Appendix B

GHG Emissions Reduction Target Options Memorandum

This memorandum (memo) presents options and considerations for establishing a GHG target in the City's Greenhouse Gas Reduction Strategy (GGRS) update. The options are informed by State guidance on the topic, science-based guidance, the City's aspirations and priorities, and targets adopted by other local governments in the area.

Establishing local greenhouse gas (GHG) emissions targets can be used to:

- Demonstrate the City's commitment to global efforts on climate change,
- Illustrate the relationship between the City's reduction target and the State's own reduction goals,
- Provide a goal post against which to evaluate the cumulative progress of the City's GHG reduction actions over time, and
- Demonstrate a level of GHG emissions below which the City would have less than cumulatively considerable GHG impacts.[1]

We have prepared this memo so that portions of the first section can be included in the GGRS document (with minor narrative revisions), and the second, more technical section can be potentially included as a Target-Setting Considerations Appendix to the GGRS in support of the environmental review analysis.

Section 1 – GHG Target Considerations and Options

A. Introduction

In 2019, the City of San José began updating its Greenhouse Gas Reduction Strategy (GGRS), which aims to reduce communitywide GHG emissions. As a first step, the City conducted a new communitywide GHG inventory to identify its baseline emissions footprint and is developing emissions forecasts based on anticipated growth in population, employment, and other factors in the community. In the next phases of the project, the City will establish a GHG reduction target and define local actions to achieve that target.

While there can be fiscal, economic, and public health benefits, one of the GGRS's primary purposes is to reduce GHG emissions. GHG targets serve as aspirational metrics to help focus local actions to achieve that end. Establishing clear and attainable targets can also motivate community members and City staff, help guide long-term strategies, and increase transparency and accountability regarding the GGRS's objectives.

There are several questions to consider when defining local GHG targets.

- **What type of targets can be used?**

  Targets can be set based on absolute emissions reductions or to reflect emissions intensity improvements in the community.

- **What guidance is available to direct local governments in setting GHG targets?**

  California has established several statewide GHG targets through legislative action that can help to inform local GHG target selection. State agencies, including the California Air Resources Board (ARB) and the Governor's Office of Planning and Research (OPR), have also issued guidance to local governments on this topic. The California Environmental Quality Act (CEQA) Guidelines also provide guidance on target selection for cities that would use their GHG reduction strategy to streamline environmental review for future development projects.

[1] *The City's target, along with reduction strategies necessary to achieve this target will facilitate tiering and streamlining for proposed projects under the provisions of CEQA Guidelines Section 15183.5.*

- **What does the climate science say?**

  According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), targets adopted to reduce GHG emissions are "science-based" if they are consistent with the magnitude of emission reductions required to limit the increase of global temperatures to 2°C above pre-industrial temperatures.

- **What is the City's emissions profile?**

  The City's 2017 emissions inventory totals 5.7 million metric tons of carbon dioxide equivalent (MMT CO_2e) with the majority coming from transportation (63%) and energy use (32%). A communitywide GHG reduction target should consider the sources of emissions and a city's ability to influence its emission sources.

- **What timeframe should the targets address?**

  Cities typically consider a range of target horizon year options, with near- or mid-term targets selected to help set the city on a pathway toward more aggressive longer-term targets, depending on the city's unique needs and aspirations. The specific target years can be chosen based on California's GHG targets, local planning priorities (such as the City's General Plan), or other considerations.

- **What kind of targets are other local governments in the area using?**

  San José is not acting alone in its efforts to reduce GHG emissions, and the targets of other local governments can also help to inform the City's own target selection process.

B. Target Types

GHG targets can be expressed as either ***mass emissions*** targets or ***emissions intensity*** targets.

Mass Emissions Targets

Mass emissions targets establish an absolute emissions level to be achieved by a target year, such as 100,000 metric tons of carbon dioxide equivalent per year (MT CO_2e/yr) by 2020. Typically, mass emissions targets are expressed as a percent below the emissions level of some base year, such as 80% below 1990 emissions by 2050. Mass emissions targets are often used in the context of deep GHG reductions or carbon neutrality, described in detail below.

Deep GHG Reduction Targets

This term refers to the common long-term GHG reduction target set by cities, aiming to reduce emissions to approximately 80% below baseline levels by 2050 to limit the global temperature increase to less than 2°C compared to pre-industrial temperatures. Many cities leading the effort on GHG mitigation set this long-term target at the start of their climate planning processes (and since that time, some of these same cities have revised their long-term targets to aim for carbon neutrality, as described below). Sometimes, this type of target is also referred to as a ***climate***-neutral target, as it is intended to neutralize the adverse impacts of climate change. The distinction between a climate-neutral target and a zero carbon or a net zero carbon target is noteworthy. While the term "climate-neutral" may be useful for marketing and communication purposes, and while the actions necessary to achieve this target certainly need to be ambitious, this term should not be confused with a zero carbon or net zero carbon target, which requires bold and systemic changes to core city transportation, buildings, and waste systems at a level beyond deep carbon reductions.

Carbon Neutrality Targets

In describing community GHG emissions, the term 'carbon neutrality' is often used interchangeably with 'zero carbon emissions' and 'net zero carbon emissions'. It is important to clarify and define each of these terms.

Zero Carbon Emissions: In its strictest sense, this term refers to a scenario under which a city eliminates all sources of direct GHG emissions associated with its activities. While theoretically possible, this type of target is very challenging to achieve because some sources of GHG emissions are near impossible to eliminate. Even if a community were to power its built environment and transportation sectors with 100% renewable energy, some GHG emissions from wastewater treatment, solid waste management, refrigeration, or fire suppression are not currently feasible to eliminate. It is worth noting that, based on our review of best practices, no city has yet endeavored to establish a goal to achieve zero carbon emissions in the strictest sense of the definition.

Net Zero Carbon Emissions: This term means that the ***net*** GHG emissions associated with a city are zero. Under this scenario, some residual emissions may be produced by a community each year, but they can be fully balanced by investing in offsetting activities, such as generating additional renewable energy and providing it to consumers outside the community, biological carbon sequestration, green procurement strategies, or the purchase of verifiable carbon credits.

Emissions Intensity–Based Targets

Emissions intensity thresholds set a target level of emissions per population or per service population (i.e., local residents plus local jobs), such as 2.25 MT CO_2e per service population per year (MT CO_2e/SP/yr) by 2035. Emissions intensity thresholds demonstrate a community's ability to grow population and employment, while emissions shrink on a per-unit basis; in effect, a community could be growing more efficiently from an emissions standpoint. In this case, total emissions within a community may increase while still achieving an emissions intensity target, if service population is growing faster than emissions.

Mass emissions and emissions intensity-based targets are both useful to consider when evaluating appropriate emissions reduction targets, and OPR and ARB suggest that local governments consider both types in their climate action plans.

Mass or Emissions Intensity-based Activity-Specific Targets

While the types of targets described above focus on GHG emissions as a metric for measurement of progress, leading cities are also adopting goals that focus specifically on the activities causing GHG emissions, such as energy consumption in the building and transportation sectors or solid waste generation. These activity-specific targets can be helpful in communicating the City's GHG goals more clearly and tracking progress within individual activities or sectors. However, they should not be used as a replacement for an overarching communitywide GHG target that covers all sectors and emissions activities because it can be difficult to understand how a specific activity target relates to total communitywide emissions. This can be especially problematic when using a climate action plan (CAP) or similar greenhouse gas reduction strategy to support CEQA streamlining for future projects where it is difficult to demonstrate how achievement of an activity target results in a less than cumulatively considerable impact related to GHG emissions.

Mass Targets Related to Net-Zero Fossil Fuel Consumption or 100% Renewable Energy Use: This type of target focuses on the activity that generates the majority of overall GHG emissions at the community level – fossil fuel combustion for energy generation used in buildings, vehicles, and equipment. Some cities use this target because they believe it is easier to understand than a GHG reduction target and is therefore more inspirational than a GHG reduction target. Some cities have applied this target strictly to electricity generation or related to a specific sector (like transportation), while others intend it to be used for all fuel sources.

