THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

INFORMATION

- Board of Directors
  Engineering and Operations Committee

6/9/2020 Board Meeting

9-2

Subject

Review of Greenhouse Gas Reduction Target for Metropolitan's Proposed Climate Action Plan

Executive Summary

In October 2018, Metropolitan's Board of Directors authorized the development of a Climate Action Plan (CAP). A CAP will streamline the California Environmental Quality Act (CEQA) greenhouse gas (GHG) analysis and mitigation process for future capital projects. In November 2019, staff provided an oral report on Metropolitan's past and current emissions profile, as well as a forecast of future emissions. In March 2020, staff provided an oral report on a recommended emissions quantification and tracking protocol that will meet the needs of Metropolitan, meet local and statewide GHG reduction goals, and ensure compliance with CEQA. Staff has since analyzed potential targets for GHG emission reductions and recommends that Metropolitan set a GHG reduction target of carbon neutrality by 2045. Staff will request that the Board adopt the CAP, including an appropriate GHG reduction target, and certify the Program Environmental Impact Report in early 2021.

Details

Background

The Global Warming Solutions Act of 2006 (AB 32) established a statewide target to reduce GHG emissions to 1990 levels by the year 2020. In 2016, Governor Jerry Brown signed Senate Bill (SB) 32, which furthered California's efforts to reduce climate change impacts by establishing a new, more stringent GHG reduction target of 40 percent below 1990 levels by the year 2030. In response to SB 32, the California Air Resources Board developed California's 2017 Climate Change Scoping Plan (Scoping Plan), which not only charts a path to the 2030 target, but also incorporates a new long-term goal established through Executive Order (EO) B-30-15 that looks beyond 2030 to a goal of 80 percent below 1990 levels by the year 2050. Since the Scoping Plan was released in 2017, Governor Brown signed EO B-55-18, which set an even more progressive long-term goal of carbon neutrality by 2045. While the Scoping Plan does not impose specific GHG reduction requirements for public water agencies, it does suggest that water agencies should "where technically feasible and cost-effective … adopt a long-term goal to reduce GHGs by 80 percent of 1990 levels by 2050, and thereafter move towards low carbon or net-zero carbon water management systems."

Metropolitan's Leadership Role in Reducing GHG Emissions

Metropolitan has a long history of demonstrated leadership in climate planning by promoting water conservation and implementing energy-saving programs that reduce GHG emissions. In 1990, Metropolitan's Conservation Credits Program provided incentives for water savings upgrades that have reduced an average of 158,000 acre-feet of water annually. In 1991, Metropolitan reduced its purchases from coal-fired power plants, which resulted in significant GHG reductions from its 1990 levels. In 2005, Metropolitan became the first water agency to voluntarily report its GHG emissions to the newly established Climate Registry, allowing Metropolitan to accurately quantify its emissions and track its savings.

In addition, Metropolitan has implemented numerous energy efficiency and renewable energy projects like replacement of outdated light fixtures with LED lamps, installation of solar power at three of its five treatment plants, and was honored with the distinction of Leadership in Energy and Environmental Design (LEED) Platinum certification at the Diamond Valley Lake Visitors' Center and LEED Silver certification at the Union

Station Headquarters facility. Further emissions reductions have been realized from the implementation of Rideshare programs, installation of electric vehicle charging stations for employee use, and the transition of some fleet vehicles to plug-in hybrid technology. Due to its significant efforts, Metropolitan is in the unique position of already having met the state's current GHG reduction target of 40 percent below 1990 levels in most years, and is well positioned to further advance California's GHG reduction goals and take advantage of the opportunity to offset GHG emissions from future capital projects by preparing a CAP.

Climate Action Plan to Offset GHG Emissions

In 2010, the CEQA Guidelines were amended to require the analysis of a project's GHG emissions by considering consistency with state and local plans to reduce GHG emissions and to apply mitigation if emissions are considered significant. GHG mitigation is accomplished by either identifying mitigation on a project-by-project basis, which requires the commitment to and implementation of specific measures to reduce project impacts, or through the use of a qualified GHG reduction plan or CAP. Due to increasingly stringent GHG emission standards, it can be challenging and costly to identify sufficient project-specific mitigation measures to reduce project impacts to a less than significant level. A CAP provides a cost-effective alternative to project-specific mitigation.

A CAP is a comprehensive programmatic planning document designed to streamline the environmental review of GHG emissions from future capital projects by identifying GHG reduction actions and programs that offset future GHG emissions. CEQA requires that a CAP contain: (1) an emissions inventory; (2) a forecast of future emissions; (3) a GHG reduction target that is consistent with state and local regulations; (4) actions to reduce or eliminate GHG emissions; and (5) adoption through a public process. Metropolitan has completed items: (1) and (2) and is now seeking Board guidance on a GHG reduction target (3). The GHG reduction target will be the foundation of Metropolitan's CAP, and Metropolitan's progress will be measured against this target.

GHG Reduction Target Analysis

At the March 9, 2020 Engineering and Operations Committee meeting, staff recommended an emissions reporting strategy and tracking mechanism to ensure Metropolitan is making progress towards meeting the recommended GHG reduction target. Staff recommended using a per capita reporting strategy, which captures how Metropolitan's substantial investments in water conservation have led to a reduction in water consumption in spite of a growing population in its service area. Staff also recommended using a carbon budget method for tracking Metropolitan's emissions. Carbon budget tracking is recognized internationally and is the method used by the International Panel for Climate Change to set the worldwide and statewide climate reduction goals aimed at averting a worldwide climate crisis. This approach sets a total GHG budget that is incrementally decreased over time to meet a stated GHG reduction target. This approach allows flexibility in higher pumping years while still ensuring Metropolitan is moving towards its adopted GHG reduction goal **(Attachment 1)**.

Staff has now completed an analysis of opportunities to achieve GHG reductions, estimated costs to achieve each GHG reduction target, and identified a realistic pathway to meet the recommended target.

GHG Reduction Targets Considered

Two GHG reduction targets were considered for the CAP: (1) the current state target of 40 percent below 1990 levels by the year 2030; and (2) the Governor's goal of carbon neutrality by the year 2045. The targets are consistent with state and local goals, as required by CEQA, and represent both the current state target and the next expected GHG reduction target to be mandated by the state. Target selection is also driven by the regulatory framework in place at the time a CAP is developed and the ability to identify realistic, achievable measures that can be implemented to meet that target. The minimum target that must be adopted in a CAP is the current state target of 40 percent below 1990 levels by the year 2030. The most recent EO B-55-18 sets a state goal of carbon neutrality by the year 2045. While not adopted as a state target, it is likely to become law in the near future.

While adoption of carbon neutrality is not legally required for Metropolitan, adopting the target set in the Governor's EO B-55-18 would be consistent with the state's goals and would enable Metropolitan to mitigate GHG emissions for its projects under CEQA. Metropolitan is well situated to meet this target because of its unique emissions profile, approximately 86 percent of which is from the purchase and consumption of electricity. This portfolio allows Metropolitan to leverage the growing market of cost-saving opportunities to purchase, store, and generate green or carbon-free energy to reduce the purchase of energy from GHG producing sources.

Setting a GHG reduction target of carbon neutrality by 2045 has an added benefit of ensuring that Metropolitan is planning now to identify and implement actions that could provide cost-effective GHG reduction benefits in the future. For example, many low-cost loan and grant programs currently exist for agencies to add electric vehicle charging infrastructure for fleet vehicles. Without the benefit of a long-range planning strategy, Metropolitan might miss these cost-saving opportunities by opting to wait until legislation has passed that will require Metropolitan to meet clean vehicle requirements.

