

Justification for Greenhouse Gas Emissions Thresholds of Significance

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Justification for Greenhouse Gas Emissions Thresholds of Significance

Executive Summary

The Sacramento Metropolitan Air Quality Management District (SMAQMD), along with a committee of air districts in the Sacramento Region¹ recognized the need to establish recommended greenhouse gas (GHG) thresholds. The thresholds provide a uniform scale to measure the significance of land use and stationary source projects under the California Environmental Quality Act (CEQA)² and enable the region to meet the Global Warming Solutions Act (AB32) goal of lowering emissions to 1990 levels by 2020. Air districts already provide recommended thresholds for criteria pollutants.

Staff objectives when developing the GHG thresholds included: ensuring ease of implementation; maximizing the use of adequate, standard analytic tools; and ensuring projects include any mitigation measures necessary to meet AB32 goals.

The thresholds committee utilized guidance from the California Air Pollution Control Officers Association (CAPCOA) to develop threshold concepts. The goal was to develop thresholds that would ensure that 90 percent of the emissions from proposed stationary source and land development projects would be reviewed to assess the need for additional mitigation measures. According to guidance issued by the California Air Pollution Control Officer's Association (CAPCOA), reviewing 90 percent of the proposed projects should be sufficient to meet AB32 goals. In addition, that level permits smaller projects to avoid the cost of additional analysis and potential mitigation obligations. For projects with emissions above the threshold, proponents must incorporate mitigation

¹ Air districts in the region include El Dorado County AQMD, Placer County APCD, Feather River AQMD, Yolo-Solano AQMD and SMAQMD.

² California Public Resources Code, §21000 et. seq.,

measures necessary to meet the AB32 requirements for reducing GHG emissions to 1990 levels by 2020. The thresholds committee has included a construction emissions threshold so GHG emissions from that sector are not overlooked.

Staff recommends that the Board of Directors adopt the following GHG significance thresholds:

- Stationary source projects subject to CEQA – 10,000 direct metric tons of CO₂e³ per year.
- Operational phase of land development projects subject to CEQA – 1,100 metric tons of CO₂e per year.
- Construction phase of projects subject to CEQA – 1,100 metric tons of CO₂e per year.

The Board of Directors is also being asked to find that projects located in a jurisdiction with an adopted climate action plan (CAP) or greenhouse gas reduction plan (GHGRP) that meets the requirements of CEQA Guidelines section 15183.5 (b) may demonstrate consistency with the jurisdiction's CAP or GHGRP in lieu of applying the GHG thresholds. Additionally, a project located in a jurisdiction with its own adopted CEQA GHG thresholds of significance would apply the local jurisdiction threshold rather than the SMAQMD's thresholds.

Background and Purpose

SMAQMD has the primary responsibility for the development, implementation, monitoring, and enforcement of air pollution control strategies, including motor vehicle use reduction measures in Sacramento County.⁴ The SMAQMD represents the citizens of the County, including its cities, in influencing the decisions of other public and private agencies whose actions may have an adverse impact on air quality. Since the region

³ CO₂e stands for carbon dioxide equivalent units.

⁴ California Health and Safety Code, Division 26, Part 3, Chapter 11, Article 2, §40961

does not meet the federal ozone standards and is a severe ozone nonattainment area, our efforts have focused on agency decisions that could impact ozone precursor emissions, including nitrogen oxide, volatile organic compounds, and particulate matter. We have concentrated on transportation and land use projects decisions and CEQA analyses, because motor vehicles account for over 70 percent of the ozone precursor emissions in our jurisdiction. We intend to take a similar, transportation-oriented approach to reducing GHG emissions, because the transportation sector is responsible for almost 36 percent of the GHG inventory in California.⁵ Sacramento County's GHG inventory⁶ identifies on-road transportation contributing 42.4 percent and residential energy use contributing 19.7 percent. By reducing vehicular trips and vehicle miles traveled and recommending energy efficiency measures through our involvement in the planning process, we will reduce both regional ozone levels and global GHG emissions.

This document, *Justification for Greenhouse Gas Emissions Thresholds of Significance*, provides substantial evidence to support the SMAQMD's thresholds of significance for greenhouse gas (GHG) emissions. The thresholds will be recommended for use by lead agencies (including SMAQMD) in Sacramento County when reviewing GHG emissions from development projects under CEQA. The thresholds would not generally apply to lead agencies that have adopted their own thresholds or have an adopted CAP or GHGRP in place.

The California Global Warming Solutions Act (AB32), signed into law in September 2006, required statewide GHG emissions to be reduced to 1990 levels by 2020.⁷ AB32 establishes regulatory, reporting, and market mechanisms to achieve this goal and provides guidance to help attain quantifiable reductions in emissions efficiently, without limiting population and economic growth. Although not currently included in state law,

⁵2012 CA GHG Inventory: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-12_2014-03-24.pdf

⁶ Sacramento County Climate Action Plan, November 9, 2011: http://www.green.saccounty.net/Documents/sac_030843.pdf

⁷ California Health & Safety Code, §§38501-38574-

Executive Order S-3-05⁸ set an ultimate goal for California to reduce GHG emissions to 80 percent below 1990 levels by 2050.

CEQA requires lead agencies to identify potentially significant environmental impacts of projects they intend to carry out or approve, and to mitigate significant effects whenever feasible. Although AB32 did not amend CEQA, it identified the many environmental problems caused by global warming.⁹ Senate Bill 97¹⁰ went a step further by requiring the Governor's Office of Planning and Research to amend the CEQA Guidelines to require that the affects of GHG emissions be analyzed and that feasible mitigation be identified for projects.

The California Air Resources Board (CARB) is primarily responsible for implementing AB32. CARB adopted a Scoping Plan in 2008¹¹ that outlined actions necessary to reduce GHG emissions. The Scoping Plan estimated that California would need to reduce emissions by 29 percent from a "business as usual" (BAU) scenario to attain AB32 goals. "Business as usual" refers to the level of GHG pollutants a project would emit if it was designed according to regulatory requirements in place in 1990.

Numerous aspects of the SMAQMD's work relate to climate change and GHG emissions. Accordingly, the SMAQMD's Board of Directors adopted a Climate Change Protection Program on March 23, 2006, that directed the district to address climate change through outreach and education, data collection and analysis, technical assistance, participation in the Climate Action Registry, review and comment on proposed legislation, and by providing support and leadership for local efforts in Sacramento County and the region to reduce emissions and implement mitigation measures.

⁸ <http://gov38.ca.gov/index.php?/print-version/executive-order/1861/>

⁹ California Health & Safety Code, Section 38501

¹⁰ Senate Bill 97, Dutton, added Sections 21083.05 and 21097 to the California Public Resources Code, August 24, 2007

¹¹ AB32 required CARB to adopt a Scoping Plan to describe the approach California will take to reduce greenhouse gases to achieve the goal of reducing emissions to 1990 levels by 2020: The Scoping Plan can be downloaded at <http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm>.

SMAQMD staff review of land development and transportation projects, and associated CEQA analyses, were immediately impacted by the adoption of AB32 and amendments to CEQA requiring GHG analysis and mitigation.

Although CEQA requires agencies to analyze and mitigate potentially significant project impacts, neither CEQA¹² nor its implementing guidelines¹³ establish specific significance thresholds. The Act and Guidelines do encourage local agencies to adopt significance thresholds¹⁴, which are defined as an identifiable quantitative, qualitative or performance levels established to measure an environmental effect.¹⁵ If a project cannot meet the performance level, agencies may determine that the impact is significant; conversely, if a project can meet the performance level, the agency may determine that the impact is less than significant.

Many local jurisdictions have asked the SMAQMD to establish GHG significance thresholds to assist them in conducting environmental reviews of local projects under CEQA. SMAQMD already provides thresholds of significance for criteria pollutants for similar purposes. The SMAQMD recognizes the importance of and need for GHG thresholds to provide a uniform standard for quantifying the GHG significance. Currently many lead agencies determine GHG significance on a project-by-project basis, which is time consuming and can lead to inconsistencies, especially in relation to global climate change.

Since air districts in the Sacramento region have a similar need to address GHG emissions from land development and stationary source permitting projects through the CEQA process, a regional air district GHG thresholds committee (Thresholds Committee) was formed in November 2009 to research and develop thresholds for both stationary source and land development projects.

¹² California Public Resources Code, Division 13

¹³ California Code of Regulations, Title 14, Chapter 3

¹⁴ California Code of Regulations, Title 14, Chapter 3, Section 15064.7

¹⁵ California Code of Regulations, Title 14, Chapter 3, Section 15064.7

As discussed below, the Thresholds Committee:

- Reviewed existing land use development and stationary source thresholds from the Bay Area, South Coast, San Joaquin Valley and San Luis Obispo air districts.
- Reviewed thresholds used by other non-air-district agencies.
- Determined if existing thresholds around the state could be applied in the Sacramento region.
- Developed thresholds that could be implemented in the Sacramento region.

Review of Existing Air District Thresholds

The committee began by reviewing GHG thresholds adopted or under consideration in other air districts. CEQA allows a lead agency to consider thresholds of significance adopted or recommended by other public agencies or recommended by experts, as long as the decision of the lead agency to adopt the thresholds is supported by substantial evidence.¹⁶

Bay Area AQMD

The Bay Area AQMD developed GHG thresholds based on reductions needed to achieve the AB32 target. The analysis indicated the Bay Area needs to achieve an estimated 29 percent reduction from projected BAU emissions, based on CARB's published GHG inventory at the time.¹⁷ The Bay Area AQMD calculated the expected emission reductions from implementing statewide measures identified in CARB's Scoping Plan¹⁸ and then did a "gap analysis" to determine the remaining emissions reductions land development projects would need to achieve to reach the 29 percent overall reduction goal.

¹⁶ California Health & Safety Code Section 15064.7 (c)

¹⁷ CARB periodically updates its GHG emission inventory, which impacts the estimated reduction level required to achieve the AB32 goal. If state measures achieve higher reduction levels, the need for mitigation from individual projects may decline.

¹⁸ These include AB 1493, the Low Carbon Fuel Standard, Energy Efficiency Standards, the Renewable Portfolio Standard, Heavy/Medium Duty Vehicle Efficiency, Passenger Vehicle Efficiency, and Solar Roof.

The Bay Area reviewed three years of historical permit and emissions data, and set several thresholds, including 1,100 metric tons of CO₂e per year for land development projects, 4.6 metric tons of CO₂e per service population (employees plus residents) per year for general land development projects, and 6.6 metric tons of CO₂e per service population per year for specific plans¹⁹. The Bay Area AQMD reviewed historical land development projects in their region to forecast future land development when creating the thresholds. The agency set the stationary source threshold at 10,000 uncontrolled metric tons of CO₂e per year based on the assumption that this threshold will ensure that 95 percent of GHG emissions will be reviewed to assess the need for additional mitigation.

Construction emissions were not included in the Bay Area AQMD's GHG thresholds development process.

Although adopted in June 2010, the Bay Area AQMD's thresholds were challenged in court and set aside in March 2012 pending review and compliance with CEQA. The case is currently on appeal to the California Supreme Court.^{20,21}

South Coast AQMD

The South Coast AQMD staff also reviewed historical data and recommended several thresholds including:

- 1,400 metric tons of CO₂e per year for commercial projects, 3,500 metric tons of CO₂e per year for residential projects, and 3,000 metric tons of CO₂e per year for mixed use projects; or

¹⁹ The metric of per service population is a demonstration of GHG efficiency for a project, which is measured by taking total GHG emissions from the project and divided the emissions by the total population and number of employees in the project.

²⁰ *BAAQMD CEQA Guidelines, May 2012* accessed on 10/8/13 at http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en

²¹ California Supreme Court Case S213478, <http://www.courts.ca.gov/supremecourt.htm>.

- 3,000 metric tons of CO₂e per year for all projects; or
- 4.6 metric tons of CO₂e per service population per year for all land development projects and 6.6 metric tons of CO₂e per year for specific and general plans.

The mass threshold options were developed on the assumption that this threshold will ensure that 90 percent of GHG emissions will be reviewed to assess the need for additional mitigation. The service population option was consistent with the Bay Area AQMD analysis method. None of these thresholds have been taken to the South Coast Board of Directors for approval.

The South Coast AQMD Board did adopt a mass emission threshold of 10,000 metric tons of CO₂e per year for stationary source projects in December 2008. The intent of the stationary source analysis method was to ensure that 90 percent of GHG emissions from stationary sources will be reviewed to assess the need for additional mitigation.

Although construction emissions were not part of the South Coast's stationary source threshold adoption, preliminary discussions on the land development GHG thresholds included amortizing construction emissions over the life of a project and adding the construction emissions to the operational emissions.

San Joaquin Valley Unified APCD

San Joaquin Valley Unified APCD based its threshold on CARB's 2008 AB32 Scoping Plan, which called for a 29 percent reduction in emissions from a BAU scenario. This approach focused on obtaining emission reductions from all projects subject to CEQA. Land development and stationary source projects that meet Best Performance Standards (BPS)²² for controlling GHG emissions would be deemed to have a less than significant cumulative impact on climate change. The APCD is in the process of developing the BPS for various emission sources, including public review for each BPS.