Emissions Intensity-based Activity Targets or Budgets: Using the concept of emissions intensity-based targets, many cities have applied these targets to key consumption activities in daily urban life to create a "budget", such as reducing per-capita electricity consumption or driving by a certain percent by a

future year. These forms of targets can make it easier to communicate the role of individual community members in reducing GHG emissions and achieving targets.

C. Guidance on Local Government Target Setting

Guidance on local government target setting in California is primarily based on three sources: the State's own GHG targets, ARB's Climate Change Scoping Plan (Scoping Plan), and OPR's General Plan Guidelines. Together, these sources help to frame the context for local GHG targets. For climate action plans that are designed to provide CEQA streamlining for future projects, precedent case law is another source of guidance for reduction targets, although this guidance is primarily based on the State's legislative GHG reduction targets.

State GHG Targets

California's statewide GHG targets are defined through adopted legislation (2020 and 2030 target years) and Executive Orders (2045 and 2050 target years), as shown in Table 1 below.

Table 1
State of California Greenhouse Gas Targets

Target Year	Target	Corresponding Legislation
2020	Return to 1990 GHG levels by 2020	Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006
2030	40% below 1990 levels by 2030	Senate Bill 32 (SB 32), the Global Warming Solutions Act of 2006
2045	Carbon neutrality by 2045	Executive Order B-55-18 of 2018
2050	80% below 1990 levels by 2050	Executive Order S-3-05 of 2005

Some cities have simply adopted the State's exact targets, and others have calculated variations of them to more accurately reflect local emissions sectors, demographics, and economic conditions. There are four primary considerations when using the State's targets as the basis for local targets:

1. How can 1990 emissions levels be approximated locally?
2. What is the local baseline year?
3. What emissions will be analyzed locally?
4. What degree of influence does the City have over different emissions sources?

Section 2 of this memo provides the supporting calculations to estimate local emissions targets based on the State's GHG targets. Following is a discussion oriented around these four questions related to the direct use of the State's reduction targets.

Approximate 1990 Emissions Levels

The State's GHG targets have been established as mass emissions targets and are often referenced in local government target setting. However, the State's specific targets are each benchmarked to a 1990 GHG inventory, and, for most local governments, it is technically challenging to back-cast an inventory for that year. Guidance in ARB's 2008 Climate Change Scoping Plan identified local governments as "essential partners" in achieving the State's GHG goals and encouraged adoption of local GHG targets "…that parallel the State's commitment to reduce greenhouse gas emissions by approximately 15% from current levels by 2020." Many local governments followed this guidance for their near-term target to

approximate a return to 1990 levels (i.e., the State's GHG target for 2020). This helps to explain why many climate action plans in California have defined a 2020 target as 15% below baseline levels.

Consider the Local Baseline Year

It is worth noting that the original ARB guidance suggesting that a 15% reduction below current GHG levels approximates a return to 1990 levels was based on an earlier version of the State's emissions forecasts. Following release of this original guidance, the 2008 economic recession occurred, resulting in slower emissions growth statewide than previously anticipated. Further, the 15% reduction target value was calculated relative to a 2008 baseline year. For cities with different baseline inventory years, the corresponding 2020 target value would be slightly different. ARB also subsequently revised the statewide 1990 inventory, which altered some of the underlying calculations associated with the 1990 target value.

Table 2 shows the State's current 1990 inventory (and therefore, its 2020 target emissions level) and the statewide inventories for 2008-2016. At the time this memo was developed, ARB had not yet released a 2017 statewide inventory that would directly correspond to the City's 2017 base year inventory. As shown in Table 2, reductions of 13.1% below a 2008 base year inventory would have been required to approximate a return to 1990 emissions levels (compared to the original 15% reduction guidance provided in the 2008 Scoping Plan). Over the years, that reduction amount has decreased as the State has implemented various GHG reduction programs. In 2015, reductions of 2.5% were needed to return to 1990 levels, and by the 2016 inventory year statewide emissions were already below 1990 levels (achieving the goals of AB 32 assuming future statewide inventories remain below 1990 levels).

Table 2
State of California Greenhouse Gas Targets

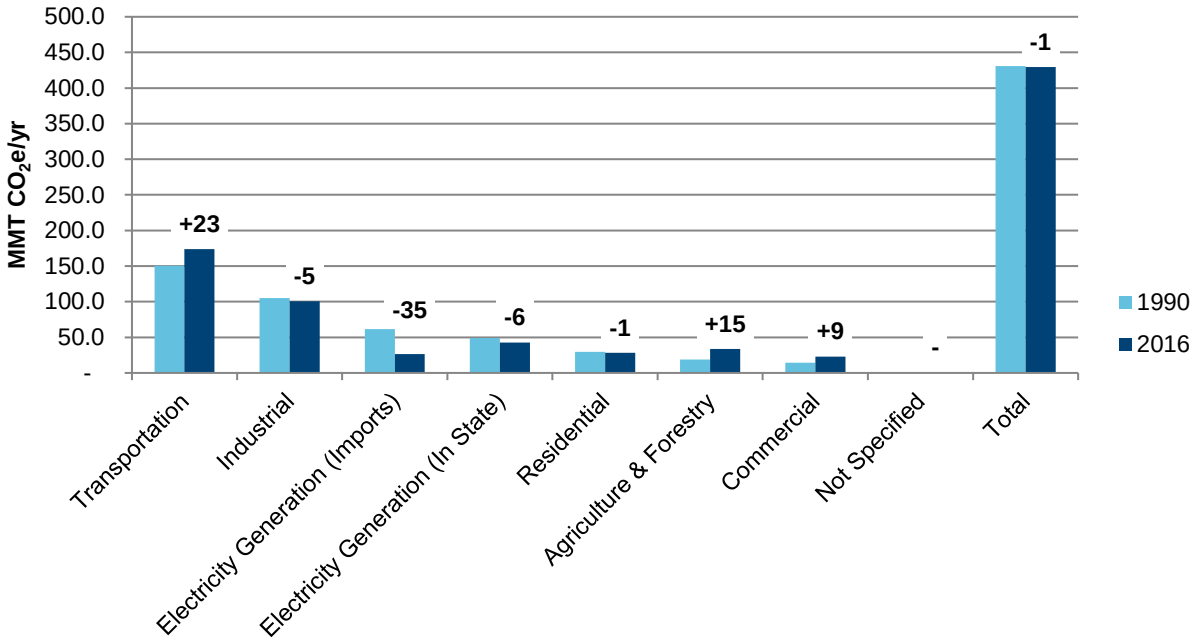
	1990	2008	2009	2010	2011	2012	2013	2014	2015	2016
Million Metric Tons CO_2e (using 4AR GWP values)	431	487.3	457.3	448.1	443.9	450.4	447.6	444.1	441.4	429.4
% reduction to achieve 1990 levels	-	13.1%	6.1%	4.0%	3.0%	4.5%	3.9%	3.0%	2.4%	-0.4%

Source: California Air Resources Board. California Greenhouse Gas Inventory for 2000-2016 - by Category as Defined in the 2008 Scoping Plan. Last Updated Friday June 22, 2018. Available: <https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-16.pdf>

The results in this table highlight the need to thoughtfully consider the selection of local GHG reduction targets with respect to now outdated guidance for local governments. For example, a city using a 2016 base year inventory might consider that year to represent a return to 1990 levels and could therefore set its GHG targets as a percent reduction below 2016 levels to mirror the statewide targets (e.g., 40% below 2016 emissions by 2030 would demonstrate consistency with the State's GHG target in SB 32).

Figure 1 on the following page shows how the statewide emissions have changed since 1990. Emissions increases are primarily attributed to the transportation and agriculture & forestry sectors, while substantial emissions reductions occurred in the imported electricity sector during the same period.

Figure 1 – Statewide Emissions Change by Sector[2]



Evaluate Local Emissions Sources

As a final consideration for the State's GHG targets, it is important to understand the sources of emissions included in the statewide inventory and how they differ from the sources typically represented at the community inventory level. Certain emissions sectors are not included or applicable locally but are included statewide based on the prevailing GHG inventory methodologies. For example, industrial process-related emissions occur within California and are included in the statewide inventory, but these same sources do not occur locally in all jurisdictions and so would not be represented in all communitywide inventories. In addition, some emission sources that may have a local presence are outside the control of local lead agencies – for example, some industrial emissions sources are the purview of the air quality management district, and not the municipality. Therefore, the State's GHG targets should also be customized for use locally in a way that considers the presence or absence of certain emissions sectors and relative degree of municipal influence. This can be achieved by analyzing the sub-set of emissions sectors that will be included in the local GHG inventory. Section 2 presents the results of this customization analysis specific to San José, should the City choose to define local targets based on the State's adopted targets.

