Prepared for
Sacramento Metropolitan Air Quality Management District
Sacramento, California

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Project Number
1690006005-013

Date
March 4, 2020, report released
April 23, 2020, Board adopted thresholds
June 1, 2020, SMAQMD finalized document

GREENHOUSE GAS THRESHOLDS FOR SACRAMENTO COUNTY

SMAQMD

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CONTENTS

APPENDICES

1. INTRODUCTION

1.1 History of GHG Thresholds of Significance and Need for Update

The Sacramento Air Quality Management District (SMAQMD) is one of 35 regional air quality districts in California responsible for local air quality planning, monitoring, and stationary source and facility permitting. SMAQMD covers all of Sacramento County, including the cities of Sacramento, Citrus Heights, Folsom, Rancho Cordova, Elk Grove, Galt, Isleton, and unincorporated Sacramento County. Under the California Environmental Quality Act (CEQA) review process for proposed projects, SMAQMD may serve as the lead agency, a responsible agency with limited discretionary authority, or a reviewing agency providing comment on the air quality impacts of a proposed project or plan. CEQA requires that lead agencies identify significant environmental impacts, including impacts from greenhouse gas (GHG) emissions, and to avoid or mitigate those impacts if feasible.

To assist lead agencies in determining significance, in October 2014 SMAQMD adopted the current GHG thresholds of significance which include a construction threshold (1,100 metric tons GHG/year), a land use operational threshold (1,100 metric tons GHG/year), and a stationary source operational threshold (10,000 metric tons GHG/year). Projects whose emissions are expected to meet or exceed the significance criteria will have a potentially significant adverse impact on global climate change. Originally, SMAQMD recommended a 21.7% mitigation from Business as Usual scenario for projects that exceeded the operational thresholds, based on the Business as Usual approach presented in the California Air Resources Board (CARB) 2011 Final Supplement to the 2008 Climate Change Scoping Plan.[1] As a result of the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming* in January 2016, SMAQMD recommended suspending the use of Business as Usual analysis and the recommended 21.7% mitigation level for projects exceeding the operational thresholds. This left agencies with the 1,100 metric tons GHG/year screening threshold and the need to demonstrate all feasible mitigation for projects exceeding the threshold. SMAQMD encouraged local agencies in Sacramento County to develop a climate action plan (CAP) or GHG reduction plan that could be used by the local agency to reduce GHG emissions and streamline CEQA review for development projects, which can provide adequate mitigation for GHG impacts by demonstrating consistency with the reduction measures adopted in the CAP. As of August 2019, the following local lead agencies within SMAQMD either have adopted or are in the process of preparing a CAP or GHG reduction plan:

Jurisdiction	CAP or GHG Plan Status	Target Years
County of Sacramento	Government Operations Only, Adopted 2012	2020
City of Sacramento	Adopted 2012	2020, 2035, 2050
City of Elk Grove	Adopted 2019	2020, 2030, 2050

[1] The regulations, court cases, and GHG plans cited in this section are described in further detail in the Regulatory Background Section 1.2 of this report.

City of Folsom	Adopted 2018	2020, 2030, 2040, 2050
City of Citrus Heights	Adopted 2011	2020
City of Rancho Cordova		
City of Galt	Adopted 2020	2030, 2050
City of Isleton		

As shown in the table above, a limited number of jurisdictions have adopted plans with longer-term targets. Therefore, SMAQMD CEQA thresholds of significance are needed to support jurisdictions which have not yet adopted a qualified CAP or GHG reduction plan with the appropriate horizon year for given projects. Even for jurisdictions with adopted CAP or GHG reduction plans, the jurisdiction may also choose to pursue projects that do not demonstrate consistency with a local agency's CAP, so the ability to instead show compliance with the SMAQMD thresholds would allow flexibility.

Furthermore, changes in State legislation and approval of the 2017 Climate Change Scoping Plan since the adoption of the SMAQMD's 2014 thresholds of significance have established the need for a threshold review and update. In September 2016, Senate Bill 32 (SB 32) established the State target to reduce GHG emissions 40% below 1990 levels by 2030. Additionally, the California Air Resources Board (CARB) adopted its Climate Change Scoping Plan in December 2017, which provided recommended per capita community emission targets that could support the State's efforts to reach climate goals. Those targets include achieving 6 metric tons GHG/year/person by 2030 and 2 metric tons GHG/year/person by 2050. Additionally, CARB recognized that GHG reduction efforts being undertaken by Metropolitan Planning Organizations in compliance with SB 375, through Metropolitan Transportation Plans/Sustainable Community Strategies (MTP/SCS), would not provide sufficient reductions in GHG emissions and vehicle miles traveled to meet the 2050 State climate goals.

For these reasons, SMAQMD is proposing an update to the its CEQA GHG thresholds of significance, to assist lead agencies in determining significance for proposed projects through 2030 and beyond. **Section 1.2** of this report provides additional background on the regulation of GHGs at the federal, state, and local levels, and the recent legislation and court decisions that prompted the need for updates to the SMAQMD significance thresholds. **Section 2** of this report provides an overview of the strategy used to develop the updated significance thresholds. **Section 3** estimates Sacramento County GHG emissions in 2030, and from this, **Section 4** estimates 2030 GHG emissions by sector for new and existing development within Sacramento County. This analysis sets the stage for the establishment of 2030 GHG targets and Best Management Practices (BMPs) by place type (**Section 4**), and GHG targets for project buildouts beyond 2030 (**Section 5**). **Section 6** describes requirements to show consistency with longer-term State targets.

1.2 Regulatory Background: Federal, State, and Local

1.2.1 Federal

1.2.1.1 U.S. Supreme Court Ruling on GHGs

In Massachusetts et al. v. Environmental Protection Agency, 549 US 497 (2007), the U.S. Supreme Court held that the United States Environmental Protection Agency (USEPA) was authorized by the Clean Air Act to regulate CO2 emissions from new motor vehicles. The Court did not mandate that the USEPA enact regulations to reduce GHG emissions, but found that the only instances in which the USEPA could avoid taking action were if it found that GHGs do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHGs contribute to climate change.

On December 7, 2009, the USEPA issued an "endangerment finding" under Section 202(a) of the Clean Air Act, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution. These findings provide the basis for adopting new national regulations to mandate GHG emission reductions under the federal Clean Air Act.

1.2.1.2 Stationary Sources

On September 22, 2009, the USEPA issued the Final Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98). The rule requires annual reporting to the USEPA of GHG emissions from certain large industrial and commercial sources that emit 25,000 metric tons or more a year of GHGs. The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change.

1.2.1.3 Mobile Sources

Also in response to the Massachusetts et al. v. USEPA ruling discussed above, an Executive Order was issued on May 14, 2007 directing the USEPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. Subsequently, the USEPA and National Highway Traffic Safety Administration (NHTSA) issued a series of joint rulemakings that regulate fuel efficiency and GHG emissions from cars and light-duty trucks of model year 2011 (March 2009 rule), model years 2012-2016 (May 2010 rule), model years 2017-2021 (October 2012 rule), and model years 2021-2026 (August 2018 proposed rule, currently pending). The USEPA and NHTSA also established fuel efficiency and GHG standards for medium- and heavy-duty trucks of model years 2014-2018 (August 2011 rule) and model years 2018-2027 (August 2016 rule).

1.2.1.4 Other Sources

In addition to the rules and regulations developed with respect to stationary and mobile sources, discussed above, various other federal developments have occurred that aim to reduce GHGs from other sources, including land use activities.

- Created under the Energy Policy Act of 2005, the Renewable Fuel Standards (RFS) program established the first renewable fuel volume mandate in the United States, for blending renewable fuel into gasoline. Under the 2007 Energy Independence and Security Act (EISA), the RFS program was expanded to include diesel, and required the USEPA to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

- The 2007 EISA also included several other provisions to reduce national GHG emissions: it issued energy efficiency standards and labeling for heating, cooling, consumer electronic, and home appliance products; set requirements for phasing out incandescent light bulbs and improving light bulb efficiency; and promoted green jobs and research in alternative energy and carbon capture.
- The 2009 American Recovery and Reinvestment Act (ARRA) was passed in response to the economic crisis of the late 2000s, with the primary purpose of maintaining existing jobs and creating new jobs. Among the secondary objectives of ARRA was investment in "green" energy programs such as funding private companies developing renewable energy technologies; local and state governments implementing energy efficiency and clean energy programs; research in renewable energy, biofuels, and carbon capture; and the development of high efficiency or electric vehicles.
- The 2015 Clean Power Plan (80 FR 64510-64660) prescribed how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units and established CO_2 emission performance standards. Implementation of the Clean power Plan was stayed by the U.S. Supreme Court pending resolution of several lawsuits. In August 2018, the USEPA issued the proposed Affordable Clean Energy (ACE) Rule to replace the Clean Power Plan; rulemaking proceedings are currently pending.
- The USEPA has also developed a number of voluntary programs to provide opportunities for industry, the USEPA, and other organizations in both the public and private sectors to work together to reduce GHG emissions. These include the Center for Corporate Climate Leadership, the Green Power Partnership, the National Clean Diesel Campaign, and State and Local Climate and Energy Programs.

1.2.2 State

California has adopted various administrative initiatives and also enacted a variety of legislation relating to climate change, much of which sets aggressive goals for GHG emissions reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in environmental review documents prepared under CEQA. In particular, the amendments to the CEQA Guidelines do not require or suggest specific methodologies for performing an assessment of thresholds of significance, and do not specify GHG reduction mitigation measures. Instead, the CEQA Guidelines amendments continue to rely on lead agencies to choose methodologies and make significance determinations based on substantial evidence, as discussed in further detail below. Consequently, no State agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating any significant effects in CEQA documents.

The discussion below provides a brief overview of CARB and Office of Planning and Research (OPR) documents, and of the primary legislation and court cases that relate to climate change and informed the development of the proposed SMAQMD significance thresholds. It begins with an overview of the primary regulatory acts that have driven GHG regulation in California, which underlie many of the GHG rules and regulations that have been developed.

1.2.2.1 Executive Order S-3-05 (Statewide GHG Targets for 2010, 2020, and 2050)

California Executive Order S-03-05 (June 1, 2005) establishes the goal of reducing GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

1.2.2.2 Executive Order B-30-15 (Statewide GHG Targets for 2030)

In April 2015, Governor Brown signed Executive Order B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels. This Executive Order also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in Executive Order S-3-05 (see discussion above). Additionally, the Executive Order directed CARB to update its Scoping Plan (see discussion below) to address the 2030 goal.

The Legislature adopted SB 32 to enact the Executive Order's 2030 goal, as described further below.

1.2.2.3 Assembly Bill 32 (Statewide GHG Reductions)

Assembly Bill (AB) 32 (Nunez, 2006), the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

Of relevance to this analysis, in 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. CARB's adoption of this limit is in accordance with Health & Safety Code Section 38550, as codified through enactment of AB 32.

Per Health & Safety Code Section 38561(b), CARB also is required to prepare, approve and amend a scoping plan that identifies and makes recommendations on "direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that [CARB] finds are necessary or desirable to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020."

2008 Scoping Plan

In 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan) in accordance with Health & Safety Code Section 38561. During the development of the 2008 Scoping Plan, CARB created a planning framework that is comprised of eight emissions sectors: (1) transportation; (2) electricity; (3) commercial and residential; (4) industry; (5) recycling and waste; (6) high global warming potential (GWP) gases; (7) agriculture; and, (8) forest net emissions.

The 2008 Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions from the eight emissions sectors to 1990 levels by 2020. In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020,

absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU]).[2] For example, in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

To achieve the necessary GHG reductions to meet AB 32's 2020 target, CARB developed a series of reduction measures in the Scoping Plan covering a range of sectors and activities. Broadly, the reduction measures can be separated into capped sectors (i.e., covered by the Cap-and-Trade Program discussed below) and uncapped sectors.

Multiple Scoping Plan measures broadly cover emissions associated with land use development, including, but not limited to:

- *Energy Efficiency/Green Buildings.* The Scoping Plan highlights the importance of energy efficiency efforts in reducing GHG emissions from residential and commercial development and indicates that zero net energy (ZNE) should be the overarching and unifying concept for energy efficiency.
- *Regional Transportation-Related GHG Targets (SB 375*). The Scoping Plan relies on Senate Bill (SB) 375, discussed below, as an important mechanism to reduce mobile GHG emissions by integrating land use planning and transportation planning at the regional and local level.
- *Vehicle Emissions*. The Scoping Plan relies on various engine, fuel and other efficiency improvement programs and increasing electrification of the vehicle fleet.
- *Cap-and-Trade Program*. The Scoping Plan identifies the Cap-and-Trade program as a lynchpin, overarching strategy for California to reduce GHG emissions. As explained in the Scoping Plan, the program's implementing regulations provide assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions.

In the 2011 *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document* (2011 Final Supplement), CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 percent (down from 28.5 percent) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12 percent to 20 percent), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16 percent (down from 28.5 percent) from the BAU conditions.

2014 First Update to the Scoping Plan

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (2014 First Update).[3] The stated purpose of the 2014 First Update is to

[2] CARB. 2008. Climate Change Scoping Plan: A Framework for Change. December. Available at: https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed: March 2020.

[3] Health & Safety Code Section 38561(h) requires CARB to update the Scoping Plan every five years.

"highlight[…] California's success to date in reducing its GHG emissions and lay[…] the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."[4] The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050, if the State attains the expected benefits of existing policy goals.

In conjunction with the 2014 First Update, CARB identified "six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050."[5] Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of the 2050 reduction target.

Based on CARB's research efforts, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050."[6] Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the 2014 First Update, CARB recalculated the State's 1990 emissions level using the GWPs identified by the Intergovernmental Panel on Climate Change's Fourth Climate Change Assessment (2007). Using the recalculated 1990 emissions level and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15.3 percent (instead of 28.5 percent or 16 percent) from the "BAU" conditions.

The 2014 First Update included a strong recommendation from CARB for setting a mid-term statewide GHG emissions reduction target. CARB specifically recommended that the mid-term target be consistent with: (i) the United States' pledge to reduce emissions 42 percent below 2005 levels (which translates to a 35-percent reduction from 1990 levels in California); and (ii) the long-term policy goal of reducing emissions to 80 percent below 1990 levels by 2050.

2017 Scoping Plan

In 2017, CARB adopted *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target* (2017 Scoping Plan).[7] This 2017 Scoping Plan addresses Executive Order B-30-15 (described earlier) and SB 32 (described in a later

[4] CARB. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. May. Available at: https://ww3.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed: March 2020.

[5] Ibid.

[6] Ibid.

[7] CARB. 2017. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. November. Available at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: March 2020.

section), which extend the goals of AB 32 and set a 2030 goal of reducing emissions 40 percent below 1990 levels. The 2017 Scoping Plan includes the following major elements for reaching the 2030 Target:

1. SB 350

   The objective of this policy element is to enhance existing programs and implement SB 350, with a target of achieving 50 percent Renewables Portfolio Standard (RPS) and a doubling of energy efficiency savings in natural gas and electricity end uses statewide by 2030.

2. Low Carbon Fuel Standard (LCFS)

   The objective of this policy element is to transition to cleaner/less-polluting transportation fuels that have a lower carbon intensity, with a goal of a 20 percent reduction in carbon intensity statewide by 2030.

3. Mobile Source Strategy

   This strategy will reduce GHGs and other pollutants from the transportation sector through transition to zero- and low-emission vehicles, cleaner transit systems, and reduction of vehicle miles traveled (VMT). Highlights of this strategy include a target of 4.2 million zero-emission vehicles on the road by 2030; reduction in GHGs from medium- and heavy-duty vehicles via the Phase 2 Medium- and Heavy-Duty GHG Standards; a suite of innovative clean transit options including requirements for the deployment of zero-emission buses, and emissions standards for new natural gas and diesel buses; a new "Last Mile Delivery" regulation for certain delivery trucks that would result in the use of cleaner engines and zero-emission vehicles; and reduction in VMT to be achieved in part by the continued implementation of regional Sustainable Community Strategies pursuant to SB 375 (described in a later section) and other statewide strategies.

4. SB 1383

   This Short-Lived Climate Pollutant strategy will achieve a 40 percent reduction in methane and hydrofluorocarbon emissions and a 50 percent reduction in anthropogenic black carbon emissions below 2013 levels by 2030.

5. California Sustainable Freight Action Plan

   This plan will improve freight system efficiency by 25 percent by 2030, deploy over 100,000 zero emission freight vehicles and equipment, and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

6. Post 2020 Cap-and-Trade Program

   CARB will continue the existing Cap-and-Trade Program after 2020 with declining caps.

With the exception of the post-2020 Cap-and-Trade Program, the above measures and policies are considered "known commitments" meaning that they were existing programs or required by statute prior to the adoption of the 2017 Scoping Plan. (Since adoption of the 2017 Scoping Plan, legislation was enacted extending the horizon year of the Cap-and-Trade Program to 2030.)

The 2017 Scoping Plan also addressed how CEQA can be used to further statewide GHG reduction goals. The Plan recommends GHG reduction goals that can apply to plan- or

project-level analyses to be incorporated into environmental documentation in support of CEQA. The Plan states that a per capita GHG target is "appropriate for the plan level (city, county, subregional, or regional level), but not for specific individual projects, because [CARB's metric] includes all emissions sectors in the State." Project-level goals may be supported by local governments or lead agencies and include potential strategies such as tiering from a geographically specific GHG reduction plan, comparing to service population emissions targets, implementing all feasible mitigation measures, achieving zero net GHG emissions, or emitting less than bright-line numerical thresholds.

Cap-and-Trade Program

The California Global Warming Solutions Act of 2006 (AB 32) allowed, but did not require, CARB to include among the mechanisms intended to reduce GHG emissions a "system of market-based declining annual aggregate emission limits." In turn, the Scoping Plan, approved by CARB on December 11, 2008, directed CARB staff to develop, among other programs, a cap-and-trade mechanism that would apply a declining aggregate cap on GHG emissions[8] and provide a flexible compliance system using tradable instruments.

On July 25, 2017, the Governor of California approved AB 398 which extended the cap-and-trade program to 2030. Under AB 398, the statewide GHG emissions goal is 40 percent below 1990 levels by 2030.

Co-Pollutant Benefits

Implementation of the cap-and-trade program will also reduce statewide emissions of criteria and toxic air pollutants. Because GHG emissions are largely the result of fuel combustion, as the cap decreases and combustion decreases, criteria and toxic air pollutants associated with combustion will also decrease. CARB also evaluated the potential for localized impacts from short-term increases in construction and operational emissions at facilities modifying operations in response to cap-and-trade compliance obligations. CARB's analysis indicated that localized impacts are unlikely due to existing local and state air quality regulations; however, where there is potential for significant impact from a proposed project, it would be addressed by local permitting agencies and CEQA lead agencies through the permitting and CEQA processes in which mitigation measures are evaluated.