Staff recommends that Metropolitan adopt a target of carbon neutrality by 2045.

Comparative Analysis of Mitigation Cost vs. Cost to Achieve GHG Reduction Targets

To compare the cost to Metropolitan of achieving the state's target of 40 percent below 1990 levels by the year 2030 and the proposed goal of carbon neutrality by 2045, staff used the completed projected emissions inventory, which included emissions from the proposed Regional Recycled Water Program (RRWP) and compared the cost to purchase carbon offsets on the open market with the cost of the programs needed to reach the required 2030 target and the proposed 2045 state goal.

The purchase of compliance offsets through a carbon banking program through 2030 was estimated at $5.9 million, and the cost through 2045 was estimated at approximately $18 million (in today's dollars)[1]. In contrast, by tracking Metropolitan's emissions with the CAP, Metropolitan can leverage the emissions reductions already achieved from existing projects and, in all but the worst-case scenario (multiple dry year with high Colorado River Aqueduct (CRA) pumping) would meet the state's 2030 GHG emissions target without additional actions. Therefore, through 2030 the CAP would save Metropolitan an expected $5.9 million in avoided offset costs.

The cost to offset the RRWP emissions through 2045 through the purchase of mitigation credits from a carbon banking program is estimated to be $18 million. To analyze the cost to meet the 2045 goal using the CAP, staff again used the projected emissions inventory and evaluated the cost of a hypothetical, business-as-usual scenario where no additional projects are implemented that would further reduce GHG emissions. Based on the carbon cost forecasts, the purchase of compliance offsets for the projected balance of Metropolitan's GHG emissions needed to reach carbon neutrality in 2045 is estimated to be $3.6 million, a savings of $14.5 million in avoided offset costs. This estimate does not include the implementation of any planned future energy sustainability projects like retrofits, solar, or battery storage projects, which would not only ensure Metropolitan's energy reliability, but would also further reduce Metropolitan's emissions and thus, overall costs.

Pathways for Meeting Carbon Neutrality by 2045

While CEQA requires CAPs to have quantified and actionable measures to reach the codified 2030 reduction target, jurisdictions must only show "substantial progress" and a pathway towards reaching the state's 2045 goal. The state does not yet have a plan (Scoping Plan) for the post-2030 target, and therefore there is still uncertainty around the strategy for reaching carbon neutrality. For Metropolitan, there are three pathways for meeting carbon neutrality that would likely all play a part in reaching the 2045 goal.

Increased Carbon-Free Energy in the Southwest

The model used to forecast emissions assumes the southwest states that provide much of Metropolitan's CRA pumping power do not increase their renewable energy past the current legislation. However, if these states exceed the legislation (which many of them have) or new legislation is passed, Metropolitan's emissions may decrease significantly without additional actions.

[1] Assumes construction of RRWP begins in 2025

Additional Energy Savings Actions

Metropolitan may choose to implement many other energy, GHG, and potentially cost-saving measures such as installing variable speed pumps, using power purchase agreements to lock in low-cost solar and energy storage on a large scale, or purchasing green energy from out of state sources. GHG reduction measures that will further reduce GHG emissions along with their estimated energy and cost are shown in **Table 1**. Metropolitan may also leverage extensive lands holdings to implement carbon sequestration programs that will generate carbon credits. These actions will depend on many variables that are not yet quantified, such as the rate of storage deployed by the State of California and its utilities, the cost of renewable energy, and the costs associated with infrastructure. As Metropolitan reviews and updates the CAP, these measures will be further investigated and tracked over time.

Purchasing Carbon Offsets

Purchasing carbon offsets will continue to be the cost ceiling for carbon reductions. These offsets reduce Metropolitan's emissions at a relatively low cost (assumed to be $18 per metric ton (MT)) in 2045, but they do not provide any co-benefits to Metropolitan, such as operational resiliency (battery storage) or cost savings (increased efficiency projects). However, they could be used to offset some portion of Metropolitans emissions into the future in order to maintain operational flexibility.

GHG Reduction Opportunities

A number of projects have been identified that can further Metropolitan's efforts to reach carbon neutrality by 2045, including developing solar and battery storage facilities, negotiating wholesale carbon-free energy contracts, improving pump efficiency, purchasing electric, or alternate energy fleet vehicles, and implementing waste recycling techniques. **Table 1** presents a number of potential GHG reduction measures, along with estimated GHG savings that can be realized from implementation of these measures, as well as projected costs to implement the projects. The final CAP will include an in-depth analysis of the GHG reduction potential of projects such as these and many others.

Table 1: Potential GHG Reduction Measures

Measure Description	Project Cost	Net Cost/(Savings)[1]	GHG Reduction 2020-2045 ($MTCO_2e$)	$/$MTCO_2e$
Baseline Project[2] – Purchase 1 MT CO_2e voluntary carbon credit	$11/ per $MTCO_2e$ per year (2% escalation)	$370	25	$15
Connect Yorba Linda Power Plant behind the Diemer Plant meter[3]	$1,500,000	($8.6 – $16.9 million)	22,000	($391 - $768)
Retrofit all lighting with LED	$730,000	($3.7 million)	35,000	($107)
Install battery storage (BESS) at Weymouth, Skinner, and Jensen Treatment Plants and OC-88 Pump Facility (3.5 MW/14 MWh)[3]	$660,000 (net cost after Self-Generation Incentive Program credit)	($3 million)	2,300	($1,300)
Purchase renewable diesel for all diesel fleet vehicles	$(0.11) to $0.04 per gallon	($200,000) to $90,000	25,000	($11) to $4
Impeller rehabilitation at all CRA facilities	Design study in progress	TBD	15,000 - 59,000[4,5]	TBD
Motor rehabilitation at all CRA facilities	Design study in progress	TBD	66,000 - 190,000[4,6]	TBD
Allow 25% of workers to telecommute 1.5 days per week on average	$0	$0	6,000	$0

[1]Project Costs/(Savings) show the anticipated costs or (savings) associated with the project cumulatively between 2020 and 2045, unless otherwise noted. These costs/(savings) have not been discounted but include assumed increases in energy costs and cost of carbon.

[2]The baseline project represents the worst-case scenario or price ceiling that Metropolitan can expect to pay to reach their GHG reduction targets. This price ceiling is the cost of purchasing offsets in units of metric tons of CO_2e ($MTCO_2e$) and at $11 per MT on an annual basis with a 2% escalation rate applied to account for expected carbon cost increases over time. The total cost to offset 1 MT of CO_2e for 25 years is $380.

[3]Source: Metropolitan Energy Sustainability Plan (2020)

[4]Assumes 0.5% - 2% improvement in motor performance. $MTCO_2e$ savings over 20 years.

[5]Assumes impeller rehabilitation on 2 pumps at each pump plant.

[6]Assumes all 9 pumps rehabilitated at each pump plant.

Conclusion

Metropolitan's current conservation efforts, coupled with new regulatory standards for renewable energy procurement and carbon emissions reductions, will enable Metropolitan to meet the state's SB 32 target of 40 percent below 1990 levels by the year 2030 target in a manner that is cost-effective and operationally achievable. In addition, there are significant opportunities to implement programs and projects that will put Metropolitan on a path to meet the long-term goal of carbon neutrality by 2045. Although this goal is not yet codified by the state, adopting this target will allow Metropolitan to begin planning now for what will likely be California's next codified GHG reduction target. Due to Metropolitan's largely electrified emissions profile, it is uniquely positioned to meet this long-term target.