Tailoring the reduction target to the specific local context also speaks to the direction from the California Supreme Court's 2015 decision in *Center for Biological Diversity v. California Department of Fish and Wildlife*,[3] commonly referenced as "Newhall Ranch." In Newhall Ranch, the Court indicated that the use of a State legislation-based GHG emissions significance threshold could be acceptable, so long as the

[2] *Figure 1 shows the 1990 and 2016 emissions inventory results organized by economic sector categorization. 1990 inventory available: https://www.arb.ca.gov/cc/inventory/1990level/1990data.htm; 2016 inventory available: https://www.arb.ca.gov/cc/inventory/data/data.htm*

[3] *62 Cal. 4th 204.*

administrative record supports how this threshold is appropriate for a specific project at a specific location.[4] Section 2 provides further detail on tailoring State guidance to local conditions.

ARB Climate Change Scoping Plan – 2008 and 2017

The 2008 Scoping Plan was developed to establish the State's pathway toward achievement of the AB 32 GHG target (i.e., return to 1990 levels by 2020). Within that document, ARB's original guidance to local governments was to adopt a GHG target of 15% reduction below current levels by 2020. Since publication of the 2008 Scoping Plan, SB 32 was adopted (2016) and directed a statewide 2030 GHG target (i.e., 40% below 1990 levels by 2030). ARB subsequently finalized a revised Scoping Plan in November 2017 to establish an achievement pathway for this new 2030 target.

The *2017 Climate Change Scoping Plan* provides the following updated guidance on target-setting for local governments:

> *"Recommended Local Plan-Level Greenhouse Gas Emissions Reduction Goals*
>
> CARB recommends statewide targets of no more than six metric tons CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. The statewide per capita targets account for all emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32 and the longer-term State emissions reduction goal of 80% below 1990 levels by 2050.[5]
>
> …CARB recommends that local governments evaluate and adopt robust and quantitative locally-appropriate goals that align with the statewide per capita targets and the State's sustainable development objectives and develop plans to achieve the local goals. The statewide per capita goals were developed by applying the percent reductions necessary to reach the 2030 and 2050 climate goals (i.e., 40% and 80%, respectively) to the State's 1990 emissions limit established under AB 32.[6]
>
> …Emissions inventories and reduction goals should be expressed in mass emissions, per capita emissions, and service population emissions. To do this, local governments can start by developing a community-wide GHG emissions target consistent with the accepted protocols as outlined in OPR's General Plan Guidelines Chapter 8: Climate Change. They can then calculate GHG emissions thresholds by applying the percent reductions necessary to reach 2030 and 2050 climate goals (i.e., 40% and 80%, respectively) to their communitywide GHG emissions target. Since the statewide per capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the State, it is appropriate for local jurisdictions to derive evidence-based local per capita goals based on local emissions sectors and population projections that are consistent with the framework used to develop the statewide per capita targets. The resulting GHG emissions trajectory should show a downward trend consistent with the statewide objectives."[7]

Based on this guidance, the 2017 Scoping Plan recommends that local governments use emissions intensity metrics to develop GHG targets for 2030 and beyond and refers to OPR's recommendation that local governments define both mass emissions and emissions intensity targets for their GHG reduction analyses. It also states that use of such targets as defined therein is consistent with the State's GHG

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[4] *Id. at 225-228 (EIR must compare the specific project's expected emissions to the existing physical environment in the project's vicinity – at a specific location - rather than a hypothetical business as usual (BAU) scenario based on statewide assumptions).*

[5] *California Air Resources Board. The 2017 Climate Change Scoping Plan, page 99. Available: <https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf>. Accessed May 24, 2019.*

[6] *Ibid*

[7] *Ibid. Pg. 100*

goals, as well as the recently signed Under 2 MOU[8] international agreement and the Paris Agreement.[9] This guidance also suggests that local governments that had been using a 2020 target and planning horizon should update to targets that are focused on the 2030 and 2050 State goals.

Office of Planning and Research (OPR) General Plan Guidelines

OPR recently updated its General Plan Guidelines, including a chapter on climate change that describes target-setting considerations for local governments.[10] The Guidelines suggest that target setting should be context-specific and tailored to a community's unique characteristics, while generally relating to the State's GHG targets. The Guidelines refer readers to ARB's guidance for local action and recommend analyzing a community's mass emissions and emissions intensity to support a fuller understanding of the issue. It is worth noting that OPR's guidance **does not** define required targets for local governments to include in their CAPs.

D. Climate Science-Driven Targets

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) stipulates that targets adopted to reduce GHG emissions are "science-based" if they are consistent with the magnitude of emission reductions required to limit the increase of global temperatures to 2°C above pre-industrial temperatures. From a policy perspective, this was interpreted as a need to reduce emissions by at least 80% below 1990 baseline levels by 2050 (this is also California's 2050 statewide GHG target expressed in EO-S-3-05).

In late 2015, advisory bodies to the IPCC reported that limiting the average global temperature increase to 2°C may not be adequate, as a 2°C increase would still result in irreparable damage to ecosystems, food security, and sustainable development in the world's most vulnerable communities, particularly small island nations and low-lying plains. They proposed an aspirational target to limit the average global temperature increase to 1.5°C to avoid the most severe impacts to these geographies. This latest literature suggests the need for a more significant magnitude of GHG reductions by cities in the developed world. To achieve the targets in the Paris Agreement, global "net-zero" emissions much be reached to maintain global temperature rise below 1.5°C. The Paris Agreement (Article 3.1) states that "Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof." As developed nations have a greater capacity to achieve such reductions given access to resources and existing quality of life, there is much incentive for such nations to drive the net-zero emissions reduction model.

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[8] *The Under 2 Memorandum of Understanding (MOU) is a subnational climate agreement developed by the Under2 Coalition to limit global temperature increases to less than 2°C through agreements from signatories to reduce their GHG emissions to 80-95% below 1990 levels by 2050 or limit to 2 MT CO_2e/capita per year by 2050. Available: <http://under2mou.org/>*

[9] *The Paris Agreement is an international agreement developed through the United Nations Framework Convention on Climate Change to keep global temperature rise below 2°C this century, and pursue efforts to limit temperature increases to 1.5°C. The Paris Agreement is based on nationally determined contributions to achieve its goal, which represent the ratifying parties' best efforts toward addressing climate change. Available: <http://unfccc.int/paris_agreement/items/9485.php>*

[10] *The Governor's Office of Planning and Research. General Plan Guidelines, Chapter 8 Climate Change. Available: <https://www.opr.ca.gov/docs/OPR_C8_final.pdf>*

E. City's Emissions Profile

As shown in Table 3 below, the City's 2017 total emissions were 5.71 million metric tons of CO_2e with the majority coming from transportation (63%) and energy use (32%). The remaining emissions come from solid waste and water & wastewater.

Table 3
City of San José 2015 Greenhouse Gas Inventory

Sector	MT CO_2e/yr	%
Transportation and Mobile Sources	**3,589,159**	**63%**
On-road Transportation	3,325,913	58%
Train/Heavy Rail	22,873	<1%
Public Transit	23,508	<1%
Aviation	28,310	<1%
Off-road Transportation	188,555	3%
Energy	**1,821,411**	**32%**
Residential	763,962	13%
Commercial	627,496	11%
Industrial	399,690	7%
Fugitive Emissions (oil/natural gas)	30,262	1%
Solid Waste	**271,862**	**5%**
Solid Waste	271,862	5%
Water and Wastewater	**29,235**	**1%**
Potable Water	20,822	<1%
Wastewater	8,413	<1%
Total	**5,711,667**	**100%**

The source of emissions should be considered during target setting since the City has more influence over some sources than others. For example, local building codes can be designed to reduce energy emissions from residential and commercial buildings, or incentive programs could be designed to trade in less efficient personal vehicles for high-efficiency or alternative fuel vehicle options. In contrast, a local government might have limited ability to influence technologies or fuels used in the aviation sector or to address fugitive emissions from natural gas distribution pipelines. These considerations are especially important for cities considering a net-zero or carbon neutrality GHG target; emissions sources that cannot be reduced would need to be offset in other ways to demonstrate target achievement.