1.2.2.4 Senate Bill 32 and Assembly Bill 197 (Statewide GHG Targets for 2030)

Enacted in 2016, SB 32 (Pavley, 2016) codifies the 2030 emissions reduction goal of Executive Order B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

SB 32 was coupled with a companion bill: AB 197 (Garcia, 2016). Designed to improve the transparency of CARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning statewide programs, policies and investments related to climate change. AB 197 also requires CARB to make certain GHG emissions inventory data publicly available on its website; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG

[8] The cap-and-trade regulation applies to the following GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

emission reductions; and include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

1.2.2.5 Executive Order B-55-18 (Carbon Neutrality)

In September 2018, Governor Brown signed EO B-55-18, which established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." This EO directs CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

In January 2019, CARB held a workshop regarding carbon neutrality in California, during which CARB staff explained that the definitional parameters and meaning of the term – carbon neutrality – are still being explored. CARB intends to hold additional workshops to explore specific topics related to the pursuit of carbon neutrality, engage with other experts in the field and stakeholders, and conduct research to ensure that any path to carbon neutrality balances scientific, economic and social justice principles.

1.2.2.6 Regulation of Energy-Related Sources

Renewables Portfolio Standard (SB 100)

As most recently amended by SB 100 (2018), California's Renewables Portfolio Standard requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 50 percent of total retail sales by 2026, and 60 percent of total retail sales by 2030. SB 100 also established a state policy goal to achieve 100 percent renewables by 2045.

GHG Emissions Standard for Baseload Generation (SB 1368)

SB 1368 (September 29, 2006) prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated out-of-state as well as in the state, and to publicly owned as well as investor-owned electric utilities.

1.2.2.7 Regulation of Mobile Sources

Senate Bill 375 (Land Use Planning)

SB 375 provided for a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires Metropolitan Planning Organizations (MPOs), including the Sacramento Area Council of Governments (SACOG), to incorporate a "sustainable communities strategy" (SCS) in their regional transportation plans (RTPs) that will achieve GHG emission reduction targets set by CARB, primarily by reducing VMT from light-duty vehicles through development of more compact, complete, and efficient communities.

SB 375 also required CARB to appoint a Regional Targets Advisory Committee (RTAC) to recommend factors and methodologies for CARB to use in setting GHG emission reduction targets (Regional Targets) for each region. On September 29, 2009, the RTAC released its recommendations to CARB, who, on September 23, 2010, adopted Regional Targets for the years 2020 and 2035. The 2010 Regional Targets were 7% for 2020 and 16% for 2035 for

the area under SACOG's jurisdiction, which includes Sacramento County. In 2018, CARB revised these Regional Targets to 7% for 2020 and 19% for 2035.[9]

In February 2016, SACOG issued the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) for the Sacramento region. The MTP/SCS supports the 2004 Sacramento Region Blueprint, which implements smart growth principles, including housing choice, compact development, mixed-use development, natural resources conservation, use of existing assets, quality design and transportation choice.[10] The Sacramento Region Blueprint and the MTP/SCS are discussed further in Regional Regulatory Background **Section 1.2.3** below.

Mobile Source Reductions (Pavley) (AB 1493)

AB 1493 required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model years 2009 through 2016. The bill required the California Climate Action Registry to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emission reduction credits. The bill authorizes CARB to grant emission reduction credits for reductions of GHG emissions prior to the date of the enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, CARB applied to the USEPA for a waiver under the federal Clean Air Act to authorize implementation of these regulations. The waiver request was formally denied by the USEPA in December 2007 after California filed suit to prompt federal action. In January 2008, the State Attorney General filed a new lawsuit against the USEPA for denying California's request for a waiver to regulate and limit GHG emissions from these vehicles. In January 2009, President Obama issued a directive to the USEPA to reconsider California's request for a waiver. On June 30, 2009, the USEPA granted the waiver to California for its GHG emission standards for motor vehicles. As part of this waiver, the USEPA specified the following provision: CARB may not hold a manufacturer liable or responsible for any non-compliance caused by emission debits generated by a manufacturer for the 2009 model year.

Low Carbon Fuel Standard

Executive Order S-1-07, as issued by Governor Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California by 2020.[11] In response, CARB approved the LCFS regulations in 2009, which became fully effective in April 2010. In September 2015, CARB re-adopted the LCFS regulations following the resolution of a lawsuit.

In January 2019, CARB adopted amendments to the LCFS regulation to support the objectives of the 2017 Scoping Plan in achieving the statewide GHG target of 40 percent below 1990 levels by 2030. The amended regulation targeted a 20 percent reduction in fuel

[9] CARB. 2019. SB 375 Regional Plan Climate Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: March 2020. If SACOG is not able to secure the funding and commitments to implement their proposed pilot project, CARB staff would evaluate the SCS performance against an 18 percent target.

[10] SACOG. 2016. Metropolitan Transportation Plan/Sustainable Communities Strategy. February. Available at: https://www.sacog.org/metropolitan-transportation-plansustainable-communities-strategy. Accessed: March 2020.

[11] Carbon intensity is a measure of the GHG emissions associated with the various production, distribution and use steps in the "lifecycle" of a transportation fuel.

carbon intensity from a 2010 baseline by 2030. Specifically, it strengthened the carbon intensity benchmarks for gasoline, diesel, and jet fuel substitutes from 2019 to 2030, and added new credit generating fuels and vehicle categories to incentivize further reductions, including alternative jet fuels.[12] The LCFS would reduce GHG emissions by reducing the carbon intensity of transportation fuels used in California by at least 10% by 2020 and, as most recently amended in 2018, by at least 20% by 2030.

Clean Cars

In January 2012, CARB approved the Advanced Clean Cars Program, which established an emissions control program for cars and light-duty trucks (such as SUVs, pickup trucks, and minivans) of model years 2017-2025. When the program is fully implemented, new vehicles will emit 75% less smog-forming pollutants than the average new car sold today, and GHG emissions will be reduced by nearly 35%. The program also requires car manufacturers to offer for sale an increasing number of zero-emission vehicles (ZEVs) each year, including battery electric and fuel cell vehicles.

In December 2012, CARB adopted regulations allowing car manufacturers to comply with California's GHG emissions requirements for model years 2017-2025 through compliance with the USEPA GHG requirements for those same model years.[13]

1.2.2.8 CEQA Guidelines Amendments

2009 CEQA Guidelines Amendments (SB 97)

The 2009 CEQA Guidelines amendments adopted pursuant to SB 97 state in Section 15064.4(a) that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines amendments note that an agency may identify emissions either by selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards."[14] Section 15064.4(b) provides that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent a project may increase or reduce GHG emissions as compared to the environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a state-wide, regional, or local plan for the reduction or mitigation of GHG emissions.[15]

[12] CARB. 2019. Low Carbon Fuel Standard. Available at: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard. Accessed: March 2020.

[13] CARB. 2012. Lev III and ZEV Regulation Amendments For Federal Compliance Option. December. Available at: https://ww3.arb.ca.gov/regact/2012/leviiidtc12/leviiidtc12.htm. Accessed: March 2020.

[14] CNRA. 2009. Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of GHG Emissions Pursuant to SB97. Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/Final_Statement_of_Reasons.pdf. Accessed: March 2020.

[15] CNRA. 2009. Revised Text of Proposed Guideline Amendments. Sacramento, CA. Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf. Accessed: March 2020.

In addition, Section 15064.7(c) of the CEQA Guidelines amendments specifies "[w]hen adopting 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"[16]. Similarly, the revision to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies' selection of significance thresholds, does not prescribe specific thresholds. Rather, Appendix G asks whether the project would:

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

This indicates that the determination of what is a significant effect on the environment should be left to the lead agency.

Accordingly, the CEQA Guidelines amendments do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Amendments emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA.

The CEQA Guidelines amendments indicate that lead agencies should consider all feasible means, supported by substantial evidence and subject to monitoring and reporting, of mitigating the significant effects of GHG emissions. These potential mitigation measures, set forth in Section 15126.4(c), may include (1) measures in an existing plan or mitigation program for the reduction of GHG emissions that are required as part of the lead agency's decision; (2) reductions in GHG emissions resulting from a project through implementation of project design features; (3) off-site measures, including offsets, to mitigate a project's emissions; and (4) carbon sequestration measures.[17]

Among other things, the California Natural Resources Agency (CNRA) noted in its Public Notice for these changes that impacts of GHG emissions should focus on the cumulative impact on climate change. The Public Notice states:

> While the Proposed Amendments do not foreclose the possibility that a single project may result in GHG emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of GHG emissions should center on whether a project's incremental contribution of GHG emissions is cumulatively considerable.[18]

Thus, the CEQA Guidelines amendments continue to make clear that the significance of GHG emissions is most appropriately considered on a cumulative level.

[16] Ibid.

[17] Ibid.

[18] CNRA. 2009. Notice of Public Hearings and Notice of Proposed Amendment of Regulations Implementing the California Environmental Quality Act. Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/Notice_of_Proposed_Action.pdf. Accessed: March 2020.

As described in the Final Statement of Reasoning[19] for the 2009 CEQA Guidelines amendments, the CEQA Guidelines specifically do not address lifecycle emission for two reasons. First, there are different interpretations of the meaning of "lifecycle" amongst lead agencies, which could lead to confusion on how to evaluate the contribution of lifecycle emissions to a project. Furthermore, requiring an analysis of lifecycle emissions may be inconsistent with CEQA, as the emissions may be outside the scope of the "indirect emissions" that are evaluated with a project.

2018 CEQA Guidelines Amendments

In late 2018, the CNRA finalized amendments to the CEQA Guidelines including changes to CEQA Guidelines section 15064.4, which addresses the analysis of GHG emissions. The amendments became effective on December 28, 2018, and clarified several points, including the following:[20]

- Lead agencies must analyze the GHG emissions of proposed projects. (See CEQA Guidelines, § 15064.4, subd. (a).)
- The focus of the lead agency's analysis should be on the project's incremental contribution to climate change, rather than simply focusing on the quantity of emissions and how that quantity of emissions compares to statewide or global emissions. (See CEQA Guidelines, § 15064.4, subd. (b).)
- The impacts analysis of GHG emissions is global in nature and thus should be considered in a broader context. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national, or global emissions. (See CEQA Guidelines, § 15064.4, subd. (b).)
- Lead agencies should consider a timeframe for the analysis that is appropriate for the project. (See CEQA Guidelines, § 15064.4, subd. (b).)
- A lead agency's analysis must reasonably reflect evolving scientific knowledge and state regulatory schemes. (See CEQA Guidelines, § 15064.4, subd. (b).)
- Lead agencies may rely on plans prepared pursuant to section 15183.5 (Plans for the Reduction of Greenhouse Gases) in evaluating a project's GHG emissions. (See CEQA Guidelines, § 15064.4, subd. (b)(3).)
- In determining the significance of a project's 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 consistent with those plans, goals, or strategies. (See CEQA Guidelines, § 15064.4, subd. (b)(3).)
- 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

[19] CNRA. 2009. Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of GHG Emissions Pursuant to SB97. Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/Final_Statement_of_Reasons.pdf. Accessed: March 2020.

[20] OPR. 2019. CEQA and Climate Change. Available at: http://opr.ca.gov/ceqa/climate-change.html. Accessed: March 2020.

incremental contribution to climate change. (See CEQA Guidelines, § 15064.4, subd. (c).) [21]

1.2.2.9 Senate Bill 743 (Transit Oriented Infill Projects)

Public Resources Code Section 21099(c)(1), as codified through enactment of SB 743, was enacted with the intent to change the focus of transportation analyses conducted under CEQA. SB 743 reflects a legislative policy to balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions. SB 743 requires OPR to establish "alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas." [22] Under SB 743, the new metrics or significance criteria must promote the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses. SB 743 dictates that once the CEQA Guidelines are amended to include new thresholds, automobile delay, as described by level of service or similar measures of vehicular capacity or congestion, shall no longer be considered a significant impact under CEQA in all locations in which the new thresholds are applied. The Legislature gave OPR the option of applying the new thresholds only to transit priority areas, or more broadly to areas throughout the State. OPR proposed to apply the new thresholds throughout the State.

In January 2016, OPR issued its *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* (Revised SB 743 Proposal). Included in the Revised SB 743 Proposal were proposed new CEQA Guidelines Section 15064.3 and related revisions to Appendix G. Under the proposed new Guidelines, the analysis of transportation impacts in the CEQA context would shift from a levels of service metric to a vehicle miles traveled (VMT) metric. In proposing the new approach, OPR noted the relationship between VMT and GHG emissions.

A VMT metric was adopted as part of the 2018 CEQA Guidelines Amendments (described above), which became effective on December 28, 2018. As described in the Final Statement of Reasoning[23] for the 2018 CEQA Guidelines amendments: "The current emphasis on traffic congestion in transportation analyses tends to promote increased vehicle use. This new guidance instead focuses on a project's effect on vehicle miles traveled, which should promote project designs that reduce reliance on automobile travel."

1.2.2.10 Building Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to incorporate new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, and whole envelope.

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[21] Ibid.

[22] California Legislative Information. 2013. SB-743 Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento. Available at: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB743. Accessed: March 2020.

[23] CNRA. 2018. Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines. Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/2018_CEQA_Final_Statement_of%20Reasons_111218.pdf . Accessed: March 2020.

The 2005, 2008, and 2013 updates to the efficiency standards included provisions such as cool roofs on commercial buildings, increased use of skylights, and higher-efficiency lighting, heating, ventilation, and air conditioning (HVAC), and water heating systems. Additionally, some standards focus on broader concepts such as reducing electricity loads at peak periods and seasons and improving the quality of energy-saving installations. Past updates to the Title 24 standards have proved very effective in reducing building energy use, with the 2013 update estimated to reduce energy consumption in residential buildings by 25% and energy consumption in commercial buildings by 30%, relative to the 2008 standards.[24] The California Energy Commission (CEC) recently adopted another update in 2019, which will become effective on January 1, 2020.[25] The 2019 updates include a requirement for solar photovoltaic systems for new homes, requirements for newly constructed healthcare facilities, additional high-efficiency lighting requirements, high-performance attic and walls, higher-efficiency water and space heaters, and high-efficiency air filters. Relative to the 2016 standards, the 2019 standards are expected to reduce high-rise residential and non-residential electricity consumption by approximately 10.7% and natural gas consumption by 1%, and require new low-rise residential buildings to achieve zero net electricity consumption using a combination of building efficiency and on-site renewable electricity generation.[26]

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen), and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. Like Part 6 of Title 24, the CalGreen standards are periodically updated, with increasing energy savings and efficiencies associated with each code update.

1.2.2.11 Zero Emission Vehicles

Zero emission vehicles (ZEVs) include hydrogen fuel cell electric vehicles and battery-electric vehicles with no tailpipe emissions.

In its 2014 First Update to the Climate Change Scoping Plan, CARB recognized that the light-duty vehicle fleet "will need to become largely electrified by 2050 in order to meet California's emission reduction goals."[27] Accordingly, CARB's Advanced Clean Cars (ACC) program requires about 15 percent of new cars sold in California in 2025 to be a plug-in hybrid, battery electric, or fuel cell vehicles.[28]

Two Executive Orders established milestones to encourage statewide ZEV usage. In 2012, Governor Brown issued EO B-16-12, which calls for the increased penetration of ZEVs into

[24] CEC. 2012. Energy Commission Approves More Efficient Buildings for California's Future. Available online at: https://energyarchive.ca.gov/releases/2012_releases/2012-05-31_energy_commission_approves_more_efficient_buildings_nr.html. Accessed: March 2020.

[25] CEC. 2019. California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Available online at: https://www.energy.ca.gov/title24/2019standards. Accessed: March 2020.

[26] CEC. 2018. 2019 Title 24 Impact Analysis. June. Available at: https://energyarchive.ca.gov/title24/2019standards/post_adoption/documents/2019_Impact_Analysis_Final_Report_2018-06-29.pdf. Accessed: June 2020.

[27] CARB. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. May. p. 48.

[28] Id. at p. 47.

California's vehicle fleet to help California achieve transportation sector GHG emissions reductions of 80 percent below 1990 levels by 2050. In support of this target, the EO also calls upon CARB, the CEC and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure.

EO B-16-12 specifically directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth, and improve the quality of life in the state."[29] In January 2018, Governor Brown issued EO B-48-18 to "boost the supply of zero-emission vehicles and charging and refueling stations in California."[30] These Executive Orders established several milestones organized into four time periods:

By 2015:

- The State's major metropolitan areas will be able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting;
- The State's manufacturing sector will be expanding zero-emission vehicle and component manufacturing;
- The private sector's investment in zero-emission vehicle infrastructure will be growing; and
- The State's academic and research institutions will be contributing to zero-emission vehicle research, innovation, and education.

By 2020:

- The State's zero-emission vehicle infrastructure will be able to support up to one million vehicles;
- The costs of zero-emission vehicles will be competitive with conventional combustion vehicles;
- Zero-emission vehicles will be accessible to mainstream consumers;
- There will be widespread use of zero-emission vehicles for public transportation and freight transport;
- Transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles;
- Electric vehicle charging will be integrated into the electricity grid; and
- The private sector's role in the supply chain for zero-emission vehicle component development and manufacturing State will be expanding.

By 2025:

[29] Executive Order B-16-2012. March 2012. Available at: https://www.ca.gov/archive/gov39/2012/03/23/news17472/index.html. Accessed: March 2020.

[30] Executive Order B-48-2018. January 2018. Available at: http://opr.ca.gov/planning/transportation/zev.html. Accessed: March 2020.

- Over 1.5 million zero-emission vehicles will be on California roads and their market share will be expanding;
- Californians will have easy access to zero-emission vehicle infrastructure; and
- California's clean, efficient vehicles will annually displace at least 1.5 billion gallons of petroleum fuels.

By 2030:

- 5 million zero-emission vehicles will be on California roadways.