By adopting the Governor's goal of carbon neutrality by 2045 as its GHG reduction target, Metropolitan has an opportunity to become a leader by committing to reduce its emissions to carbon neutral by 2045, thus furthering California's ambitious goals, while ensuring it is doing its part to protect local, statewide, and worldwide resources from the effects of climate change.

Next Steps

Staff will complete the CAP and CEQA documents and return to the Board to adopt the CAP and certify the Program Environmental Impact Report.

Policy

By Minute Item 44813, dated March 12, 2002, the Board adopted policy principles on global climate change and water resources planning, expressing Metropolitan's support for further research into the potential water resource and quality effects of global climate change, and support for reasonable, economically-viable, and technologically-feasible management strategies and efforts for reducing the potential impacts of global climate change to water resources.

By Minute Item 51350, dated October 9, 2018, the Board authorized the development of a Climate Action Plan.

5/28/2020
Shane O. Chapman *Date*
Chief Administrative Officer

5/28/2020
Jeffrey Kightlinger *Date*
General Manager

Attachment 1 – Metropolitan Climate Action Plan Targets Memo

Ref# cao12673080

January 8, 2020
Project No: 18-06008

Malinda Stalvey, Interim Team Manager
Environmental Planning Section
The Metropolitan Water District of Southern California
700 North Alameda Street
Los Angeles, California 90012-2944
Via email: MStalvey@mwdh2o.com

Subject: Metropolitan Water District of Southern California GHG Reduction Target Options and Recommendations

Dear Ms. Stalvey:

There is a wide array of options when setting a greenhouse gas (GHG) emission reduction target and these decisions can have significant impacts on how The Metropolitan Water District of Southern California (Metropolitan) will track progress and measure the success of its proposed Climate Action Plan (CAP). The selection of the appropriate reduction target will also increase the overall defensibility of the CAP as a tool to streamline CEQA. There are three components that comprise each potential target scenario; 1) the target setting methodology, 2) the target reduction level, and 3) the target tracking mechanism. A brief summary of the options available to Metropolitan are as follows:

- Target Reduction Level
  - Linear to Carbon Neutral by 2045[1] – Results in more aggressive 2030 target than SB 32[2]
  - SB 32 to EO-S-3-05[3] – Linear reduction to 80% below 1990 levels by 2050
  - SB 32 to Carbon Neutral by 2045 – 40% reduction by 2030 then Carbon Neutral
- Target Methodology
  - Mass Emissions[4]
  - Per Capita[5]
  - Efficiency[6]
- Tracking Mechanism
  - Traditional
  - Running Average
  - Carbon Budget

[1] Statewide carbon neutrality by 2045 called for by Executive Order (EO) B-55-18
[2] Senate Bill 32 – SB 32 is the most recent codified GHG reduction target for California and requires the State to reduce GHG emissions statewide to 40% below 1990 levels by 2030
[3] Executive Order S-3-05 –Executive Order requiring State operations to reduce emissions to 80% below 1990 by 2050 (recently superseded by Executive Order B-55-18)
[4] A target based on mass emissions involves reducing total GHG emissions to a certain level or lower by a specific target year
[5] Per capita emissions are calculated as the total emissions for Metropolitan divided by the population of the service area
[6] Efficiency targets aim to reduce the amount of GHG emissions associated with a unit of product

This memo will lay out the pros and cons of each of these options and will provide a recommendation for each option. The previously provided GHG Inventory and Forecast Memo is referenced throughout this document and is the basis for both the 1990 baseline emissions as well as the GHG inventories and GHG emissions forecasts which are used to determine the carbon budget and GHG emissions "gap" or level of GHG emissions reductions required to meet a specific target.

Regulatory Background

Metropolitan is in the process of developing and adopting a CAP which can be used to streamline the GHG emissions-related California Environmental Quality Act (CEQA) review of future construction projects, including the proposed Regional Recycled Water Project. As such, the GHG emissions reduction target selected by Metropolitan must meet the criteria set forth under Section 15183.5 of the State CEQA Guidelines. Under Section 15183.5 of the State CEQA Guidelines, lead agencies may analyze and mitigate the significant effects of GHG emissions at a programmatic level though a planning document that contains six elements intended to produce GHG emission reductions. When accompanied by a certified EIR, these plans can additionally be used to streamline the cumulative impact analyses of future projects. One of the six elements that pertains to the setting of GHG emission reduction targets is described in 15183.5(b)(1)(B) of the State CEQA Guidelines. This element requires lead agencies to "establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable."

GHG emission reduction targets from State policies can be used to guide the establishment of targets within CAPs. Section 15064.4 of the State CEQA Guidelines, updated in 2018 in response to recent court decisions, indicates that, "in determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable."

In this context, it may be appropriate for Metropolitan to align targets with State policies for GHG emissions reduction as published through the California Climate Change Scoping Plan (Scoping Plan).[7] The Scoping Plan, most recently updated by the California Air Resources Board (CARB) in 2017, represents the State's overall strategy for GHG emissions reduction to meet the targets established by legislation. This includes meeting the targets set by Senate Bill (SB) 32 which directs the State to reduce annual GHG emissions to 40 percent below 1990 levels by 2030. The Scoping Plan reports statewide GHG emissions for eight sectors: agriculture, residential and commercial, electric power, high global warming potential (GWP) gases, industrial, recycling and waste, transportation, and cap-and-trade program.[8] The CARB 2016 California GHG inventory also reports statewide GHG emissions for these eight sectors.[9] For each sector, the Scoping Plan reports the 1990 emissions levels and ranges of reductions needed by 2030 for the State to achieve the SB 32 target. The CARB estimates that some emissions sectors will need to achieve greater proportional reductions than others to achieve the 2030 target due to multiple factors (e.g., the Scoping Plan assumes 2030 emissions reductions up to 72

[7] CARB. California's 2017 Climate Change Scoping Plan. Available: http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed January 4 and 15, 2019.
[8] Ibid.
[9] CARB. California Greenhouse Gas Emission Inventory - 2018 Edition. Available: http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed January 4, 2019.

percent below 1990 levels for the electric power sector, and up to 15% below 1990 levels for the industrial sector).

While the Scoping Plan covers GHG emissions from a broad range of activities in multiple sectors, many of which are regulated by State agencies, it also provides information on actions local agencies can take in specific sectors to support the State's GHG reduction efforts. In Chapter 4, "Key Sectors", of the Scoping Plan there is a subsection that addresses the water sector's contribution to statewide GHG emissions. Here the Scoping Plan indicates that local water agencies "should support statewide efforts by adopting a long-term goal to reduce GHGs by 80 percent below 1990 levels by 2050 where technically feasible and cost-effective, and thereafter move toward low carbon or net-zero carbon water management systems". This long-term 2050 goal for GHG reduction is consistent with Executive Order (EO) S-3-05, which sets a goal to reduce annual GHG emissions statewide to 80 percent below 1990 levels by 2050. Using a target setting approach specific to the water sector for a water agency is consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming* (2015) 62 Cal.4th 204, which determined that the approach of assessing a project's consistency with statewide emission reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emissions to the statewide Scoping Plan reduction goals.