F. Target Timeframes

Local GHG targets can be set to align with various objectives, such as State GHG goals, local funding cycles, or long-term planning horizons. From an implementation standpoint, most CAPs are designed with near-term (5-10 years), medium-term (10-20 years), and long-term (20+ year) targets to provide

waypoints for progress tracking. With this approach, it is helpful to identify the final target (long-term target) up front, and then set a series of interim targets (near- and medium-term targets) that lead to it. This ensures that near-term targets are aggressive enough to make progress toward the long-term target and supports strategic thinking on early-action items that will provide long-term benefits. In the case of the GGRS update, which will establish one medium-term target (i.e., 2030, 2035, or 2040), consistency with the statewide targets can help to ensure that the City's chosen target would support longer-term target achievement in the future (e.g., a 2050 GHG target).

California's GHG target years are 2020, 2030, and 2045/2050. Given the proximity to the State's 2020 target year, a GGRS target for 2030, 2035, or 2040 is tentatively proposed to allow the City time to establish and achieve the most meaningful GHG reduction targets. The 2030 target approach would link the City's target directly to the State's GHG planning timeframe, while a 2035 target year aligns with the existing San José GGRS long-term target year. Alternatively, the City could select a 2040 target year, which would align with the City's General Plan Update. However, a 2040 target would be a decade beyond the scope of the State's 2017 Scoping Plan that outlines a pathway to achieve the 2030 statewide target. Therefore, the extent of additional statewide action beyond the 2030 target year is unknown and might make it difficult to demonstrate a local target achievement pathway for 2040 (i.e., a 2040 target would be more aggressive than the State's 2030 target and additional statewide policies and programs would likely be required to achieve that more aggressive target, but the specifics of such expanded statewide action is currently unknown).

G. Other Local Government Targets

In addition to the guidance provided by State agencies, it can be helpful to consider the GHG targets of other local governments when defining a target because it reinforces the notion that cities are not acting alone, and therefore, are not putting themselves at a regional economic disadvantage through their climate change response. It is also important to consider the context of other cities' targets, including their baseline year, the types of reduction strategies included in their plans, and how they treat statewide actions, when referencing them as the basis for local target setting.

Table 4 shows different GHG targets from other local governments in the California.

Table 4
Other Local Government Greenhouse Gas Targets

City Name (CAP Year)	Target Type	Target Year				
		2020	2025	2030	2035	2050
City of LA (2017)	Mass emissions	Achieve 1990 levels	45% below 1990 levels	-	60% below 1990 levels	80% below 1990 levels[11]
City of Oakland (2018)	Mass Emissions	-	-	56% below 2005 levels	-	83% below 2005 levels
City of San Francisco (2013)	Mass emissions	-	-	40% below 1990 levels	-	80% below 1990 levels
City of Mountain View (2012)	Emissions intensity	15-20% below 2005 levels	-	30% below 2005 levels	-	-
City of Cupertino (2015)	Mass emissions	15% below 2010 levels	-	-	49% below 2010 levels	83% below 2010 levels

[11] *The City is currently evaluating GHG reduction pathways to achieve carbon neutrality by 2050.*

Table 4
Other Local Government Greenhouse Gas Targets

City Name (CAP Year)	Target Type	Target Year				
		2020	2025	2030	2035	2050
City of Santa Clara (2013)	Mass emissions	15% below 2008 levels	-	-	55% below 2008 levels	-
County of Santa Clara (2007)	Mass emissions	20% below 2007 levels	30% below 2007 levels	40% below 2007 levels	50% below 2007 levels	80% below 2007 levels
City of Palo Alto (2016)	Mass emissions	-	-	80% below 1990 levels	-	-
City of Sunnyvale (2019)	Mass emissions	-	-	40% below 1990 levels	-	80% below 1990 levels

As shown in the examples above, most of the communities established a mid-term target for 2030 or 2035, and five have set long-term targets that align with the statewide 2050 target. In addition, the City of Los Angeles is considering a carbon neutrality target, though it has not yet formally adopted one. In the table, only the City of Mountain View has established emissions intensity targets so far. This may be because many of the reference CAPs were prepared prior to the 2017 Scoping Plan Update and OPR's General Plan Guidance, which both reference emissions intensity targets as acceptable options for local governments and recommend their use along with mass emissions targets to present a holistic understanding of emissions in the community. This does not suggest that San José could not adopt an emissions intensity target, but that it might be useful to include mass emissions targets for reference, as well to better support comparisons with neighboring communities' commitments.

H. 2030, 2035, and 2040 Target Options for San José

Target selection is an iterative process that is typically informed by local needs and policy guidance, direction from elected officials, and analysis of emissions forecasts and GHG reduction opportunities. Table 5 on the following page presents several target options for the 2030, 2035, and 2040[12] planning years that can be evaluated during the subsequent phases of this project. Target selection considerations are provided for each option to describe whether the potential targets might be appropriate for use at the local level (i.e., Recommended, Maybe, Not Recommended), and what potential challenges the City might face in selecting each target.

We preliminarily recommend the targets shown in Option D for the City's GGRS because they align with the most current guidance from ARB, OPR, and indirectly with the California Supreme Court's Newhall Ranch decision[13]; are tailored to match the emissions sectors included locally in the City's inventory; and provide an easy calculation metric for tracking future target progress.

[12] Target options A and B include a 2020 target as a reference point upon which the subsequent targets are based.

[13] The Newhall Ranch case was not about a communitywide climate action plan, but rather a new development project and that project's GHG threshold. This is an important distinction because communitywide CAPs consider emissions from existing and future development, whereas a project's CEQA analysis only considers emissions from new development associated with the project. However, the guidance provided in the Newhall Ranch case decision is still interpreted as a good analog for CAP target setting because it affirms the connection between State's GHG legislative framework, local agency determination, and CEQA determination.

Target Options A, B, and F represent more aggressive reduction levels than Option D and could be considered further following the emissions forecasting and GHG reduction analysis to better understand the City's capacity for greater GHG reductions.

We do not recommend Options C or E for further consideration at this time. They were included in this memo because they fall within the realm of potential target options but given the City's existing emissions context and the other target options available neither represents the best available option.

Table 5
2030, 2035, and 2040 Greenhouse Gas Target Options

Option	Target	Target Selection Considerations
Target Option A – Statewide Inventory Mass Emissions Target – EO-S-3-05		
2020	0% below 2017 levels (5,711,667 MT CO_2e/yr)	**Maybe:** The State established mass emissions targets that could be applied locally. However, these targets are aggressive and may not be achievable locally. **Method**: The State's 2017 inventory is not yet available; however, the 2016 inventory results are approximately equal to a return to 1990 emissions levels statewide. Assuming the State's 2017 inventory would show no change from 2016 levels or a slight decrease in keeping with the long-term trajectory of statewide emissions, the City could interpret its 2017 inventory as a return to 1990 levels and then directly apply the State's GHG targets to that baseline level to demonstrate consistency. Assumes linear interpolation of the State's 2030 target and Executive Order S-3-05 target of 80% below 1990 levels by 2050.
2030	40% below 2017 levels (3,426,999 MT CO_2e/yr)	
2035	50% below 2017 levels (2,855,833 MT CO_2e/yr)	
2040	60% below 2017 levels (2,284,666 MT CO_2e/yr)	
Target Option B – Statewide Inventory Mass Emissions Target – EO-B-55-18		
2020	0% below 2017 levels (5,711,667 MT CO_2e/yr)	**Maybe:** The State established mass emissions targets that could be applied locally. However, these targets are aggressive and may not be achievable locally. **Method**: Same approach as Option A, except that it assumes linear interpolation of the State's 2030 target and Executive Order B-55-18 carbon neutrality target by 2045
2030	40% below 2017 levels (3,426,999 MT CO_2e/yr)	
2035	60% below 2017 levels (2,284,666 MT CO_2e/yr)	
2040	80% below 2017 levels (1,142,333 MT CO_2e/yr)	
Target Option C – 2017 Scoping Plan Emissions Intensity Targets		
2030	6.0 MT CO_2e/capita (7,164,066 MT CO_2e/yr)	**Not Recommended:** Not an appropriate use of ARB guidance in Scoping Plan Update because targets assume all statewide inventory sectors are included in local inventory; City's inventory only includes a sub-set of statewide sectors. The City's baseline per capita emissions are already lower than the 2030 target shown here, which could make selection of this target challenging from a public messaging perspective (i.e., it would allow local emissions to increase through 2030 before declining). **Method**: Direct application of per capita targets included in 2017 Scoping Plan.
2035	5.0 MT CO_2e/capita (6,269,555 MT CO_2e/yr)	
2040	4.0 MT CO_2e/capita (5,255,244 MT CO_2e/yr)	