²² http://www.valleyair.org/Programs/CCAP/bps/Fact_Sheet_Development_Sources.pdf

Construction emissions were not discussed in the San Joaquin Valley Unified APCD's GHG threshold development process.

San Luis Obispo APCD

San Luis Obispo APCD adopted GHG thresholds in 2012. The APCD followed the same development process used by the Bay Area AQMD. The APCD adopted a stationary source threshold of 10,000 metric tons of CO₂e per year and a land use development threshold of 1,150 metric tons of CO₂e per year or an efficiency threshold of 4.9 metric tons of CO₂e per year service population.

Construction GHG emissions from land development projects are calculated, amortized over the life of the project, and added to the operational emissions.

Review of Other Agency Thresholds

Other agencies (County of Sacramento, County of San Diego, and City of Davis, for example) have adopted or are in the process of developing GHG thresholds. Non-air district agencies generally develop thresholds based on local emissions inventory data or only target one segment of the GHG emissions inventory. Consequently it would be difficult to adapt these thresholds to a different geographical area or to all project types and sizes.

Developing Thresholds for the Sacramento Region

Land Use Development Projects

The Threshold Committee determined that none of the existing land use development GHG emissions thresholds adopted in the state could be directly applied in the Sacramento region. The Bay Area, South Coast and San Luis Obispo air districts' thresholds were based on land development trends and emissions inventories within their jurisdictions, while the San Joaquin air district approach would require an

extensive undertaking to develop best performance standards for the Sacramento region. The Threshold Committee considered a per capita methodology, but found that it would not be practical for lead agencies.²³ As a result, the Thresholds Committee took a different approach to develop the following Sacramento region thresholds.

Land Use Threshold Methodology

The Thresholds Committee developed a clear, understandable threshold that will ensure that 90 percent of emissions from projects in the region are reviewed to determine the need for additional mitigation. Projects captured by the threshold would be required to fully analyze emissions and provide feasible mitigation consistent with the AB32 requirement to reduce GHG emissions to 1990 levels by 2020. In the future, SMAQMD staff will have to consider California's ultimate goal to reduce GHG emissions to 80 percent below 1990 levels by 2050 in project analysis and mitigation. Additional information on the 2050 goal and interim milestones is forthcoming from CARB.

AB32 seeks to reduce GHG emissions without limiting the state's population and economic growth. Consequently, the Threshold Committee sought to capture only those projects that are necessary to meet AB32 goals. Ultimately, the 90 percent rate will ensure small projects, which generally have low emission levels, would not be considered significant. These small projects will still be required to reduce their GHG emissions because they must comply with state and local regulations that require energy efficiency and transportation infrastructure improvements.

CAPCOA's white paper, *CEQA & Climate Change*,²⁴ describes one potential method for setting a threshold that would exempt small projects from the requirement to analyze and mitigate GHG emissions. Although based on a small sample size (a set of projects from Los Angeles, Pleasanton, Dublin and Livermore), the white paper suggests that

²³ Details on the Threshold Committee's application of a per capita threshold are included in Appendix C.

²⁴ CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Project Subject to the California Environmental Quality Act, January 2008, CAPCOA. <http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf>.

projects emitting 900 metric tons of CO₂e per year could be an effective benchmark. This level would ensure that 90 percent of GHG emissions are reviewed to assess the need for additional mitigation. The 900 metric tons of CO₂e per year threshold is roughly equivalent to 52 residential dwelling units, a 59,300 square foot office, 28,400 square feet of general retail, or a 12,200 square foot supermarket, according to the analysis.

Using 900 metric tons of CO₂e per year as the threshold, the Threshold Committee analyzed 74 representative projects within our region. Project types included residential, commercial, civic, and mixed-use developments of various sizes. The analysis showed that the 900 metric tons CO₂e per year threshold would ensure that 77 percent of the land use projects in the Sacramento region would be reviewed and analyzed for additional mitigation. The Thresholds Committee estimates that although only 77 percent of the projects would be analyzed when the 900 metric ton threshold is applied, over 95 percent of the emissions from land use projects would be reviewed, which exceeds the 90 percent target.

Threshold Committee members recognized that the 900 metric ton threshold could be viewed as placing development in our region at a disadvantage, since it might appear to be a more stringent standard than the 1,100 metric ton threshold set by the Bay Area AQMD. To determine whether the threshold could be set at 1,100 metric tons while still ensuring adequate reductions, the Threshold Committee analyzed the same 74 representative projects at the 1,100 metric ton level. The analysis showed that if the 1,100 metric tons CO₂e per year threshold is used, 73 percent of the land use projects would be required to analyze and potentially mitigate GHG emissions. This is just 4 percent lower than the 900 metric ton threshold. And the Thresholds Committee estimated that the 1,100 metric ton level would still ensure the review of over 95 percent of the emissions from land development projects. Consequently, we recommend adopting the 1,100 rather than 900 metric tons as the threshold. The project list and analysis is included in Appendix A.

Once a lead agency determines that a project exceeds the 1,100 metric tons CO₂e per year threshold, the project proponent would be required to either mitigate below the 1,100 threshold or show that the project mitigation strategies will reduce emissions consistent with AB32 goals.

To determine the quantity of the emissions reductions necessary to attain AB32 goals, the Threshold Committee relied on the emission reduction targets established under CARB's August 2011 re-adopted Scoping Plan,²⁵ which projected GHG emissions in 2020 under a "business-as-usual" (BAU)^{26,27} scenario, and compared them to levels that will be necessary to reduce emissions to the 1990 levels. CARB calculated that a reduction of 21.7 percent from 2020 BAU emissions is required for California to reach 1990 emissions levels. Thus, a land development project would have to show a 21.7 percent reduction in GHG emissions to demonstrate emission reductions consistent with AB32.

In May 2014, CARB adopted its *First Update to the Climate Change Scoping Plan*. Chapter IV of the updated Scoping Plan includes recalculated 2020 GHG emissions BAU scenario and 1990 GHG emissions levels (which sets the 2020 emissions limit) using the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report global

²⁵ Originally the Scoping Plan called for a 29% reduction in BAU emissions.

²⁶A "business-as-usual" (BAU) scenario does not take into account any reductions from GHG reduction measures included in the Scoping Plan. It is a projection of GHG emissions in the future if one assumes that California does not adopt any measures to reduce GHG emissions. Some agencies proposed using BAU to measure a project's impacts under CEQA, and several entities objected to that approach, because it does not reflect baseline conditions at the time a project is proposed. This Guidance does not contemplate using the BAU to assess impacts. Instead, we are using the BAU approach to assess the level of required mitigation. Under this approach, whatever a project's GHG emissions are when compared to the CEQA baseline, the emissions are adequately mitigated if they meet AB32 reduction objectives. To distinguish this mitigation-based approach, we have called the analysis a "No Action Taken" scenario.

²⁷The Final Supplement to the AB32 Scoping Plan Functional Equivalent Document (FED) (Final Supplement) was prepared on August 19, 2011, to address a California State trial court finding that the original FED prepared for the Scoping Plan was not sufficient for informed decision-making and public review under CEQA. In the Final Supplement, an updated "Proposed Scoping Plan" was developed since the Scoping Plan must be reconsidered by the CARB. The "Proposed Scoping Plan" for reconsideration has a few modifications including a revision to the 2020 BAU forecast. The BAU forecast was adjusted in part to account for the challenging economic conditions in California.

warming potentials. The 2020 limit changed to 431 million metric tons of CO₂e and the 2020 BAU changed to 509 million metric tons of CO₂e. Although the needed reduction to meet 1990 levels in the Updated Scoping Plan is calculated as 15.3 percent, the recommended mitigation level for the thresholds of 21.7 percent is not currently being modified because the modeling tools used for CEQA analysis do not currently use the IPCC's Fourth Assessment Report global warming potentials. SMAQMD staff along with the Thresholds Committee will review the 15.3 percent once the modeling tools are updated.

Projects will be able to demonstrate that they achieve a substantial portion of these reductions by complying with state measures adopted after AB32. To determine whether additional emission reductions would still be required to meet the AB32 goals, the Thresholds Committee enlisted the assistance of ENVIRON International Corporation (ENVIRON), an environmental consulting firm that has prepared GHG emissions analyses for numerous land development projects in California. ENVIRON developed a method to compare GHG emissions for a proposed land development project first under a well-defined no-action-taken scenario (NAT), and then with state regulations and locally mandated mitigation measures. If a project can show a 21.7 percent GHG emissions reduction compared to the NAT scenario, then the project is consistent with AB32. ENVIRON's analysis, which used the California Emissions Estimator Model (CalEEMod),²⁸ is included as Appendix B.

The Thresholds Committee analyzed 21 representative projects from the Sacramento region and compared their emissions to the NAT scenarios to determine if 21.7 percent emissions reduction could be achieved to show AB32 consistency, as described above. Using CalEEMod²⁹, staff modeled project emissions in 2020 with mitigation measures

²⁸ CalEEMod is the modeling tool recommended by air districts for analyzing emissions from land development projects. The model, user's guide and other documentation can be downloaded from www.caleemod.com

²⁹ CalEEMod version 2013.2.2 was used to model NAT scenario emissions. Version 2013.2 was used to model project scenario emissions.

and under the NAT scenario. If a project had no known mitigation measures, the analysis assumed two baseline measures:

- 15 percent higher energy efficiency than Title 24 requirements, and
- low-flow water fixtures.

These baseline measures were chosen since they are money saving features a prospective building owner might find desirable and are therefore likely to be included as part of a project.

The modeling showed that after mitigation measures were considered, ten of the 21 projects did not meet the 21.7 percent reduction target. These projects would be required to achieve on average an additional 4 percent reduction in emissions to meet the 21.7 percent target. The Threshold Committee considered these levels of additional reductions to be reasonable in light of the importance of achieving the AB32 goals. The project list with emissions estimates is included in Appendix A.

Construction Activities

Although construction emissions are generally a smaller portion of the GHG inventory compared to operational emissions (for example, construction emissions are 1,100 metric tons per year for 2 years at the threshold level, while operational emissions are 1,100 metric tons per year for 30 years at the threshold level), CEQA requires agencies to analyze construction emissions and to mitigate the emissions to the extent feasible if the analysis demonstrates that emissions will be significant. There are two types of construction projects: construction of infrastructure projects (i.e., levees, pipelines, roadways) and construction associated with a land use development project.

The Threshold Committee reviewed emissions data for 19 infrastructure projects occurring in Sacramento County over a three year period and compared the projects to the 1,100 metric ton CO₂e per year threshold developed for land development projects to determine if the land development threshold could be applied to infrastructure projects and meet a 90 percent emissions capture rate. Applying the 1,100 metric ton

level for infrastructure projects would have ensured the review of 75 percent of the construction-related emissions. Although this does not meet the 90 percent emissions rate goal, the Threshold Committee recommends using the 1,100 metric ton level as the construction emissions threshold for infrastructure projects to be consistent with the land development threshold. This is based on a recognition that infrastructure projects provide a public benefit. The list of infrastructure projects is included in Appendix A.

The 1,100 metric tons of CO₂e threshold will also be applied to construction GHG emissions associated with land development projects in order to maintain a consistent threshold for GHG emissions.

Currently, there are limited options to mitigate construction GHG emissions on-site. After applying on-site mitigation, a project may consider amortizing the construction emissions over the life of the project and adding the emissions to the operational GHG emissions. The Thresholds Committee will continue to research construction mitigation options.

Analysis and mitigation exemptions

A few project types are exempt from GHG emissions analysis and mitigation. Land development projects that are statutorily or categorically exempt from CEQA requirements are not required to conduct a GHG review or to mitigate GHG emissions³⁰.

The Threshold Committee also recommends exempting projects from the GHG mitigation requirements if the project is consistent with a qualified climate action plan³¹ (CAP) or GHGRP that has been reviewed under CEQA and adopted by an agency after public review³². The CEQA analysis for a project tiering from a CAP must describe in

³⁰ California Code of Regulations, Title 14, section 15260 *et seq.* (Statutory Exemptions) and section 15300 *et seq.* (Categorical Exemptions)

³¹ A Climate Action Plan is a planning/policy document that is used to guide an agency or community in reducing its greenhouse gas emissions over a period of time.

³² California Code of Regulations, Title 14, section 15183.5 (b)

detail the project's consistency with the qualified CAP and identify the specific emission mitigations, policies, or strategies in the CAP that apply to the project. Showing consistency with a CAP is the preferred method for a land development project to comply with CEQA and contribute to GHG reductions.

Stationary Sources

There has been some consistency among California air districts in the development of GHG thresholds of significance for stationary sources. The Bay Area, South Coast and San Luis Obispo air districts adopted a threshold of 10,000 metric tons of CO₂e per year for stationary source permitting. SMAQMD and Threshold Committee members determined that consistency with other air districts was important to address a global problem and provide a level playing field for industry.