EOs establish statewide *goals* for long-term GHG reduction, which are different from *targets* established by legislation like Assembly Bill (AB) 32[10] and SB 32. Targets established by legislation are codified into state law and set nearer-term timeframes (e.g. 2020 or 2030) to meet specific GHG thresholds. Goals established by EOs are typically longer-term (e.g. 2045 or 2050) and reflect the priorities of the Governor signing the order. An additional EO that is not yet incorporated into the Scoping Plan but will likely be included in a future update is EO B-18-55, which sets a statewide carbon neutrality goal for GHG emissions in all sectors by 2045. The EO states, "achievement of carbon neutrality will require both significant reduction in carbon pollution and removal of carbon dioxide from the atmosphere, including sequestration in forests, soils, and other natural landscapes".[11] It further directs the CARB to update the Scoping Plan to reflect this goal. Achieving carbon neutrality through a combination of GHG reductions and carbon sequestration is synonymous with achieving net-zero carbon, which as previously described, is a recommended goal for local water agencies beyond 2050 in the Scoping Plan. It is unknown at this time how the carbon neutrality target will be applied to the water sector in future updates to the Scoping Plan, however, it is apparent that carbon sequestration will play some role in addressing long-term GHG emissions.

Although not codified into state law, EOs setting long-term GHG reduction goals are still important to consider in CEQA analyses associated with GHG reduction plans according to the California Supreme Court, which opined in *Cleveland National Forest Foundation v. SANDAG (2017)*[12] that the long term targets established by these EOs "provide important value to policymakers and citizens in considering the emissions impacts" and "reflect the pace and magnitude of reduction efforts that the scientific community believes necessary to stabilize the climate".[13] Thus, selecting a GHG emissions reduction target that places Metropolitan on a trajectory toward at least a 40% reduction from 1990 by 2030 and carbon neutrality by 2045 would be the most defensible GHG emissions reduction target providing consistency with SB 32, the most recent Scoping Plan, and EO B-55-18.

[10] California's landmark climate change bill which established a GHG reduction target of returning to 1990 levels by 2020.
[11] https://www.gov.ca.gov/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf
[12] https://caselaw.findlaw.com/ca-supreme-court/1867838.html
[13] https://cases.justia.com/california/supreme-court/2017-s223603.pdf?ts=1499965286

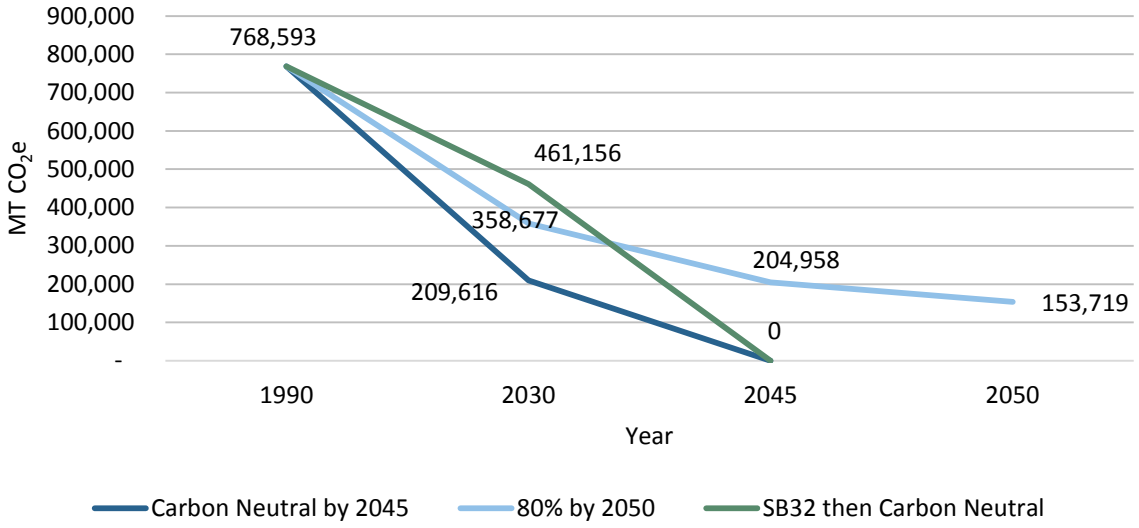
Reduction Levels

Because Metropolitan will be using this CAP to streamline CEQA, Rincon suggests adopting a GHG reduction target that is at least as stringent as the SB 32 requirement of 40% below 1990 levels by 2030. Any reduction target less stringent than this would potentially open Metropolitan up to litigation risks when using the CAP for CEQA streamlining in the future.

There is some flexibility for setting a 2045 target. Metropolitan could adopt an 80% reduction below 1990 levels pursuant to the 2017 California Climate Change Scoping Plan and consistent with EO S-3-05. However, since the 2017 Scoping Plan update a new EO, B-55-18, was passed which calls for carbon neutrality by 2045 at the latest. Since Metropolitan is not required to comply with EOs, it is not required to adopt the 2045 carbon neutrality target at this time. However, it is generally projected that the 2045 carbon neutrality target will be adopted in a future scoping plan and that adopting the carbon neutrality target now will provide Metropolitan a more long-lasting CAP and the ability to start planning earlier to meet this challenging goal.

A third option for a GHG reduction level is to reduce GHG emissions in a linear fashion from the baseline 1990 emission level to zero by 2045. This would set a more aggressive 2030 target than SB 32 and allow Metropolitan to take a leadership role in climate action. Furthermore, this more aggressive reduction target appears to be easily accomplished based on Metropolitan's GHG emission forecast. Figure 1 illustrates the impacts of the three target reduction levels on the mass emissions pathway for Metropolitan GHG emissions.[14]

Figure 1 Metropolitan's Reduction Level Options



*Please note reductions do not look linear due to different number of years between data points

MT – metric tons; CO_2e – carbon dioxide equivalents

[14] A fourth option, that was not considered in this analysis is meeting the SB 32 target and then the EO S-3-05 target in 2050. This was not considered because it is not referenced in the Scoping Plan and because EO B-55-18 has superseded EO S-3-05.

Each of these reduction target levels could be determined by using any of the three target methodologies discussed in the next section. Rincon recommends setting either the *Linear to Carbon Neutral by 2045* or *SB 32 then Carbon Neutral by 2045* reduction target levels for the highest degree of defensibility over time. Metropolitan could also select a custom 2030 reduction target in-between the highest and lowest 2030 targets (*SB 32 then Carbon Neutral* and *Linear to Carbon Neutral*) based on the results of the measure quantification study currently underway.

Target Methodologies

As noted above, a reduction level of 40% below 1990 levels by 2030 and carbon neutrality by 2045 is the most defensible target reduction level and the levels which are recommended by the consultant team. However, there are several different target methodologies which Metropolitan could choose through which the reduction levels would be applied. They include:

- Mass Emission Targets
- Per Capita Targets
- Efficiency Targets

The following sections will outline the pros and cons of each of these of these methodologies as well as a recommended approach for setting Metropolitan's 2030 and 2045 reduction targets.

Mass Emissions

A target based on mass emissions involves reducing total GHG emissions to a certain level or lower by a specific target year. Total emissions for Metropolitan are defined by those emissions under Metropolitan's operational control and are estimated in the GHG inventory to be 768,593 metric tons (MT) of carbon dioxide equivalent (CO_2e) in 1990.[15] The year 1990 is the baseline year by which most legislation, including SB 32 and EO S-3-05, determine the percentage-based reduction target. Table 1 shows the applicable targets based on the mass emission reduction methodology for each of the three target reduction levels.

Table 1 Metropolitan Mass Emission GHG Reduction Targets by Target Reduction Level

Target Reduction level	1990 Emissions (MT CO_2e)	2030 Target (MT CO_2e)	2045 Target (MT CO_2e)	2050 Target (MT CO_2e)
Linear to Carbon Neutral by 2045	768,593	209,616	0	0
SB 32 to EO-S-3-05 - 80% by 2050	768,593	358,677	204,958	153,719
SB 32 then Carbon Neutral by 2045	768,593	461,156	0	0

[15] Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), and is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one.