Table 5
2030, 2035, and 2040 Greenhouse Gas Target Options

Option	Target	Target Selection Considerations
Target Option D – Local Emissions Source-Based Intensity Targets		
2030	4.29 MT CO_2e/capita (5,123,954 MT CO_2e/yr); 2.94 MT CO_2e/SP (5,280,218 MT CO_2e/yr)	**Recommended:** These emissions intensity targets are consistent with guidance from ARB and OPR to establish emissions intensity targets based on the local emissions context **Method**: Calculates per capita and per service population emissions targets based on a sub-set of statewide emissions sectors that are also included in City's inventory. See Section 2 of this memo for a detailed description of this methodology.
2035	3.46 MT CO_2e/capita (4,335,912 MT CO_2e/yr); 2.37 MT CO_2e/SP (4,575,656 MT CO_2e/yr)	
2040	2.69 MT CO_2e/capita (3,528,445 MT CO_2e/yr); 1.84 MT CO_2e/SP (3,803,055 MT CO_2e/yr)	
Target Option E – Local Emissions (without Passenger Vehicles) Intensity Targets		
2030	2.81 MT CO_2e/capita (3,355,734 MT CO_2e/yr); 1.93 MT CO_2e/SP (3,458,072 MT CO_2e/yr)	**Not Recommended**: This option has not been applied in any other known cities to date; its results are very similar to Option A, which could be a more defensible target since it is a clearer application of the State's own adopted targets. **Method**: Same as Option D, except this approach also excludes emissions from passenger cars and light duty trucks, which will be addressed at the regional level through SB 375 legislation.[14] *Note: This option proposes removing only the passenger vehicle emissions from consideration and not mobile emissions from other types of vehicles. This would remove only GHG emissions that are specifically addressed through the SB 375 process.*
2035	2.26 MT CO_2e/capita (2,839,742 MT CO_2e/yr); 1.55 MT CO_2e/SP (2,996,759 MT CO_2e/yr)	
2040	1.76 MT CO_2e/capita (2,311,033 MT CO_2e/yr); 1.21 MT CO_2e/SP (2,490,895 MT CO_2e/yr)	

[14] *The Sustainable Communities and Climate Protection Act of 2008 (SB 375) directs the California Air Resources Board to set regional targets for GHG reductions from passenger vehicles. The targets are designed to align with the State's GHG reduction targets and are implemented through a Regional Transportation Plan/Sustainable Communities Strategy prepared by California's metropolitan planning organizations, including the Association of Bay Area Governments of which San José is a member.*

Table 5 2030, 2035, and 2040 Greenhouse Gas Target Options		
Option	**Target**	**Target Selection Considerations**
Target Option F – Net Carbon Neutrality Target – Emissions Intensity Trajectories		
2030	2.95 MT CO_2e/capita (3,518,792 MT CO_2e/yr); 2.12 MT CO_2e/SP (3,806,384 MT CO_2e/yr)	**Maybe**: The 2030 option here may be achievable with known statewide actions and some aggressive local action; the 2035 and 2040 targets are likely too ambitious to demonstrate a target achievement pathway at this time without including some very aggressive action implementation assumptions. Achieving full carbon neutrality would require GHG reductions in emissions sub-sectors over which the City does not exercise direct control (e.g., aviation, rail transport) and would be contingent upon partnerships with external agencies/organizations or investment in carbon offset programs. **Method**: Assumes net-zero emissions achieved by 2045, with interim targets defined based on a linear trajectory from the City's 2017 baseline emissions intensity levels (i.e., per capita, per service population) to net zero emissions in 2045.
2035	1.96 MT CO_2e/capita (2,463,546 MT CO_2e/yr); 1.41 MT CO_2e/SP (2,729,016 MT CO_2e/yr)	
2040	0.98 MT CO_2e/capita (1,290,615 MT CO_2e/yr); 0.71 MT CO_2e/SP (1,460,221 MT CO_2e/yr)	

I. Target Option Summary

Figure 2 on the following page illustrates each of the target options presented above in terms of mass emissions. For example, the per capita targets were multiplied by the City's population forecast in each target year to calculate the total emissions allowance for each year (e.g., 6.0 MT CO_2e/capita * 1,194,011 residents = 7,164,066 MT CO_2e). Population and employment forecasts were taken from the City's General Plan Update Land Use Element. The result is that each target option, excluding Option C, would result in mass emissions reductions below the 2017 base year levels; Option C is not recommended for the reasons described in Table 5.

Option D would result in gradual emissions reductions and aligns with the guidance for local governments in the 2017 Scoping Plan to consider a per capita emissions target. Options A, B, E, and F are more aggressive than Option D and would therefore require greater local reductions to achieve.

Options A and B have the same 2030 target, which is the State's adopted 2030 target; Option A then follows a more gradual trajectory to the State's 2050 target of 80% below 1990 levels, while Option B follows a more aggressive trajectory to the State's 2045 carbon neutrality target. Option E follows a similar trajectory as Option A, while Option F follows a similar carbon neutrality trajectory as Option B.