The CAPCOA white paper, *CEQA & Climate Change*³³ indicated that stationary source significance thresholds could be developed by establishing a threshold that ensures 90 percent of the GHG emissions from projects are reviewed and assessed to determine whether additional mitigation is necessary. The Bay Area, South Coast and San Luis Obispo air districts utilized a minimum of 90 percent emissions rate to set their stationary source thresholds at 10,000 metric tons of CO₂e per year.

SMAQMD staff reviewed the active stationary source permits in 2011 and the total direct GHG emissions from those permitted sources. Because the SMAQMD jurisdictional area does not have a heavy industrial presence, only about 2 percent of SMAQMD's permitted sources (73 out of 4,211) had annual GHG emissions over 10,000 metric tons. But this 2 percent accounted for 83 percent of the total emissions from all permits. Reviewing 90 percent of the stationary source GHG emissions would require dropping the threshold to 1,933 metric tons per year, a far more stringent threshold than proposed by any other jurisdiction.

³³ CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Project Subject to the California Environmental Quality Act, January 2008, CAPCOA. <http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf>.

Threshold Committee members recognized that proposing a stationary source threshold of 1,933 metric tons could be viewed as placing stationary sources in our region at a disadvantage, since it would be a more stringent standard than the 10,000 metric ton thresholds set by the South Coast, Bay Area and San Luis Obispo air districts.

Considering the 10,000 metric tons threshold would capture 83 percent of the emissions (only 7 percent less than the 90 percent goal) and remain consistent with other air districts in the state, SMAQMD staff recommends selecting 10,000 metric tons as the stationary source threshold. Additionally, 10,000 metric tons is a level imposed on stationary sources requiring the reporting of emissions through CARB's Mandatory GHG Reporting regulation³⁴.

The justification for recommending a stationary source threshold (10,000 metric tons) that is almost ten times higher than the land use development threshold (1,100 metric tons) is threefold.

1. The on-road transportation and residential energy use sectors dominate the Sacramento County GHG inventory, contributing 62 percent. GHG emissions from the industrial sector are not dominant, only a portion of the 18 percent commercial and industrial energy use sector are attributed to permitted stationary sources.³⁵
2. As noted above, it is important economically to have a consistent threshold for stationary sources throughout California.
3. The 10,000 metric ton level is consistent with CARB's mandatory reporting level for stationary sources emitting GHG.

³⁴ California Code of Regulations Title 17, Division 3, Chapter 1, Subchapter 10, Article 2.

³⁵ http://www.green.saccounty.net/Documents/sac_030843.pdf

Sacramento County's 2005 GHG inventory shows 42.4% GHG from on-road, 19.7% from residential energy use = 62%

Public Review Process

The SMAQMD met with local jurisdictions between August and December 2013, and held a public workshop on November 13, 2013, to introduce the GHG thresholds and to request comments. The thresholds were presented to the North State Building Industry Association and the Governor's Office of Planning and Research in February 2014. The SMAQMD met with SMUD staff in March 2014 to respond to SMUD staff's questions regarding the thresholds. In May and June 2014, SMAQMD conducted outreach to local organizations such as the Environmental Council of Sacramento and Association of Environmental Professionals. In August 2014, SMAQMD requested comments on the GHG thresholds concepts revised after the November 2013 workshop.

Recommended Thresholds

SMAQMD and the Threshold Committee members developed thresholds that: (i) can be easily implemented by jurisdictions and project proponents, (ii) use a standard analysis tool, and (iii) are consistent with AB 32 goals. The thresholds are:

Stationary Sources:

Operational impacts: 10,000 direct metric tons of CO₂e per year

Land Development Projects:

Operational project impacts: 1,100 metric tons of CO₂e per year. The 1,100 metric tons of CO₂e per year threshold is roughly equivalent to 54 residential dwelling units, 63,000 square feet of office space, 29,000 square feet of general retail space, or 12,500 square feet of supermarket space.

All Construction Activities: 1,100 metric tons of CO₂e per year.

Any project that exceeds the thresholds would be required to conduct a full GHG analysis and mitigate GHG emissions consistent with the AB32 goal of reducing GHG emissions to 1990 levels by 2020, which the 2011 CARB Scoping Plan estimates will require a 21.7 percent reduction from a no-action-taken scenario. This 21.7 percent reduction target will be adjusted when future CARB Scoping Plans demonstrate an updated level of reductions is necessary to meet the 1990 target. CARB is required to update the Plan every five years, and the updates will undergo a rigorous public process. SMAQMD and Threshold Committee members will actively participate in the update processes. Any changes in the percent reduction needed to achieve the 1990 emissions levels through CARB's update process would apply to the land use threshold mitigation reductions to remain consistent with AB32. The 2014 Updated Scoping Plan indicated an inventory change which included using the IPCC's Fourth Assessment Report global warming potentials. Until the modeling tools used for CEQA analysis are updated to include the Fourth Assessment Report global warming potentials, the 21.7 percent mitigation level won't be modified.

Staff recommends the SMAQMD Board authorize staff to automatically update the land use threshold mitigation reduction percent when the CARB Scoping Plan target reductions change. This is similar to the approach for the criteria pollutant thresholds, which are automatically adjusted by staff when the California Ambient Air Quality Standards are adjusted by CARB. SMAQMD staff will hold a public hearing prior to finalizing a change in the mitigation reduction percent.

GHG Screening: Land development projects that meet the criteria delineated below would not be required to adopt any additional mitigation:

- Land development projects that are statutorily or categorically exempt from CEQA³⁶ would not be subject to the GHG threshold as they are not required to conduct a CEQA review.
- Land development projects that are consistent with a climate action plan (CAP) or greenhouse gas emissions reduction plan (GHGRP) that has been publicly reviewed and adopted would not be subject to the GHG threshold³⁷. The project-level CEQA analysis must document in detail the project's consistency with the qualified CAP.

Conclusion

To assist local jurisdictions and the air districts with AB32 and CEQA compliance, SMAQMD staff and Threshold Committee members undertook a process to develop thresholds of significance for GHG emissions. Threshold Committee members reviewed existing thresholds, compared samples of local projects in the Sacramento region to draft thresholds, and developed recommended GHG thresholds for land use development, stationary source, and construction projects that would ensure review of more than 90 percent of land development project emissions, 83 percent of stationary source project emissions, and 75 percent of infrastructure construction emissions.

As part of this process, SMAQMD staff and Threshold Committee members provided an opportunity for local jurisdictions and the public to review, and comment on, the recommended GHG thresholds. SMAQMD staff requests that the Board of Directors consider the information provided in this *Justification for Greenhouse Gas Emissions Threshold of Significance* document and adopt the recommended thresholds for immediate use by jurisdictions and the SMAQMD when reviewing projects for CEQA compliance.

³⁶ California Code of Regulations, Title 14, Chapter 3, Articles 18 (Statutory Exemptions) and 19 (Categorical Exemptions)

³⁷ California Code of Regulations, Title 14, Chapter 3, Section 15183.5 (b)

Appendix A – Project Lists

Sacramento Region GHG Thresholds Committee – Project List – Land Use Threshold Level, November 2013

Sacramento Region GHG Thresholds Committee – Project List – Comparing 2020 Projects to NAT, November 2013

Sacramento Region GHG Thresholds Committee – Project List – Infrastructure Review, February 2014

Sacramento Region GHG Thresholds Committee - Projects List - Land Use Threshold Level

Project Type ¹	Air District	Project Description	Project Size ²	Total unmitigated emissions ³	Exempt using 1100 MT/year or land use size equivalent? ⁵
RES	FeatherRiver	Whatley	4 du	79.13	yes
RES	Sacramento	Davis Property	17 du		yes
RES	El Dorado	Ridgeview	44 du		yes
RES	Placer	50 lots	50 du	850.04	yes
RES	El Dorado	119 lot subdivision	119 du		no
RES	El Dorado	El Dorado Retirement Residents	130 du	653.33	yes
RES	El Dorado	Promontory	63 du	927.94	yes
RES	FeatherRiver	Jeffrey Catlett Residential	splitting 244 and 121 acre parcels into 7 parcels (21 to 115 acres)		yes
RES	FeatherRiver	Unity Estates and Office Park	52 du age restricted condos, club house, office buildings		no
RES	FeatherRiver	Aurora Street LLC	splitting 85 acres into 9 parcels		yes
RES	Placer	Ranch del Oro	89 du		no
RES	Placer	100 lots	100 du		no
RES	Placer	Rocklin 60	179 du	3,043.14	no
RES	Placer	West Oaks	282 du plus large lot no details yet	7,286.58	no
RES	Sacramento	Barrett Ranch East	126 acres, 98.5 acres low density res., 15.7 acres med density res.		no
RES	Sacramento	Campus Crest Student Housing	224 multi family du, 604 parking spaces	1,858.59	no
RES	Sacramento	Fairway Oaks	100 du, 10 acre park		no
RES	Sacramento	Silverado Village SPA	660 du		no
RES	Sacramento	Sun Grove Tent. Sub. Map (fka Bayless Condos)	162 du, 1 acre park, 19 total acres		no
RES	Sacramento	River Oaks	358 du	4,728.69	no
RES	YoloSolano	Hypo. Residential	325 du	5,234.81	no
MU	Sacramento	The Creamery	217 du, retail, office, industry	4,403.02	no
MU	Sacramento	Arboretum	3,926 du, retail, office, schools	88,207.42	no
MU	Sacramento	Elverta Specific Plan	4,950 du, 43 ksf office, 163 ksf commercial		no
MU	Sacramento	Folsom Blvd Transit Area Plans (TAPs)	Butterfield - 197 acres; Hazel - 36 acres TOD		no
MU	Sacramento	Madeira East (Zehnder Ranch)	875 du, office and multifamily lots		no
MU	Sacramento	Mather Airport Master Plan	2,875 acres, industrial, office, airport		no
MU	Sacramento	Mather Specific Plan Amendment aka Mather Field	1,259 acres, industrial, university, 2530 du		no
MU	Sacramento	Murieta Gardens I and II	95 du, 83 room hotel, 111.2 ksf shopping center		no
MU	Sacramento	NewBridge Specific Plan	1,095 acres, residential and mixed uses		no
MU	Sacramento	North Watt Avenue Corridor Plan	1.17 million sf retail, 714.7 ksf office, 7,200 condo/townhouse		no

Sacramento Region GHG Thresholds Committee - Projects List - Land Use Threshold Level

Project Type¹	Air District	Project Description	Project Size²	Total unmitigated emissions³	Exempt using 1100 MT/year or land use size equivalent?⁵
MU	Sacramento	Southeast Policy Area (formerly Southeast Area Specific Plan and Rezone)	4,850 du, commercial, industrial and office uses		no
MU	Sacramento	Suncreek Specific Plan aka Sunrise Douglas 2	4,697 du, commercial uses		no
MU	FeatherRiver	Nichols Grove Specific Plan	1609 du		no
MU	Placer	Creekview Specific Plan	501 acres, 2,011 sf and mfd, 15.7 acres parks, 7 acre school site, 19.3 acres commercial		no
MU	Placer	Sierra Vista Specific Plan	2,064 acres, 8,679 sf and mfd, 259 acres commercial, 106 acres parks, 56 acres schools		no
MU	Placer	Placer Vineyard Town Center	196 acres, medium and high density residential and commercial mix.	27,194.11	no
MU	Placer	Westpark Phase 4	Modification to specific plan, adding 23 residential units, reducing industrial uses	63,167.02	no
MU	Placer	Fiddymont Ranch Amendment	1,661 du, 586 low, 609 medium and 472 high density units		no
MU	YoloSolano	Landmark Family Project	64 du, 4 ksf retail	896.42	yes
MU	YoloSolano	Brighton Landing	769 du, 650 elementary students, 1200 junior high students, 6 acre park, 25 ksf retail	17,567.81	no
MU	YoloSolano	Cannery	551 du, 171 ksf retail, 650 elementary students	14,070.29	no
MU	YoloSolano	Vanden Meadows	939 du, 650 elementary students, 7.4 acre park	18,448.15	no
MU	Sacramento	Cordova Hills	20,000 du, office, commercial, university	194,321.67	no
COM	Placer	Life Time Fitness	120 ksf fitness, 110 ksf tennis, 58.5 ksf pool deck, 12 ksf child care center	4,793.51	no
COM	Placer	Gen office	20 ksf	264.49	yes
COM	Sacramento	Capital Village & Capital Village Commercial	4.2 ksf restaurant		yes
COM	FeatherRiver	Sutter Lamon Business Center	38.7 ksf	608.61	yes
COM	Placer	Comm commercial	20 ksf rural		yes
COM	Placer	Drug store with drive thru	1.5 ksf	72.05	yes
COM	El Dorado	Latrobe Market	2.4 ksf		yes
COM	El Dorado	GreenValley Convenience Center	8 gas pumps, 1.97 ksf fast food restaurant	1,182.28	no
COM	Placer	Quality restaurant	15 ksf	908.22	yes
COM	Sacramento	CHW med office	65 ksf	1,778.19	no
COM	FeatherRiver	Fres N Easy Walgreens	14.5 ksf pharmacy, 14 ksf supermarket, 2.5 ksf retail	1,964.19	no