Pros of Mass Emission Targets

Mass emission targets are the most commonly used and most basic GHG emissions targets. They are found in many CAPs throughout the state and have been successfully defended. Mass emission targets are not scaled by population or product efficiency (i.e., acre-feet of water delivered) and therefore are an accurate representation of the total CO_2e entering the atmosphere from Metropolitan activities.

Cons of Mass Emissions Targets

Because mass emission targets do not account for acre-feet of water delivered, or population growth these targets can unfairly penalize Metropolitan for changes outside of its control (e.g. increases in water demand or population served), rather than focusing on the efficiency of Metropolitan infrastructure and operations.

Also, due to Metropolitans' highly variable annual GHG emissions, which can change by several hundred thousand MT per year depending on CRA pumping levels, relying on any single year of data is problematic. To remedy this, a running average of either three or five years would need to be used. This would help smooth out variability in the data and provide a better estimate of overall emissions trends. However, this method would lose some accuracy due to rounding which in turn could misrepresent Metropolitans' emissions reduction progress.

Reductions Required for Mass Emissions Targets

Due to Metropolitan's variable GHG emissions based on CRA pumping levels, projecting annual emissions is difficult. Using pumping projections from Metropolitan's 2015 Urban Water Management Plan (UWMP), Rincon developed three possible forecasts representing the upper, lower and middle bounds for GHG emissions over time. Figure 2 shows the actual and forecasted GHG emission for Metropolitan. Table 2 shows the projected reductions based on these forecasts compared to the 1990 baseline. Using the mass emissions target, Metropolitan would reach the SB 32 2030 goal in the low and average emissions scenario without further additional action and only continuing current actions, such as water conservation efforts. However, in the high scenario, an additional 31% reduction in GHG emissions would be required which equates to approximately 395,515 MT of CO_2e.

Figure 2 Metropolitan's Forecasted Mass Emissions 2020 to 2045

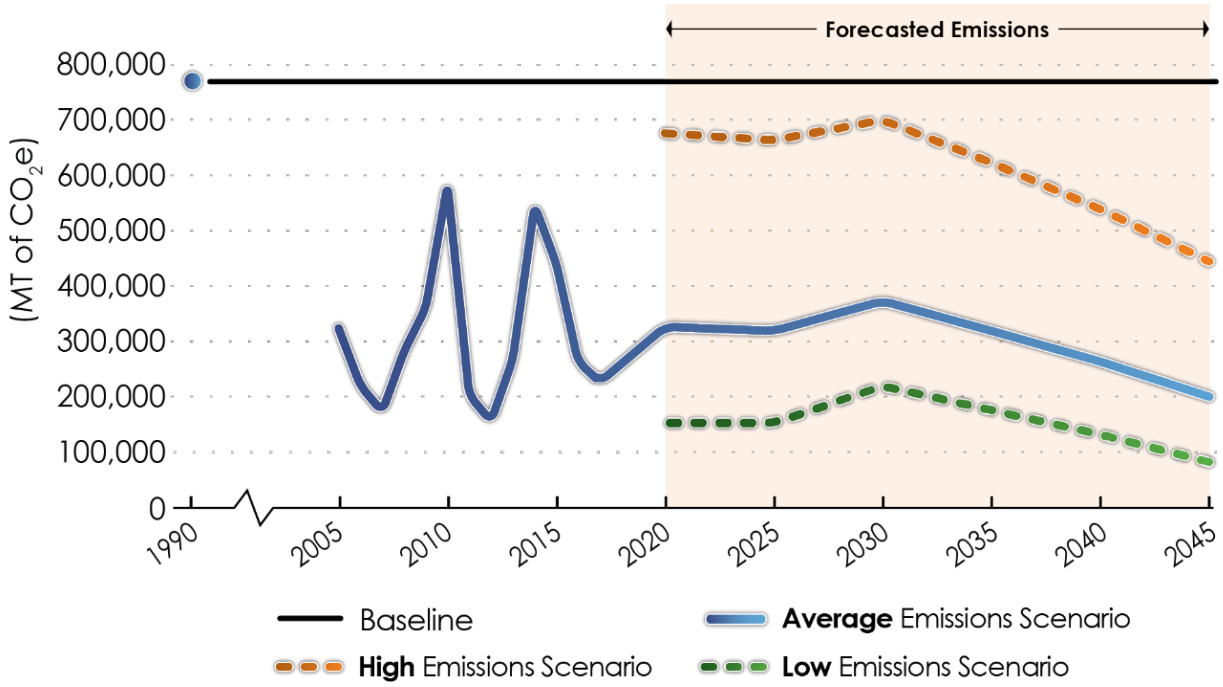


Table 2 Metropolitan Forecasted Mass Emissions 2020 to 2045

Emissions Scenario	1990 Emissions (MT CO_2e)	2030 Forecast Emissions (MT CO_2e)	Forecasted Reduction[1]	2045 Forecast Emissions (MT CO_2e)	Forecasted Reduction
High	768,593	702,952	9%	444,498	42%
Average	768,593	375,438	51%	202,283	74%
Low	768,593	217,819	72%	85,762	89%

[1] The forecasted reduction is the percent difference between the adjusted forecast (which includes GHG reductions from legislative changes such as SB100) and the 1990 baseline inventory. For more information on the forecast and inventory methodology, see the Inventory and Forecast memo.

By 2045, in all scenarios Metropolitan would need additional reductions in order to reach carbon neutral but would be on pace to reach the 80% reduction by 2050 in all but the high scenario. To achieve the recommended target of carbon neutrality would require 100% carbon neutral electricity consumption, a move to electric vehicles, and some level of carbon sequestration or offsets.

Per Capita Emissions

Chapter 5 of the Scoping Plan, "Achieving Success," recommends several approaches for local plan-level projects to show consistency with State targets. As an overall goal, "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" (CARB 2017:99). However, these values include all sectors (energy, water, waste, transportation, agriculture) and cannot be applied to any individual city or jurisdiction. Rather at the local plan level, agencies are required to demonstrate use of the appropriate methodology by applying

locally specific data such as the local GHG inventory and population. The CARB includes the following recommendations for demonstrating how local jurisdictions can demonstrate consistency with statewide targets. The following language in the 2017 Scoping Plan is related to local plan-level GHG reduction goals (CARB 2017:100):

> CARB advises that local governments also develop community-wide GHG emissions reduction goals necessary to reach 2030 and 2050 climate goals. 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 percent and 80 percent, respectively) to their community-wide 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* (emphasis added). The resulting GHG emissions trajectory should show a downward trend consistent with the statewide objectives. The recommendation for a community-wide goal expands upon the reduction of 15 percent from "current" (2005-2008) levels by 2020 as recommended in the 2008 Scoping Plan.

The language above references community-wide GHG emissions from local agencies, which is often interpreted to mean community-wide CAPs. This may also be interpreted as guidance for the development of targets for a regional district whose operations support numerous communities. This is arguably the case for Metropolitan, whose operations support the supply of water to 26 member agencies comprised of cities and water districts.[16] For this reason and because demand by its member agencies drives Metropolitan's emissions, it is possible to use Metropolitan's service population to develop per capita targets aligned with the State's stated goals for GHG emissions reduction.

Table 3 shows the resulting GHG emissions targets for the per capita target methodology under the three reduction level scenarios.