In furtherance of those goals, in February 2013, the Governor's Interagency Working Group on Zero-emission Vehicles issued the *2013 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[31] The 2013 ZEV Action Plan identifies four broad goals for state government to advance ZEVs: 1) Complete needed infrastructure and planning; 2) Expand consumer awareness and demand; 3) Transform fleets; and 4) Grow jobs and investment in the private sector. As part of these goals, some highlighted strategies and actions include: i) supporting ZEV infrastructure planning and investment by private entities; ii) enabling universal access to ZEV infrastructure for California drivers; iii) reducing upfront purchase costs for ZEVs; iv) promoting consumer awareness of ZEVs; and v) helping to expand ZEVs in bus fleets. The Action Plan discusses the challenges of ZEV expansion, which include the need to enable electric vehicle chargers in homes, increase consumer awareness, address up-front costs and operational limitations, and address that ZEVs are not commercially available for all categories of vehicles.

In October 2016, the Governor's Interagency Working Group on Zero-emission Vehicles issued the *2016 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[32] This report provides an update on progress toward achieving the 2013 goals and highlights the following four top priorities for the upcoming years: 1) Raise consumer awareness and education about ZEVs; 2) Ensure ZEVs are accessible to a broad range of Californians; 3) Make ZEV technologies commercially viable in targeted applications in the medium-duty, heavy-duty, and freight sectors; and 4) Aid ZEV market growth beyond California. The broad goals to advance ZEV adoption are: i) Achieve mainstream consumer awareness of ZEV options and benefits; ii) Make ZEVs an affordable and attractive option for drivers; iii) Ensure convenient charging and fueling infrastructure for greatly expanded use of ZEVs; iv) Maximize economic and job opportunities from ZEV technologies; v) Bolster ZEV market growth outside of California; and vi) Lead by example by integrating ZEVs into state government. The goals and strategies proposed in the 2013 Action Plan will continue to be implemented. Additional strategies are proposed to help achieve the new goals, including setting targets to increase home charging stations in multi-unit dwellings and disadvantaged communities and for public transit and school bus electrification. The 2016 Action Plan describes challenges toward achieving the 2025 goal of 1.5 million ZEVs in California, such as that most consumers are still not aware of the benefits of passenger ZEVs and that over 1,000,000 charge points will be needed at homes,

[31] Governor's Interagency Working Group on Zero-emission Vehicles. 2013. Available at: http://opr.ca.gov/docs/Governors_Office_ZEV_Action_Plan_(02-13).pdf. Accessed: March 2020.

[32] Governor's Interagency Working Group on Zero-emission Vehicles. 2016. 2016 ZEV Action Plan. Available at: https://www.ca.gov/archive/gov39/wp-content/uploads/2018/01/2016_ZEV_Action_Plan-1.pdf. Accessed: March 2020.

workplaces, and public locations but only 11,000 non-home charge points are installed as stated in the 2016 ZEV Action Plan.

In January 2018, Governor Brown signed EO B-48-18 issuing a "Priorities Update": An update to the 2016 Zero-Emission Vehicle Action Plan to help expand private investment to the zero-emission vehicle infrastructure, particularly in the low income and disadvantaged communities. The initiative is focused on deploying charging and fueling infrastructure through multi-stakeholder efforts, thus increasing both ownership and operations of ZEVs. The 2018 Priorities Update focuses specifically on state agency actions and is designed to serve three fundamental purposes: 1) Provide direction to state agencies on the most important actions to be executed in 2018 to enable the progress toward the 2025 targets and 2030 vision; 2) Give stakeholders transparency into the actions state agencies plan to take (or are taking) this year to further the ZEV market; and 3) Create a platform for stakeholder engagement, feedback, and collaboration.[33]

California is incentivizing the purchase of ZEVs through implementation of the Clean Vehicle Rebate Project (CVRP), which is administered by a non-profit organization (The Center for Sustainable Energy) for CARB and currently subsidizes the purchase of passenger near-zero and zero emission vehicles as follows:

- Hydrogen Fuel Cell Electric Vehicles: $5,000
- Battery Electric Vehicles: $2,500
- Plug-In Hybrid Electric Vehicles: $1,500
- Neighborhood Electric Vehicles and Zero Emission Motorcycles: $900

In July 2017, CARB approved the first of Volkswagen's (VW) four 30-month ZEV Investment Plans (Plan).[34] This Plan is required by California's partial settlement for $800 million with VW resulting from the automaker's use of illegal defeat devices in its 2.0-liter diesel cars sold in the state from model years 2009 to 2015. The Plan describes how VW proposes to spend the first $200 million in California on ZEV charging infrastructure (including the development and maintenance of ZEV charging stations), public awareness, increasing ZEV access, and a green city demonstration. In December 2018, CARB approved VW-subsidiary Electrify America's Cycle 2 California ZEV Investment Plan, which continues to support the goals established in the first funding cycle but adds in new metropolitan and regional charging corridors. It also expands investments for charging stations to support ZEV bus fleets, ride-hail services, and autonomous vehicle charging.[35]

Many other statewide and regional initiatives are helping spur ZEV uptake.

Senate Bill 391 (California Transportation Plan)

SB 391 requires that Caltrans updates the California Transportation Plan by December 31, 2015, and every five years thereafter, accounting for a wide variety of measures, including

[33] Governor's Interagency Working Group on Zero-emission Vehicles. 2018. 2018 ZEV Action Plan Priorities Update. Available at: https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf. Accessed: March 2020.

[34] VOLKSWAGEN, Group of America. 2017. California ZEV Investment Plan: Cycle 1. March. Available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/documents/vwinvestplan1_031317.pdf. Accessed: March 2020.

[35] Electrify America. 2018. California ZEV Investment Plan: Cycle 2. October. Available at: https://ww2.arb.ca.gov/resources/documents/zev-investment-plans. Accessed: June 2020.

the use of alternative fuels, new vehicle technology, tailpipe emissions reductions, and the expansion of public transit, bicycling, and walking. The California Transportation Plan was updated in 2015.[36]

1.2.2.12 Other State GHG Regulatory Activities

Executive Order S-13-08 (Climate Adaptation Strategy)

On November 14, 2008, Governor Arnold Schwarzenegger signed Executive Order S-13-08, which called on State agencies to develop a strategy for identification of and preparation for expected climate change impacts in California. The resulting *2009 California Climate Adaptation Strategy* report was developed by the CNRA in coordination with the Climate Action Team (CAT). The report presents the best available science relevant to climate impacts in California and proposes a set of recommendations for decision-makers to assess vulnerability and promote resiliency to reduce California's vulnerability to climate change. Guidance regarding adaptation strategies is general in nature and emphasizes incorporation of strategies into existing planning policies and processes. The report has since been updated in 2014 and 2018 and is now known as the Safeguarding California Plan, which is a roadmap for the state's programmatic and policy actions to achieve an integrated climate change adaptation strategy.[37]

Other Regulations or Policies

Senate Bill X7 7 (Water Conservation Act of 2009)

The Water Conservation Act of 2009 sets an overall goal of reducing per-capita urban water use by 20% by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per-capita water use by at least 10% by December 31, 2015. Reduction in water consumption directly reduces the necessary energy and the associated emissions to convey, treat, distribute, and eventually treat the water.

California Integrated Waste Management Act

AB 341 (2011) amended the California Integrated Waste Management Act of 1989 (Public Resources Code Sections 40000 et seq.) to include a provision declaring that it is the policy goal of the state that not less than 75 percent of solid waste generated be source-reduced, recycled, or composted by 2020, and annually thereafter.[38] In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the State's policy goal.[39] CalRecycle conducted several stakeholder workshops and published a discussion document in May 2012 titled California's New Goal: 75 Percent Recycling, which identifies concepts that CalRecycle believes would assist the state in reaching the 75 percent goal by 2020.[40]

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[36] California Department of Transportation. California Transportation Plan 2040. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/finalctp2040-report-webready.pdf. Accessed: March 2020.

[37] CNRA. 2019. Safeguarding California and Climate Change Adaptation Policy. Available at: https://resources.ca.gov/CNRALegacyFiles/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf. Accessed: March 2020.

[38] Cal. Pub. Res. Code § 41780.01(a).

[39] Cal. Pub. Res. Code § 41780.02.

[40] CalRecycle. 2018. California's 75 Percent Initiative Defining the Future. Available at: https://www.calrecycle.ca.gov/75percent. Accessed: March 2020.

AB 1826 (2014) further amended the California Integrated Waste Management Act of 1989 to require commercial businesses to recycle organic waste, which includes food waste and green waste, with phased-in requirements based on the volume of waste generated. It also required local jurisdictions to adopt an organic waste recycling program.

In March 2017, CARB released its Short-Lived Climate Pollution Reduction Strategy which included a provision for CalRecycle to develop regulations to reduce statewide organic waste disposal by 50% of 2014 levels by 2020 and 75% of 2014 levels by 2025. These regulations will take effect on or after January 1, 2022.[41]

1.2.2.13 Court Rulings

Several recent court rulings affect the derivation and applicability of GHG thresholds for CEQA. These are summarized below.

Newhall Ranch: Center for Biological Diversity v. Department of Fish and Wildlife, 62 Cal. 4th 204 (2016)

In the Newhall Ranch decision, the California Supreme Court recognized that an individual project's emissions alone will most likely not have any appreciable impact on global GHG emissions, but an individual project will contribute to the significant cumulative impact caused by GHG emissions from other sources around the globe. The question therefore becomes whether the project's incremental addition of GHGs is cumulatively considerable in light of the global problem, and thus significant. The Court acknowledged that the fact that emissions are global rather than local gives rise to an argument that a certain amount of GHG emissions "is as inevitable as population growth." The Court stated, "Under this view, a significance criterion framed in terms of efficiency is superior to a simple numerical threshold because CEQA is not intended as a population control measure."

Golden Door: Golden Door Properties, LLC v. County of San Diego/Sierra Club, LLC v. County of San Diego, Cal. App. 5th (2018)

In the Golden Door decision, the Court ruled that San Diego County's 2016 Guidance Document for analyzing GHG impacts violated CEQA because it was not adopted by ordinance, resolution, rule, or regulation, or through a public review process. The Court further ruled that the Guidance Document's GHG efficiency metric of 4.9 metric tons of CO_2e per service population per year was not supported by substantial evidence that explained why use of statewide GHG reduction levels was appropriate for all projects in San Diego County.

Together, the Newhall Ranch and Golden Door court decisions suggest that data used to support thresholds should be local, and the applicability of one threshold to all land use types or emission sectors may not be appropriate.

1.2.3 Regional

1.2.3.1 Sacramento Region Blueprint

SACOG adopted the Sacramento Blueprint in 2004 as a smart growth vision for the region. The Blueprint integrates land use and transportation planning in an effort to reduce sprawl, vehicle emissions, and traffic congestion by incorporating smart growth principles that

[41] CARB. 2017. Short-Lived Climate Pollutant Reduction Strategy. March. Available online at: https://ww2.arb.ca.gov/sites/default/files/2018-12/final_slcp_report%20Final%202017.pdf. Accessed: March 2020.

encourage housing options closer to centers of employment, shopping, and recreation hubs. The key planning principles of the Blueprint include: transportation choice, compact development, mixed use development, housing choice and diversity, use of existing assets, natural resource conservation, and quality design.[42] The Blueprint establishes 2050 targets including percent distribution of housing types (rural residential, large-lot single family, small-lot single family, attached homes); percent distribution of new housing vs. new jobs; square miles of new land for urban uses; and square miles of agricultural land to be converted to urban and public-use open space. The Blueprint conceptual map and growth principles are updated regularly to include new information, no less frequently than the update cycle for the MTP/SCS.[43]

1.2.3.2 Sacramento Metropolitan Transportation Plan/Sustainable Communities Strategy

The Sacramento Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) supports the Sacramento Region Blueprint and links land use, air quality, and transportation needs. As the state and federally designated MPO for the region, SACOG is responsible for developing the MTP/SCS in coordination with Sacramento, Yolo, Yuba, Sutter, El Dorado, and Placer counties. The MTP/SCS includes a long-range regional transportation plan covering a 20-year planning horizon (the MTP component), as well as policies and strategies to reduce GHG emissions from passenger vehicles based on targets set by CARB (the SCS component) pursuant to SB 375.[44] In 2018, CARB set SACOG's GHG emissions reduction targets to 7% for 2020 and 19% for 2035.[45]

The most recent version of the MTP/SCS was adopted in November 2019 and covers the period from 2020 to 2040. The 2020 MTP/SCS is a multimodal transportation plan that is required to be financially feasible, achieve health standards for clean air, and address statewide climate goals. It is guided by four priority policy areas: build vibrant places for today's and tomorrow's residents; foster the next generation of mobility solutions; modernize the way we pay for transportation infrastructure; and build and maintain a safe, reliable, and multimodal transportation system. The MTP/SCS includes a regional growth forecast and projected land use pattern (residential and employment) to accommodate estimated increases in population, employment, and housing. It also reports on historical VMT data, observed VMT trends, and forecasted VMT through 2040.[46] Data from the 2020 MTP/SCS is used to establish Sacramento County's share of future transportation emissions for new developments, as described later in this report.

[42] SACOG. Sacramento Region Blueprint. Available online at: https://www.sacog.org/sacramento-region-blueprint. Accessed: March 2020.

[43] SACOG. 2007. Special Report: Preferred Blueprint Alternative, Sacramento Region Blueprint Transportation Land Use Study. June. Available online at: https://www.sacog.org/sites/main/files/file-attachments/special_reportbp_insert_jan_2005.pdf. Accessed: March 2020.

[44] SACOG. Metropolitan Transportation Plan/Sustainable Communities Strategy. Available online at: https://www.sacog.org/metropolitan-transportation-plansustainable-communities-strategy. Accessed: March 2020.

[45] CARB. 2019. SB 375 Regional Plan Climate Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: March 2020.

[46] SACOG. 2019. Metropolitan Transportation Plan/Sustainable Communities Strategy, November 2019. Available online at: https://www.sacog.org/2020-metropolitan-transportation-plansustainable-communities-strategy-update. Accessed: March 2020.

1.2.4 Local

1.2.4.1 County of Sacramento Climate Action Plan

The County of Sacramento adopted its Government Operations CAP in 2012, which addresses GHG emissions from the County's operations including County-owned facilities, vehicles, equipment, and employee commute. It identified an action plan to reduce County government GHG emissions to a level 15% below baseline 2005 levels by 2020.[47]

The County is currently developing a Communitywide Greenhouse Gas Reduction and Climate Change Adaptation Plan (Communitywide CAP), which will update the government operations GHG inventory and CAP measures, update the unincorporated County's GHG inventory and forecasts, identify GHG reduction targets for 2020, and propose measures to achieve the required GHG reductions for the entire County. It will also conduct a climate change vulnerability assessment and develop an adaptation strategy. So far, a memorandum documenting the existing and projected Business-as-Usual emissions inventories has been released.[48]

1.2.4.2 City Climate Action and GHG Reduction Plans

In 2011, the City of Citrus Heights adopted its Greenhouse Gas Reduction Plan with a GHG reduction target of 10-15% below 2005 baseline emission levels by 2020.[49]

In 2012, the City of Sacramento adopted its Climate Action Plan, and in 2015 it was incorporated into the City's 2035 General Plan. The CAP/2035 General Plan identified how City operations as well as the broader community could reduce GHG emissions to achieve 22% and 15% reductions below 2005 baseline levels by 2020 for municipal and community emissions, respectively. It also set longer-term reduction targets of 49% by 2035 and 83% by 2050.[50] In 2016, the City of Sacramento updated its Climate Action Plan for Internal Operations. The plan documented the City's attainment of a 24% GHG emissions reduction from municipal operations from 2005 to 2013, thus exceeding the adopted CAP/2035 General Plan target of 22% reduction by 2020. The 2016 update set a new target to achieve 33% reduction by 2020.[51] The City is currently developing the 2040 General Plan, which will include an ambitious update to the Climate Action Plan with the goal of establishing Sacramento as a climate leader.[52]

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[47] Sacramento County. 2012. Climate Action Plan: County Government Operations. June. Available online at: https://planning.saccounty.net/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/Government%20Operations%20CAP.pdf. Accessed: March 2020.

[48] Sacramento County. 2019. Planning and Environmental Review: Communitywide Greenhouse Gas Reduction and Climate Change Adaptation (Communitywide CAP) Project. Available online at: https://planning.saccounty.net/PlansandProjectsIn-Progress/Pages/CAP.aspx. Accessed: March 2020.

[49] City of Citrus Heights. 2011. Greenhouse Gas Reduction Plan. August. Available online at: https://www.citrusheights.net/203/Greenhouse-Gas-Reduction-Plan. Accessed: March 2020.

[50] City of Sacramento. 2015. Sacramento Climate Action Plan and 2035 General Plan. March. Available online at: https://www.cityofsacramento.org/Community-Development/Resources/Online-Library/Sustainability. Accessed: March 2020.

[51] City of Sacramento. 2016. Climate Action Plan for Internal Operations. June. Available online at: https://www.cityofsacramento.org/Public-Works/Facilities/Sustainability/Climate-Action-Plan-for-Internal-Operations. Accessed: March 2020.

[52] City of Sacramento. 2018. 2040 General Plan Update. Available online at: http://www.cityofsacramento.org/Community-Development/Planning/Major-Projects/General-Plan. Accessed: March 2020.

In 2018, as part of its 2035 General Plan, the City of Folsom set GHG reduction targets of 15%, 40%, 51%, and 80% below 2005 baseline levels by 2020, 2030, 2040, and 2050, respectively.[53]

In 2019, the City of Elk Grove updated its CAP as part of its General Plan. The updated CAP set per capita emissions targets of 7.6 $MTCO_2e$ per capita by 2020, 4.1 MT CO_2e per capita by 2030, and 1.4 MT CO_2e per capita by 2050.[54]

The City of Galt's CAP was adopted in March 2020.[55] The cities of Rancho Cordova and Isleton have not yet developed CAPs.

The State CEQA Guidelines describe the technical and procedural conditions needed to be a Qualified CAP.

1.2.4.3 The Mayor's Commission on Climate Change

In 2018, Mayor Darrell Steinberg of Sacramento and Mayor Christopher Cabaldon of West Sacramento[56] established the Mayors' Commission on Climate Change. The Commission aims to develop a common vision and strategies for both cities to achieve net zero greenhouse gas emissions, referred to as Carbon Zero, by 2045. Specifically, the Commission's objectives are to: (1) establish goals and priority areas of action to achieve Carbon Zero by 2045, (2) strengthen local and regional partnerships to address climate change and increase resiliency, (3) engage community members and business leaders to build political support for robust climate action, (4) provide a forum to develop and vet the guiding principles of ambitious strategies within the City of Sacramento and West Sacramento's Climate Action Plans, (5) advance social equity and economic prosperity, and (6) attract additional investments into the region.[57]

Key focus sectors include the built environment, mobility, and community health and resiliency. The Commission will issue a Final Recommendations Report that highlights priority strategies to achieve Carbon Zero to inform future updates to the cities' Climate Action Plans. Current adopted strategies for the built environment include mandating new construction to be all-electric to eliminate fossil fuel use in new buildings by 2023, transitioning 25% of existing residential and small commercial buildings to all-electric by 2030, and supporting infill to ensure that 90% of growth is in the established and center/corridor communities and 90% small-lot and attached homes by 2040, consistent with the regional MTP/SCS.[58] The Climate Commission's adopted mobility strategies are to expand and enhance accessibility to low-stress connected infrastructure for walking and

[53] City of Folsom. 2018. 2035 General Plan. August. Available online at: https://www.folsom.ca.us/community/planning/general_plan/2035_general_plan.asp. Accessed: March 2020.