Sacramento Region GHG Thresholds Committee - Projects List - Land Use Threshold Level

Project Type ¹	Air District	Project Description	Project Size ²	Total unmitigated emissions ³	Exempt using 1100 MT/year or land use size equivalent? ⁵
COM	FeatherRiver	Yuba Crossing Shopping Center	35.6 ksf retail, 14.6 ksf pharmacy drive thru, 5.6 ksf sit down restaurant, 39.7 ksf light industrial	3,678.57	no
COM	YoloSolano	Comm, mixd use	45.5 ksf	2,394.20	no
COM	Placer	Comm supermkt	50 ksf		no
COM	Sacramento	Walmart (Galt)	133 ksf	4,195.59	no
COM	Sacramento	Cal Waste Recycling Processing Center	97 ksf recycling center	1,207.83	no
COM	Sacramento	CARMAX	59.3 ksf car dealer, 19 acres parking		no
COM	Sacramento	Entertainment Complex	59.8 ksf theater, bowling alley, restaurant	3,070.82	no
COM	Sacramento	Moore Sheldon Center	27.4 ksf commerical, 8 pump gas station, 1.8 ksf office, fast food	3,656.97	no
COM	Sacramento	Simmerhorn Commercial Complex	500 ksf commercial retail		no
COM	Sacramento	Walmart Supercenter (North Highlands)	124 ksf supercenter		no
COM	Placer	Bohemia	155 ksf	8,354.69	no
PUB	Sacramento	C.W. Dillard Elementary renovation	875 students, 12.3 acres	924.92	yes
PUB	Sacramento	Folsom Lake College: Rancho Cordova Center	78 ksf college, 370 parking spaces	1,544.04	no
PUB	YoloSolano	California Charter College	650 student charter school	943.41	yes
PUB	FeatherRiver	Calvary Christian Center	80 ksf church, 16.4 ksf (200 students) elementary school, 612 parking spaces, play fields		no
PUB	El Dorado	Church	4.54 ksf	59.53	yes
PUB	Sacramento	Level II Infill Correctional Facilities Project	792 bed prison, 9861.38 MT CO2e/year (CalEEMod version 2011)	9,861.38	no
PUB	Sacramento	Walker Park	40 acre park	90.10	yes
PUB	Sacramento	Cosumnes Elementary School	76 ksf elementary school, 2.5 acres park	1,259.36	no
			Total projects	74	20
NOTES:					
1 - RES-residential, MU-mixed use, COM-commercial/retail, PUB-public/civic					
2 - du-dwelling unit, ksf-thousand square feet, sf-square feet					
3 - CalEEMod version 2013.2 or newer, except for Level II Infill Correctional Facilities Project (2011), operational year 2020					
5 - 1100 MT/yr equates to 54 sfd, 63 ksf office, 29 ksf retail, 12.5 ksf supermarket - CalEEMod 2013.2.2					

Sacramento Region GHG Thresholds Committee - Projects List - Comparing 2020 Project to NAT

Project Type	Air District	Project Description	Project Size	Total Emissions NAT	Emissions in 2020 without mitigation	% Reduction includes only state measures	project specific % reduction needed to get to 21.7%	Total Emissions 2020 with mitigation	% Reduction includes state measures and project mitigation	Mitigation included
RES	Sacramento	Campus Crest Student Housing	224 mfdu, 604 parking spaces	2,325.06	1,858.59	20.06%	1.64%	1,835.44	21.06%	Title 24 -15%, low flow water fixtures
RES	Sacramento	River Oaks	358 du	5,857.26	4,728.69	19.27%	2.43%	4,572.19	21.94%	Title 24 - 15%, low flow water fixtures, improve ped network on and off-site
MU	Sacramento	The Creamery	217 du, retail, office, industry	5,510.55	4,403.02	20.10%	1.60%	3,385.94	38.56%	Increase density, increase diversity, walkability design, improve destination access, increase transit accessibility, improve ped network on and off site, limit parking supply
MU	Sacramento	Arboretum	3,926 du, retail, office, schools	108,442.38	88,207.42	18.66%	3.04%	76,553.78	29.41%	Increase diversity, improve ped network onsite, traffic calming, expand transit network, transit subsidy, rideshare, title 24 - 5%, low flow fixtures
MU	YoloSolano	Brighton Landing	769 du, 650 elementary students, 1200 junior high students, 6 acre park, 25 ksf retail	20,090.14	17,567.81	12.56%	9.14%	15,743.55	21.64%	Increase diversity, improve ped network on and off site, Title 24 - 15%, low flow water fixtures
MU	YoloSolano	Cannery	551 du, 171 ksf retail, 650 elementary students	17,940.95	14,070.29	21.57%	0.13%	12,865.07	28.29%	improve destination accessibility, increase transit accessibility, improve ped network onsite, solid waste recycling 10%
MU	YoloSolano	Vanden Meadows	939 du, 650 elementary students, 7.4 acre park	20,750.12	18,448.15	11.09%	10.61%	17,814.40	14.15%	Title 24 - 15%, low flow fixtures, solid waste recycling 5%
MU	Sacramento	Cordova Hills	20,000 du, office, commercial, university	244,592.43	194,321.67	20.55%	1.15%	160,344.29	34.44%	Increase density, increase diversity, improve destination access, increase transit accessibility, improve ped network on site, traffic calming, new expanded transit, increase transit frequency, TMA, Title 24 - 20%, On-site renewable - 20%, energy efficient appliances (fans and dishwashers)
COM	Sacramento	CHW med office	65,000 sq ft	2,166.40	1,778.19	17.92%	3.78%	1,609.09	25.73%	improve diversity, improve ped network on and off-site, improve transit accessibility, improve destination to downtown, TMA 100% voluntary, Title 24 - 15%, low flow bathroom faucet and toilet
COM	FeatherRiver	Fresn N Easy Walgreens	14.5 ksf pharmacy, 14 ksf supermarket, 2.5 ksf retail	2,400.48	1,964.19	18.18%	3.52%	1,952.80	18.65%	Improve diversity, improve ped network on and off-site
COM	FeatherRiver	Yuba Crossing Shopping Center	35.6 ksf retail, 14.6 ksf pharmacy drive thru, 5.6 ksf sit down restaurant, 39.7 ksf light industrial	3,803.77	3,678.57	3.29%	18.41%	3,645.46	4.16%	Title 24 - 15%, low flow water fixtures
COM	Placer	Comm supermkt	50,000 sq ft	4,479.74	3,686.99	17.70%	4.00%	3,520.43	21.41%	Title 24 - 15%, low flow water fixtures, solid waste recycling 50%
COM	Sacramento	Walmart (Galt)	133,000 sq ft	5,323.36	4,195.59	21.19%	0.51%	3,803.74	28.55%	Title 24 - 15%, low flow water fixtures, improve ped network on and off-site, improve diversity, increase transit accessibility, traffic calming 75%, high efficiency lighting 25%
COM	Sacramento	Cal Waste Recycling Processing Center	97 ksf recycling center	1,444.93	1,253.66	13.24%	8.46%	1,207.83	16.41%	Title 24 - 15%, low flow water fixtures
COM	Sacramento	Entertainment Complex	59.8 ksf theater, bowling alley, restaurant	3,885.78	3,070.82	20.97%	0.73%	3,023.13	22.20%	Increase diversity, improve ped network onsite and offsite, Title 24 - 15%
COM	Sacramento	Moore Sheldon Center	27.4 ksf commerical, 8 pump gas station	4,728.21	3,656.97	22.66%	-0.96%	3,443.53	27.17%	Title 24 - 15%, low flow water fixtures, improve ped network on and off-site, improve diversity, low flow water fixtures
COM	Placer	Bohemia	155 ksf commercial, 18 pump gas station	10,482.41	8,354.69	20.30%	1.40%	7,581.34	27.68%	Increase density of jobs/job acre, improve ped network, traffic calming, limit parking, title 24 - 20%, Efficient lighting 20%, water efficient irrigation, solid waste recycling 50%
PUB	Sacramento	C.W. Dillard Elementary renovation	875 students, 12.3 acres	1,148.89	924.92	19.49%	2.21%	908.08	20.96%	Title 24 - 15%, low flow water fixtures
PUB	Sacramento	Folsom Lake College: Rancho Cordova Center	78 ksf college, 370 parking spaces	1,946.77	1,544.04	20.69%	1.01%	1,513.17	22.27%	Title 24 -15%, low flow water fixtures
				21		20	3.84%		10	

total projects

failed with no mitigation

-0.96%

failed with mitigation, additional mitigation needed

18.41%

Sacramento Region GHG Thresholds Committee - Project List - Infrastructure Review

Project Name	Average tons/year GHG construction emissions
Twin Cities Road Widening	26
American River Common Features WRDA 96 Remaining Sites Phase 2A, Sites R8, L8	107
Folsom Blvd Widening and Ramona Avenue Extension	237
South Sacramento County Streams Project Design Refinements	334
Twin Cities Road/Hwy 99 Interchange Improvements	356
Folsom Dam and Reservoir Raw Water Pipeline Bypass	420
American River Common Features Lower American River Features Natomas East Main Drain Canal	429
American River Watershed Common Features Project WRDA 96 Remaining Sites Phase 1: R1, R5, R6 and L12	488
American River Common Features WRDA 96 Remaining Sites Site R10	488
CSA T-Main and Florin Road Sewer Pipeline	512
Sacramento River Bank Protection Project 25 Erosion Sites 2009 and 2010	628
American River Common Features Lower American River Features Jacob Lane A, B and C	720
PG&E DFM Pipeline	894
American River Common Features WRDA 96 Remaining Sites L7, L10, R3A and R7	902
White Rock Road Widening, Improvements and Safety	977
State Route 99 Elverta Road Interchange	1,191
I-5 HOV Lanes Project	1,349
Folsom Dam Safety and Flood Damage Reduction Project (Joint Federal Project) (phase V)	6,530
Natomas Levee Improvement Program- Landside (4b)	13,700

Total projects	19
Total Emissions	30,288
90% capture of emissions	27,259
Total emissions captured with 1,100 MT threshold	22,481
% capture using 1,100 MT threshold	74%

Appendix B – ENVIRON Quantification Documents

Quantification of Greenhouse Gas Emissions for Non-Transportation Analysis, ENVIRON International Corporation, November 2013

Quantification of Greenhouse Gas Emissions for Transportation Analysis, ENVIRON International Corporation, November 2013



Quantification of Greenhouse Gas Emissions for Non- Transportation Activities

Prepared for:
Sacramento Metropolitan Air Quality Management District
Sacramento, California

Prepared by:
ENVIRON International Corporation
San Francisco, California

Date:
November 2013

Project Number:
03-30404B



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Table

Table 1:	Non-Transportation Quantification Methods: Project vs. NAT Sacramento Metropolitan Air Quality Management District
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1 Introduction

The California Environmental Quality Act (CEQA) requires a comparison of a project's impact to a baseline to determine significance of greenhouse gas impacts.¹ For greenhouse gas (GHG) emissions, the Sacramento Metropolitan Air Quality Management District (SMAQMD) interprets the threshold of significance to mean consistency with AB 32, the California Global Warming Solutions Act of 2006, which requires a statewide reduction of GHG emissions to 1990 levels by 2020. The California Air Resources Board's (ARB) Scoping Plan is a roadmap that describes California's plan for achieving the AB 32 goal. The Scoping Plan compares a projection of GHG emissions in 2020 under a "business-as-usual" (BAU)^{2,3} scenario to the emissions goal of AB 32 for 2020. The analysis shows that a reduction in 21.7% from the state's projected BAU emissions in 2020 is required to reach 1990 emissions levels.

A project's consistency with AB 32 can be determined by comparing its emissions under a "No Action Taken" (NAT) scenario to the project scenario. A NAT scenario would be consistent with the AB 32 Scoping Plan's assumptions for BAU in 2020. A reduction in 21.7% or more from the NAT scenario would demonstrate consistency with AB 32.

The California Emissions Estimator Model (CalEEMod) was developed by ENVIRON International Corporation (ENVIRON) in collaboration with the South Coast Air Quality Management District (SCAQMD) for use in developing emission inventories suitable for CEQA analysis.⁴ The model is publically available and employs widely accepted calculation methodologies for emission estimates combined with appropriate default data if site-specific information is not available. As the model is in wide use for developing emission inventories for land use projects under CEQA, there is a need to develop unambiguous methods to determine both NAT and project scenario emissions for determining consistency with AB 32 goals. This document provides specific instructions for project proponents on how to use CalEEMod to estimate both project and NAT emission scenarios. For the NAT scenario, CalEEMod should be set to a 2020 operational year with adjustments to reflect NAT for energy usage. For the

¹ CEQA Guidelines, Section 15064.4(b)(1): A lead agency should consider "the extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting."