Table 3 Metropolitan Per Capita Emissions Target Options (Converted to Mass Emissions)

Emissions Scenario	1990 Emissions (MT CO_2e)	2030 Target (MT CO_2e)	2045 Target (MT CO_2e)	2050 Target (MT CO_2e)
Linear to Carbon Neutral by 2045	768,593	289,136	0	0
SB 32 to EO-S-3-05 - 80% by 2050	768,593	494,744	305,720	N/A*
SB 32 then Carbon Neutral by 2045	768,593	636,100	0	0

* 2050 Population projections were not available at the time of writing. If the 2050 target pathway is desired, these numbers can be updated.

[16] http://www.mwdh2o.com/pdf_in_the_community/3.3_service_area_map.pdf

Pros of Per Capita Emissions Targets

This target methodology considers the substantial population growth occurring in Metropolitan's service area and the past and ongoing water conservation efforts made by Metropolitan. Since 1990, population in the Metropolitan service area has increased by nearly 7.4 million people.[17] Emissions per capita have decreased substantially and are expected to continue to decline. This methodology also emphasizes the water conservation efforts taken by Metropolitan and the significant investments made in those areas over the past 30 years. Because of these efforts, and the overall decrease in water consumption per person, using a per capita GHG emissions target decreases the amount of GHG emissions reduction required in the short term. However, in the long term, emissions will still need to decrease to net zero, or carbon neutral.

Cons of Per Capita Emissions Targets

Although per capita emissions targets are explicitly called out in the Scoping Plan, their use is less common in CAPs. Furthermore, some of the water conservation work that has resulted in less water use (and therefore, lower GHG emissions) per person have been from efforts not undertaken by Metropolitan. While still defensible, using a per capita reduction target is potentially less defensible than the mass emissions reduction target.

Another drawback of the per capita emissions target methodology is the reliance on accurate population numbers. Due to variability in the actual rate of population growth compared to the current projections the projected reduction targets could shift over time and would need to be carefully tracked and updated. The discrepancy between projected and actual population is expected to be small but should be taken into consideration.

Furthermore, the per capita GHG emissions target would still need to be averaged over multiple years to ensure that emissions fluctuations in the target year do not misrepresent overall trends. However, as with the mass emissions target, the use of the carbon budget explained in the following section could provide a solution.

Reductions Required for Per Capita Emissions Targets

Figure 3 shows the projected per capita emissions for Metropolitan. Table 4 shows the expected percent change compared to the 1990 baseline. When using the per capita emissions reduction target methodology Metropolitan should see a 34% reduction in per capita GHG emissions by 2030 even under the high emissions scenario. This means that even in the high emissions scenario, Metropolitan would need to reduce emissions by 98,232 MT of CO_2e per year to reach a 40% reduction from 1990 in 2030 (SB 32). This is substantially lower than the required reduction under the mass emissions target (98,232 MT of CO_2e reduction compared to over 300,000 MT of CO_2e reduction).

[17] Southern California Association of Governments Regional Transportation Plan-12 and San Diego Association of Governments Series 13 Forecast – Provided by Metropolitan

Figure 3 Metropolitan Forecasted Per Capita Emissions

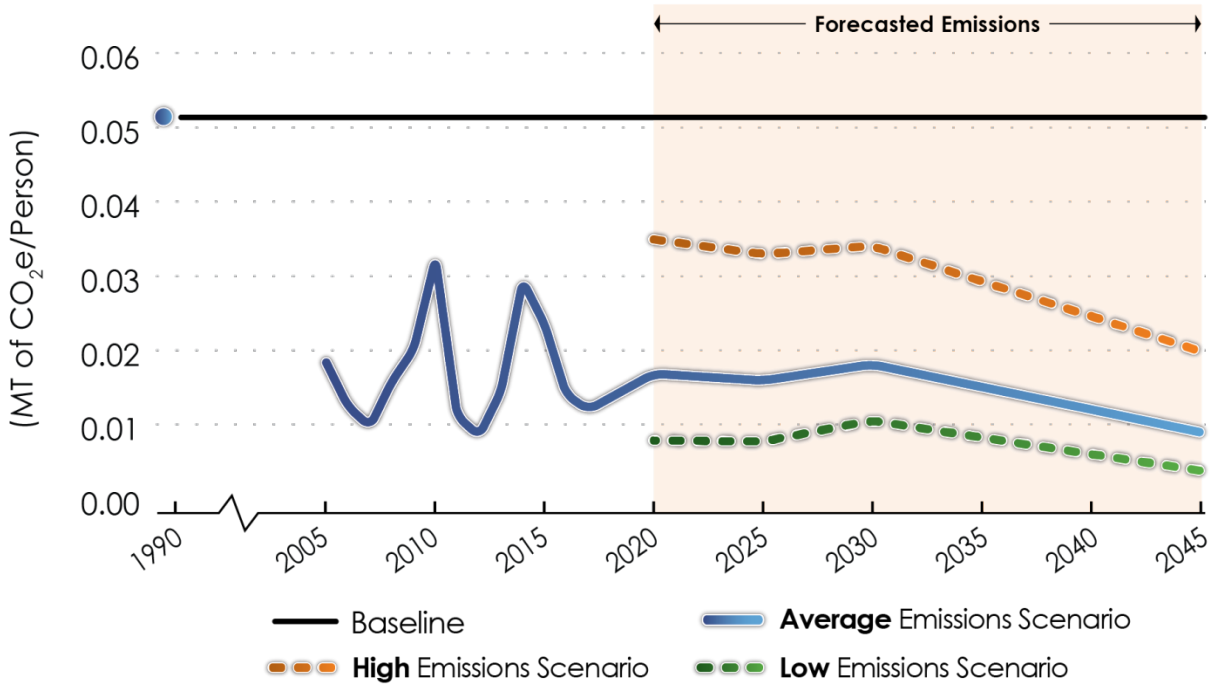


Table 4 Metropolitan Forecasted Per Capita Emissions

Emission Scenario	1990 Emissions (MT/Person/Year)	2030 Forecast (MT/Person/Year)	Forecasted BAU Reduction	2045 Forecast (MT/Person/Year)	Forecasted BAU Reduction
High	0.0514	0.0356	34%	0.020	61%
Average	0.0514	0.0181	65%	0.009	82%
Low	0.0514	0.0106	79%	0.004	93%

Population assumptions for the Metropolitan service area are as follows: 1990 population = 14,961,310; 2030 population = 20,637,023; 2045 population = 22,316,594

Efficiency Targets

Although not regularly used, efficiency targets are common in corporate GHG reduction strategies. These targets aim to reduce the MT of CO_2e associated with each unit of product. For Metropolitan, the unit of measure would be MT CO_2e per acre-foot of water supplied.

Pros of Efficiency Targets

This target methodology focuses solely on the operations of Metropolitan and the efficiency of the operations that produce water. It normalizes for population growth because it no longer matters how many acre-feet are supplied (like it would with the mass emissions targets) and focuses on how efficiently Metropolitan can supply a unit of water.

Cons of Efficiency Targets

The primary negative aspect of using only an efficiency target is that total emissions (mass emissions) could increase over time if more water is being provided even while emissions per acre-foot decrease. Therefore, this type of target could be considered less defensible. Furthermore, this type of target does not provide any benefit to Metropolitan for water conservation-related GHG emission reductions because it normalizes the amount of water provided.

Another hurdle to this target methodology is ensuring consistency between what is considered "supplied" acre-feet. Metropolitan has many options when it comes to water delivery between storage, member agencies and other actions. How this water is accounted for could change and impact the efficiency number for that year. For example, if a large amount of water is pumped from the CRA, but much of it goes to storage and is not counted as "supplied", the emissions per acre-foot of "supplied" water would increase even if the overall system became more efficient. In other years that stored water would potentially become "supplied" water with a much lower pumping required, leading to an artificially low efficiency number. While a well thought out definition for "supplied water" could solve this problem, it adds to overall complexity.

