 2009. 2009 California Climate Adaptation Strategy. March 2009. http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf

[57] California Department of Water Resources. 2018. Indicators of Climate Change in California. May 2018. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf

[58] California, State of. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf

[59] Ibid.

60 Ibid.

Agriculture

California has an over $51 billion annual agricultural industry that produces over a third of the country's vegetables and three-quarters of the country's fruits and nuts.[61] Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent, which would increase water demand as hotter conditions lead to the loss of soil moisture. In addition, crop yield could be threatened by water-induced stress and extreme heat waves, and plants may be susceptible to new and changing pest and disease outbreaks (California Natural Resource Agency 2019). Temperature increases could also change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality.[62]

Ecosystems and Wildlife

Climate change and the potential resultant changes in weather patterns could have ecological effects on the global and local scales. Soil moisture is likely to decline in many regions as a result of higher temperatures, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals: timing of ecological events; geographic distribution and range of species; species composition and the incidence of nonnative species within communities; and ecosystem processes, such as carbon cycling and storage.[63,64]

[61] California Department of Food and Agriculture. 2022. California Agricultural Production Statistics. Available at: https://www.cdfa.ca.gov/Statistics/

[62] California Climate Change Center (CCCC). 2006. Climate Scenarios for California.

[63] Parmesan, C. August 2006. Ecological and Evolutionary Responses to Recent Climate Change.

[64] California, State of. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf

Appendix B

CEQA GHG Threshold Calculations

1. BAU Forecast Summary	**Annual GHG Emissions**				
		Annual 2030 GHG Emissions (MT CO2e)			
Forecast Scenario	**Sector**	**Existing (2019)**	**New (2030-2019)**	**Total (2030)**	
BAU	Residential Energy	101,618	10,844	112,462	Residential Sector
	Commercial Energy	87,498	1,651	89,149	Nonresidential Sector
	Passenger Onroad Transportation	298,256	31,828	330,084	Residential + Nonresidential Sector
	Commercial + Bus Onroad Transportation	119,606	13,019	132,625	Nonresidential Sector
	Public Transit	4,855	180	5,035	Residential + Nonresidential Sector
	Offroad Equipment	24,287	4,797	29,084	Residential + Nonresidential Sector
	Wastewater	2,082	94	2,176	Residential + Nonresidential Sector
	Water	6	0	6	Residential + Nonresidential Sector
	Solid Waste	46,187	1,712	47,899	Residential + Nonresidential Sector
	Consistency Check	-		-	

2. Demographics Forecast Summary	**Demographics**			
		Annual 2030 Demographics		
Category	**Sector**	**Existing (2019)**	**New (2030-2018)**	**Total (2030)**
Demographics	Residents	160,197	7,228	167,425
	Jobs	70,739	1,335	72,073
	Service Population	230,936	8,563	239,498

3. Emissions Savings Summary	Legislative & Measure Reductions				
			GHG Emissions (MT CO2e)		
Category	**Measure**	**Sector**	**2019**	**2030**	
State Legislation	Transportation Legislation	Passenger VMT	0	66,065	Residential + Nonresidential Sector
		Commercial + Bus VMT	0	31,822	Nonresidential Sector
		Public Transit	0	1,144	Residential + Nonresidential Sector
	California Green Building Code (Title 24)	Residential Energy	0	1,514	Residential Sector
		Nonresidential Energy	0	152	Nonresidential Sector
	California RPS (SB 100)	Residential Energy	0	2,613	Residential Sector
		Water + Wastewater Energy	0	167	Residential + Nonresidential Sector
		Nonresidential Energy	0	2,556	Nonresidential Sector
CAP Update	BE-1: All-electric new construction	Residential Energy	0	3,394	Residential Sector
		Nonresidential Energy	0	1,997	Nonresidential Sector
	BE-2: Residential building electrificaqtion	Residential Energy	0	13,872	Residential Sector
	BE-3: Commerical and multi-family builidng electrification	Residential Energy	0	6,794	Residential Sector
		Nonresidential Energy	0	13,872	Nonresidential Sector
	BE-4: Carbon-free electricity	Residential Energy	0	2,940	Residential Sector
		Nonresidential Energy	0	1,863	Nonresidential Sector
	T-1: Active transportation	Passenger VMT	0	6,485	Residential + Nonresidential Sector
	T-2: Public and shared transit	Passenger VMT	0	7,585	Residential + Nonresidential Sector
	T-4: Passenger ZEVs	Passenger VMT	0	16,014	Residential + Nonresidential Sector
	T-5: Commercial + Bus ZEVs	Commercial + Bus VMT	0	3,161	Nonresidential Sector
	T-6: Offroad ZEVs	Off-road	0	4,312	Residential + Nonresidential Sector
	SW-1: Landfilled organics	Waste	0	35,924	Residential + Nonresidential Sector
	WW-1: Water consumption	Water and Wastewater	0	35	Residential + Nonresidential Sector
	CS-1: Tree planting	Carbon Sequestration	0	212	Residential + Nonresidential Sector
	CS-2: Compost application	Carbon Sequestration	0	3,081	Residential + Nonresidential Sector
	Consistency Check			-	
	Consistency Check			-	