² A "business-as-usual" (BAU) scenario does not take into account any reductions from GHG reduction measures included in the Scoping Plan. It, in effect, is a projection of GHG emissions in the future if we assume that California proceeds as business-as-usual without taking any measures to reduce GHG emissions pursuant to AB 32 mandates. While the term "BAU" is used in the Scoping Plan, we use the term "No Action Taken" (NAT) to mean the same thing.

³ The Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED) (Final Supplement) was prepared on August 19, 2011 to address a California State trial court finding that the original FED prepared for the Scoping Plan was not sufficient for informed decision-making and public review under CEQA. In the Final Supplement, an updated "Proposed Scoping Plan" is developed since the Scoping Plan must be reconsidered by the Air Resource Board. The "Proposed Scoping Plan" for reconsideration has a few modifications including two measures that are excluded (related to refrigerants and high global warming potential gases) and a revision to the 2020 BAU forecast.

An updated 2020 BAU forecast can be found in the Status of Scoping Plan Recommended Measures, ARB, 2011. http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf (Accessed October 29, 2013). The 21.7% reduction does not account for the Pavely vehicle emission standards or the Renewables Portfolio Standard in the baseline.

⁴ The CalEEMod model, User Guide, and supporting technical appendices are available at: www.caleemod.com

Project scenario, CalEEMod should be set to a 2020 operational year with adjustments to reflect project specific data and mitigation. Projects with the first operational year beyond 2020 may also consider providing a model run for that operational year for full CEQA disclosure.

Quantification methods are provided for the following four categories:

- Energy (electricity and natural gas)
- Water
- Solid Waste
- Vegetation

Transportation-related emissions are addressed in a separate document.

Each section below provides a description for how to estimate emissions in both NAT and Project scenarios. A summary of these descriptions is shown in Table 1. For proper CEQA documentation, any changes from default CalEEMod settings require a description in the Remarks field to explain the change.

2 Energy

There are two types of GHG emissions associated with energy use: indirect emissions resulting from electricity usage and direct emissions resulting from the combustion of natural gas. CalEEMod estimates both default electricity and natural gas usage based on California-specific surveys of energy usage by land use type. Emission factors for electricity are based on Power Utility Protocol reports submitted to the California Climate Action Registry (CCAR) with the most recent years around 2006-2008 or from the Local Government Operations Protocol.⁵ Natural gas emission factors are from CCAR.⁶ The calculation of NAT and Project scenarios is described below.

2.1 “No Action Taken”

One adjustment needs to be made for this category. The default energy usage quantities take into account the 2008 Title 24 energy standards. The 2005 Title 24 standards were in effect when ARB developed its Scoping Plan 2020 No Action Taken predictions. Thus, in CalEEMod, the “Using Historical Data” option must be selected to remove any adjustments made for 2008 Title 24 standards.

2.2 Project

The user has several options in CalEEMod to properly account for project emissions associated with energy usage:

- Energy Intensity - Default energy intensity values by land use type are based on California average data. If project-specific energy intensity values are available, the project proponent can enter them into CalEEMod.
- Renewables Portfolio Standard (RPS) – Senate Bill 2 (SBX1 2) increased California's RPS such that 33% of California's retail electric load must be met with renewable resources by the year 2020.⁷ SBX1 2 also contains a milestone benchmark at 2016 for 25% RPS. The electricity emission factor should be adjusted to reflect the required percentage at the first year of operation of the development. In order to do this, the project proponent must determine the percent from renewables the default electricity emission factor represents.⁸ The emission factor should then be decreased accordingly to the required RPS percent for the first year of operation.

⁵ California Air Resources Board, California Climate Action Registry, ICLEI (Local Governments for Sustainability), and The Climate Registry. Local Government Operations Protocol: For the Quantification and Reporting of Greenhouse Gas Emissions Inventories. Version 1.1. May. Table G.6. Available at: <http://www.theclimateregistry.org/downloads/2010/05/2010-05-06-LGO-1.1.pdf> (Accessed October 2, 2012)

⁶ California Climate Action Registry (CCAR) General Reporting Protocol (GRP), Version 3.1 (January) Chapter 8. Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf (Accessed October 2, 2012).

⁷ Senate Bill 2. (2011)

⁸ This can be found in the Power Utility Protocol (PUP) report from the California Climate Action Registry (CCAR). Renewable energy is the sum of biogenic, geothermal, other renewable generation, and zero emission generation energy (in megawatt-hours). The renewable energy is then divided by the total energy delivery to get the percent from renewables.

For example:

The carbon dioxide (CO₂) electricity emission factor for Pacific Gas and Electric, 641.35 pounds per megawatt-hour (lbs/MW-hr), corresponds to the year 2008 when the utility obtained 12% of energy from renewables.⁹ To estimate the CO₂ electricity emission factor for an operational year of 2020 (which has a 33% RPS), the calculation would be as follows:

$$\begin{aligned} EF_{CO_2,2020} &= EF_{CO_2,2008} \times (1 - \text{Renewables}\%_{2020}) / (1 - \text{Renewables}\%_{2008}) \\ &= (641.35 \text{ lb/MW-hr}) \times (1 - 33\%) / (1 - 12\%) \\ &= 488 \text{ lb/Mw-hr} \end{aligned}$$

Where:

$EF_{CO_2,2020}$	= carbon dioxide emission factor in 2020
$EF_{CO_2,2008}$	= carbon dioxide emission factor in 2008
$\text{Renewables}\%_{2020}$	= percent renewables requirement in 2020
$\text{Renewables}\%_{2008}$	= percent renewables achieved in 2008

- Title 24 Building Codes – CalEEMod implements 2008 Title 24 standards, which are already an update to the Scoping Plan 2020 NAT predictions. If the project proponent commits to exceeding Title 24 standards by a percentage, then it can be entered into CalEEMod.
- High Efficiency Lighting – If the project proponent commits to including high efficiency lighting, then the percentage reduction in lighting energy can be entered into CalEEMod.
- Alternative Energy – If the project proponent commits to generating electricity through on-site renewable sources, then either the quantity of electricity generated (in kilowatt-hours) or the percentage of total electricity use generated by renewables can be entered into CalEEMod.
- Energy Efficient Appliances – If the project proponent commits to installing energy efficient appliances, then the land use subtypes that use each appliance type can be entered into CalEEMod. The default percentage improvement values are typical values based on the 2008 Energy Star Annual Report. These improvement values may be modified if available data supports such percentage improvement levels.

⁹ California Climate Action Registry Reporting Online Tool, PG&E's Power/Utility Protocol (PUP) Reports. 2008. Available at: <http://www.climateregistry.org/tools/carrot/carrot-public-reports.html> (Accessed October 8, 2012)

3 Water

CalEEMod calculates GHG emissions associated with supplying and treating the water and wastewater. Default values for indoor and outdoor water usage by land use type are based on a number of California-specific studies.¹⁰ Electricity intensity values (kilowatt-hours/gallon water) for the supply and treatment of water and wastewater are based on a California Energy Commission (CEC) study.¹¹ Direct emissions from wastewater treatment are based on the type of the treatment system used (i.e., septic tanks, aerobic, anaerobic with facultative lagoons, anaerobic digester with combustion of digester gas, and anaerobic digestion with cogeneration from combustion of digester gas.) The default distribution of wastewater treatment type for all locations, except for Santa Barbara Air Pollution Control District (APCD) and Tehama County APCD, is based on a California average in GHG inventories developed by ARB.

3.1 “No Action Taken”

No adjustments need to be made for a NAT scenario since default settings are consistent with the AB 32 Scoping Plan.

3.2 Project

Features that are specific to the project can be incorporated into the CalEEMod calculations:

- Water Use - Default water usage values by land use type are based on California average data. If project-specific water usage values are available, the project proponent can enter them into CalEEMod.
- Electricity Intensity Factors– The current electricity intensity factors are based on Northern and Southern California averages for the supply, treatment, distribution, and wastewater treatment of water. While not anticipated, if location specific information is available on any electricity intensity factor, then it can be entered into CalEEMod.
- Types of Wastewater Treatment –The types of wastewater treatment available are as follows:
 - septic tanks
 - aerobic, anaerobic with facultative lagoons
 - anaerobic digester with combustion of digester gas, and
 - anaerobic digestion with cogeneration from combustion of digester gas

¹⁰ Gleick, P.H.; Haasz, D.; Henges-Jeck, C.; Srinivasan, V.; Cushing, K.K.; Mann, A. 2003. Waste Not, Want Not: The Potential for Urban Water Conservation in California. Published by the Pacific Institute for Studies in Development, Environment, and Security. Full report available online at: http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf. Appendices available online at: http://www.pacinst.org/reports/urban_usage/appendices.htm (Accessed October 2, 2012)

Dziegielewski, B.; Kiefer, J.C.; Optiz, E.M.; Porter, G.A.; Lantz, G.L.; DeOreo, W.B.; Mayer, P.W.; Nelson, J.O. 2000. Commercial and Institutional End Uses of Water. Published by the American Water Works Association Research Foundation.

¹¹ CEC. 2006. Refining Estimates of Water-Related Energy Use in California. Available at: http://www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html (Accessed October 2, 2012)

If the specific distribution of wastewater treatment from the project is known, it can be modified from the default distribution.

- Water Conservation Strategy – If a commitment to reduce indoor and/or outdoor water use is made, then the project proponent can enter the percent reduction in CalEEMod.
- Use of Reclaimed Water or Grey Water- If a commitment to use reclaimed water or grey water is made, then the project proponent can enter in the percentage of indoor and/or outdoor water use that will be replaced in CalEEMod.
- Low-Flow Fixtures – The project proponent can specify installation of low-flow bathroom faucets, kitchen faucets, toilets, and showers in CalEEMod. The default reduction percentages are based on the mandatory requirements under the 2010 California Green Building Standards Code.¹² If a project proponent can commit to higher reduction in flow, then these reduction percentages can be entered into CalEEMod.
- Turf Reduction – A reduction in turf directly reduces the quantity needed to water the turf. The project proponent can either enter in the turf reduction area (in acres) or a percent reduction in turf.
- Water-Efficient Irrigation Systems – Water-efficient irrigation systems, or “smart” irrigation control systems, use weather, climate, and/or soil moisture data to automatically adjust watering schedules in response to environmental and climate changes, such as changes in temperature or precipitation levels. Thus, appropriate amount of moisture for a certain vegetation type is maintained while excessive watering is avoided. The default outdoor water reduction from the use of such a system is 6.1%, based on a California study.¹³ If the project proponent will use such a water-efficient irrigation system, then the default reduction may be used. Alternatively, if substantial evidence is available, then a project-specific percent reduction in outdoor water usage may be entered.
- Water-Efficient Landscape – Water-efficient landscapes are those that use less water compared to standard California landscape plantings. The reduction in water use can be accounted for by providing both the:
 - Maximum Applied Water Allowance (MAWA) - represents a baseline water usage for standard California landscape plantings
 - Estimated Total Water Use (ETWU) –represents the reduced water usage for a water-efficient landscape

¹² California Code of Regulations (CCR) Title 24, Part 11. California Green Building Standards Code (CAL Green Code). Available at: http://www.documents.dgs.ca.gov/bsc/CALGreen/2010_CA_Green_Bldg.pdf. Accessed April 1, 2013.

¹³ “Evaluation of California Weather-Based “Smart” Irrigation Controller Programs.” July 2009. Presented to the California Department of Water Resources by The Metropolitan Water District of Southern California and The East Bay Municipal Utility District. Facilitated by the California Urban Water Conservation Council. Prepared by Aquacraft Inc., National Research Center Inc., and Dr. Peter J. Bickel. Available online at: <http://www.aquacraft.com/sites/default/files/pub/Aquacraft-%282009%29-Evaluation-of-California-Weather-Based-Smart-Irrigation-Controller-Programs.pdf> (Accessed October 2, 2012)

The calculation of the MAWA and ETWU is fully described in the California Air Pollution Control Officers Association Report (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures.¹⁴

¹⁴ CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August. Available at: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf> (Accessed October 2, 2012)

4 Solid Waste

CalEEMod estimates GHG emissions associated with the decomposition of waste into methane based on the total amount of degradable organic carbon. The GHG emissions associated with the combustion of methane is also calculated, if applicable. Default values for solid waste generation by land use type are based on waste disposal or generation rates from the California Department of Resources Recycling and Recovery (CalRecycle).¹⁵ The distribution of types of landfills (i.e., no gas capture, capture gas flare, capture energy recovery) is based on the distribution used by ARB in its GHG emission inventories.¹⁶

4.1 “No Action Taken”

No adjustments need to be made for a NAT scenario since default settings are consistent with the AB 32 Scoping Plan.