Lastly, not all acre-feet pumped by Metropolitan have the same carbon footprint. The variability between State Water Project and CRA derived water would skew this target year to year depending on the extent of CRA pumping. It is because of these factors that this target is not recommended.

Reductions Required for Efficiency Targets

Rincon does not currently have 1990 water supplied data to generate a reduction target based on 1990 data. This data would need to be provided for a complete reduction analysis to be completed.

Tracking Methodologies – Rolling Average vs. Carbon Budget

For most cities and jurisdictions in California, emissions increase and decrease in a steady fashion along with population growth and in response to marginal GHG reduction actions. Metropolitan's emissions by contrast can fluctuate greatly year-to-year in response to CRA pumping levels. This means that the emissions in any given year are not necessarily a good indicator of overall GHG reduction progress. To help solve this issue, two potential solutions were considered; the rolling average and the carbon budget.

The Rolling Average

One of the only other water agency CAPs that is comparable to Metropolitan's is the California Department of Water Resources (DWR) CAP. DWR faces the same variability problem as Metropolitan and chose to apply a five-year rolling average to its emissions.[18] The rolling average helps to minimize fluctuations in emissions over time and better reflect the overall emissions trend. The major benefit of the five-year rolling average is that it has been previously adopted by DWR. However, the rolling average, while better than looking at emissions in any one year, is still an estimate of actual emissions over time and some information will inherently be lost.

[18] https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Climate-Action-Plan

The Carbon Budget

The carbon budget can be thought of as a savings account. Using one of the above target methodologies (Rincon suggests either the mass emissions or per capita methodology), the total MT of CO_2e allowed to be emitted by Metropolitan between the year 2005[19] and the target year (i.e., 2030 and 2045) based on the selected percent reduction from 1990 would be calculated. This budget would then act as Metropolitan's carbon savings account, from which Metropolitan could emit or "spend" each year moving forward. As long as Metropolitan emits or "spends" less MT of CO_2e by 2030 than the budget has allocated, the goal would be considered achieved, regardless of the emissions in that particular year.

The carbon budget is the proposed solution to Metropolitan's highly variable annual emissions and is preferable to the rolling average emissions methodology. Rolling averages of three to five years could be used, but using an average is less accurate than the carbon budget which accounts for all of the emissions produced by Metropolitan on an annual basis.

While not currently used in any municipal or community CAPs, the carbon budget methodology is well understood and utilized at the highest levels of policy development including by the International Panel on Climate Change (IPCC) and World Resources Institute, and in peer reviewed literature.[20] [21] [22] Carbon budgets help us understand how much carbon can be added to the atmosphere before the planet exceeds 2°C warming, which is understood by scientists to be the threshold between moderate and severe climate impacts. Additionally, California's emissions reduction targets are based on the IPCC carbon budget and are referenced in the CARB's Carbon Neutrality presentations.[23]

The carbon budget can be considered a more conservative and accurate approach to GHG emissions reductions compared to simply meeting a target in a designated year, because it tracks the total amount of CO_2e that enters the atmosphere and contributes to climate change rather than just total GHG emissions in the target year. Under the carbon budget methodology, an entity cannot emit at high levels until 2029 and then reduce emissions in the year 2030 to meet the target as that would exceed the allocated budget.

Even under the carbon budget methodology, it is recommended Metropolitan set a target of reaching carbon neutrality by 2045 regardless of how much "budget" is remaining. This action would ensure consistency with State targets and make the targets included in the CAP more defensible.

Pros of Carbon Budget

The carbon budget is the most accurate way to track emissions reductions. It focuses directly on the GHG emissions that cause climate change and accounts for them directly rather than setting a reduction goal for one particular year in the future, which is better suited for use by municipalities whose emissions do not fluctuate annually due to external factors.

[19] 2005 was selected as the baseline year because that is when detailed GHG emissions inventories were started. All carbon budgets would be calculated using a percent reduction from 1990 as a starting place and then "cut" out the portion from 2005 to the target year.
[20] https://www.earth-syst-sci-data.net/11/1783/2019/
[21] https://www.wri.org/resources/data-visualizations/infographic-global-carbon-budget
[22] https://www.carbonbrief.org/analysis-why-the-ipcc-1-5c-report-expanded-the-carbon-budget
[23] https://ww3.arb.ca.gov/cc/scopingplan/meetings/012319/cneutrality_ca.pdf

Cons of Efficiency Targets

The primary reason carbon budgets are not used more often is likely a lack of data. Using a carbon budget means that an inventory must be completed on an annual basis, something many municipalities do not have capacity to accomplish. However, Metropolitan already tracks Scope 1 and 2 emissions annually through The Climate Registry reporting process. Scope 3 emissions represent a very small portion of Metropolitan's emissions and could be estimated for interim years with a comprehensive Scope 1, 2 and 3 update completed every 3 years.[24]

The other drawback related to carbon budgets is their relative lack of use in climate action planning. However, the carbon budget idea is well cited and understood. Furthermore, the actual reduction targets (percent of emissions to be reduced by 2030 or 2045) would not be affected and would remain consistent with State targets.

Rincon has discussed the carbon budget methodology with the CARB previously and while they were not able to provide an official approval of the methodology, they did not identify any major issues with its use.

Reductions Required for Carbon Budgets

As noted above, carbon budgets are not reduction targets, but rather a way of tracking progress towards the target over time. Therefore, either the per capita or mass emissions target methodology along with one of the three reduction levels could be selected and used along with a carbon budget for emissions tracking on an annual basis.

Figure 4 shows the carbon budget for a target of Linear Reduction to Carbon Neutral by 2045 using the mass emissions methodology and the medium (or average) CRA pumping forecast. Under this scenario Metropolitan exceeds the carbon budget in approximately the year 2043 as shown using the right-hand axis. The date which Metropolitan exceeds the carbon budget is when the green budget line exceeds the zero of the right-hand axis. However, as noted above, emissions would need to fall to carbon neutral by this point in order to meet the intent of EO B-55-18.

Figure 5 shows the same scenario, medium (average) CRA pumping and Linear Reduction to Carbon Neutral in 2045 but uses the per capita emissions methodology. In this scenario, Metropolitan never exceeds the 2045 carbon budget, but would still need to achieve carbon neutrality by 2045.

[24] Scope 1 emissions are from direct combustion of fossil fuels, Scope 2 emissions are from the indirect combustion of fossil fuels such as those resulting from electricity consumption. Scope 3 emissions are other indirect sources such as waste, water, and employee commute.