[54] City of Elk Grove. 2019. Climate Action Plan: 2019 Update. February. Available online at: http://www.elkgrovecity.org/UserFiles/Servers/Server_109585/File/Departments/Planning/Projects/General%20Plan/GPU/Adopted_2019-02/ElkGrove_CAP_Adopted_Clean.pdf. Accessed: March 2020.

[55] City of Galt. 2020. City of Galt Climate Action Plan. February. Available online at: http://www.ci.galt.ca.us/city-departments/community-development/planning/climate-action-plan-cap. Accessed: June 2020.

[56] The City of West Sacramento is part of Yolo County; however, it is part of the Greater Sacramento area and within SACOG's jurisdiction.

[57] The Mayor's Commission on Climate Change. Available online at: https://www.lgc.org/climatecommission/. Accessed: March 2020.

[58] The Mayor's Commission on Climate Change. 2019. Meeting #5: Built Environment Strategy Recommendations. October. Available online at: https://www.lgc.org/wordpress/wp-content/uploads/2019/10/2.-Built-Environment-Strategy-Recommendations.pdf. Accessed: March 2020.

rolling (e.g., bicycling), prioritizing improvements that address specific community and neighborhood concerns and needs, so that 30% of all trips are by active transportation by 2030 and 40% by 2045; expand and improve transit and shared mobility services to be more accessible, affordable, timely, and attractive than single-occupancy vehicle use, so that 30% of all trips are by transit and pooled share mobility by 2030 and 50% by 2045; and develop a comprehensive package of incentives, disincentives, and policies to encourage the adoption of ZEVs so that they make up 70% of new vehicle registrations by 2030 and achieve 100% electrification of all public, private, and shared fleets by 2045.[59] Draft strategies for the community health and resiliency sector are still under development as of the writing of this report.

[59] The Mayor's Commission on Climate Change. 2019. Meeting #5: Mobility Strategy Recommendations. Available online at: https://www.lgc.org/wordpress/wp-content/uploads/2019/10/3.-Mobility-Strategy-Recommendations.pdf. Accessed: March 2020.

2. OVERVIEW OF STRATEGY FOR THRESHOLD DEVELOPMENT

As described in Section 1, there is a need for substantiated GHG thresholds for purpose of CEQA that are consistent with achieving the portion of the State's targeted GHG emissions reductions specific to the quantities and sectors of emissions from Sacramento County. The thresholds developed in this document supplement the thresholds and modeling methodologies already available in the SMAQMD CEQA Guide and the SMAQMD Recommended Guidance for Land Use Emissions Reductions.[60,61] The overall modeling and reporting strategy for CEQA climate change sections will generally follow existing SMAQMD guidance, but with updates to default assumptions and significance thresholds as described in Sections 4 and 5. These thresholds are developed and applied in four steps, described in more detail below:

1. Determine Sacramento County's share of statewide 2030 GHG emissions by sector consistent with the CARB Scoping Plan (See Section 3).
2. Determine share of Sacramento County 2030 emissions from existing development vs new development (See Section 4).
3. Allocate 2030 GHG emissions from new development among land uses and place types to set numeric thresholds (See Section 4).
4. Set Best Management Practices by land use and place types that achieve numeric thresholds (See Section 5).

The land use types to which these thresholds apply include a range of residential and commercial uses. Examples of the land uses types that these thresholds are intended to cover include:[62]

- Residential
- Commercial
- Retail
- Educational
- Recreational
- Light industrial
- Mixed-Use

These thresholds are not intended to address projects from which the majority of emissions are not related to building energy or mobile vehicle traffic, or that relate to sectors not

[60] SMAQMD. 2018. Chapter 6 Greenhouse Gas Emissions. Available online at: http://www.airquality.org/LandUseTransportation/Documents/Ch6GHG4-25-2020.pdf. Accessed: June 2020.

[61] SMAQMD. 2017. Recommended Guidance for Land Use Reductions. Available online at: http://www.airquality.org/LandUseTransportation/Documents/LandUseEmissionReductions4.1Final.pdf. Accessed: June 2020

[62] Definitions and land use subtypes for these categories are available in the CalEEMod® Users Guide, Table 1. 2017. Available at: http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4. Accessed: June 2020.

captured here. These thresholds are only intended to address GHG emissions and are not intended to address other regulatory considerations. Other sectors analyzed in the 2017 Scoping Plan include agriculture and industrial emissions. Projects in those sectors are relatively unique and should be evaluated on a case-by-case basis. This includes agriculture, industrial, transportation, infrastructure, stadiums, military bases, and hospitals. Projects such as hospitals should consult with SMAQMD to determine whether and how to apply these thresholds.

3. SACRAMENTO COUNTY GHG EMISSIONS IN 2030

The first step in threshold development requires the derivation of the GHG emissions in 2030 by sector in Sacramento County that would be needed to be consistent with the CARB Scoping Plan. First, the Scoping Plan assumptions are reviewed to determine the assumptions that are either geographically specific or specific to new developments as compared to existing developments. Next, the analysis determines the share and total amount of emissions in the Scoping Plan scenario that can reasonably be attributed to Sacramento County.

3.1 Scoping Plan Assumptions

The 2017 CARB Scoping Plan projects emissions by sector to achieve California's 2030 GHG target of 40 percent below 1990 levels. The Scoping Plan assumptions and assessments are just one potential set of modeling assumptions to achieve the State's targets; the targets could be achieved by other methods, policies, or technologies, but those used in the modeling are considered reasonable, and are used as the basis for these guidelines. The assumptions are detailed by Environment, Economics, and Energy (E3)'s PATHWAYS modeling outputs and described in more detail in the Scoping Plan Appendix D.[63] Assumptions by sector and their relationship to geographic locations and new and existing developments are summarized below. The analyzed sectors include building energy, water, mobile sources, waste, entities included under cap-and-trade and other sectors.

3.1.1 Building Energy (natural gas and electricity):

Scoping Plan assumptions: The Scoping Plan assumes that the SB 350 goal of doubling additional achievable energy efficiency by 2030 is met. This includes measures such as a 50% increase in energy efficiency for new appliances (appliances, water heating, space heating, lighting, cooking) compared to 2015, and small reductions in heating (3%), cooling (4.4%), and lighting (2%) loads due to behavior changes and better windows. The assumptions for this sector also assume achievement of 50% RPS by 2030, plus 18 gigawatts of behind-the-meter solar PV. The scenario does not assume any additional electrification or renewable natural gas.

Conclusion: Improvements in energy efficiency and renewables generation are not geographically specific, and the assumed improvements could be met through a variety of pathways. As described in Section 1.2.2, the Title 24 Building Energy Efficiency Standards have improved energy efficiency in new buildings with each triennial update cycle. The standards are required to be cost effective over the lifespan of a building.[64] The 2019 standards require low-rise residential buildings to generate on-site renewable electricity. Currently, the 2022 Title 24 standards update is underway, with an expected focus on nonresidential and multifamily buildings and decarbonization.[65] Therefore, new developments

[63] CARB. 2017. 2030 Scoping Plan Appendix D: PATHWAYS. Available at: https://ww3.arb.ca.gov/cc/scopingplan/2030sp_appd_pathways_final.pdf. Accessed: March 2020.

[64] CEC. 2019 Building Energy Efficiency Standards Frequently Asked Questions. Available at: https://ww2.energy.ca.gov/title24/2019standards/documents/Title24_2019_Standards_detailed_faq.pdf. Accessed: June 2020.

[65] California Energy Commission. 2019. April 24 Staff Workshop on Triennial California Energy Code Measure Proposal Template. Available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=227863. Accessed: March 2020.

will include more efficient buildings and appliances than existing buildings and an increase in renewables generation due to code compliance and economic considerations.

3.1.2 Water

Scoping Plan assumptions: The Scoping Plan includes a 10% reduction in water heating demand due to urban water efficiency measures.

Conclusion: Reductions in water demand are overall not geographically specific (though total water consumption may vary by climate zone and land use type). Water reductions apply to both new and existing developments.

3.1.3 Mobile

Scoping Plan assumptions: The Scoping Plan scenario uses the CARB's "Clean Technologies and Fuels" VISION model scenario plus incorporates additional ZEVs, biofuels, and a reduction in light-duty VMT. The end result of the assumptions is equivalent to achieving all of the prior SB 375 SCS targets (as adopted prior to the Scoping Plan's analyses in 2016) plus an additional ~15% reduction in VMT per capita, as noted in CARB's January 2019 white paper. [66]

Conclusion: The SCS targets are geographically specific, but the 4 major MPOs all have similar targets (set 19% in 2035 for the SCS targets as adopted in 2018).[67] Therefore, it is reasonable to assume a similar per-capita reduction percentage is required for each region. Reductions for different place types within each region may be tailored to the region. Note that the SCS target percentages refer to reductions in light-duty vehicle GHG emissions compared to a 2005 baseline, so are not directly comparable to SB 743 targets or CARB's related supporting documentation, which are based on VMT reductions compared to 2015-2018 existing conditions.

The 2019 CARB white paper describes how per capita VMT reductions related to new projects as follows:

> "It is reasonable for new development to achieve a fair share of per capita VMT and GHG emissions reductions necessary to achieve statewide climate goals and to continue to work towards additional VMT and GHG emissions reductions through other measures. The remainder of this document presents quantitative information about the rate of per capita VMT reduction needed on a statewide average basis compared to existing conditions to achieve the State's long-term climate goals. This rate of per capita VMT reduction is scalable to a fair share reduction at the project level."

The ~15% VMT per capita reduction target from existing conditions described in CARB's 2019 white paper as consistent with the Scoping Plan is also consistent with SB 743 requirements for new developments' transportation analyses for CEQA purposes. As described further below, the thresholds developed here are based on CARB's analyses and

[66] CARB. 2019. California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals. January. Available at: https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate. Accessed: March 2020.

[67] CARB. 2019. SB 375 Regional Plan Climate Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: March 2020. If SACOG is not able to secure the funding and commitments to implement their proposed pilot project, CARB staff would evaluate the SCS performance against an 18 percent target.

are meant to show consistency with the mobile emissions reductions needed to achieve the Scoping Plan target.

3.1.4 Waste

Scoping Plan assumptions: The Scoping Plan scenario includes a 14% reduction in waste emissions due to organic diversion of waste.

Conclusion: Reductions in waste emissions are not geographically specific as it applies to municipal solid waste. This reduction applies to both new and existing developments.

3.1.5 High-GWP Gases:

Scoping Plan assumptions: High-GWP gases include methane, hydrofluorocarbons (HFCs) and anthropogenic black carbon. The Scoping Plan scenario is generally consistent with the mitigation scenario in the Short-Lived Climate Pollutant (SLCP) Strategy per SB 1383, which mandates a 40 percent reduction in methane and HFC emissions by 2030 and a 50 percent reduction in anthropogenic emissions of black carbon by 2030.[68] Several components of non-energy GHGs are not evaluated here because they are associated with industrial or agricultural land uses. Black carbon is not evaluated here because it is not part of the State's GHG inventory that tracks progress toward the State's climate targets. [69] Emissions categories associated with residential and commercial land use types include solid waste disposal and a portion of refrigerant use (F-gases, HFCs). As described in Section 3.1.4, the Scoping Plan scenario includes a 14% reduction in waste emissions due to organic diversion of waste (on top of the reductions required by SB 1383 by 2020). In addition, the Scoping Plan scenario includes a 63% reduction in F-gases.

As described in the SLCP Strategy, "HFCs are synthetic gases used in refrigeration, air conditioning, insulating foams, solvents, aerosol products, and fire protection…The major concern with respect to HFCs is that their contribution to climate forcing is expected to increase rapidly in the future as they continue to replace ozone depleting substances (ODS), such that they will become very significant contributors." HFCs from transportation are expected to decrease due to the California and USEPA light-duty vehicle GHG emission standards.[70] Refrigerant HFC emissions are expected to decrease significantly due to State and International HFC phasedown agreements, but not enough to meet the 2030 reduction goal. Additional measures are being considered to further reduce emissions, with a menu of potential actions presented in the SLCP Strategy. The SLCP Strategy states, "Early action…can avoid locking-in the use of high-GWP refrigerants in new or retrofitted systems in the coming years. For example, as effective alternatives become available, ARB will consider developing limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment where lower-GWP alternates are feasible and readily available" (page 90). The safety and feasibility of low-GWP refrigerants (e.g., hydrofluoro-olefin blends, ammonia, CO_2) is not fully established for all uses. Other actions include financial incentive programs for low-GWP refrigeration early adoption and a prohibition on sales of very-high GWP refrigerants. California's Significant New Alternatives Policy (SNAP), comprised of the

[68] CARB. 2017. Final Short-Lived Climate Pollutant Reduction Strategy. March. Available at: https://ww2.arb.ca.gov/resources/documents/final-short-lived-climate-pollutant-reduction-strategy-march-2017. Accessed: March 2020.

[69] CARB. 2017. California's 2017 Climate Change Scoping Plan. (page 11). Available at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: March 2020.

[70] The effects of the recent federal actions to roll back vehicle efficiency standards have not yet been quantified.

CARB HFC Regulation and SB 1013, took effect on January 1, 2019, and will require HFC emissions reductions from non-mobile sources.[71] This includes refrigerant prohibitions for new household refrigerators and freezers, retail food refrigeration, cold storage warehouses, foams, and aerosols, among other substances, with effective dates ranging from January 1, 2019, to January 1, 2021.

Conclusion: As discussed in Section 3.1.4, reductions in waste emissions are not geographically specific as it applies to municipal solid waste, and this reduction applies to both new and existing developments. F-gas emissions may vary geographically based on refrigeration and air conditioning requirements. Per the SLCP Strategy, "[e]xisting equipment using high-GWP HFCs has an average lifetime of 15-20 years and can be expected to continue operating and emitting high-GWP HFCs well past 2030" (page 97). Emissions reductions will occur during replacement and maintenance of existing refrigeration equipment or purchase or installation of new equipment, so would apply both to existing and new developments. However, due to the length scale for HFC replacement, emissions reductions would be more heavily weighted toward new developments.

3.1.6 Other Sectors:

Scoping Plan assumptions: The Scoping Plan includes emissions and reduction strategies from several other sectors that include agriculture, industrial, and offroad sources such as landscaping equipment. The natural and working lands sector includes forests, rangelands, farms, wetlands, and soils, and California's climate objective is to maintain these as a net carbon sink. The State continues to develop quantification methodology and implementation scenarios to incorporate into future climate policies that affect natural and working lands. However, the Scoping Plan does not assume any GHG reductions in the natural and working lands sector.[72]

Conclusion: The Scoping Plan includes emissions and reduction strategies from several other sectors that are not generally controlled by the types of developments covered by this report and are not disclosed in a geographically specific manner. However, project proponents should be generally aware of these sectors and not conflict with reduction strategies therein. Projects should comply with federal permitting requirements for high-value sequestering lands such as wetlands and agricultural land.[73],[74]

3.1.7 Cap-and-Trade:

Scoping Plan assumptions: Any 'gap' in reductions to achieve the State's goals that are not explicitly included in other sectors are assumed to be met through Cap-and-Trade.

Conclusion: Cap-and-Trade assumptions are not geographically specific. This is an overarching emissions reduction strategy in the 2017 Scoping Plan that does not apply

[71] CARB. California Significant New Alternatives Policy (SNAP). 2019. Available at: https://ww2.arb.ca.gov/our-work/programs/california-significant-new-alternatives-policy-snap/about. Accessed: March 2020.

[72] CARB. 2017. California's 2017 Climate Change Scoping Plan. (page 82-87 and Table 3). Available at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: March 2020.

[73] USEPA. 2019. Section 404 of the Clean Water Act. Available at: https://www.epa.gov/cwa-404/permit-program-under-cwa-section-404. Accessed: March 2020.

[74] USEPA. 2019. Laws and Regulations that Apply to Your Agricultural Operation by Farm Activity. Available at: https://www.epa.gov/agriculture/laws-and-regulations-apply-your-agricultural-operation-farm-activity. Accessed: March 2020.

specifically to the residential and commercial land use developments, although it could drive energy efficiency and vehicle efficiency as fuel gets more expensive.

3.2 Sacramento County GHG Share

To determine the Sacramento County GHG emissions as a percentage of statewide totals by sector requires assumptions about historical consumption, growth, and future expected emissions reductions. Sacramento County is expected to grow in population and employment at a faster rate than the State, on average, through 2030 and 2050.[75] As a conservative approach to set the Sacramento County maximum allowed emissions, for all emissions sectors of interest other than mobile sources, the proportion of statewide emissions from historical data in Sacramento County is assumed to remain constant in 2030 with no adjustment factor to account for its more rapid growth than the rest of the state. This is conservative, because as the population increases, Sacramento County could otherwise feasibly claim it should be allocated a larger share of total state emissions. As described further below, for the mobile sector, data from CARB's EMFAC2017 program and additional reductions to show consistency with the State target are used to project the County's share of future transportation emissions. While most of the emissions reductions are similar across California, the fraction of each sector represented in Sacramento will be different than in other areas of the state. This will result in a location-specific evaluation. **Appendix A** shows the detailed calculations used to inform the summary statistics presented below.