4.2 Project

Features that are specific to the project can be incorporated into the CalEEMod calculations:

- Solid Waste Generation – Default solid waste generation (or disposal) rates by land use type are based on California average data from CalRecycle. If project-specific waste generation rates are available, the project proponent can enter it into CalEEMod.
- Landfill Type Distribution – The default distribution of landfill types is based on a California average used by ARB. If the project proponent can specify the distribution of landfill types specific to the project, then it can be entered into CalEEMod. The specific types of landfills are as follows:
 - No Gas Capture
 - Gas Capture (flared)
 - Gas Capture with Energy Recovery (Co-Generation)
- Reduction in Waste Disposed – The project proponent can also specify a percentage reduction in solid waste generated from the default value. If this is selected, then the mitigation monitoring plan must include measures to ensure this level of waste reduction.

¹⁵ Residential disposal rates available at: <http://www.calrecycle.ca.gov/wastechar/ResDisp.htm>. Non-residential waste disposal and generation rates based on data available: <http://www.calrecycle.ca.gov/wastechar/WasteGenRates/default.htm>

¹⁶ Distribution of landfill types available: http://www.arb.ca.gov/cc/inventory/doc/methods_v1/ghg_inventory_technical_support_document.pdf

5 Vegetation

CalEEMod calculates the one-time change in carbon sequestration capacity of a vegetation land use type and also sequestration of net new trees added to the project site, consistent with Intergovernmental Panel on Climate Change (IPCC) methodologies.¹⁷

5.1 “No Action Taken”

NAT should specify the number of trees required by code during the 2006 time period. If this is not available, then keep settings at “zero”.

5.2 Project

Features that are specific to the project can be incorporated into the CalEEMod calculations:

- Vegetation Land Use Change – The project proponent can enter initial and final acres of vegetation land use types, if known. The annual CO₂ accumulation per acre values are defaults from the California Climate Action Registry (CCAR),¹⁸ but can be changed if project specific data are available.
- Net New Trees – The project proponent can enter in the type and quantity of net new trees (i.e., the addition of new trees beyond what is required by code). If the code requirement is not available, then the “net new trees” should be set as the number of new trees. The default annual CO₂ accumulation per tree are from IPCC,¹⁹ but can be changed if project specific data are available.

¹⁷ IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html> (Accessed October 2, 2012)

¹⁸ CCAR. 2007. Forest Sector Protocol Version 2.1. September. Available at: http://www.climateregistry.org/resources/docs/protocols/industry/forest/forest_sector_protocol_version_2.1_sept2007.pdf (Accessed October 2, 2012)

¹⁹ IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html> (Accessed October 2, 2012)

Table

**Table 1:
Non-Transportation Quantification Methods: Project vs. NAT
Sacramento Metropolitan Air Quality Management District**

Category	Project	No Action Taken (NAT)
Energy	<u>Energy Intensity</u> - Modified to project-specific energy intensity values if available.	None.
	<u>Renewables Portfolio Standard (RPS)</u> - Manually adjust electricity emission factor to scale up to the expected RPS % for the project year.	No adjustment. Use the default emission factor.
	<u>Title 24</u> <i>Application of 2008 standards</i> - use of default energy values from CalEEMod.	Select "historical" energy use box. (This goes to 2005 standards).
	<i>Commitments beyond Title 24</i> - enter in commitment percentage in mitigation tab.	None
	<u>High efficiency lighting</u> - enter in percentage in lighting energy reduction	None
	<u>Alternative energy</u> - enter either kWh generated or % of total electricity use generated	None
	<u>Energy Efficient Appliances</u> - enter the land use subtypes that will use each appliance type. Default values represent typical percent improvement from the 2008 Energy Star Annual Report.	None
Water	<u>Water Use</u> - enter project specific water use by land use type	None
	<u>Electricity Intensity Factors</u> - enter project specific electricity intensity factors, if available, for each of supply, treatment, distribution, and wastewater treatment.	
	<u>Types of wastewater treatment</u> - enter distribution of wastewater treatment types	
	<u>Water conservation strategy</u> - % reduction indoor and outdoor water	
	<u>Reclaimed water</u> - % of indoor water use and outdoor water use	
	<u>Grey water</u> - % of indoor water use and outdoor water use	
	<u>Installation of low flow fixtures</u> - specify if low flow fixtures are used: bathroom faucet, kitchen faucet, toilet, shower. Specify reduction of water usage if available.	
	<u>Turf reduction</u> - enter turf reduction area or % reduction in turf	
	<u>Water-efficient irrigation systems</u> - enter % reduction. Otherwise use default reduction of 6.1%.	
	<u>Water-efficient landscape</u> - enter in Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU) based on CAPCOA methodology.	

**Non-Transportation Quantification Methods: Project vs. NAT
Sacramento Metropolitan Air Quality Management District**

Category	Project	No Action Taken (NAT)
Solid Waste	<u>Solid Waste Generation</u> - enter in project-specific waste generation	None
	<u>Landfill Type Distribution</u> - enter landfill type distribution, if known.	
	<u>Reduction in waste disposed</u> - enter % waste reduced.	
Vegetation	<u>Vegetation land use change</u> - enter initial and final acres of vegetation land use type	None
	<u>Sequestration</u> - enter type and quantities of net new trees (i.e., the addition of new trees beyond what is required by code.) If number required by code is unavailable, then "net new trees" should be set as the number of new trees planted as a result of the project.	Number of trees required by code during the 2006 time period. If unavailable, then keep settings at "zero".

Abbreviations

CalEEMod - California Emissions Estimator Model
 CAPCOA - California Air Pollution Control Officers Association
 ETWU - Estimated Total Water Use
 kWh - kilowatt-hour
 MAWA - Maximum Applied Water Allowance
 NAT - No Action Taken
 RPS - Renewables Portfolio Standard

Sources

CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August. Available at: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf> (Accessed October 2, 2012)

ENVIRON. 2011. CalEEMod User's Guide and Technical Appendices. Version 2011.1. Prepared for South Coast Air Quality Management District. February. Available at: www.caleemod.com (Accessed October 2, 2012)



Quantification of Greenhouse Gas Emissions for Transportation Activities

Prepared for:
Sacramento Metropolitan Air Quality Management District
Sacramento, California

Prepared by:
ENVIRON International Corporation
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1 Introduction

The California Environmental Quality Act (CEQA) requires a comparison of a project's impact to a baseline to determine significance of greenhouse gas (GHG) impacts.¹ For GHG emissions, the Sacramento Metropolitan Air Quality Management District (SMAQMD) and air districts of the Sacramento Region² interpret the threshold of significance to mean consistency with AB 32, the California Global Warming Solutions Act of 2006, which requires a statewide reduction of GHG emissions to 1990 levels by 2020. The California Air Resources Board's (ARB) Scoping Plan is a roadmap that describes California's plan for achieving the AB 32 goal. The Scoping Plan compares a projection of GHG emissions in 2020 under a "business-as-usual" (BAU)^{3,4} scenario to the emissions goal of AB 32 for 2020. A "business-as-usual" (BAU) scenario does not take into account any reductions from GHG reduction measures included in the Scoping Plan. It, in effect, is a projection of GHG emissions in the future if we assume that California proceeds as business-as-usual without taking any measures to reduce GHG emissions pursuant to AB 32 mandates. In 2011, ARB published a new estimate of 2020 BAU GHG emissions, revised to account for the economic downturn.⁵ A 21.7% reduction from the state's projected BAU emissions in 2020 is required to reach 1990 emissions levels. This 21.7% reduction is based on a BAU estimate that does not take into account GHG reduction measures such as the renewable portfolio standards (RPS), Pavley Clean Car Standards, and the Low Carbon Fuel Standards (LCFS).

A project's consistency with AB 32 can be determined by comparing its emissions under a "No Action Taken" (NAT) scenario to the project scenario. A NAT scenario would be consistent with the AB 32 Scoping Plan's assumptions for BAU in 2020. A reduction in 21.7% or more from the NAT scenario would demonstrate consistency with AB 32.

The California Emissions Estimator Model (CalEEMod) was developed by ENVIRON International Corporation (ENVIRON) in collaboration with the South Coast Air Quality Management District (SCAQMD) for use in developing emission inventories suitable for CEQA analysis.⁶ The model is publically available and employs widely accepted calculation methodologies for emission estimates combined with appropriate default data if site-specific

¹ CEQA Guidelines. Section 15064.4(b)(1): A lead agency should consider "the extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting."

² Sacramento Region air districts in addition to the SMAQMD include El Dorado, Feather River, Placer, and Yolo Solano.

³ While the term "BAU" is used in the Scoping Plan, we use the term "No Action Taken" (NAT) to mean the same thing.

⁴ The Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED) (Final Supplement) was prepared on August 19, 2011 to address a California State trial court finding that the original FED prepared for the Scoping Plan was not sufficient for informed decision-making and public review under CEQA. In the Final Supplement, an updated "Proposed Scoping Plan" is developed since the Scoping Plan must be reconsidered by the Air Resource Board. The "Proposed Scoping Plan" for reconsideration has a few modifications including two measures that are excluded (related to refrigerants and high global warming potential gases) and a revision to the 2020 BAU forecast.

⁵ Status of Scoping Plan Recommended Measures, ARB, 2011.
http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf

⁶ The CalEEMod model, User Guide, and supporting technical appendices are available at: www.caleemod.com

information is not available. As the model is in wide use for developing emission inventories for land use projects under CEQA, there is a need to develop unambiguous methods to determine both NAT and project scenario emissions for determining consistency with AB 32 goals. This document provides specific instructions for project proponents on how to use CalEEMod to estimate both project and NAT emission scenarios.

Quantification methods are provided for transportation emissions. Emissions from energy, water, solid waste, and vegetation are addressed in a separate document (“Quantification of Greenhouse Gas Emissions for Non-Transportation Activities”).

Below is a description for how to estimate emissions in both NAT and Project scenarios. For proper CEQA documentation, any changes from default CalEEMod settings require a description in the Remarks field to explain the change.

2 Transportation

CalEEMod calculates GHG emissions associated with transportation. GHG emissions from vehicles are generated during startup, idling, and traveling. Default trip generation rates are based on Institute of Transportation Engineers (ITE) data.⁷ These values are standard for many transportation studies and have been standard use in many CEQA documents. Default trip distances come from Sacramento Area Council of Governments (SACOG) data.⁸ Default fleet mixes and emission factors come from EMFAC 2011, and are specific to each year and county.⁹ GHG emissions from traveling (i.e., running emissions) are calculated by multiplying the vehicle miles traveled (VMT) by a running emission factor. GHG emissions from startup and idling are estimated by the number of trips, instead of by VMT.¹⁰

2.1 “No Action Taken”

A few adjustments need to be made for the NAT scenario, for consistency with the AB 32 Scoping Plan. CalEEMod should be set to a 2020 operational year, and the following default emission factors (annual, summer, and winter) need to be replaced.

- LDA, LDT1, LDT2, MDV – replace CO₂ emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in CalEEMod Appendix D, Table 4.4.
- All other vehicle classes – divide CO₂ emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) by 0.9 to remove effect of LCFS.

Please see Appendix A for tables showing the emission factor substitutions needed for this methodology. Table A.1 shows the non-Pavley, non-LCFC emission factors from CalEEMod Appendix D, Table 4.4. Tables A.2 (El Dorado County), A.4 (Feather River), A.6 (Placer County), A.8 (Sacramento Metropolitan), and A.10 (Yolo-Solano) show the default emission factors in CalEEMod. Tables A.3 (El Dorado County), A.5 (Feather River), A.7 (Placer County), A.9 (Sacramento Metropolitan), and A.11 (Yolo-Solano) show the replacement emission factors to use.

2.2 Project

A separate CalEEMod run needs to be made for the project scenario. For the Project scenario, CalEEMod should be set to a 2020 operational year. Projects with the first operational year beyond 2020 may also consider providing a model run for that operational year for full CEQA disclosure. Features that are specific to the project can be incorporated into the CalEEMod calculations:

⁷ Trip Generation Manual. 2008. Institute of Transportation Engineers (ITE). 8th Edition.

⁸ From Sacramento Area Council of Governments (SACOG) average regional trip data.

⁹ Sources of default data can be found in CalEEMod Appendix D.

¹⁰ Details on calculation methodologies can be found in CalEEMod Appendix A.

- Trip generation rates - Default trip generation values by land use type are based on ITE data. If project-specific trip rates are available, the project proponent can enter them into CalEEMod along with references for supporting information.
- Trip length - Default trip lengths are based on SACOG data.¹¹ If project-specific trip rates are available, the project proponent can enter them into CalEEMod along with references for supporting information.
- Fleet mix – Default fleet mixes are based on EMFAC 2011. While not anticipated, if project-specific information on a non-default fleet mix is available, then it can be entered into CalEEMod.