4. Allocate savings between existing/new and residential/nonresidential

Category	Allocation Description	2030 Emissions (MT CO2e)				
		Existing		New		
		Residential	Nonresidential	Residential	Nonresidential	
State Reductions						
Transportation Legislation	Allocate passenger VMT reductions to existing and new residential/nonresidential using SP; allocate nonresidential VMT to existing and new nonresidential using jobs	44,955	51,084	2,028	964	
California Green Building Code (Title 24)	Allocate all Title 24 reductions to new residential buildings	0	0	1,514	152	
California RPS (SB 100)	Allocate residential reductions to existing and new residential using population; allocate nonresidential reductions to nonresidential existing and new using jobs	2,612	2,558	118	48	
CAP Reductions						
BE-1: All-electric new construction	Allocate residential reductions to new residential using population and nonresidential reductions to new nonresidential using jobs.	0	0	3,394	1,997	
BE-2: Residential building electrificaqtion	Allocate residential reductions to existing buildings	13,872	0	0	0	
BE-3: Commerical and multi-family builidng electrificatic	Allocate nonresidential and residential reductions to existing buildings	6,794	13,872	0	0	
BE-4: Carbon-free electricity	Allocate residential reductions to existing and new residential using population; allocate nonresidential reductions to nonresidential existing and new using jobs	2,813	1,828	127	34	
T-1: Active transportation	Allocate passenger VMT reductions to existing using SP and new residential/nonresidential using population, jobs, and SP	4,338	1,916	196	36	
T-2: Public and shared transit	Allocate passenger VMT reductions to existing using SP and new residential/nonresidential using population, jobs, and SP	5,073	2,240	229	42	
T-4: Passenger ZEVs	Allocate passenger VMT reductions to existing and new residential/nonresidential using SP; allocate nonresidential VMT to existing and new nonresidential using jobs	10,712	4,730	483	89	
T-5: Commercial + Bus ZEVs	Allocat to existing and new nonresidential using jobs.	0	3,103	0	59	
T-6: Offroad ZEVs	Allocate reductions to existing and new residential/nonresidential using SP, residents, and jobs.	2,884	1,274	130	24	
SW-1: Landfilled organics	Allocate reductions to existing and new residential/nonresidential using SP, residents, and jobs.	24,029	10,611	1,084	200	
WW-1: Water consumption	Allocate reductions to existing and new residential/nonresidential using SP, residents, and jobs.	24	10	1	0	
CS-1: Tree planting	Allocate reductions to existing and new residential/nonresidential using SP, residents, and jobs.	142	63	6	1	
CS-2: Compost application	Allocate reductions to existing and new residential/nonresidential using SP, residents, and jobs.	2,061	910	93	17	
Forecasts						
BAU Forecast		418,731	265,664	43,437	20,689	
CAP-Adjusted Forecast	BAU Forecast minus reductions	298,422	171,465	34,032	17,023	**GHG Emissions Remaining*

5. 2030 GHG Thresholds		
Category	**New Growth GHG Threshold**	**Total Population 2030 GHG Threshold**
Residential (per resident)	4.71	1.99
Nonresidential (per employee)	12.75	2.62
Mixed-Use (per service person)	5.96	2.18

6. Summary Table				
Category	**Existing**	**New Residential**	**New Non-residential**	**Total**
BAU	418,731	43,437	20,689	482,856
State Laws/Programs	47,567	3,660	1,164	52,392
CAP Building Energy Measures	23,479	3,521	2,032	29,032
CAP Transportation Measures	23,007	1,038	250	24,296
CAP Waste Measures	24,029	1,084	200	25,314
CAP Water Measures	24	1	0	25
CAP Carbon Sequestration Measures	2,203	99	18	2,320
Remaining Total GHG Emissions	298,422	34,032	17,023	349,478

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Appendix C

United States Green Building Council Building Area per Employee by Business Type Rates[65]

[65] United States Green Building Council. 2008. "Building Area per Employee by Business Type." May 13, 2008.

BUILDING AREA PER EMPLOYEE BY BUSINESS TYPE

	ITE		USDOE	SANDAG
Land-Use	Land-Use Code	Sq.Ft./ Employee	Sq.Ft./ Employee	Sq.Ft./ Employee
Commercial Airport	21	224		
General Aviation Airport	22	392		
Truck Terminal	30	427		
General Light Industrial	110	463		
Heavy Industrial	120	549		
Industrial Park	130	500		
Manufacturing	140	535		
Warehousing	150	781	2114	
Elementary School	520	1250	1131	
High School	530	1587		
Hospital	610	372	486	
General Office - Suburbs	710	304		
Corporate HQ - Suburbs	714	260		
Single Tenant Office	715	295		
Medical-Dental Building	720	207		
U.S. Post Office	732	230		
Office Park	750	278		
Research & Development Center	760	405		
Business Park	770	332		249
Building Material - Lumber Store	812	806		
Specialty Retail Store	814	549		
Discount Store	815	654		
Hardware Store	816	1042		
Nursery-Garden Center	817	529		
Quality Restaurant (Sit Down)	831	134		
High Turnover (Sit Down)	832	100		
Fast Food w/o drive-thru	833	70		
Fast Food w/ drive-thru	834	92		
Grocery			938	
Lodging			1124	917
Bank				317
Office under 100,000 sq.ft.				228
Office over 100,000 sq.ft.				221
Neighborhood Retail				588
Community Retail				383

Sources:
ITE -- Institute of Transportation Engineers
USDOE -- U.S. Department of Energy
SANDAG -- San Diego Assn of Governments

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