Figure 2 – Target Options in Mass Emissions

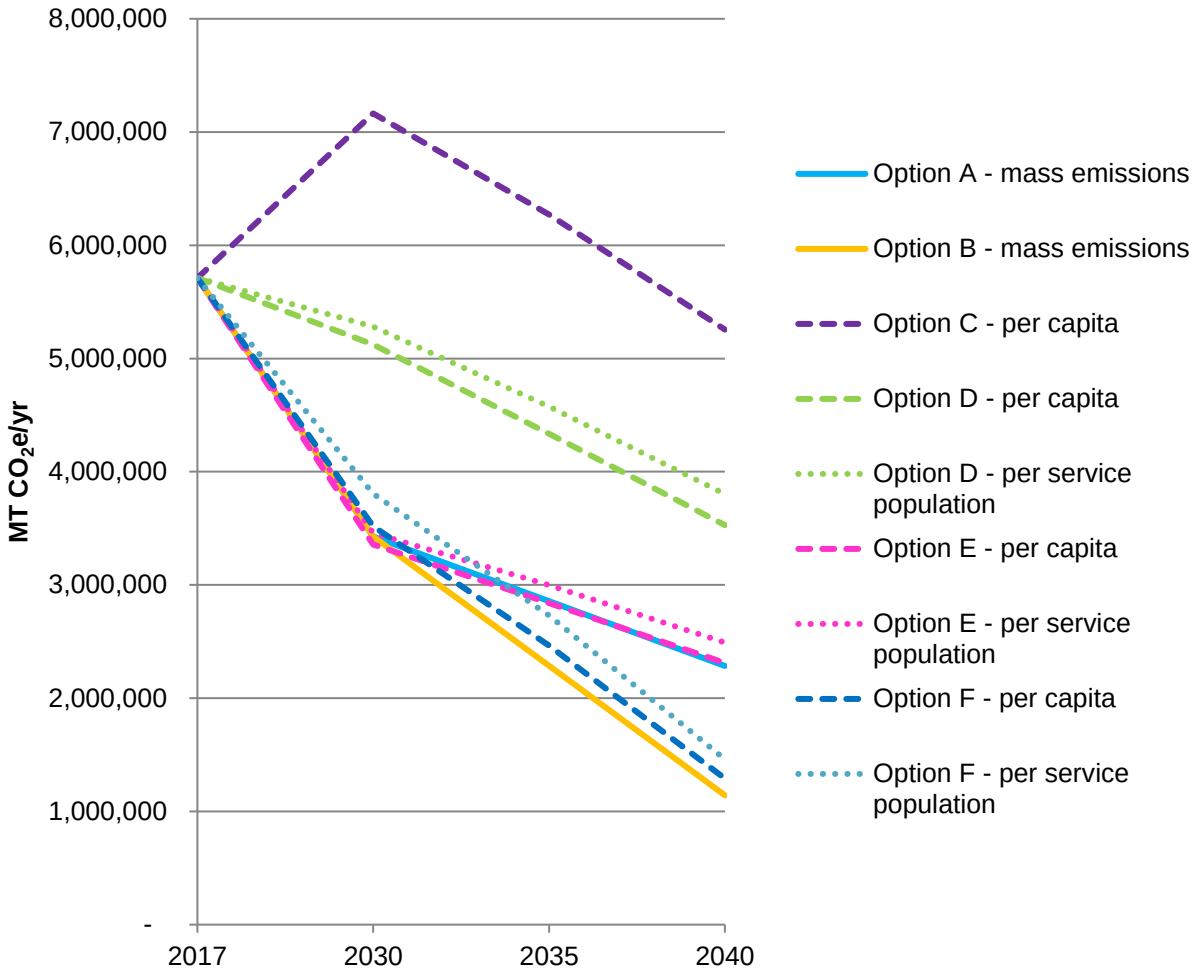


Figure 3 represents the options as per capita targets. As mentioned above, Option C would allow per capita emissions to increase in 2030 from existing base year levels and is not recommended as a viable target option. All other options would result in per capita emissions improvements. Option D reflects gradual improvement in emissions intensity over time, while Options A, B, E, and F would each require more aggressive action in the near-term (i.e., 2030).

Figure 3 – Target Options – Per Capita

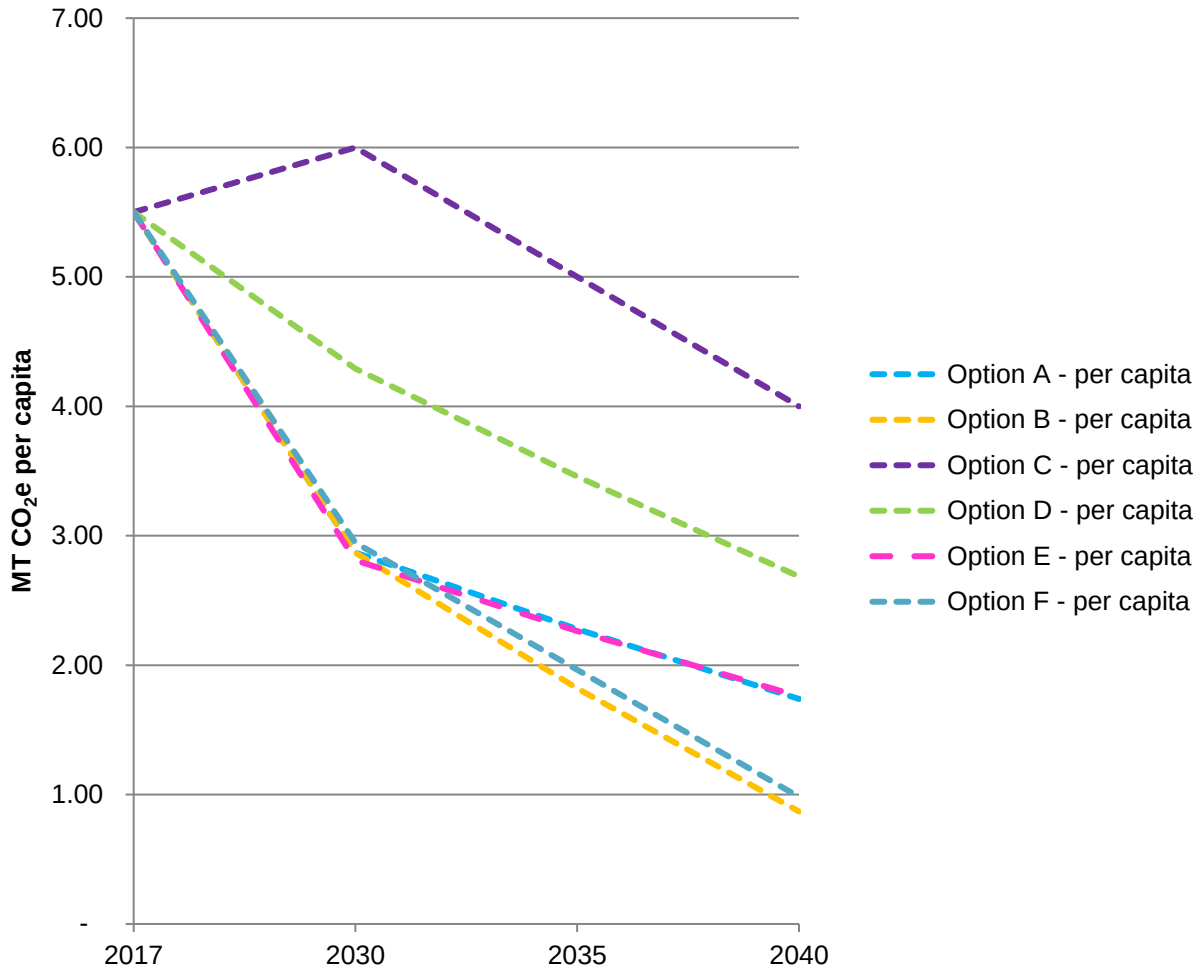
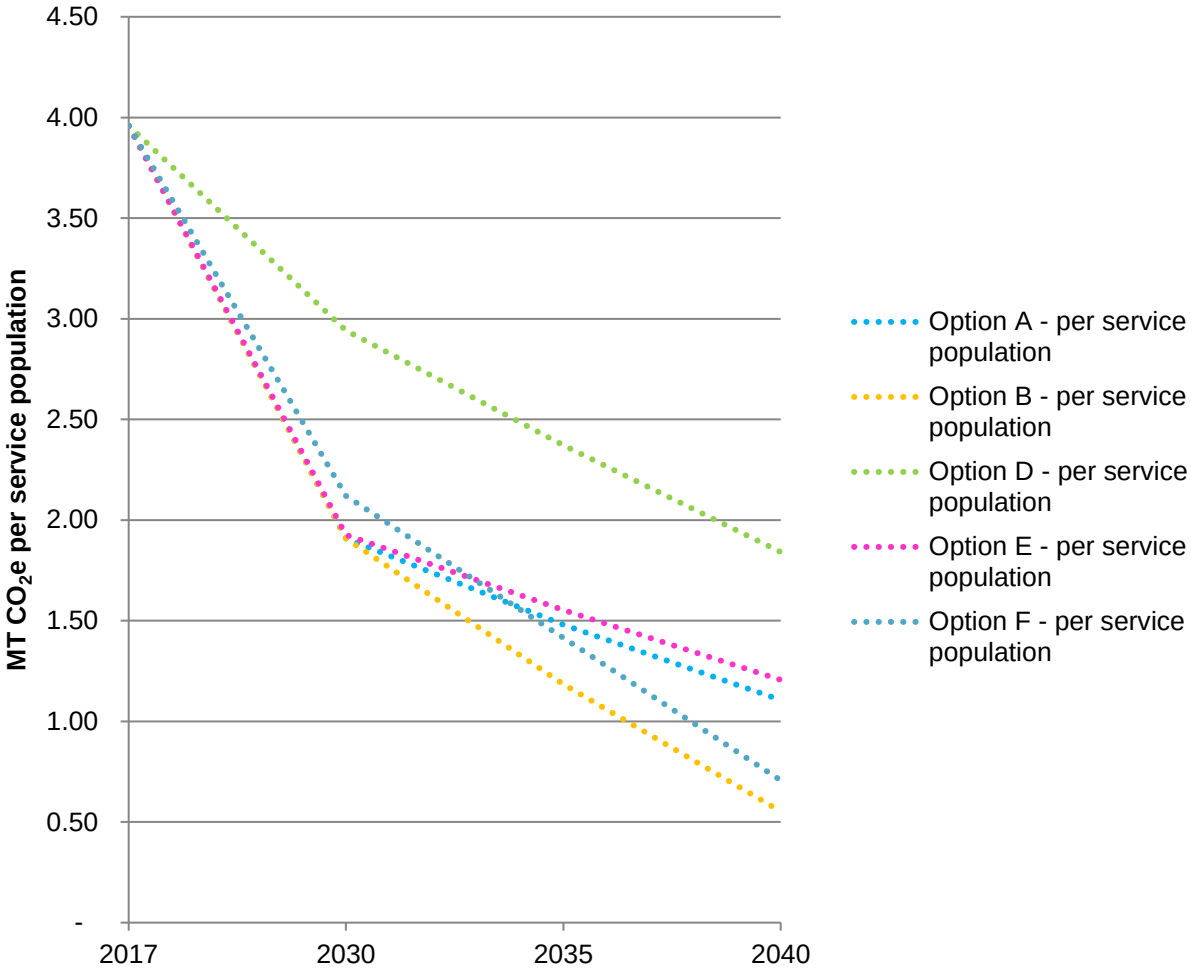