3.2.1 Building Energy:

Building energy emissions include natural gas combustion, indirect emissions from electricity generation required for both electricity consumption and electricity used to supply, treat, and distribute water and wastewater. Natural gas combustion is included in the 2017 Scoping Plan sector "Residential and Commercial", while electricity is separated into the sector "Electric Power". The percent of statewide emissions is based on historical consumption data for electricity and natural gas for Sacramento County residential and commercial sectors out of State totals.[76,77,78] This data is shown in **Table A-1** for electricity and **Tables A-2** and **A-3** for natural gas**.**

3.2.2 Mobile

As described in Section 1.2, the currently adopted 2016 MTP/SCS provides a roadmap to achieving the SB 375 targets as included in the Scoping Plan's assumptions. For the SACOG region, this includes a 15% reduction in light-duty vehicle GHG emissions per capita from a 2005 baseline by 2035. However, meeting statewide 2030 and 2050 climate goals would require a 16.8% reduction in per capita light-duty VMT or a 14.3% reduction in total per capita VMT from 2015-2018 conditions, based on CARB's January 2019 white paper; this is not directly comparable to the SB 375 reduction target but rather aligns with the SB 743

[75] California Department of Finance (CDOF). 2019. P-1: State Population Projections (2010-2060), Total Population by County. Available at: http://www.dof.ca.gov/Forecasting/Demographics/Projections/ (http://www.dof.ca.gov/Forecasting/Demographics/Projections/documents/P1_County_1yr_interim.xlsx). Accessed: March 2020.

[76] California Energy Commission (CEC). 2016. Electricity Consumption by Entity. Available at: http://www.ecdms.energy.ca.gov/elecbyutil.aspx. Accessed: March 2020.

[77] CEC. 2016. Gas Consumption by County. Available at: https://ecdms.energy.ca.gov/gasbycounty.aspx. Accessed: March 2020.

[78] CEC. 2016 Gas Consumption by Entity. Available at: http://www.ecdms.energy.ca.gov/gasbyutil.aspx. Accessed: March 2020.

15% reduction targets recommended by the Office of Planning and Research (OPR) as described further in Section 4.3. The CARB paper states:

> "An RTP/SCS that meets the applicable SB 375 targets alone will not produce the GHG emissions reductions necessary to meet state climate goals in 2030 nor in 2050… Certain land use development projects located in areas that would produce rates of total VMT per capita that are approximately 14.3 percent lower than existing conditions, or rates of light-duty VMT per capita that are approximately 16.8 percent lower than existing conditions (either lower than the regional average or other appropriate planning context) could be, by virtue of their location and land use context, interpreted to be consistent with the transportation assumptions embedded in the 2017 Scoping Plan and with 2050 State climate goals.".[79]

Two steps are followed to determine the share of statewide emissions corresponding to this sector. First, the projected gasoline and diesel fuel use from on-road mobile vehicles for Sacramento County is calculated using CARB's EMFAC2017 for calendar year 2030. Then, a reduction of 14.3% is taken to show consistency with the State's 2030 GHG target, as described above. **Table A-4** shows how EMFAC2017 fuel uses are converted to GHG emissions.

3.2.3 Waste:

CalRecycle provides historical waste disposal data for each jurisdiction. Sacramento County's share of statewide recycling and waste emissions is based on historical waste disposal data for Sacramento County out of State totals, as shown in **Table A-5**.

3.2.4 High-GWP Gases:

As described in Section 3.1.5, HFCs are the primary high-GWP gases of interest for the residential and commercial sectors. HFCs are expected to comprise 21% of the total high-GWP gas emissions if the State achieves its 2030 target. As shown in the SLCP Strategy, California's 2030 HFC emission sources with existing measures are expected to be comprised of 37% commercial refrigeration, 9% industrial refrigeration, 20% residential refrigeration, 5% residential aerosol use, 17% foam (insulation in products and materials), 10% transportation refrigeration, 1% other aerosols, and 1% solvents and fire suppression. The residential and commercial sectors are assumed to include 78% of HFC emissions based on the categories of commercial, residential and transportation refrigeration; residential aerosols; and a portion of the foam emissions.[80] The percent of statewide emissions in Sacramento County is estimated based on the projected population of Sacramento County out of State totals in 2030. Air conditioning and cooling needs may be higher in Sacramento County than more temperate areas of the state (e.g., San Francisco Bay Area, northern California, Lake Tahoe region), so this is likely underestimating. This calculation is shown in **Table A-6.**

[79] CARB. 2019. California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals. January. Available at: https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate. Accessed: March 2020.

[80] 35% of foam emissions are assumed to be associated with the residential and commercial portions of emissions, based on Table 8 of CARB. 2015. California's High Global Warming Potential Gases Emission Inventory: Methodology and Technical Support Document. Available at: https://ww3.arb.ca.gov/cc/inventory/slcp/doc/hfc_inventory_tsd_20160411.pdf. Accessed: March 2020.

3.2.5 Localized Emissions by Sector

Localized emissions **by sector** consistent with the Scoping Plan using the methodology described above are summarized in Table 1.

Table 1: Localized Greenhouse Gas Emissions by Sector, 2030

Sector	Statewide (MT CO2e) [a]	Sacramento County 2030 Emissions for Residential & Commercial Development Consistent with Scoping Plan [b]	
	Updated Scoping Plan	% of Statewide	Emissions (MT CO_2e)
Agriculture	23,854,810	N/A	N/A
Residential and Commercial Natural Gas Combustion	38,078,729	1.4%	548,714
Electric Power	53,014,776	3.4%	1,817,830
High GWP	10,655,327	0.7%	70,523
Industrial	82,560,459	N/A	N/A
Recycling and Waste	9,167,237	2.1%	195,538
Transportation (Incl. TCU)	103,055,723	3.9%	3,967,853
Total	**320,387,064**	**N/A**	**6,600,457**
% of Total Considered c	55%	N/A	N/A

Notes:

[a] Data from CARB Scoping Plan. Available at:
https://www.arb.ca.gov/cc/scopingplan/comparison_graphs_6cases101817.xlsm
[b] Supporting details are shown in Appendix A, Tables A-1 through A-6.
[c] Calculated based on the residential and commercial proportion assumed for each sector.

Abbreviations:
GWP – global warming potential
MMT CO_2e – million metric tons of carbon dioxide equivalents
N/A – not applicable
TBD – to be determined

4. GHG EMISSIONS BY SECTOR FROM NEW VS EXISTING DEVELOPMENT

The second step in thresholds development uses the Scoping Plan assumptions and emissions by sector derived in Section 3 to determine the GHG targets by sector for new developments in Sacramento County. As detailed below, for the residential and commercial sector, projected emissions from existing development are summarized and subtracted from the sector-specific emissions targets shown in Table 1. Any remaining emissions are allocated to new developments. Consistency between new and existing developments with the electric power and solid waste sector targets are qualitatively achieved through regulatory compliance. Consistency between now and existing development with the mobile targets is achieved through per capita VMT reductions consistent with the directives of SB 743.

4.1 Residential and Commercial

The emissions included in this sector as analyzed in the Scoping Plan are from natural gas combustion for heating, cooking, and other uses within buildings (including natural gas use for fireplaces or hearths). Other emissions sources associated with buildings are included in separate sectors such as Electric Power and Solid Waste. To determine the natural gas target for new developments, projections were used to establish the amount of natural gas emissions from existing commercial and residential buildings. Natural gas-related GHG emissions in new developments would be represented by the difference between projected emissions from natural gas in existing developments and the sector target shown in **Table 1**, as natural gas use in existing development is unlikely to grow as appliances become increasingly efficient.

Data from the Sacramento County Communitywide CAP (SCCCAP) technical memo #1 was used to evaluate the total emissions from residential and commercial buildings and the projected change in emissions from 2015 to 2030 under the business-as-usual scenario. [81] This percent change is assumed to be similar for Unincorporated Sacramento County (as shown in the SCCCAP) and the rest of the County. The percent change is then applied to Countywide historical (2015) natural gas usage data to estimate natural gas use and emissions totals from existing and new developments Countywide in 2030. **Table A-7** shows the methodology and results.

As shown in Table A-7, there is **no** remaining emissions budget for natural gas from new developments; in fact, existing developments will need to reduce their natural gas use to meet the 2030 sector target.[82] This seems reasonable based on increasing energy efficiency for new appliances as they replace existing appliances in existing uses. Based on this analysis, new projects will need to either be electrified, reduce emissions beyond

[81] Available at: http://www.per.saccounty.net/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/2015%20Greenhouse%20Gas%20Emissions%20Inventory%20and%20Forecasts_Rev.pdf. Accessed: March 2020.

[82] In the CARB Scoping Plan, E3 performed stock-based modeling of space heaters and water heaters for residential and commercial buildings that would result in emissions totals that meet the State's 2030 target. In the Scoping Plan scenario, new heating systems were mainly assumed to be natural gas, with the resulting gap in emissions necessary to meet the State target assumed to be reduced through Cap-and-Trade. In the Alternative 1 (no Cap-and-Trade) scenario, E3 assumed nearly 100% of new water and space heaters would be high-efficiency electric heat pumps by 2030. Available at: https://ww3.arb.ca.gov/cc/scopingplan/pathways_stock_charts_101917.xlsm. Accessed: March 2020.

requirements from other sectors, or fund off-site GHG emissions reductions. These options are discussed further in Section 5.

4.2 Electric Power

The emissions included in this sector are indirect GHG emissions that occur when electricity is used, typically from generation from offsite power plant locations. Typical electricity uses are for building energy (air conditioning, lighting, electronic appliances, and equipment, etc.) and electricity used to convey, treat, and distribute water and wastewater.

New developments must comply with more stringent Building Energy Efficiency Standards (Title 24, Part 6) and Green Building Standards (Title 24, Part 11) than evaluated in the Scoping Plan. Further, SB 100 (De León, 2018) requires utilities to achieve 60% renewables by 2030, a more stringent target than contemplated in the Scoping Plan. In addition, new developments must achieve consistency with the latest State and local water conservation requirements. Water reductions reduce the amount of electricity needed to supply, treat, and transport the water and treat the resulting wastewater and therefore also reduce GHG emissions. Therefore, through regulatory compliance, new developments are assumed to achieve their "fair share" of reductions for the electric power sector.

4.3 Mobile

The emissions included in this sector are direct emissions from the combustion of gasoline, diesel, or compressed natural gas fuel. As described in Section 3.2.2, achievement of the currently adopted SCS targets per SB 375 are insufficient to reach the statewide GHG targets for 2030 in the Scoping Plan or longer-term 2045 or 2050 targets. Therefore, additional reductions in per capita VMT are needed. These reductions include both existing and new developments, where new developments should cover their fair share. The metrics described below are designed to show consistency with the State's climate goals while reducing the need for extra traffic modeling and reporting beyond that to be required by SB 743.

OPR's December 2018 Technical Advisory on Evaluating Transportation Impacts in CEQA[83] proposes the following thresholds and references the CARB January 2019 memorandum[84] that confirms these targets are consistent with the 2017 Scoping Plan's 2030 and 2050 trajectories. It also states that "meeting the targets described above (for overall climate change) will require substantial reductions in existing VMT per capita…" In other words, the Technical Advisory acknowledges that people in both new and existing developments will need to reduce single-occupancy vehicle use, but still suggests an additional reduction for new development.

4.3.1 Regional VMT Targets

Projects should use consistency with SB 743 to determine required VMT reductions that show consistency with the GHG targets. As described by OPR, these targets are as follows:

- Residential projects: A proposed project below a level of 15 percent below existing VMT per capita may indicate a less than significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita or as city VMT per capita.

[83] OPR. December 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. Available at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf. Accessed: March 2020.

[84] CARB. 2019. California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals. January. Available at: https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate. Accessed: March 2020.

- Office projects: A proposed project below a level of 15 percent below existing regional VMT per employee may indicate a less than significant transportation impact.
- Retail projects: A net increase in total VMT may indicate a significant transportation impact.

For jurisdictions with SB 743 targets already established, projects that show consistency with those established targets will show consistency with the SMAQMD GHG targets. For jurisdictions without established SB 743 targets, regional targets have been developed using SACOG data for the 2020 MTP/SCS. This data was used to derive historical average Sacramento County regional VMT per resident and VMT per worker (based on 2016 data, which falls within the 2015-2018 data that represents existing conditions in CARB's January 2019 white paper). This VMT per capita is then reduced by 15% to determine targets consistent with the State targets. For Sacramento County, these values are shown below in **Table 2**.

Table 2: VMT per Capita for Sacramento County GHG Targets

Type	2016 VMT per Capita	VMT per Capita to Shown Consistency with Target	
	(miles/capita)[a]	% Reduction	(miles/capita)
Residential	15.9	15%	13.5
Worker	17.2	15%	14.6

Notes:
[a] Data provided by SACOG as used in the 2020 MTP/SCS.

Abbreviations:
MTP/SCS – Metropolitan Transportation Plan/Sustainable Communities Strategy
VMT – vehicle miles traveled N/A – not applicable

4.3.2 Projects with de Minimis Mobile GHG Impacts

Certain projects may be assumed to have a negligible contribution toward total GHG emissions or be consistent with the targets and will not be required to perform a full VMT evaluation. This methodology adopts slight variations on the *de minimis* significance thresholds from the OPR December 2018 Technical Advisory and exempts the following types of projects, provided that project-specific or location-specific information do not indicate that the project will still generate significant levels of VMT as described by OPR.[85]

- Small projects that generate or attract fewer than 110 trips per day
- Residential and office projects in areas with low VMT (currently below threshold VMT) that incorporate similar features (i.e., density, mix of uses, transit accessibility), including affordable housing infill development.

[85] See pages 13 to 15 of OPR. 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. Available at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf. Accessed: March 2020.

- Residential, retail, office, or mixed-use projects within ½ mile walking distance of an existing major transit stop or existing stop along a high quality transit corridor, *unless the primary use of the site is auto-oriented (e.g., car dealership, car wash, gas station)*.

4.4 Solid Waste

The emissions included in this sector as analyzed in the Scoping Plan cover all aspects of solid waste and materials management including reduction/reuse; recycling; remanufacturing of recovered material; composting and in-vessel digestion; biomass management; municipal solid waste transformation; and landfilling. Following legislative and CARB action discussed earlier, CalRecycle is required to adopt regulations to (1) achieve a 75% statewide solid waste recycling rate by 2020; (2) reduce landfilling of organic waste by 50% below 2014 levels by 2020; (3) reduce landfilling of organic waste by 75% below 2014 levels by 2025; and (4) recover at least 20% of edible food destined for organic waste and divert to feed people in need by 2025.[86,87] Existing and new developments must comply with all applicable CalRecycle or other local requirements including those for diversion, recycling, and composting. Therefore, through regulatory compliance, new developments are assumed to achieve their "fair share" of reductions for the solid waste sector.

4.5 High-GWP Gases

The emissions included in this sector as analyzed in the Scoping Plan include HFCs, anthropogenic black carbon, and methane emissions. As described in Section 3.1.5, California's SNAP and other regulations will reduce HFC emissions. However, these regulations are not yet determined to be sufficient to achieve the targets. Through regulatory compliance, new developments are expected to achieve their "fair share" of reductions for the high-GWP sector. However, if low-GWP refrigeration substitutes become available prior to their regulatory requirement, new developments would be expected to use these substitutes to ensure their consistency with the State target.

[86] CARB. 2017. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. November. Available at: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: March 2020.

[87] CalRecycle. 2018. Legislation and Regulations. Available online at: https://www.calrecycle.ca.gov/Laws/. Accessed: March 2020.

5. GHG TARGETS AND BEST MANAGEMENT PRACTICES BY PLACE TYPE

5.1 Best Management Practices

To demonstrate consistency with the GHG targets by sector for new developments described in Section 4, project proponents shall commit to a menu of best management practices (BMPs). Based on the targets derived above, there are two tiers of BMPs: Tier 1: Required for all projects to avoid conflicting with long-term State goals, and Tier 2: Required for projects that do not screen out of further requirements (e.g., large or inefficient projects). Approximate GHG reductions expected due to the BMPs are described in Section 5.5. These BMPs may be revised over time to incorporate regulatory or technological advances.

Tier 1: BMPs Required for all Projects

- BMP 1: No natural gas: Projects shall be designed and constructed without natural gas infrastructure.
- BMP 2: Electric vehicle ready: Projects shall meet the current CalGreen Tier 2 standards, except all EV Capable spaces shall instead by EV Ready. **Appendix B** provides definitions and estimated costs and notes on current and future regulatory requirements.

Alternatives may be proposed that demonstrate the same level of GHG reductions as BMPs 1 and 2. Example alternative reductions are described in Section 5.3. As described in Section 6, at a minimum, for purposes of evaluating consistency with 2045 statewide carbon neutrality, a project would need to mitigate any natural gas emissions and require all pre-wiring necessary so that the building is ready for a future retrofit to all-electric (e.g., such that electric space heating, water heating, drying, and cooking appliances could be installed).

Small, efficient projects may screen out of further requirements. This includes projects that screen out due to OPR's *de minimis* VMT criteria as discussed in Section 4.3, and projects that emit less than 1,100 MT CO_2e/year prior to implementation of BMP 1 and 2.[88] SMAQMD recently reviewed 102 Environmental Impact Reports (EIRs) and Mitigated Negative Declarations (MNDs) in Sacramento County between 2014 and 2018. Of these projects, a screening level of 1,100 MT CO_2e/year would result in 43 projects below the screening level but would still capture over 98% of the total GHG emissions. SMAQMD has prepared an operational screening table of project sizes by land use subtype that are below the 1,100 MT CO_2e/year threshold to assist in these designations.[89] The 1,100 MT threshold was adopted by the Board with substantial evidence and documented through staff reports.[90]

Tier 2: BMP Required for Large or Inefficient Projects

- BMP 3: As described in more detail in Section 4.3.1, residential projects shall achieve a 15% reduction in VMT per resident, and office projects should achieve a 15% reduction in

[88] 1,100 MT CO2e/year is the current SMAQMD de minimis threshold. By complying with BMPs 1,and 2 above (removing natural gas, EV-ready), small projects would reduce emissions to be consistent with State goals.

[89] SMAQMD. 2018. SMAQMD Operational Screening Levels. Available at: http://www.airquality.org/LandUseTransportation/Documents/Ch4+Ch6OperationalScreening4-2018.pdf. Accessed: June 2020.

[90] SMAQMD. 2014. Justification for Greenhouse Gas Emissions Thresholds of Significance. September. Available at: http://www.airquality.org/LandUseTransportation/Documents/GHGThresholdsJustificationSept2014.pdf. Accessed: June 2020.