Mitigation measures applied to the project can also be incorporated into CalEEMod:

- Project Setting – To apply any traffic mitigation measures requires first selecting the Project Setting, as defined by CAPCOA.¹²
- Density [LUT-1] – If the project proponent commits to increasing housing or job density, then the number of dwelling units per acre or jobs per job-acre can be entered into CalEEMod.
- Diversity [LUT-3] – If the project proponent commits to increasing the diversity of urban and suburban developments (mixed use), then this mitigation measure can be selected in CalEEMod.
- Walkability [LUT-9] – If the project proponent commits to improving the design to improve walkability, then the number of intersections per square mile can be entered into CalEEMod.
- Destination Accessibility [LUT-4] – If the project proponent commits to improving destination accessibility, then the distance to downtown/job center can be entered into CalEEMod.
- Transit Accessibility [LUT-5] – If the project proponent commits to increasing transit accessibility, then the distance to a transit station can be entered into CalEEMod.
- Below Market Housing [LUT-6] – If the project proponent commits to integrating affordable and below market rate housing, then the number of below market dwelling units can be entered into CalEEMod.
- Pedestrian Network [SDT-1] – If the project proponent commits to improving the pedestrian network, then this mitigation measure can be selected in CalEEMod.
- Traffic Calming Measures [SDT-2] – If the project proponent commits to traffic calming measures, then the % streets or intersections with these measures can be entered into CalEEMod.
- NEV Network [SDT-3] – If the project proponent commits to implementing a neighborhood electric vehicle network, then this mitigation measure can be selected in CalEEMod.

¹¹ From Sacramento Area Council of Governments (SACOG) average regional trip data.

¹² Quantifying Greenhouse Gas Mitigation Measures. CAPCOA. 2010. <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>

- Limit Parking Supply [PDT-1] – If the project proponent commits to limiting parking supply, then the % reduction in spaces can be entered into CalEEMod.
- Unbundle Parking Costs [PDT-2] – If the project proponent commits to unbundling parking costs from property cost, then the monthly parking cost can be entered into CalEEMod.
- On-Street Market Pricing [PDT-3] – If the project proponent commits to implementing on-street market priced public parking, then the % increase in price can be entered into CalEEMod.
- BRT System [TST-1] – If the project proponent commits to providing a bus rapid transit system, then the % of lines included can be entered into CalEEMod.
- Transit Network [TST-3] – If the project proponent commits to expanding the transit network, the % increase in transit coverage can be entered into CalEEMod.
- Transit Frequency [TST-4] – If the project proponent commits to increasing transit frequency, then the level of implementation and % reduction in headways can be entered into CalEEMod.
- Trip Reduction Program [TRT-1, TRT-2] – If the project proponent commits to implementing a trip reduction program, then the % eligible employees and program type can be entered into CalEEMod.
- Transit Subsidy [TRT-4] – If the project proponent commits to implementing a transit subsidy, then the % eligible employees and the daily subsidy amount can be entered into CalEEMod.
- Employee Parking “Cash-Out” [TRT-15] – If the project proponent commits to implementing an employee parking “cash-out”, then the % eligible employees can be entered into CalEEMod.
- Workplace Parking Charge [TRT-14] – If the project proponent commits to pricing workplace parking, then the % eligible employees and the daily parking charge can be entered into CalEEMod.
- School Bus Program [TRT-13] – If the project proponent commits to implementing a school bus program, then the % families using the program can be entered into CalEEMod.
- Telecommuting and Alternative Schedules [TRT-6] – If the project proponent commits to encouraging telecommuting and alternative work schedules, then details can be entered into CalEEMod.
- Commute Trip Reduction Option [TRT-7] – If the project proponent commits to marketing a commute trip reduction option, then the % eligible employees can be entered into CalEEMod.
- Employee Vanpool/Shuttle [TRT-11] – If the project proponent commits to providing an employer-sponsored vanpool/shuttle, then the % eligible employees and the vanpool mode share can be entered into CalEEMod.
- Ride Sharing Program [TRT-3] – If the project proponent commits to providing a ride sharing program, then the % eligible employees can be entered into CalEEMod.

For more details, please refer to CAPCOA's Quantifying Greenhouse Gas Mitigation Measures report and the CalEEMod User's Guide.^{12,13}

Although all mitigation measures in CalEEMod are included, not every mitigation measure is suitable for use in every air district. Coordination with air district staff is recommended prior to selecting mitigation measures to include for the project.

¹³ CalEEMod User's Guide, version 2013.2. Available at: <http://caleemod.com/>.

Appendix A
Emission Factors for “No Action Taken” (NAT) Scenario

**Table A.1
Non-Pavley, Non-LCFS CO2 Emission Factors**

AD	Location	Season	Year	CO2 Running (g/VMT)			CO2 Starting (g/trip)				
				LDA	LDT1	LDT2	MDV	LDA	LDT1	LDT2	MDV
AD	El Dorado County AQMD	Annual	2020	342.718	398.456	469.09	596.749	73.513	84.8967	100.545	127.169
AD	El Dorado County AQMD	Summer	2020	373.267	429.231	505.951	643.697	73.513	84.8967	100.545	127.169
AD	El Dorado County AQMD	Winter	2020	335.107	390.722	459.817	584.957	73.513	84.8967	100.545	127.169
AD	Feather River AQMD	Annual	2020	325.282	377.785	442.944	562.612	73.7578	85.2928	100.709	127.275
AD	Feather River AQMD	Summer	2020	362.096	418.693	491.503	623.694	73.7578	85.2928	100.709	127.275
AD	Feather River AQMD	Winter	2020	315.1	366.54	429.54	545.655	73.7578	85.2928	100.709	127.275
AD	Placer County APCD	Annual	2020	331.885	385.394	453.007	578.177	73.4124	85.0133	100.59	127.772
AD	Placer County APCD	Summer	2020	368.725	425.028	500.214	638.111	73.4124	85.0133	100.59	127.772
AD	Placer County APCD	Winter	2020	322.138	374.9	440.595	562.291	73.4124	85.0133	100.59	127.772
AD	Sacramento Metropolitan AQMD	Annual	2020	338.715	391.371	460.98	587.398	73.6376	84.6282	100.473	127.204
AD	Sacramento Metropolitan AQMD	Summer	2020	376.758	433.183	511.309	650.574	73.6376	84.6282	100.473	127.204
AD	Sacramento Metropolitan AQMD	Winter	2020	328.518	380.164	447.489	570.463	73.6376	84.6282	100.473	127.204
AD	Yolo Solano AQMD	Annual	2020	353.47	408.43	481.69	614.50	73.52	84.64	100.48	127.26
AD	Yolo Solano AQMD	Summer	2020	389.71	448.17	529.67	674.78	73.52	84.64	100.48	127.26
AD	Yolo Solano AQMD	Winter	2020	344.20	398.28	469.45	599.14	73.52	84.64	100.48	127.26

Notes

1. These are the alternative CO2 emission factors for the El Dorado County AQMD, Feather River AQMD, Placer County APCD, Sacramento Metropolitan AQMD and Yolo Solano AQMD for year 2020. Emission factors for other air districts and years can be found in CalEEMod Appendix D, Table 4.4

Abbreviations

APCD - Air Pollution Control District
AQMD - Air Quality Management District

Source

CalEEMod v 2013.2.2 Appendix D, Table 4.4. Available at: <http://caleemod.com/>.

Table A.2
Default CO2 Emission Factors
El Dorado County Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD El Dorado County AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.56	9.50	569.13	528.20	534.88	0	0	547.00	0	3
AD El Dorado County AQMD	2020	A	CO2_NBIO_RUNEX	231.00	285.45	352.08	470.07	656.58	542.31	995.14	1481.07	1007.25	1606.50	138.43	1033.71	702.18	2,3
AD El Dorado County AQMD	2020	A	CO2_NBIO_STREX	52.01	62.97	77.18	102.49	26.57	10.95	50.27	49.33	32.73	53.17	38.47	115.30	26.72	2,3
AD El Dorado County AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.56	9.50	602.95	559.58	566.66	0	0	579.49	0.00	3
AD El Dorado County AQMD	2020	S	CO2_NBIO_RUNEX	251.48	307.21	379.61	506.87	656.58	542.31	995.14	1481.07	1007.25	1606.50	138.43	1033.71	702.18	2,3
AD El Dorado County AQMD	2020	S	CO2_NBIO_STREX	52.01	62.97	77.18	102.49	26.57	10.95	50.27	49.33	32.73	53.17	38.47	115.30	26.72	2,3
AD El Dorado County AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.56	9.50	522.44	484.86	491.00	0.00	0.00	502.12	0.00	3
AD El Dorado County AQMD	2020	W	CO2_NBIO_RUNEX	225.90	279.98	345.15	460.82	656.58	542.31	995.14	1481.07	1007.25	1606.50	138.43	1033.71	702.18	2,3
AD El Dorado County AQMD	2020	W	CO2_NBIO_STREX	52.01	62.97	77.18	102.49	26.57	10.95	50.27	49.33	32.73	53.17	38.47	115.30	26.72	2,3

Notes

1. These are the default emission factors for the El Dorado County AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.3
CO2 Emission Factors, Modified for NAT Scenario
El Dorado County Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD El Dorado County AQMD	2020	A	CO2 NBIO_IDLEX	0	0	0	0	10	11	632	587	594	0	0	608	0	3
AD El Dorado County AQMD	2020	A	CO2 NBIO_RUNEX	342.72	398.46	469.09	596.75	729.53	602.57	1105.71	1645.63	1119.17	1785.00	153.81	1148.57	760.20	2,3
AD El Dorado County AQMD	2020	A	CO2 NBIO_STREX	73.51	84.90	100.55	127.17	29.53	12.17	55.86	54.81	36.37	59.08	42.75	128.12	29.69	2,3
AD El Dorado County AQMD	2020	S	CO2 NBIO_IDLEX	0	0	0	0	10	11	670	622	630	0	0	644	0	3
AD El Dorado County AQMD	2020	S	CO2 NBIO_RUNEX	373.27	429.23	505.95	643.70	729.53	602.57	1105.71	1645.63	1119.17	1785.00	153.81	1148.57	760.20	2,3
AD El Dorado County AQMD	2020	S	CO2 NBIO_STREX	73.51	84.90	100.55	127.17	29.53	12.17	55.86	54.81	36.37	59.08	42.75	128.12	29.69	2,3
AD El Dorado County AQMD	2020	W	CO2 NBIO_IDLEX	0	0	0	0	10	11	560	539	546	0	0	568	0	3
AD El Dorado County AQMD	2020	W	CO2 NBIO_RUNEX	335.11	390.72	459.82	584.96	729.53	602.57	1105.71	1645.63	1119.17	1785.00	153.81	1148.57	760.20	2,3
AD El Dorado County AQMD	2020	W	CO2 NBIO_STREX	73.51	84.90	100.55	127.17	29.53	12.17	55.86	54.81	36.37	59.08	42.75	128.12	29.69	2,3

Notes

1. These are the default emission factors for the El Dorado County AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, default CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) have been replaced with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, MH), default CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) have been divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.4
Default CO2 Emission Factors
Feather River Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
Feather River AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.59	9.17	568.20	527.75	534.88	0	0	547.00	0	3
Feather River AQMD	2020	A	CO2_NBIO_RUNEX	221.00	265.45	327.83	437.25	652.24	577.60	1005.49	1539.09	1088.44	1812.22	137.33	1078.32	692.90	2,3
Feather River AQMD	2020	A	CO2_NBIO_STREX	51.67	62.36	76.35	101.28	26.37	16.65	49.83	50.45	32.73	34.32	38.37	115.30	27.39	2,3
Feather River AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.59	9.17	601.95	559.11	566.66	0	0	579.49	0.00	3
Feather River AQMD	2020	S	CO2_NBIO_RUNEX	245.88	293.90	363.56	484.42	652.24	577.60	1005.49	1539.09	1088.44	1812.22	137.33	1078.32	692.90	2,3
Feather River AQMD	2020	S	CO2_NBIO_STREX	51.67	62.36	76.35	101.28	26.37	16.65	49.83	50.45	32.73	34.32	38.37	115.30	27.39	2,3
Feather River AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.59	9.17	521.58	484.45	491.00	0.00	0.00	502.12	0.00	3
Feather River AQMD	2020	W	CO2_NBIO_RUNEX	214.13	257.63	317.96	424.15	652.24	577.60	1005.49	1539.09	1088.44	1812.22	137.33	1078.32	692.90	2,3
Feather River AQMD	2020	W	CO2_NBIO_STREX	51.67	62.36	76.35	101.28	26.37	16.65	49.83	50.45	32.73	34.32	38.37	115.30	27.39	2,3