Figure 4 illustrate the options as per service population targets. Note there is no per service population version of Target Option C, which is described in the 2017 Scoping Plan explicitly as per capita targets. Each of the target options would result in reduced emissions intensity on a per service population basis. Option D represents a more gradual improvement over time, while Options A, B, E, and F are more aggressive in the near-term (i.e., 2030), with trajectories that become less aggressive in subsequent years.

Figure 4 – Target Options – Per Service Population



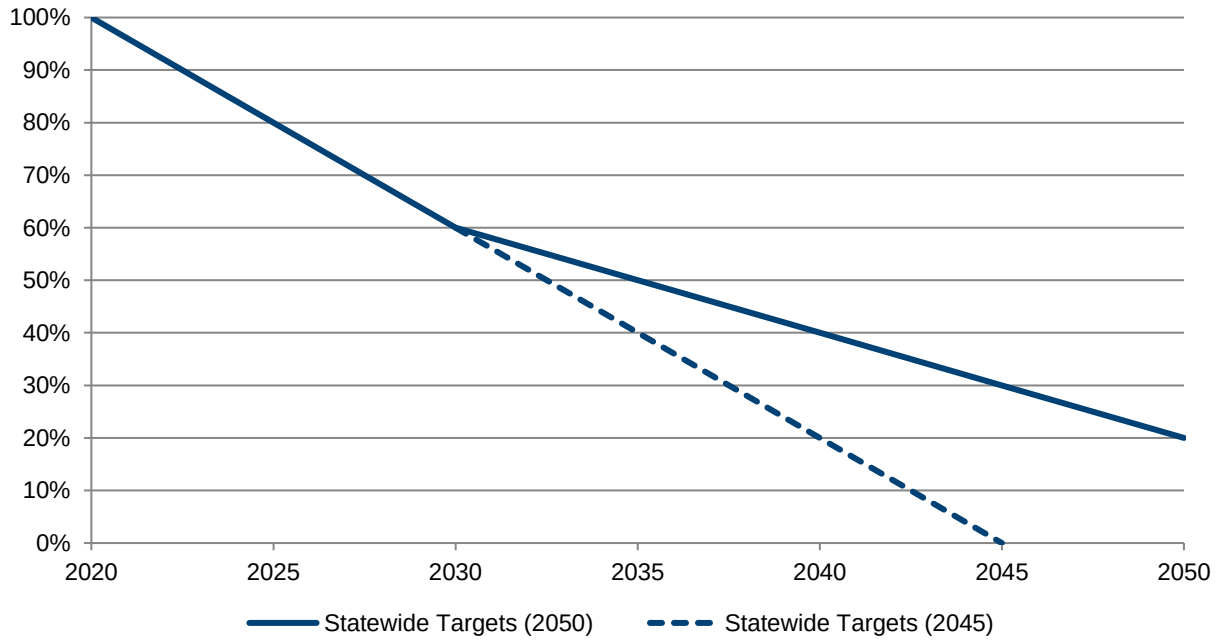
Section 2 – Target Calculation Methodology

A. Statewide Targets

In 2006, California took steps to develop a long-term response to the challenges of climate change through adoption of Assembly Bill 32 (AB 32). As the first-of-its-kind legislation in the country, AB 32 established a statewide GHG emissions reduction target to return to 1990 emissions levels by the year 2020. In addition to the near-term 2020 target codified in AB 32, Executive Order (EO) S-3-05 was signed by then-Governor Schwarzenegger in 2005 to establish a long-term emissions target of 80% below 1990 levels by 2050. Then, SB 32 was signed in 2016 to establish an interim target between the State's 2020 and 2050 targets, calling for reductions of 40% below 1990 levels by 2030. In 2018, then-Governor Brown signed EO B-55-18 to establish a 2045 carbon neutrality target for the state. Figure 5 illustrates the trajectory of the State's targets from 2020 through 2050 as a solid line, and from 2020 through 2045 as a dashed line to illustrate both long-term Executive Order GHG targets.

For purposes of the target setting calculation methodology described in this section, the State's 2050 GHG targets expressed in EO S-3-05 are referenced and used to calculate the 2040 interim target options. This is to align the target options with the local government guidance provided in the 2017 Scoping Plan, which also references the State's 2050 climate goals.

Figure 5 – Statewide Emissions Target Trajectory



Statewide Emissions Inventory

AB 32 (2006) required that the Air Resources Board (ARB) to determine the statewide greenhouse gas emissions level in 1990, from which progress toward achievement of the emissions targets shown in Figure 1 can be measured. AB 32 also required ARB to approve a statewide greenhouse gas emissions

limit, equal to the 1990 level, as a limit to be achieved by 2020. In 2014, ARB adopted a revised 2020 emissions limit of 431 MMT CO_2e. This new emissions limit replaced the original 1990 limit approved in 2007. The currently approved 1990 limit (i.e., 431 MMT CO_2e) includes emissions from all sectors within the state. Table 6 shows the State's 2020, 2030 and 2050 emissions targets based on the approved 1990 limit. 2035 and 2040 target year values were interpolated between the 2030 and 2050 targets to correspond with the original San José GGRS mid-term target year (i.e., 2035) and the San José General Plan horizon year (i.e., 2040).

Table 6
Statewide Emissions Inventory and Reduction Targets

	1990	2020	2030	2035	2040	2050
Statewide Emissions Targets (MMT CO_2e)	431.0 [1]	431.0 [1]	258.6 [2]	n/a	n/a	86.2 [4]
Interpolated Mid-term Reduction Target	n/a	n/a	n/a	215.5 [2]	172.4 [3]	n/a
Amount below 1990 Levels	0%	0%	40%	50%	60%	80%

Source: AECOM 2019
Note: MMT CO_2e = million metric tons of carbon dioxide equivalent
[1] California 1990 Greenhouse Gas Emissions Level and 2020 Limit, ARB: <http://www.arb.ca.gov/cc/inventory/1990level/1990level.htm>
[2] 40% below 1990 levels per SB 32
[3] Interpolated between 2030 and 2050 targets
[4] 80% below 1990 levels per EO-S-3-05

Local Application of Statewide Emissions Targets

Local governments in California often select the same emissions targets as the State when preparing GHG analyses. However, community GHG inventories often do not include all of the same emissions sectors as the statewide inventory. For example, community inventories may not include agricultural or forestry emissions. Therefore, a scaled version of the full statewide emissions inventory was developed as part of the City's GGRS analysis, which is based on the emissions inventory sectors occurring in San José. The revised inventory is more appropriate for use in community GGRS target-setting because it draws a clearer correlation between the City's GHG target and its relationship to the State's own targets.

Table 7 on the following page presents a revised version of the 1990 statewide emissions shown in Table 6 and includes only the sectors and sub sectors included in the San José communitywide inventory.