VMT per worker compared to existing average VMT per capita for the county, or for the city if a more local SB 743 target has been established. Retail projects should achieve no net increase in total VMT, as required to show consistency with SB 743. These reductions can be achieved by many strategies, such as:

- Locate in an area that already has low VMT due to location, transit service, etc.
- Adopt CAPCOA measures
- Adopt measures noted in Sacramento's CAP checklist
- Join a Transportation Management Association
- Incorporate traffic calming measures
- Incorporate pedestrian facilities and connections to public transportation
- Promote electric bicycle or other micro-mobility options

Quantification methodology for these strategies is described in the SMAQMD Recommended Guidance for Land Use Emission Reductions (AQMP) guidance.[91] Projects that are located in areas with existing VMT per capita above the county or city average VMT per capita shall also provide sufficient electrical capacity (e.g., transmission lines and substation sites) such that 100% of project vehicles have the potential to be zero-emission vehicles in future years.[92]

If a project cannot incorporate the required BMPs, other reductions or purchasing and retiring GHG/carbon offsets from a registry approved by the SMAQMD may be required. Carbon offsets are instruments that can be bought, sold, and traded. Like a stock or equity that represents a unit of ownership in a company, a carbon offset represents a unit of greenhouse gas emissions reductions. Each offset is essentially a certification that a certain quantity of greenhouse gas emissions has been avoided, prevented, or sequestered. Offset registries that the SMAQMD may approve have developed a broad consensus around the standards that are necessary to ensure that offsets are environmentally sound, namely, that offsets be real, permanent, quantifiable, verifiable, enforceable, and additional. Approved registries may include but are not limited to any of the following: (i) the Climate Action Reserve, the American Carbon Registry and Verra, which are all approved by CARB; (ii) any entity approved at any time by CARB to act as an "offset project registry" under the state's cap-and-trade program; (iii) other regulatory or voluntary credits that demonstrate, based on substantial evidence, that the offsets are real, permanent, quantifiable, verifiable, enforceable, and additional.

In addition to the BMPs, projects need to show consistency with the 2045 statewide carbon neutrality target, as described further in Section 6.

5.2 Modeling Unmitigated and Mitigated Emissions

Emissions should be quantified for projects that are either required to comply with the Tier 2 BMPs or would not comply with the Tier 1 BMPs (for example, they choose to use natural gas). The California Emissions Estimator Model (CalEEMod®) is typically used to model GHG

[91] SMAQMD. 2020. Recommended Guidance for Land Use Emission Reductions. Available at: http://www.airquality.org/businesses/ceqa-land-use-planning/mitigation. Accessed: June 2020.

[92] Projects in areas with below-average VMT per capita tend to be urban or infill locations with limited parking facilities where additional electrical capacity may be infeasible, but also where public or fast charging are likely to be targeted nearby by programs such as the VW fund.

and criteria air pollutants for project operations for CEQA purposes and has been recommended by SMAQMD in its Recommended Guidance for Land Use Emission Reductions.[93] The most current version of CalEEMod® should be run to calculate operational emissions for the buildout year for the proposed project land use subtypes and climate zone. Most of the inputs and descriptions for modeling emissions will be consistent with the SMAQMD guidance.[94] Differences are described below.

Building Energy:

Natural Gas and Electricity: The unmitigated natural gas use should assume compliance with the most current version of the Title 24, Part 6 Building Energy Efficiency Standards. The mitigated natural gas use should include assumed compliance with BMP-1 and therefore should include no natural gas use (including in the area source – hearths and fireplaces inputs). This will allow a project proponent to accurately assess the emissions reductions necessary if they do not comply with BMP-1.

The CO_2 intensity factor for electricity should be based on consistency with SB 100. To derive this factor, the historical emissions from delivered electricity and the percent of RPS-eligible renewable electricity for the relevant utility (e.g., Sacramento Metropolitan Utility District, SMUD) should be used to calculate the emissions from non-RPS-eligible renewables per megawatt-hour (MWh) delivered. This factor should be assumed to remain constant, and the percent of renewables required by SB 100 should be incorporated for the project buildout year.[95] The year-by-year projections that should be used for projects that receive power from SMUD is shown in **Table A-8.** The unmitigated electricity use should assume compliance with the most current version of the Title 24, Part 6 Building Energy Efficiency Standards. The mitigated electricity use should include any additional electricity needed to replace natural gas.

Energy use conversion from major natural gas appliances to their equivalent electric replacements tends not to be straightforward given that most significant gas appliances (e.g. water heaters, space heaters, ovens and cooktops) have varying input-to-output efficiencies and losses from product to product. Equivalent electric appliances also have differing efficiencies, and usage patterns for these equivalent appliances may differ in some way. However, the increase in electricity use as a result of natural gas to electric switchover can be estimated more easily with the aid of average end use consumption data for equivalent gas and electric appliance types.

Table A-9 shows average energy use rates per dwelling unit or area for major natural gas commercial and residential end uses. Any full or partial reduction in natural gas end uses or appliance types can be estimated by multiplying the percentage of natural gas reduction by the percent of total natural gas consumption for a given gas appliance. That reduction percentage can then be subtracted from an existing total gas consumption rate (e.g. CalEEMod default energy use intensities). The additional electricity use can be estimated by multiplying the electric energy use rate by the number of dwelling units or commercial

[93] SMAQMD. 2020. Recommended Guidance for Land Use Emission Reductions. Available at: http://www.airquality.org/residents/ceqa-land-use-planning/mitigation. Accessed: June 2020.

[94] SMAQMD. 2020. Recommended Guidance for Land Use Emission Reductions. Available at: http://www.airquality.org/residents/ceqa-land-use-planning/mitigation. Accessed: June 2020.

[95] If SMUD fails to achieve its SB 100 targets or shows significant changes in its non-RPS-eligible power generation source types, this table should be updated to reflect more current information.

square footage and adding this to the CalEEMod® default total electricity consumption rate. For example, a single family residence that complies with BMP 1 would remove all natural gas use from the CalEEMod® default ("Title 24" and "Non-Title 24" natural gas categories) and add 4,650 kWh to the electricity total. In contrast, a residence that keeps natural gas cooking would use Table A-9 to show that it should keep 9% of the CalEEMod® default natural gas use and should add (4,650 minus 310 equals 4,340) 4,340 kWh to the electricity total.

For energy consumption estimates not broken down by appliance groups, total natural gas consumption rates per dwelling unit or area are presented for the three most significant gas appliance types, along with total consumption rates for these appliances' electric equivalents. **Appendix C** includes additional supporting documentation used to derive Table A-9.

Water: The unmitigated and mitigated water use rates should use CalEEMod® defaults. As described in Section 3.1.2, projects are assumed to meet a 10% reduction target through regulatory compliance. If a project reduces water use beyond regulatory requirements, this can be included in the mitigated run.

Mobile:

CalEEMod® contains default mobile trip generation rates, lengths, and trip types based on the Institute for Transportation Engineers (ITE) data that generally applies to suburban development nationwide. Adjustments to the defaults can be applied to reduce emissions based on either Project-specific traffic modeling or standard mitigation assumptions related to the land use location, density, mixed-use type, or other metrics that may reduce VMT. In September 2019, SACOG prepared updated default data on trip lengths and trip types based on traffic modeling for each of its counties; if this has not yet been incorporated into CalEEMod® by the time these GHG thresholds are used, users should replace the CalEEMod® defaults with the more current data.

Modeling GHG emissions and VMT to show consistency with the metrics in Section 4.3 likely requires adjustments to typical CalEEMod® emissions modeling. The SB 743 thresholds that will be used for the SMAQMD GHG thresholds apply to trips from light-duty vehicles for residential and office projects only. However, all mobile emissions from all land uses should be disclosed in the GHG section, including those from non-passenger vehicles and for land uses other than residential and office. CalEEMod® defaults should be adjusted to account for Sacramento County-specific VMT and to determine the necessary VMT reduction for the Project. If projects are located in jurisdictions with more local data and methodologies that are SB 743 compliant, that data can be used rather than the Sacramento County-overall data.

A lookup map has been prepared using the SACOG 2020 MTP/SCS data that shows adjustment factors to apply to the CalEEMod® default VMT for relevant land use subtypes in Sacramento County. This map is available at http://sb743-sacog.opendata.arcgis.com/. These adjustment factors are based on the 2016 relative VMT per capita based on the location-specific traffic modeling.

Project proponents should use the (new) defaults from CalEEMod multiplied by the relevant adjustment factor for their unmitigated CalEEMod® emissions modeling. To calculate the adjustment factor, the project proponent should zoom into the proposed project location in the map. The map will contain hexagon-shaped areas with data on VMT per capita for each hexagon ("hex-level VMT per capita"). The project proponent should divide the hex-level

VMT per capita by the Sacramento County VMT per capita to derive the adjustment factor. For example, a project located in a center or corridor community in downtown Sacramento might see its VMT reduced by 60% compared to the countywide average; its adjustment factor to the CalEEMod® defaults trip generation rate would thus be 60%. The mitigated run then needs to demonstrate a 15% VMT reduction below the Sacramento County average resident per capita and worker per capita VMT as shown in Table 2. The example in downtown Sacramento would already be consistent with this reduction requirement. The 15% reduction could be due to project design features or mitigation measures, as described further in Section 5.1, but should not double-count features that are already incorporated in SACOG's default modeling (e.g., mixed-use features for established communities).

For retail uses, there are several alternative means that might be used to demonstrate no net increase in VMT. For chains, loyalty "club" card data for the nearby stores may be used, where available, to determine the origins and distance traveled for store users of that type (e.g., supermarket, hardware store) and similar locations. Another option is to look at the distance from population centroids as compared to competitor distance. A third option is to evaluate the nexus to public transportation as opposed to competitors.

For other land use types, the defaults can be used, and the emissions disclosed.

Note that vehicle emission reductions (e.g., zero emission vehicles) cannot be substituted for VMT reductions; CARB has concluded that VMT reductions are needed in addition to cleaner vehicles and fuels to meet statewide goals.[96]

Waste:

The unmitigated waste disposal rates should use CalEEMod® defaults. As described in Section 4.4, projects are assumed to meet the State targets through regulatory compliance. If a project reduces waste disposal beyond regulatory requirements, this can be included in the mitigated run.

Other Sectors:

The other sectors should use CalEEMod® defaults and project-specific data, where available. If the project reduces emissions beyond regulatory requirements, this can be included in the mitigated run.

5.3 Alternative Greenhouse Gas Reduction Measures

As described in Section 5.1, if applicants cannot or choose not to incorporate the required BMPs, they may propose alternative GHG reduction strategies that achieve equivalent reductions, provided that they are surplus to the reductions needed to achieve the State's targets. This guidance is intended to allow applicants to pursue innovative and cost-effective measures and is not intended to restrict the reduction measures to those described here. However, example strategies include the following, among many others:

- Use natural refrigerants: Projects can participate in SMUD's pilot program to use lower-GWP or natural alternates for refrigeration and air conditioning. Natural refrigerants include ammonia, CO2, or hydrocarbons. To quantify the benefits of this measure, the

[96] CARB. 2017 Scoping Plan, page 75. Available at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed June 2020.

applicant should work with SMUD or CARB tools to calculate high-GWP emissions from traditional refrigerants (as these emissions are not typically included in CEQA emissions inventories and would not be added to the unmitigated emissions totals) and then calculate the reduction due to the lower-GWP refrigerants.

- Increase vegetation sequestration: Projects can increase carbon sequestration in natural and working lands through planting and management techniques. To quantify the benefits of these commitments, the applicant should use calculational methodology such as CARB's approved offsets protocols, California Climate Initiatives (CCI) tools and calculators, and/or CalEEMod®.
- Install electric vehicle charging stations: Projects can install EV charging stations in addition to the electrical infrastructure required by BMP 2. To quantify the benefits of this measure, the applicant should use Project-specific or applicable published literature to calculate the projected amount of charging that will be provided by the chargers, then subtract the indirect emissions from electricity used by the chargers from the gasoline- or diesel-combustion tailpipe emissions that would otherwise be produced by internal combustion-powered vehicles. The applicant should take care not to double-count GHG reductions with reductions already assumed by the State in its base EV projections.
- Solar water heaters and other water heating reductions: Projects can install solar water heaters to replace the need for natural gas or electricity for water heating. Since the unmitigated default to show compliance with BMP 1 is to assume no natural gas, the GHG benefit should be the reduction in electricity that would otherwise be used to heat water.
- Increase water and waste reductions beyond regulatory compliance: As described in Section 5.2, projects can demonstrate GHG reductions beyond defaults based on project-specific studies and initiatives and can quantify these reductions using CalEEMod® methodology.
- Reduce gas- or diesel-powered landscaping equipment use: Project proponents design for reduced landscaping equipment (xeriscaping) or contract with a parks district, city, or homeowners' association to require the use of electric landscaping equipment. To demonstrate GHG reductions would require enforceable mechanisms. For example, the California Electrical Code requires outdoor receptacle outlet(s) to be installed at an accessible level for all new residences[97]; this can enable the use of electric landscaping equipment but does not ensure its use.

5.4 Other Thresholds

As described in Section 1, this report is not intended to replace SMAQMD's existing thresholds or suggested GHG reduction guidance for stationary source emissions or construction emissions. Those thresholds were adopted by the Board with substantial evidence and documented through staff reports.[98]

[97] California Building Standards Commission. 2019 Title 24, Part 3 California Electrical Code, Sections 210.52(E)

[98] SMAQMD. 2014. Justification for Greenhouse Gas Emissions Thresholds of Significance. Available at: http://www.airquality.org/LandUseTransportation/Documents/GHGThresholdsJustificationSept2014.pdf. Accessed: June 2020.

5.5 GHG Reductions from BMPs

The BMPs were developed to show consistency with the State's climate goals as applicable to new developments in Sacramento County, as described in Sections 3 and 4. The BMPs are expected to reduce GHG emissions as follows:

BMP 1: The reduction in natural gas emissions is approximately 257,000 MT, based on the difference between the 2015 natural gas emissions and the 2030 business-as-usual natural gas emissions summarized in Table A-7. As described in Table A-7, the business-as-usual increase in emissions between the 2015 and 2030 inventories would be solely due to population and employment growth, and therefore is the amount reduced if the growth excludes natural gas. This does not include any additional reductions that would result if renovations or building retrofits reduce natural gas use from existing buildings.

BMP 2: Additional EV infrastructure is necessary to achieve the State's EV goals. The California Energy Commission and National Renewable Energy Laboratory project that far more chargers are needed than currently on-track to be installed to meet the State's 2025 targets; even more will be needed to meet targets for 2030 and beyond.[99] In addition, the 2020 SACOG MTP/SCS assumes zero emission vehicle infrastructure higher in the SACOG region than the State's overall projections in order to meet the SCS target reduction.[100] On an operational per-mile basis, EVs will reduce emissions by approximately 89% compared to internal combustion engine vehicles at around 211 grams of CO_2e per mile, based on the electricity grid composition and passenger fleet fuel economy expected in 2030; this is shown in **Table A-10**. In later years, as the grid becomes cleaner, this benefit will increase.

BMP 3: The GHG emissions reduction due to the 15% VMT reduction is projected to be approximately 662,000 MT CO_2e, based on the difference in EMFAC2017 projected fuel use and fuel use to meet the State goals as shown in Table A-4.

[99] National Renewable Energy Laboratory. 2018. California Plug-in Electric Vehicle Infrastructure Projections: 2017-2025. California Energy Commission Publication CEC-60-2018-001. Available at: https://www.nrel.gov/docs/fy18osti/70893.pdf.

[100] SACOG. 2019. Metropolitan Transportation Plan/Sustainable Communities Strategy (page 62). Available online at: https://www.sacog.org/2020-metropolitan-transportation-plansustainable-communities-strategy-update. Accessed: March 2020.

6. LONGER-TERM GHG TARGETS

After 2030, SB 100 (De León, 2018) requires statewide 100% carbon-free electricity by 2045. In addition, Governor Brown's Executive Order B-55-18 (2018) targets all other sectors of the economy (including transportation, building heating and cooling, industry, etc.) by setting a policy goal of statewide carbon neutrality by 2045.

Achieving statewide carbon neutrality will require systemic changes in how energy is produced and consumed through all sectors of the economy. Because the mix of technologies, strategies, and policy choices the state will ultimately choose to implement to achieve the 2045 goal is not readily ascertainable at this time, any accounting of future GHG emissions from an individual development project cannot yet reflect the scope and scale of reductions that may occur as the state transitions toward new regulations designed to achieve the new long-term goals. Furthermore, in absence of a state plan to achieve these long-term goals, it is difficult to identify the "fair share" of reductions to be applied at the local or project level. Therefore, in order to evaluate the significance of a project with buildout beyond 2030, the project would be required to show that the SMAQMD 2030 targets and BMPs are met, and also qualitatively describe consistency with statewide carbon neutrality by 2045.

A number of studies have been conducted to identify pathways to achieving the statewide goal of reducing GHG emissions to 80% below 1990 levels by 2050, which was established in Governor Schwarzenegger's 2005 Executive Order S-3-05 and preceded the 2045 statewide carbon neutrality goal.[101,102,103,104,105,106,107] In general, these studies have similar conclusions: deep cuts in GHG emissions can be achieved with substantial changes in electricity production, transportation fuels, and industrial processes. Meeting the 2050 goal (and by extension, the 2045 goal) would require:

- Electricity production that relies on much more renewable energy, plus other carbon-free sources.
- The reduction in petroleum-based fuels for transportation, including a combination of the electrification of transportation to reduce GHG emissions with increased energy efficiency

[101] Williams et al. 2012. The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity. Available at: https://science.sciencemag.org/content/335/6064/53.full. Accessed: March 2020.

[102] California Council on Science and Technology. 2012. California's Energy Future – Portraits of Energy Systems for Meeting Greenhouse Gas Reduction Targets. Available at: https://ccst.us/reports/californias-energy-future-portraits-of-energy-systems-for-meeting-greenhouse-gas-reduction-requirements/. Accessed: March 2020.

[103] California Department of Transportation. 2016. California Transportation Plan 2040. June. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/finalctp2040-report-webready.pdf. Accessed: March 2020.

[104] E3. 2015. Summary of the California State Agencies PATHWAYS Project: Long-Term GHG Reduction Scenarios. Available at: https://ethree.com/public_projects/energy_principals_study.php. Accessed March 2020.

[105] E3. 2015. Pathways to Deep Decarbonization in the United States. Available at: http://www.arb.ca.gov/research/lectures/speakers/williams/williams.pdf. Accessed: August 2019.

[106] EPRI and NRDC. Environmental Assessment of a full Electric Transportation Portfolio. Volume 2, Greenhouse Gas Emissions. Available at: http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=3002006881. Accessed: March 2020.

[107] CARB. 2017. 2017 Scoping Plan Appendix C: Vibrant Communities and Landscapes and Potential State-Level Strategies to Advance Sustainable, Equitable Communities and Reduce Vehicle Miles of Travel. Available at: https://ww3.arb.ca.gov/cc/scopingplan/2030sp_appc_vmt_final.pdf. Accessed: March 2020.

that comes from electric motors and reduced fossil fuel use due to the decarbonized electricity supply and the use of hydrogen fuels.