Notes

1. These are the default emission factors for the Feather River AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.5
CO2 Emission Factors, Modified for NAT Scenario
Feather River Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD Feather River AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	10	10	631	586	594	0	0	608	0	3
AD Feather River AQMD	2020	A	CO2_NBIO_RUNEX	325.26	377.78	442.94	562.61	724.71	641.78	1117.21	1710.10	1209.38	2013.58	152.59	1198.13	769.89	2.3
AD Feather River AQMD	2020	A	CO2_NBIO_STREX	73.76	85.29	100.71	127.27	29.30	18.50	55.36	56.06	36.37	38.13	42.63	128.11	30.44	2.3
AD Feather River AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	10	10	669	621	630	0	0	644	0	3
AD Feather River AQMD	2020	S	CO2_NBIO_RUNEX	362.10	418.69	491.50	623.69	724.71	641.78	1117.21	1710.10	1209.38	2013.58	152.59	1198.13	769.89	2.3
AD Feather River AQMD	2020	S	CO2_NBIO_STREX	73.76	85.29	100.71	127.27	29.30	18.50	55.36	56.06	36.37	38.13	42.63	128.11	30.44	2.3
AD Feather River AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	10	10	580	538	546	0	0	558	0	3
AD Feather River AQMD	2020	W	CO2_NBIO_RUNEX	315.10	366.54	429.54	545.66	724.71	641.78	1117.21	1710.10	1209.38	2013.58	152.59	1198.13	769.89	2.3
AD Feather River AQMD	2020	W	CO2_NBIO_STREX	73.76	85.29	100.71	127.27	29.30	18.50	55.36	56.06	36.37	38.13	42.63	128.11	30.44	2.3

Notes

- These are the default emission factors for the Feather River AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
- For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
- For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.6
Default CO2 Emission Factors
Placer County Air Pollution Control District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
Placer County APCD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.36	9.09	568.82	528.05	534.88	0	0	547.00	0	3
Placer County APCD	2020	A	CO2_NBIO_RUNEX	226.25	272.60	337.18	451.19	676.36	585.12	1005.76	1549.56	882.14	1760.65	138.20	1034.35	708.37	2,3
Placer County APCD	2020	A	CO2_NBIO_STREX	51.68	62.56	76.78	101.88	30.29	18.02	49.52	52.69	32.73	35.86	38.30	115.30	26.09	2,3
Placer County APCD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.36	9.09	602.61	559.42	566.66	0	0	579.49	0.00	3
Placer County APCD	2020	S	CO2_NBIO_RUNEX	251.19	300.32	372.13	497.67	676.36	585.12	1005.76	1549.56	882.14	1760.65	138.20	1034.35	708.37	2,3
Placer County APCD	2020	S	CO2_NBIO_STREX	51.68	62.56	76.78	101.88	30.29	18.02	49.52	52.69	32.73	35.86	38.30	115.30	26.09	2,3
Placer County APCD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.36	9.09	522.15	484.73	491.00	0.00	0.00	502.12	0.00	3
Placer County APCD	2020	W	CO2_NBIO_RUNEX	219.66	265.27	327.99	438.88	676.36	585.12	1005.76	1549.56	882.14	1760.65	138.20	1034.35	708.37	2,3
Placer County APCD	2020	W	CO2_NBIO_STREX	51.68	62.56	76.78	101.88	30.29	18.02	49.52	52.69	32.73	35.86	38.30	115.30	26.09	2,3

Notes

1. These are the default emission factors for the Placer County APCD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.7
CO2 Emission Factors, Modified for NAT Scenario
Placer County Air Pollution Control District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
Placer County APCD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	9	10	632	587	594	0	0	608	0	3
Placer County APCD	2020	A	CO2_NBIO_RUNEX	331.89	385.39	453.01	578.18	751.51	650.14	1117.51	1721.73	980.16	1956.28	153.55	1149.27	787.08	2.3
Placer County APCD	2020	A	CO2_NBIO_STREX	73.41	85.01	100.59	127.77	33.65	20.02	55.02	58.54	36.37	39.84	42.55	128.11	28.99	2.3
Placer County APCD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	9	10	670	622	630	0	0	644	0	3
Placer County APCD	2020	S	CO2_NBIO_RUNEX	368.73	425.03	500.21	638.11	751.51	650.14	1117.51	1721.73	980.16	1956.28	153.55	1149.27	787.08	2.3
Placer County APCD	2020	S	CO2_NBIO_STREX	73.41	85.01	100.59	127.77	33.65	20.02	55.02	58.54	36.37	39.84	42.55	128.11	28.99	2.3
Placer County APCD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	9	10	580	539	546	0	0	558	0	3
Placer County APCD	2020	W	CO2_NBIO_RUNEX	322.14	374.90	440.60	562.29	751.51	650.14	1117.51	1721.73	980.16	1956.28	153.55	1149.27	787.08	2.3
Placer County APCD	2020	W	CO2_NBIO_STREX	73.41	85.01	100.59	127.77	33.65	20.02	55.02	58.54	36.37	39.84	42.55	128.11	28.99	2.3

Notes

1. These are the default emission factors for the Placer County APCD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.8
Default CO2 Emission Factors
Sacramento Metropolitan Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.04	8.81	568.20	527.75	534.88	0	0	547.00	0	3
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_RUNEX	230.00	277.88	343.33	461.73	726.35	626.59	983.01	1488.02	1033.73	1653.59	137.22	995.42	680.71	2,3
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_STREX	51.88	62.78	76.90	102.33	35.55	22.70	50.03	51.56	32.73	47.00	38.62	115.30	28.28	2,3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.04	8.81	601.95	559.11	566.66	0	0	579.49	0.00	3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_RUNEX	255.66	307.23	380.63	511.10	726.35	626.39	983.01	1488.02	1033.73	1653.59	137.22	995.42	680.71	2,3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_STREX	51.88	62.78	76.90	102.33	35.55	22.70	50.03	51.56	32.73	47.00	38.62	115.30	28.28	2,3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.04	8.81	521.58	484.45	491.00	0.00	0.00	502.12	0.00	3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_RUNEX	223.13	270.01	333.33	448.50	726.35	626.39	983.01	1488.02	1033.73	1653.59	137.22	995.42	680.71	2,3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_STREX	51.88	62.78	76.90	102.33	35.55	22.70	50.03	51.56	32.73	47.00	38.62	115.30	28.28	2,3

Notes

1. These are the default emission factors for the Sacramento Metropolitan AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.9
CO2 Emission Factors, Modified for NAT Scenario
Sacramento Metropolitan Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.93	9.79	631.33	586.39	594.31	0.00	0.00	607.77	0.00	3
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_RUNEX	338.72	391.37	460.98	587.40	807.06	695.99	1092.23	1653.35	1148.59	1837.33	152.46	1106.02	756.34	2,3
AD Sacramento Metropolitan AQMD	2020	A	CO2_NBIO_STREX	73.64	84.63	100.47	127.20	39.50	25.23	55.58	57.29	36.37	52.22	42.91	128.11	31.43	2,3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.93	9.79	668.84	621.23	629.62	0.00	0.00	643.88	0.00	3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_RUNEX	376.76	433.78	511.31	650.57	807.06	695.99	1092.23	1653.35	1148.59	1837.33	152.46	1106.02	756.34	2,3
AD Sacramento Metropolitan AQMD	2020	S	CO2_NBIO_STREX	73.64	84.63	100.47	127.20	39.50	25.23	55.58	57.29	36.37	52.22	42.91	128.11	31.43	2,3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.93	9.79	579.53	538.28	545.55	0.00	0.00	557.91	0.00	3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_RUNEX	328.52	380.16	447.49	570.46	807.06	695.99	1092.23	1653.35	1148.59	1837.33	152.46	1106.02	756.34	2,3
AD Sacramento Metropolitan AQMD	2020	W	CO2_NBIO_STREX	73.64	84.63	100.47	127.20	39.50	25.23	55.58	57.29	36.37	52.22	42.91	128.11	31.43	2,3

Notes

1. These are emission factors modified for modeling NAT scenarios in the Sacramento Metropolitan AQMD. Emission factors will be different for other locations.
2. For vehicle classes LDA, LDT1, LD2, and MDV, default CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) have been replaced with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), default CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) have been divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.10
 Default CO2 Emission Factors
 Yolo Solano Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD Yolo Solano AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	8.33	9.09	568.20	527.75	534.88	0	0	547.00	0	3
AD Yolo Solano AQMD	2020	A	CO2_NBIO_RUNEX	242.46	292.96	361.29	486.03	686.66	587.51	1019.65	1546.06	902.70	1899.73	157.95	1062.19	692.04	2,3
AD Yolo Solano AQMD	2020	A	CO2_NBIO_STREX	52.11	63.02	77.15	102.71	30.72	17.99	49.60	52.14	32.73	27.16	38.39	115.30	27.55	3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	8.33	9.09	601.95	559.11	566.66	0	0	579.49	0.00	3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_RUNEX	267.14	321.13	397.09	533.42	686.66	587.51	1019.65	1546.06	902.70	1899.73	157.95	1062.19	692.04	2,3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_STREX	52.11	63.02	77.15	102.71	30.72	17.99	49.60	52.14	32.73	27.16	38.39	115.30	27.55	2,3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	8.33	9.09	521.58	484.45	491.00	0.00	0.00	502.12	0.00	3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_RUNEX	236.16	285.77	362.15	473.96	686.66	587.51	1019.65	1546.06	902.70	1899.73	157.95	1062.19	692.04	2,3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_STREX	52.11	63.02	77.15	102.71	30.72	17.99	49.60	52.14	32.73	27.16	38.39	115.30	27.55	2,3

Notes

1. These are the default emission factors for the Yolo Solano AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Table A.11
CO2 Emission Factors, Modified for NAT Scenario
Yolo Solano Air Quality Management District

Location ¹	Year	Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH	Note
AD Yolo Solano AQMD	2020	A	CO2_NBIO_IDLEX	0	0	0	0	9	10	631	586	594	0	0	608	0	3
AD Yolo Solano AQMD	2020	A	CO2_NBIO_RUNEX	353.47	408.43	481.69	614.50	762.96	652.79	1132.95	1717.84	1003.00	2110.81	175.50	1180.22	788.93	2,3
AD Yolo Solano AQMD	2020	A	CO2_NBIO_STREX	73.52	84.64	100.48	127.26	34.13	19.99	55.11	57.94	36.37	30.17	42.66	128.11	30.61	2,3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_IDLEX	0	0	0	0	9	10	669	621	630	0	0	644	0	3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_RUNEX	389.71	448.17	529.67	674.78	762.96	652.79	1132.95	1717.84	1003.00	2110.81	175.50	1180.22	788.93	2,3
AD Yolo Solano AQMD	2020	S	CO2_NBIO_STREX	73.52	84.64	100.48	127.26	34.13	19.99	55.11	57.94	36.37	30.17	42.66	128.11	30.61	2,3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_IDLEX	0	0	0	0	9	10	580	538	546	0	0	558	0	3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_RUNEX	344.20	388.26	469.45	598.14	762.96	652.79	1132.95	1717.84	1003.00	2110.81	175.50	1180.22	788.93	2,3
AD Yolo Solano AQMD	2020	W	CO2_NBIO_STREX	73.52	84.64	100.48	127.26	34.13	19.99	55.11	57.94	36.37	30.17	42.66	128.11	30.61	2,3

Notes

1. These are the default emission factors for the Yolo Solano AQMD for year 2020. Emission factors for other air districts and years are available in CalEEMod.
2. For vehicle classes LDA, LDT1, LD2, and MDV, replace CO2 emission factors (CO2_NBIO_RUNEX, CO2_NBIO_STREX) with non-Pavley, non-LCFS emission factors in Table A.1 (from CalEEMod Appendix D, Table 4.4).
3. For all other vehicle classes (LHD1, LHD2, MHD, HHD, OBUS, UBUS, MCY, SBUS, MH), replace CO2 emission factors (CO2_NBIO_IDLEX, CO2_NBIO_RUNEX, CO2_NBIO_STREX) with the default emission factor divided by 0.9, to remove the effect of LCFS.

Abbreviations

- A - Annual
- S - Summer
- W - Winter

Source

CalEEMod v 2013.2.2. Available at: <http://caleemod.com/>.

Appendix C

Applying a Service Population (or Per Capita) Threshold to Local Projects

The Thresholds Committee undertook a process to apply the Bay Area AQMD's methodology to the Sacramento region. The methodology was fully described and based on statewide GHG emissions inventory, and population and employment data. The Thresholds Committee calculated a threshold of 4.82 metric tons of CO₂e per service population per year, using the state GHG emissions inventory and population and employment data for land use in the Sacramento region. This threshold was then applied to 29 local projects of various types and sizes considered representative of development in the region. Results of the review showed that none of the 29 projects could meet the 4.82 metric tons of CO₂e per service population per year threshold. The Thresholds Committee determined that it would not be reasonable to proceed with a threshold that required all projects, regardless of size, to conduct the same level of analysis and carry the same mitigation burden. The Thresholds Committee then tried different variations of per capita thresholds, splitting out transportation and energy emissions, and examining different levels of emission reduction targets, but determined that the variations would create confusion for project proponents and local jurisdictions.

A per capita threshold would hold all projects, regardless of size, to the same GHG emissions analysis and mitigation standards. This approach is not cost-effective for small projects and could impede their development. Therefore, the Thresholds Committee sought to develop a threshold that would ensure that at least 90 percent of emissions from projects in the region would be reviewed and analyzed to determine if additional mitigation should be required, while exempting small projects from the requirement to analyze GHG emissions and mitigate.