Table 7 Adjusted Statewide Emissions Inventory – Local Emissions Sources			
Main Sector / Sub Sector Level 1	**Total Emissions (MMT CO_2e/yr) [1]**	**Adjusted Emissions – Local Sources (MMT CO_2e/yr)**	**Notes/Adjustments**
Agriculture & Forestry	18.9	0.0	*Excluded*
Commercial	14.4	13.9	Excludes National Security emissions from Sub Sector Level 1
Electricity Generation (Imports)	61.5	61.5	Includes all emissions
Electricity Generation (In State)	49.0	45.0	Excludes CHP emissions from Sub Sector Level 1 for non-natural gas fuel types
Industrial	105.3	13.6	Industrial emissions included, except as described in sub sectors below:
CHP: Industrial	*9.7*	*0.0*	*Excluded*
Flaring	*0.2*	*0.0*	*Excluded*
Landfills	*7.4*	*7.4*	
Manufacturing	*32.1*	*0.7*	*Includes only Construction emissions from Sub Sector Level 3*
Mining	*0.03*	*0.0*	*Excluded*
Not Specified	*2.7*	*0.0*	*Excluded*
Oil & Gas Extraction	*14.8*	*0.0*	*Excluded*
Petroleum Marketing	*0.02*	*0.0*	*Excluded*
Petroleum Refining	*32.8*	*0.0*	*Excluded*
Pipelines	*1.9*	*1.9*	
Waste Water Treatment	*3.6*	*3.6*	
Not Specified	1.3	0.0	*Excluded*
Residential	29.7	29.7	Includes all emissions
Transportation	150.6	150.6	Includes all emissions
Total	**430.7**	**314.3**	

Notes: Sectors/sub-sectors may not sum exactly due to rounding

[1] California 1990 Greenhouse Gas Emissions Level and 2020 Limit by Sector, ARB: <http://www.arb.ca.gov/cc/inventory/1990level/1990level.htm>

Table 8 on the following page presents the adjusted statewide emissions based on the local emissions sources occurring in the San José community inventory, with the corresponding statewide emissions targets for the 2020, 2030, 2035, 2040, and 2050 target years.

Table 8
Adjusted Statewide Emissions Inventory, Forecasts, and Reduction Targets – Local Emissions Sources

	1990	2020	2030	2035	2040	2050
Statewide Emissions Targets (MMT CO_2e)	314.3 [1]	314.3 [1]	188.6 [2]	157.1 [3]	125.7 [3]	62.9 [4]
Amount below 1990 Levels	0%	0%	40%	50%	60%	80%

Source: AECOM 2019
Note: MMT CO_2e = million metric tons of carbon dioxide equivalent
[1] See Table 7 for statewide inventory source and local emissions source adjustments.
[2] 40% below 1990 levels (i.e., 2020 target levels) per SB 32
[3] Interpolated between 2030 and 2050 targets
[4] 80% below 1990 levels (i.e., 2020 target levels) per EO-S-3-05

B. Emissions Intensity Targets

Statewide emissions reduction targets can be normalized and expressed on a per-capita or per-service population basis to represent the rate of emissions needed statewide to achieve the AB 32 and SB 32 targets. This approach is often called an “emissions intensity” target. For example, to create an emissions intensity target that represents SB 32, one would divide the statewide emissions target for 2030 (shown in Table 7) by the statewide population forecasts for 2030. This would yield an emissions “budget” for each California resident and demonstrate that emissions levels in a community are the same as what would be required statewide to achieve the SB 32 GHG reduction target. As noted previously, ARB’s Proposed Scoping Plan recommends an emissions intensity target approach for local governments for 2030 and 2050 target years. Table 9 presents statewide population and employment forecasts through 2040. The year 2026 is presented in this table because updated employment forecasts are available from the State Employment Development Department for this year.

Table 9
Statewide Demographic Projections

	2017	2026	2030	2035	2040
Population	39,613,019 [1]	42,655,695 [1]	43,939,250 [1]	45,440,735 [1]	46,804,202 [1]
Employment	18,282,910 [2]	20,022,700 [3]	20,625,204 [4]	21,330,005 [4]	21,970,0215 [4]
Service Population (population + employment)	57,895,929	62,678,395	64,564,454	66,770,740	68,774,223

Source: AECOM 2019
[1] DOF Table P-1 Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year increments. January 2018. Available online at: <http://www.dof.ca.gov/Forecasting/Demographics/projections/>
[2] Interpolated from Employee Development Department (EDD) Employment Projections for 2016 (18,089,600) and 2026 (20,022,700). See Note 3 for employment estimation source.
[3] Employee Development Department (EDD) Employment Projections. Published August 2018. Available online at: <http://www.labormarketinfo.edd.ca.gov/data/employment-projections.html>
[4] EDD does not provide employment estimates to 2040, so the ratio of employment to population estimated in 2026 (i.e., 46.9%) was applied to the DOF population estimates for 2030, 2035, and 2040.

Emissions Intensity Targets – Total Statewide Inventory

Using the demographic forecasts from Table 9 and the statewide GHG targets from Table 6, statewide emissions intensity targets can be developed for the 2030, 2035, and 2040 target years, which are presented in Table 10.

Table 10
Statewide Emissions Intensity Baseline and Targets

	2030	2035	2040
Emissions Targets (MT CO_2e/yr) [1]	258,600,000	215,500,000	172,400,000
Population [2]	43,939,250	45,440,735	46,804,202
Service Population (SP) [2] (population + employment)	64,564,454	66,770,740	68,774,223
Per Capita Emissions Intensity Targets (MT CO_2e/capita/yr)	**5.89**	**4.74**	**3.68**
Per Service Population Emissions Intensity Targets (MT CO_2e/SP/yr)	**4.01**	**3.23**	**2.51**

Source: AECOM 2019
Note: MT CO_2e = metric tons of carbon dioxide equivalent; Service Population (SP) = population + employment
[1] See Table 6 for sources.
[2] See Table 9 for sources.

Emissions Intensity Targets – Local Emissions Sources

Local emissions intensity targets can be based upon the adjusted statewide emissions inventory to reflect local emissions sources. The calculation of local emissions intensity targets needs to incorporate the employment projections associated with the emissions activities for which emissions are being considered. Table 11 presents the revised statewide demographic projections reflecting only those employment sectors included in the local emissions sources from Table 7.

Table 11
Statewide Demographic Projections – Local Emissions Sources Employment

	2026	2030	2035	2040
Population	42,655,695 [1]	43,939,250 [1]	45,440,735 [1]	46,804,202 [1]
Employment	19,561,700 [2]	20,150,332 [3]	20,838,906 [3]	21,464,186 [3]
Service Population (population + employment)	62,217,395	64,089,582	66,279,641	68,268,388

Source: AECOM 2019
[1] DOF Table P-1 Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year increments. January 2018. Available online at: <http://www.dof.ca.gov/Forecasting/Demographics/projections/>
[2] Employee Development Department (EDD) Employment Projections. Published August 2018. Available online at: <http://www.labormarketinfo.edd.ca.gov/data/employment-projections.html>. Sorted to remove jobs from: 11000000 – Total Farm and 10000000 – Mining and Logging.
[3] EDD provides 2- and 10-year employment estimates that currently extend to 2026, so the ratio of employment to population estimated in 2026 (i.e., 45.9%) was applied to the DOF population estimates for 2030, 2035, and 2040 to estimate employment in those years.

Based on the adjusted statewide demographic projections shown above, Table 12 shows the emissions intensity targets most applicable for use in San José's GGRS given the emissions sources included in its communitywide inventory.

Table 12
Local Emissions Intensity Targets

	2030	2035	2040
Emissions Targets (MT CO_2e/yr) [1]	188,560,000	157,130,000	125,700,000
Percent Mass Emissions Reduction	40% below 1990	50% below 1990	60% below 1990
Population [2]	43,939,250	45,440,735	46,804,202
Service Population (SP) [2]	64,089,582	66,279,641	68,268,388
Per Capita Emissions Intensity Targets (MT CO_2e/capita/yr)	**4.29**	**3.46**	**2.69**
Per Service Population Emissions Intensity Targets (MT CO_2e/SP/yr)	**2.94**	**2.37**	**1.84**

Source: AECOM 2019
Note: MT CO_2e = metric tons of carbon dioxide equivalent; Service Population (SP) = population + employment
[1] See Table 8 for sources
[2] See Table 11 for sources.