- The electrification of industrial process heating that is currently provided by fossil fuels.
- Land use strategies that ensure future growth and development occurs in infill locations or locations with existing infrastructure, minimizes vehicles miles traveled, prioritizes active transportation and transit, and preserves natural and working lands, in addition to landscape-scale forest conservation and soil carbon sequestration.
- Reductions in non-energy, non-CO_2 GHGs including reductions in F-gases; solid waste source reduction, diversion, composting, and recycling; and agricultural policies, such as the reduction of methane emissions from dairy cows and manure.
- The use of technologies that have not yet been established or proven.

Thus at a minimum, for purposes of evaluating consistency with 2045 statewide carbon neutrality, a project would need to eliminate natural gas completely or require all pre-wiring necessary so that the building is ready for a future retrofit to all-electric, and in regions with relatively high VMT per capita (e.g., suburban and greenfield developments) to provide sufficient electrical capacity such that 100% of project vehicles have the potential to be zero-emission vehicles. Additionally, the project would be required to qualitatively show that it is not otherwise impeding the 2045 statewide carbon neutrality goal.

APPENDIX A
TABLES

Table A-1
2018 Sacramento Electric Power Usage Compared to State by Sector
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Utility Type	Utility Name	Commercial Building	Commercial Other	Residential	All Sectors Total	Commerical + Residential Sectors Total
		GWh[1]				
Publicly owned utility	Sacramento Municipal Utility District	4,143	431	4,550	10,315	9,124
Self Generator	Self Generation in the NCNC planning area	160	55	297	580	512
Sacramento County Total		4,303	486	4,847	10,895	9,636
Statewide Total		103,199	15,038	92,640	281,024	210,876
Sacramento Residential and Commercial Percentage of Statewide Total						**3.4%**

Notes:

[1] 2018 electricity consumption by entity for the State of California. Source: California Energy Commission. Available at: http://www.ecdms.energy.ca.gov/elecbyutil.aspx. All sectors total includes all uses, including industry, mining, streetlights, and agriculture.

Abbreviations:

CEQA- California Environmental Quality Act
GWh- Gigawatt hour
NCNC- Northern California Non-California Independent System Operator (ISO)

Table A-2
2018 PG&E Gas Usage Compared to State by Sector
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Utility Type	Utility Name	Commercial Building	Commercial Other	Residential	All Sectors Total	Commerical + Residential Sectors Total
		Millions of Therms[1]				
Investor owned utility	PG&E[2]	899	59	1,833	4,794	2,791
Statewide Total		2,050	169	4,393	12,638	6,612
PG&E Commercial + Residential Usage Percentage of PG&E Total Usage						**58%**

Notes:

[1] 2018 gas consumption by utility for the State of California. Source: California Energy Commission. Available at: https://ecdms.energy.ca.gov/gasbyutil.aspx. All sectors total includes all uses, including industry, mining, streetlights, and agriculture.

[2] PG&E services Sacramento County as well as other regions of California. The purpose of this calculation is to calculate the proportion of natural gas use in the PG&E service area that is used for commercial and residential sectors, as this data is not otherwise available at the County level. This percent is then used to calculate the Sacramento County share of residential and commercial natural gas use in Table A-3.

Abbreviations:

CEQA- California Environmental Quality Act
GWh- Gigawatt hour
PG&E - Pacific Gas and Electric

Table A-3
2018 Sacramento Gas Usage Compared to State
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

County	Sector	Total Usage[1]
		Millions of Therms
Sacramento	Non-Residential	111
Sacramento	Residential	194
Statewide	Non-Residential	8,245
Statewide	Residential	4,393
Sacramento Total		**305**
Statewide Total		**12,333**
Sacramento Percentage of Statewide		**2.5%**
Proportion of Total from Residential and Commercial [2]		58%
Sacramento Residential and Commercial Percentage of Statewide		**1.4%**

Notes:

[1] 2018 gas consumption by county for the State of California. Source: California Energy Commission. Available at: https://ecdms.energy.ca.gov/gasbycounty.aspx

[2] As shown in Table A-2.

Abbreviations:

CEQA- California Environmental Quality Act

Table A-4
Sacramento County Mobile Fuel Use to GHG Emissions
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Variable	Fuel Type	Sacramento County Value	Units
		2030	
EMFAC2017 Projected Fuel Use[1]	GAS	1,179,547	gal/day
	DSL	248,646	
Reduction to Meet State Goals[2]	ALL	14.3%	%
Total Fuel Use to Meet State Goals[1,2]	GAS	1,010,872	gal/day
	DSL	213,089	
Emission Factors[3]	GAS	9.13	kg CO_2/gal
	DSL	10.35	
Annual GHG Emissions[4]	Total	**3,967,853**	MT CO_2/year
Statewide Total Emissions[5]	Total	103,055,723	MT CO_2e/year
Sacramento County Percentage of Statewide	Total	**3.9%**	%
Reduction in GHG Emissions[6]	Total	**662,081**	MT CO_2/year

Notes:

[1] Projected fuel use from CARB EMFAC2017 web database for Sacramento County, calendar year 2030, aggregated models and speeds. Available at: https://www.arb.ca.gov/emfac/2017/. Does not the very small portion of mobile vehicles fueled by natural gas.

[2] This reduction aligns with CARB's reductions in total VMT per capita to meet statewide targets and assumes fuel use is directly proportional to VMT. Source: CARB. 2019. California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals. January. Available at: https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate. Accessed: August 2019.

[3] The conversion factors for gasoline and diesel are 9.13 kg CO2/gal and 10.35 kg CO2/gal, respectively. Source: The Climate Registry, 2018 Default Emission Factor Document. Available at: https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf

[4] Consistent with CARB methodology for the quantification of GHG reduction measures, daily VMT was multiplied by 347 days per year to estimate annual VMT to account for lower VMT during weekends, holidays, and summer periods.

[5] Data from CARB Scoping Plan. Available at: https://www.arb.ca.gov/cc/scopingplan/comparison_graphs_6cases101817.xlsm

[6] This is the approximate reduction compared to the EMFAC2017 Sacramento County projected mobile GHG emissions due to a 14.3% reductions in gasoline and diesel fuel use.

Abbreviations:

CARB - California Air Resources Board
CEQA - California Environmental Quality Act
EMFAC - EMission FACtors Model
gal - gallon
GHG - greenhouse gas emissions
kg - kilogram
MT - metric tonnes

Table A-5
2018 Sacramento Waste Landfilled Compared to State
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

County	Waste Landfilled[1]
	Tons
Sacramento Total	833,340
Statewide Total	39,068,723
Sacramento Percentage of Statewide	**2.1%**

Notes:

[1] 2018 Landfill Tonnage Reports for Sacramento County out of the state. Source: CalRecycle. Available at: https://www2.calrecycle.ca.gov/LandfillTipFees/

Abbreviations:

CEQA- California Environmental Quality Act

Table A-6
Sacramento County Portion of High-GWP Gases Emissions
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Type	Variable	Value
Data from SLCP Strategy	HFC % of Total High-GWP Emissions[1]	21%
	% of HFC Emissions from Residential & Commercial Sector[2]	78%
Population in 2030[3]	Sacramento County	1,758,565
	Statewide	43,631,295
	% of Statewide	4.0%
Sacramento Residential & Commercial Percentage of Statewide		**0.7%**

Notes:

[1] Data from CARB SLCP Strategy, Table 1, 2030 Emissions Reduction Target. Available at: https://ww2.arb.ca.gov/resources/documents/final-short-lived-climate-pollutant-reduction-strategy-march-2017. Accessed: September 2019. Assumes residential and commercial sectors are primarily associated with HFC emissions, not methane or anthropogenic black carbon emissions.

[2] The residential and commercial sectors are assumed to include 78% of HFC emissions based on the categories of commercial refrigeration (37%), residential refrigeration (20%), transportation refrigeration (10%), residential aerosols (5%), and a portion of the foam emissions (6%). 35% of foam emissions are assumed to be associated with the residential and commercial portions of emissions, based on Table 8 of CARB. 2015. California's High Global Warming Potential Gases Emission Inventory: Methodology and Technical Support Document. Available at: https://ww3.arb.ca.gov/cc/inventory/slcp/doc/hfc_inventory_tsd_20160411.pdf. Accessed: September 2019.

[3] Data from CA Department of Finance, Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year Increments. Available at: http://www.dof.ca.gov/Forecasting/Demographics/Projections/documents/P1_County_1yr_interim.xlsx. Accessed: September 2019.

Abbreviations:

CARB - California Air Resources Board

GWP - Global Warming Potential

HFC - hydrofluorocarbon

SLCP - Short-Lived Climate Pollutants

Table A-7
Natural Gas Emissions Budget for New Developments
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Location	Type	Residential & Commercial Natural Gas
Building Energy Emissions from Unincorporated SCCAP BAU	2015 Emissions (MT CO_2e)[1]	685,662
	2030 Emissions (MT CO_2e)[2]	844,454
	Change, 2015-2030	23%
Sacramento County	2015 use (million therms)[3]	163
	2015 Emissions (MT CO_2e)[4]	1,109,800
	2030 BAU Emissions (MT CO_2e)[5]	1,366,818
	2030 Sector Target (MT CO_2e)	548,714
	2030 Remaining for New Development[6]	**0**

Notes:

[1] 2015 emissions from the Sacramento County Communitywide CAP (SCCCAP) technical memo #1, Table 6, for the residential and commercial sectors. 2015 emissions are 33% of the total 2015 emissions from the "Residential Energy" and "Commercial/Industrial Energy" as presented in the SCCCAP. Available at: http://www.per.saccounty.net/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/2015%20Greenhouse%20Gas%20Emissions%20Inventory%20and%20Forecasts_Rev.pdf

[2] Because the SCCCAP Business-as-Usual projection does not incorporate changes in the electricity intensity factor over time, the increase in emissions between the 2015 and 2030 inventories is solely due to population and employment growth. Therefore the same proportion of total emissions (33%) described in footnote #1 is applied to the 2030 BAU "Residential Energy" and "Commercial/Industrial Energy" emissions from the SCCCAP to derive the 2030 emissions from residential and commercial natural gas combustion.

[3] Data from the CEC for 2015 for total natural gas use for Sacramento County, multiplied by 58% to represent residential and commercial sector natural gas use (consistent with Table A2). Available at: https://ecdms.energy.ca.gov/gasbycounty.aspx.

[4] Emissions based on PG&E and Climate Registry Emission Factors for natural gas provided in SCCAP Table 5 and IPCC Fourth Assessment Report Global Warming Potentials.

[5] The percent change is assumed to be similar for Unincorporated Sacramento County (as shown in the SCCCAP) and the rest of the County.

[6] As shown in Table 1, the sector target for Sacramento County Residential and Commercial GHG emissions is lower than the 2030 BAU projection and lower than the 2015 historical emissions. Therefore, there is no emissions budget available for new developments to produce natural gas emissions.

Abbreviations:

BAU - Business as Usual

CEC - California Energy Commission

CEQA - California Environmental Quality Act

CO_2e - carbon dioxide equivalence

IPCC - Intergovernmental Panel on Climate Change

PG&E - Pacific Gas & Electric

SCCAP - Sacramento County Communitywide CAP

Table A-8
Electricity Intensity Projections for SMUD
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Historic Electricty Intensity

Annual Electricity Data	2016[1,2]	2017[1,2]	2018[1,2]	Average[3]	Units
CO_2 Intensity Factor per Total Energy Delivered	493	384	466	448	lbs CO_2/MWh delivered
% of Total Energy From RPS-Eligible Renewables	20%	19%	20%	19.7%	[-]
CO_2 Intensity Factor per Total Non-RPS-Eligible/Non-Renewable Energy[4]	616	474	583	557	lbs CO_2/MWh delivered

Estimated Intensity Factor for Total Energy Delivered

Model Year	RPS %[5]	Projected Electricity Intensity per MWh delivered[6]	
		lbs CO_2/MWh	lbs CO_2e/MWh
2020	**33%**	373	375
2021	35.8%	358	360
2022	38.5%	343	344
2023	41.3%	327	329
2024	**44%**	312	314
2025	47.0%	295	297
2026	**50%**	279	280
2027	**52%**	267	269
2028	54.7%	253	254
2029	57.3%	238	239
2030	**60%**	223	224
2031	62.7%	208	210
2032	65.3%	193	195
2033	68.0%	178	180
2034	70.7%	163	165
2035	73.3%	149	150
2036	76.0%	134	135
2037	78.7%	119	120
2038	81.3%	104	106
2039	84.0%	89	91
2040	86.7%	74	76
2041	89.3%	59	61
2042	92.0%	45	46
2043	94.7%	30	31
2044	97.3%	15	16
2045	**100%**	0	2

Notes:

[1] Total CO_2 intensity factors from The Climate Registry. Available at: https://www.theclimateregistry.org/our-members/cris-public-reports/. Accessed: September, 2019. For 2018, data provided by SMUD.

[2] Percent of total energy from eligible renewables is from the SMUD 2016, 2017, and 2018 Power Content Labels.

[3] This average uses the most recent three years of data.

[4] The emissions metric presented here is calculated based on the total CO_2 intensity factor divided by the percent of energy delivered from non-RPS-eligible or non-renewable sources. The intensity factor for total energy delivered is estimated by multiplying the percentage of energy delivered from non-RPS-eligible or non-renewable energy by the CO_2 emissions per total non-renewable energy metric calculated above. The estimate provided here assumes that renewable energy sources do not result in any CO_2 emissions. If newer information becomes available that results in a substantial change to the long-term assumed CO_2 intensity per non-RPS energy, this table should be updated.

[5] Emission factors presented here are consistent with the requirements of SB 100: 33% RPS by 2020, 44% RPS by 2024, 50% RPS by 2026, 52% RPS by 2027, 60% RPS by 2030, and 100% carbon-free electricity for 2045. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Factors are interpolated for intervening (non-**bolded**) years.

[6] Global Warming Potentials (GWP) are based on the IPCC Fourth Assessment Report. CH_4 and N_2O emission factors are from the eGRID2016 total output emission rates for California, and are conservatively assumed not to change from these estimates. Available at: https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf, Table 3. As more renewable energy is integrated into the electricity grid, these intensity factors will also decrease.

Abbreviations:

CARB - California Air Resources Board
CO_2 - carbon dioxide
GHG - greenhouse gases
RPS - Renewables Portfolio Standard
lbs - pounds
MWh - megawatt-hour
SB - Senate Bill
RPS - Renewable Portfolio Standards
SMUD - Sacramento Metropolitan Utility District
USEPA - US Environmental Protection Agency

Table A-9
Increases in Electricity Use to Replace Natural Gas
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Commercial Energy Use Categories[1]

	Appliance Group	Percent of Total Annual Energy Use
Gas	Water Heaters	31%
	Space Heaters	44%
	Cooking (Oven + Cooktop)	18%
	Total (Water Heater, Space Heater, & Cooking)[2]	93%
Electric	**Appliance Group**	**Energy Use Index (kWh/ksf/year)**
	Water Heaters	341
	Space Heaters	1,037
	Cooking (Oven + Cooktop)	666
	Total (Water Heater, Space Heater, & Cooking)[3,8]	**2,045**

Residential Energy Use Categories[4]

	Appliance Group	Percent of Primary Natural Gas Energy Uses				
		Single Family Units	**Town Homes**	**2-4 Unit Apartments**	**5+ Unit Apartments**	**Mobile homes**
Gas[5]	**Water Heaters**	47%	68%	65%	76%	53%
	Conventional Heat	44%	21%	24%	13%	40%
	Cooking (Oven + Cooktop)	9%	11%	11%	12%	6%
	Total (Water Heater, Conventional Heat, & Cooking)	100%	100%	100%	100%	100%
	Appliance Group	**Energy Use per Dwelling Unit (kWh/DU/year)**				
		Single Family Units	**Town Homes**	**2-4 Unit Apartments**	**5+ Unit Apartments**	**Mobile homes**
Electric	Water Heaters	3,169	2,190	1,301	1,543	2,575
	Conventional Heat	1,171	501	552	570	739
	Cooking (Oven + Cooktop)	310	234	218	165	224
	Solar Water heater (Electric Backup)[6]	1,877	2,075	--	--	--
	Heat Pump	994	320	324	522	504
	Total (Water Heater, Conventional Heat, & Cooking)[7,8]	**4,650**	**2,925**	**2,071**	**2,278**	**3,538**

Notes

1. Commercial energy consumption by end-use is provided from the California Commercial End Use Survey for Sacramento Metropolitan Utility District (SMUD) for All Commercial Gas and Electric fuel types. For projects that do not fit the generic commercial definition, this same methodology and reference can be used by the project applicant to determine the electricity use for more specific building types.

2. This demonstrates that the majority of natural gas use in commercial buildings in the SMUD region (93%) is accounted for by these three appliance groups. Due to differences in efficiency between electric and natural gas appliances, the relative amount of energy used for each appliance group may vary if applied to electricity consumption.

3. For commercial projects that comply with BMP 1, the electricity use rates should be increased by this total per ksf. For projects that do not comply with BMP 1 and instead commit to one or two of the appliance groups to be electric, the electricity use can be increased by just the rate shown for the relevant appliance groups, and the CalEEMod default natural gas use rate can be decreased by the percent of natural gas from the appliance groups shown above.

4. Residential energy consumption data is provided per appliance type by the California Energy Commission (CEC) 2009 Residential Appliance Saturation Study. The CEC began an updated survey in 2019, but results are not yet available as of March, 2020.

Table A-9
Increases in Electricity Use to Replace Natural Gas
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

5. Natural Gas Energy Consumption estimates are presented only for homes with natural gas billing data. Due to variability in saturation rates of other natural gas appliances (e.g., spa heaters, auxiliary heating, gas dryers), these totals are assumed to sum to 100% for use in this methodology. If the applicants only electrify certain appliances and therefore use these percentages to calculate reductions from CalEEMod defaults, this is assumed to be a reasonable representation because the current Title 24 Building Energy Efficiency Standards are expected to reduce natural gas use more than what is reflected in the CalEEMod defaults.

6. Solar Water Heater data should be interpreted with caution given limited data due to low statewide saturation rates of residential solar water heater appliances.

7. For residential projects that comply with BMP 1, the electricity use rates should be increased by this total per DU. For projects that do not comply with BMP 1 and instead commit to one or two of the appliance groups to be electric, the electricity use can be increased by just the rate shown for the relevant appliance groups and the natural gas use can be reduced by the percent of natural gas from the appliance groups shown above. Heat pumps are more efficient than conventional electric heating, so projects that plan to use heat pumps can use the heat pump values instead of the conventional heat values.