Figure 4 Metropolitan's Carbon Budget Using Mass Emissions Methodology and a Straight Line to Carbon Neutrality by 2045 Target (Medium CRA Pumping Forecast)

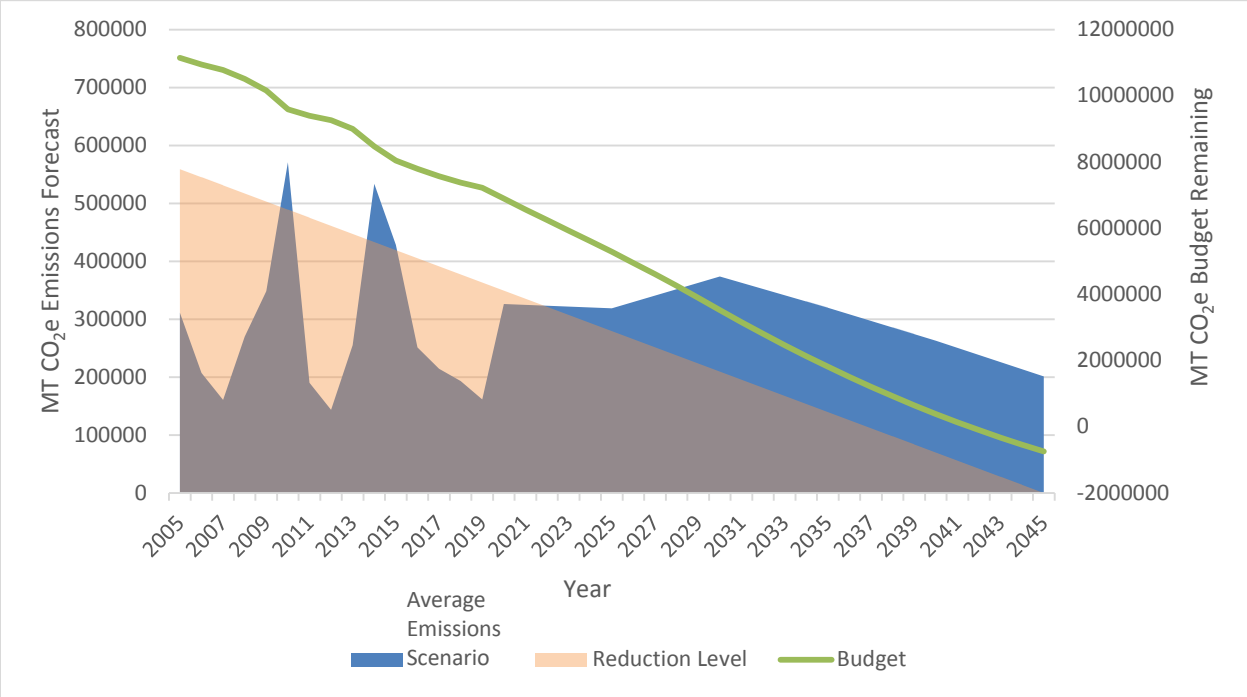


Figure 5 Metropolitan's Carbon Budget Using Per Capita Methodology and a Straight Line to Carbon Neutrality by 2045 Target (Medium CRA Pumping Forecast)

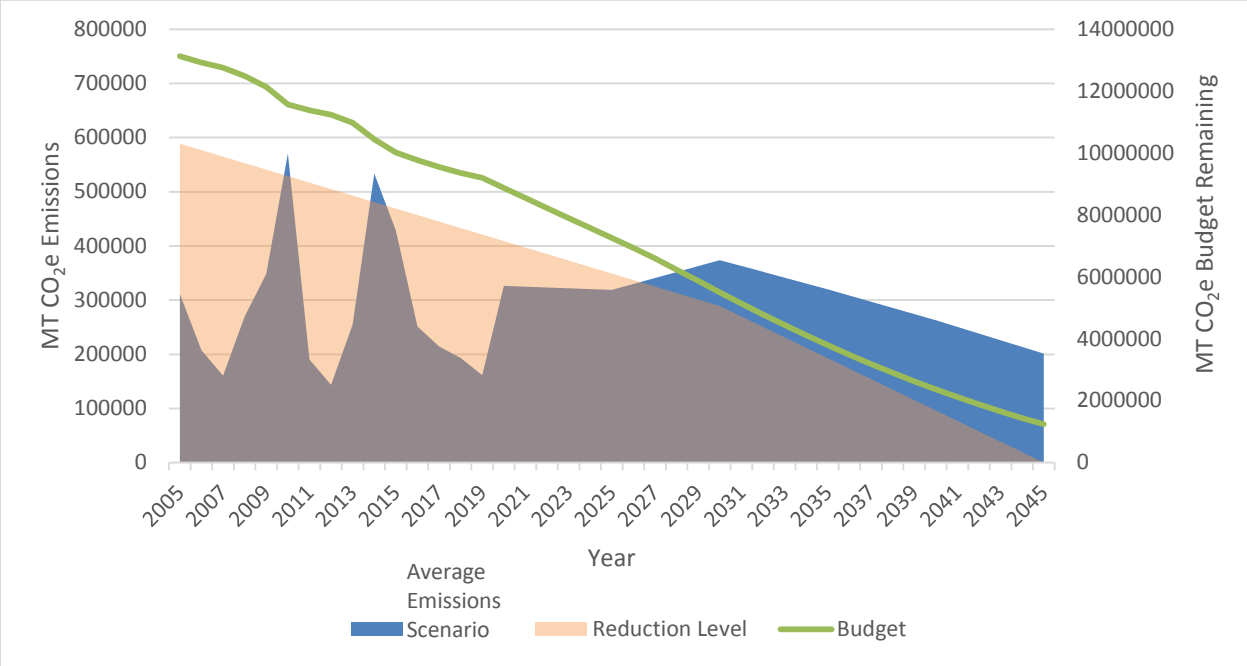


Table 5 shows the total carbon budget for Metropolitan under both the mass emissions and per capita methodologies. Each methodology also shows the difference between three different reduction level scenarios. The most stringent target scenario is the Mass Emissions - Linear to Carbon Neutral by 2045 target which allows Metropolitan a total of 11,495,023 MT of CO_2e from 2005 to 2045. The least stringent is the Per Capita - SB 32 then Carbon Neutral by 2045 target which would allow 22,067,795 MT of CO_2e to enter the atmosphere. Not shown is a fourth scenario which would reduce to SB 32 levels in 2030 and then to 80% below 1990 by 2050. This scenario would be the least stringent and due to the lack of achieving carbon neutral by 2045 is not recommended

Table 5 Metropolitan Carbon Budget Options

Target Reduction Level	Total Carbon Budget 2005-2045 Mass Emissions (MT CO_2e)	Total Carbon Budget 2005-2045 Per Capita (MT CO_2e)
Linear to Carbon Neutral by 2045	11,459,023	13,437,080
SB 32 to EO-S-3-05 - 80% by 2050	18,181,447	20,958,937
SB 32 then Carbon Neutral by 2045	17,716,069	22,067,795

Suggested Target Scenario

As noted above, there are a wide range of target setting options with their own pros and cons. The difference between the *Linear to Carbon Neutral by 2045 - Mass Emissions* scenario (most conservative) and the *SB 32 then Carbon Neutral by 2045 - Per Capita* scenario (least conservative) is 11 million MT of CO_2e. From the options described here, Rincon recommends adopting the Linear Reduction to Carbon Neutral by 2045 - Per Capita with a Carbon Budget scenario for the following reasons:

- This target accounts for both operational efficiency as well as water use reduction projects which Metropolitan has spent considerable resources on.
- This methodology is more stringent than the current State required goals and is therefore, more defensible. Defensibility is key because Metropolitan will be using this CAP for CEQA streamlining of high-profile projects in future.
- The Carbon Budget allows Metropolitan greater accuracy when tracking emissions, is more conservative than hitting a target in a single year and allows the most flexibility through 2045.

A potentially more defensible scenario would be the Linear Reduction to Carbon Neutral by 2045 - Mass Emissions with a Carbon Budget. Using this methodology Metropolitan would not gain credit for many of the water conservation projects both current and future. However, this would remove one variable from the target tracking process (population change) and would result in a more conservative and less variable reduction target over time.

If you have any questions about these target reduction level options or the suggested methodologies, please contact Ryan Gardner or Erik Feldman at RGardner@rinconconsultants.com and EFeldman@rinconconsultants.com.

Sincerely,

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