8. Space heating and water heating are included in the Title 24 electricity and Title 24 natural gas energy usage categories of CalEEMod, while cooking and appliances are included in the non-title 24 electricity and natural gas energy usage categories.

Abbreviations

DU - Dwelling Unit
kBTU - thousand British Thermal Units
kWh - kilowatt-hour
EF - Energy Factor
ksf - thousand square feet

References

California Commercial End Use Survey, Annual Summary Statistics. Accessed February 2020. Available online at http://capabilities.itron.com/CeusWeb/Chart.aspx

2009. California Energy Commission. California Residential Appliance Saturation Study, Volume 2: Study Results. Accessible online at https://webtools.dnvgl.com/RASS2009/Uploads/2009_RASS_Volume%202_FINAL_101310.pdf

Table A-10
GHG Reductions due to Electric Vehicles
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Estimating GHG Emissions Reduction to Replace Gasoline Vehicle with Electric Vehicle		
SMUD electricity emission factor[1]	0.10	(MT CO_2e/MWh)
Fuel Economy of Electric Vehicle[2]	0.25	(kWh/mile)
Electric Vehicle GHG Emissions[3]	25	(gms/mile)
Gasoline/Diesel CO_2e emission while running[4]	236	(gms/mile)
GHG Emissions Reduction from Additional Electric Vehicles, per mile	211	(gms/mile)
	89%	

Notes:

[1] CO_2e intensity factor for SMUD accounts for the 60% projected RPS for 2030 as shown in Table A-8.

[2] National Renewable Energy Laboratory (NREL), 2018. California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025 (Table C.1). Available at: https://www.nrel.gov/docs/fy18osti/70893.pdf.

[3] Electric vehicle GHG emissions per mile are estimated based on the SMUD electricity emission factor (MT CO_2e/MWh) and the fuel economy of electric vehicles (KWh/mile).

[4] CARB, 2015. EMFAC2017, running and starting exhaust emission rate for CO_2 and CH_4 for light duty gasoline- and diesel-powered vehicles in Sacramento County, aggregated for all models and speeds, averaged over all seasons for 2030. Available at: http://www.arb.ca.gov/emfac/.

Abbreviations:

CARB - California Air Resources Board
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EMFAC - California Air Resources Board Emissions Factor Model
EV - electric vehicle
GHG - greenhouse gases
gms - grams
kWh - kilowatt-hour
MT - metric tonnes
MWh - megawatt-hour
SMUD - Sacramento Metropolitan Utility District

APPENDIX B
EV REGS AND COSTS

Appendix B Table 1. Electric Vehicle Infrastructure Requirements as of September, 2019.

CalGreen Background

-The California Building Energy Efficiency Standards Title 24 Part 11 ("CalGreen" Green Building Code) is a statewide building code with mandatory measures that apply to all new construction and additions or alterations of buildings in the state.

-The first CalGreen code was adopted in 2008, and it is updated approximately every 3 years to incorporate additional feasible measures with input from stakeholders including designers, architects, builders, property owners, businesses, the government and its agencies.

-The CalGreen code contains provisions on planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality.

-The California Building Standards Commission, Department of Housing and Community Development, Divison of the State Architect, all Office of Statewide Health Planning and Development all have specific scopes responsible for code adoption and enforcement.

Electric Vehicle Charging Infrastructure Definitions

CalGreen does not currently require installation of electric vehicle (EV) chargers but does require ***EV Capable spaces*** *as described in the table below, to avoid costly retrofits.*

EV supply equipment (EVSE, "chargers") require a dedicated circuit for each EVSE unit on the electrical panel; sufficient electrical capacity from the utility connection to the electrical panel; and sufficient electrical capacity at the panel. [1]

-EV Capable: "Installation of "raceway" (the enclosed conduit that forms the physical pathway for electrical wiring to protect it from damage) and adequate panel capacity to accommodate future installation of a dedicated branch circuit and charging station(s)."
If 1 space is required:
The raceway shall be capable of accommodating a 208/240-volt dedicated branch circuit, not less than trade size 1", shall originate at a service panel or subpanel serving the area, shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet, box, enclosure, or equivalent. The service panel or subpanel shall have sufficient capacity to accommodate a minimum 40-ampere dedicated branch circuit for the future installation of the EVSE.
If multiple spaces are required:
Plan design shall be based upon 40-ampere minimum branch circuits. Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage. The service panel or subpanel(s) shall have sufficient capacity to accommodate the required number of dedicated branch circuit(s) for the future installation of the EVSE.

-EV Ready: "Installation of dedicated branch circuit(s), circuit breakers, and other electrical components, including a receptacle or blank cover needed to support future installation of one or more charging stations" [2]

-Chargers: The physical device that the EV plugs into, e.g., devices from ChargePoint, AeroVironment, Blink, others.

2019 CalGreen Mandatory Measures (Title 24, Part 11), Effective 1/1/2020

Land Use Type	Requirements for New Construction	Ref
1-2 family dwelling units and townhouses with attached garages	EV Capable for every dwelling unit	3
Multifamily dwelling units with residential parking available	EV Capable for 10% of total parking spaces	4
Hotels and motels	EV Capable, # spaces depending on number of parking spaces: 0-9 spaces: 0 EV spaces 10-25: 1 26-50: 2 51-75: 4 76-100: 5 101-150: 7 151-200: 10 201+: 6 percent of total (rounded up)	5
Nonresidential	EV Capable, # spaces depending on number of parking spaces: 0-9 spaces: 0 EV spaces 10-25: 1 26-50: 2 51-75: 4 76-100: 5 101-150: 7 151-200: 10 201+: 6 percent of total (rounded up)	6

References:

[1] US Department of Energy. https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

[2] California Air Resouces Board. https://arb.ca.gov/cc/greenbuildings/pdf/tcac2018.pdf

[3] 2019 CalGreen. Section 4.106.4.1. https://codes.iccsafe.org/content/chapter/15772

[4] 2019 CalGreen. Section 4.106.4.2. https://codes.iccsafe.org/content/chapter/15772

[5] 2019 CalGreen. Section 4.106.4.3. https://codes.iccsafe.org/content/chapter/15772

[6] 2019 CalGreen. Section 5.106.5.3. https://codes.iccsafe.org/content/chapter/15773

Appendix B Table 2. Potential Upcoming Requirements

CalGreen Proposed and Voluntary Standards

-CalGreen contains voluntary "Tier 1" and "Tier 2" standards that are not mandatory statewide but could be required by a City or County. These are 'reach' standards that can be adopted by local jurisdictions and may be incorporated as mandatory standards in future code cycles.

- Sacramento County does not currently require compliance with the voluntary standards, but the air district (SMAQMD), utility (SMUD), and Sacramento Area Council of Governments (SACOG) recently recommended that Sacramento County should require compliance with Tier 1 or Tier 2 CalGreen standards (see table below).[1]

Electric Vehicle Charging Infrastructure Definitions

CalGreen does not currently require installation of electric vehicle (EV) chargers, but proposed and Tier 1 or Tier 2 measures would require additional EV Capable or EV Ready spaces, as shown below.

EV supply equipment (EVSE, "chargers") require a dedicated circuit for each EVSE unit on the electrical panel; sufficient electrical capacity from the utility connection to the electrical panel; and sufficient electrical capacity at the panel. [2]

-EV Capable: "Installation of "raceway" (the enclosed conduit that forms the physical pathway for electrical wiring to protect it from damage) and adequate panel capacity to accommodate future installation of a dedicated branch circuit and charging station(s)."
If 1 space is required:
The raceway shall be capable of accommodating a 208/240-volt dedicated branch circuit, not less than trade size 1", shall originate at a service panel or subpanel serving the area, shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet, box, enclosure, or equivalent. The service panel or subpanel shall have sufficient capacity to accommodate a minimum 40-ampere dedicated branch circuit for the future installation of the EVSE.
If multiple spaces are required:
Plan design shall be based upon 40-ampere minimum branch circuits. Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage. The service panel or subpanel(s) shall have sufficient capacity to accommodate the required number of dedicated branch circuit(s) for the future installation of the EVSE.[1]

-EV Ready: "Installation of dedicated branch circuit(s), circuit breakers, and other electrical components, including a receptacle or blank cover needed to support future installation of one or more charging stations" [3]

-Chargers: The physical device that the EV plugs into, e.g., devices from ChargePoint, AeroVironment, Blink, others.

Source[a]	Land Use Type	Requirements for New Construction	Ref
2019 CalGreen Voluntary Measures (Tier 1)	1-2 family dwelling units and townhouses with attached garages	EV Ready for every dwelling unit	4
	Multifamily dwelling units	EV Capable for 15% of total parking spaces	4
	Nonresidential, and New hotels and motels	EV Capable, # spaces depending on number of parking spaces: 0-9 spaces: 0 EV spaces 10-25: 2 26-50: 3 51-75: 5 76-100: 7 101-150: 10 151-200: 14 201+: 8 percent of total (rounded up)	4,5
2019 CalGreen Voluntary Measures (Tier 2)	Multifamily dwelling units (any number of units)	EV Capable for 20% of total parking spaces	4
	Nonresidential, and New hotels and motels	EV Capable, # spaces depending on number of parking spaces: 0-9 spaces: 1 EV spaces 10-25: 2 26-50: 4 51-75: 6 76-100: 9 101-150: 12 151-200: 17 201+: 10 percent of total (rounded up)	4,5
City of Sacramento Final EV Strategy (December 2017)	New development projects	"Evaluate options to advance EV charging in new development projects citywide, such as **mandatory standards**, incentives, and educational programs..."	6

Appendix B Table 2. Potential Upcoming Requirements

Source[a]	Land Use Type	Requirements for New Construction	Ref
Sacramento County EV Readiness and Infrastructure Plan (June 2017), Prepared by the air district (SMAQMD), utility (SMUD), and Sacramento Area Council of Governments (SACOG), Clean Cities Coalition, and other contributors	Recommendations for County of Sacramento	"-Adopt Tier 1 or Tier 2 voluntary green building codes to increase the number of EV charging ready parking spaces and parking standards for multifamily and non-residential projects. -Research the cost and policy implications of requiring the installation of EV chargers in new multifamily dwelling units and/or commercial centers adjacent to MF complexes. -Require all new Master Plans and Specific Plans to address and incorporate EV charging infrastructure."	1
Mayor's Commission on Climate Change	Potential Mobility Implementation Tactics for Sacramento Region, July 2019	"-Adopt Tier 2 of the CA Green Building Code for new parking structures/lots to require installation of EV chargers and dedicated EV parking spaces for new non-residential garages, MUDs, hotels. -Extend EV Infrastructure code with Reach Codes such as specific in the Peninsula Reach Code: -MUDs: One EV Ready circuit per dwelling. 25% of spaces to be Level 2 EV Ready, 75% are either Level 1 EV Ready or Level 2 EV Ready with load management -Non-Res: 10% Level 2 EVSE Installed, 10% Level 1 EV Ready with L2 conduit; on-grade parking: 50% Level 2 EV Capable, Panel Capacity, average 2kW/ EV space; underground or deck parking: 100% Level 2 EV Capable; Panel Capacity, average 1kW/ EV space "	7

References:

[0] California Building Standards Commission. http://www.bsc.ca.gov/Rulemaking/adoptcycle/2018TriennialCodeAdoptionCycle/ComMtg1-2019.aspx

[1] Sacramento Area PEV Collective. 2017. Page 26. http://www.cleancitiessacramento.org/uploads/2/7/8/6/27862343/sac_county_ev_inf_planfinal_6-20-17.pdf

[2] US Department of Energy. https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

[3] California Air Resouces Board. https://arb.ca.gov/cc/greenbuildings/pdf/tcac2018.pdf

[4] 2019 CalGreen. Section A4.106.8. https://codes.iccsafe.org/content/chapter/15777

[5] 2016 CalGreen. Section A5.106.5.3. https://codes.iccsafe.org/content/chapter/15778

[6] Section 1.2. https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Electric-Vehicles/EVStrategy_171206_FINAL_DRAFT_CityOfSacramento.pdf?la=en

[7] Mayors' Commission on Climate Change. https://www.lgc.org/wordpress/wp-content/uploads/2019/07/Potential-Mobility-Implementation-Tactics.p

Appendix B Table 3. Estimated Costs for EV Ready and EV Supply Equipment

Type	Stage of Infrastructure [a,b,c]	
	EV Full Wiring ("EV Ready")	EV Supply Equipment ("Chargers") [d]
Single Family Residential	~$250/home [1]	$500-$2,000 per Level 2 charge point (before rebates)
Commercial/Multifamily, Surface Parking	~$760-$830/space [2,3]	
Commercial/Multifamily, Enclosed Garage	~$280/space [2], ~10% of total electrical work cost for large parking lots [3]	

Notes:

[a] -EV Capable: "Installation of "raceway" (the enclosed conduit that forms the physical pathway for electrical wiring to protect it from damage) and adequate panel capacity to accommodate future installation of a dedicated branch circuit and charging station(s)." Required as noted in Table 1, so costs are not shown.
-EV Ready: "Installation of dedicated branch circuit(s), circuit breakers, and other electrical components, including a receptacle or blank cover needed to support future installation of one or more charging stations" [2]
-Chargers: The physical device that the EV plugs into, e.g., devices from ChargePoint, AeroVironment, Blink, others.

[b] EV supply equipment require a dedicated circuit for each EVSE unit on the electrical panel; sufficient electrical capacity from the utility connection to the electrical panel; and sufficient electrical capacity at the panel. [4]

[c] 2019 CalGreen mandatory measures include EV capacity, to avoid more costly retrofitting as EV adoption increases. EV full wiring is still voluntary as of September, 2019. [3]

[d] SMUD has rebates to cover most of the cost of charging equipment in single-family homes, multifamily homes, and workplaces. [5]

References:

[1] http://energy-solution.com/wp-content/uploads/2015/01/Reducing-Barriers-to-Electric-Vehicle-Adoption-through-Building-Codes_EnergySolutions_ACEEE-2012.pdf
[2] https://arb.ca.gov/cc/greenbuildings/pdf/tcac2018.pdf
[3] https://arb.ca.gov/cc/greenbuildings/pdf/tcac2015.pdf
[4] https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf
[5] https://www.smud.org/en/Going-Green/Electric-Vehicles/Business

APPENDIX C
Building Energy

Appendix C-1
Non-Residential Natural Gas Use from Space Heating & Cooling, Water Heating, Cooking
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

End Use[1]	End Use Floor Stock (KSF)	Annual Natural Gas Use (10,000 therms)[1]	Percent of Total NG Use	Energy Use Index (therms/ksf/yr)	Energy Use Index (kBTU/ksf/yr)
Heating	135,072	2,710	44.3%	201	20,059
Cooling	0	0	0.0%	--	--
Water Heating	105,832	1,883	30.8%	178	17,788
Cooking	67,170	1,088	17.8%	162	16,194
Miscellaneous	15,962	165	2.7%	103	10,335
Process	7,948	275	4.5%	346	34,592
Segment Total	227,831	6,121	100.0%	269	26,860
Percent of Annual Natural Gas Use from Heating, Water Heating, and Cooking		93%			

Notes:

1. End use data from California Commercial End Use Survey, with SMUD, all commercial buildings, and natural gas settings.

Abbreviations:

kBTU - thousand British Thermal Units

ksf - thousand square feet

NG - natural gas

yr - year

References:

California Commercial End Use Survey, Annual Summary Statistics. Accessed February 2020. Available online at http://capabilities.itron.com/CeusWeb/Chart.aspx

Appendix C-2

Non-Residential Electric Use from Space Heating & Cooling, Water Heating, Cooking
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

End Use[1]	End Use Floor Stock (KSF)	Annual Electricity Use (GWh)[1]	Percent of Total Elec Use	Energy Use Index (kWh/ksf/yr)
Heating	116,632	121	3%	1,037
Cooling	184,121	546	15%	2,965
Ventilation	188,858	531	14%	2,812
Water Heating	117,243	40	1%	341
Cooking	198,227	132	4%	666
Miscellaneous	214,149	241	6%	1,125
Process	7,283	12	0%	1,648
Segment Total	227,831	3,759	100%	16,499
Percent of Annual Electricity Use from Heating, Water Heating, and Cooking		8%		

Notes:

1. End use data from California Commercial End Use Survey, with SMUD, all commercial buildings, and electricity settings.

Abbreviations:

GWh - gigawatt-hour
ksf - thousand square feet
kWh - kilowatt-hour
yr - year

Reference:

California Commercial End Use Survey, Annual Summary Statistics. Accessed February 2020. Available online at http://capabilities.itron.com/CeusWeb/Chart.aspx

Appendix C-3
Residential Unit Energy Consumption for Natural Gas and Electric End Uses
Greenhouse Gas CEQA Thresholds Update
Sacramento County, California

Natural Gas Energy Consumption per appliance (therms)[1,3]

Appliance Group	Housing Type				
	Single Family Units	Town Homes	2-4 Unit Apartments	5+ Unit Apartments	Mobile Homes
All Household	425	247	232	150	352
Water heater	195	189	186	183	193
Primary Heat	184	59	68	31	146
Range/Oven	36	32	33	28	23
Solar Water heater (Gas backup)[2]	164	133	143	165	147
Auxillary Heat	118	38	61	49	70

Electricity Energy Consumption per appliance (kWh)[1]

Appliance Group	Housing Type				
	Single Family Units	Town Homes	2-4 Unit Apartments	5+ Unit Apartments	Mobile Homes
All Household	7605	4561	3821	3709	5580
Water heater	3,169	2,190	1,301	1,543	2,575
Conventional Heat	1,171	501	552	570	739
Range/Oven	310	234	218	165	224
Solar Water heater (Electric Backup)[2]	1,877	2,075	--	--	--
Heat Pump	994	320	324	522	504
Auxillary Heat	382	86	62	99	342

Notes:

1. Energy Consumption estimates are given per dwelling unit, assuming 1 appliance per dwelling unit. Consumption data from California Residential Appliance Saturation Study.
2. Given the low saturation rate of Solar Water Heaters in residential units, estimates should be interpreted with caution.
3. Natural Gas Energy Consumption estimates are presented only for homes with natural gas billing data.

Abbreviations:

kWh - kilowatt-hour

References:

2009. California Energy Commission. California Residential Appliance Saturation Study, Volume 2: Study Results. Accessible online at https://webtools.dnvgl.com/RASS2009/Uploads/2009_RASS_Volume%202_FINAL_101310.pdf