City of Carlsbad Climate Action Plan Annual Report

Reporting Period 7: Jan 1, 2023 – Dec. 31, 2023

April 16, 2024

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Table of Contents

Tables and Figures

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I. Executive Summary

The purpose of this document is to provide an update on the status of implementation of the Climate Action Plan (CAP) that occurred during the most recent reporting period. The CAP requires that the city annually monitor and report on CAP implementation activities and present this report to the City Council in a public meeting. This annual report for Year 7 (AR7) covers the period from Jan. 1, 2023, to Dec. 31, 2023.

The CAP established a 2012 baseline of 977,000 metric tons of carbon dioxide equivalent ($MTCO_2e$). This baseline was used to project greenhouse gas (GHG) emissions into the future and set targets within the CAP; specifically, the CAP sets goals to reduce GHG emissions by 4% below the 2012 baseline by 2020 (a reduction of approximately 39,080 $MTCO_2e$) and 52% below baseline by 2035 (a reduction of approximately 508,040 $MTCO_2e$). The most recent complete GHG inventory from 2018[1] shows the city surpassing its 2020 targets with a 4.8% reduction in GHG emissions (a reduction of approximately 47,000 $MTCO_2e$), as seen in Figure 1.

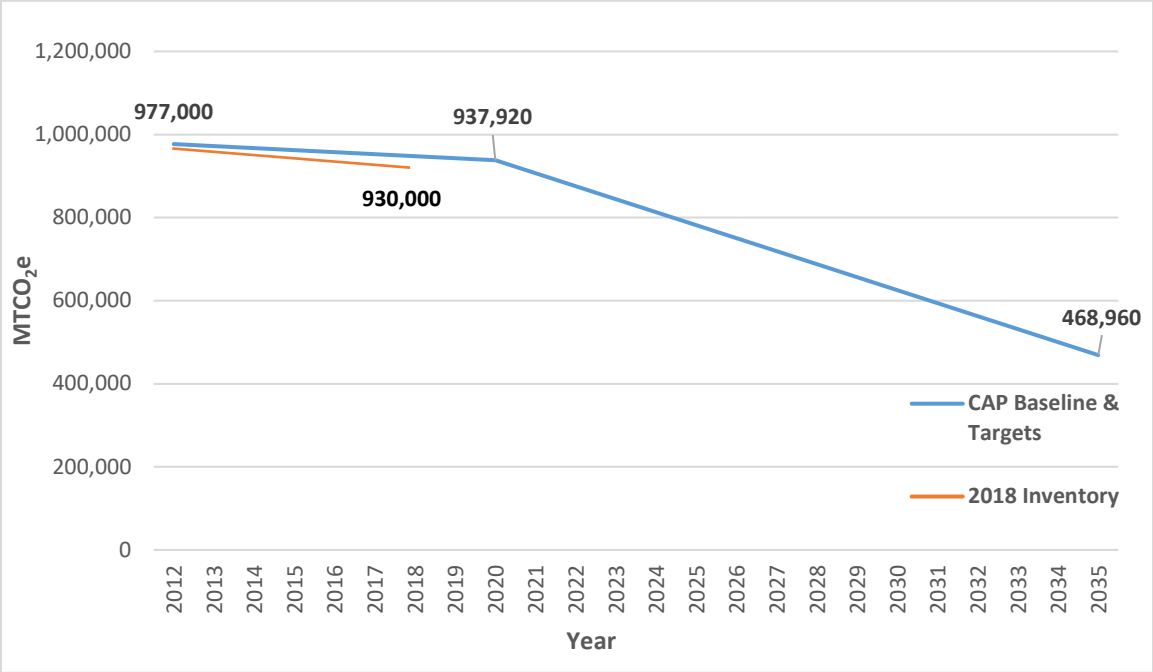

Figure 1. GHG Emissions Baseline, Reductions, and Targets

[1] More details on this and other GHG inventories are included in Section VI.

The CAP includes measures and actions that the city must pursue to meet its GHG reduction targets. There are 12 measures and 35 actions included in the CAP[2]. Through Year 7, 16 actions have been completed, 15 are in progress and on schedule, 3 are in progress and delayed, and 1 action has no progress[3]. Figure 2 shows this information as percentages.

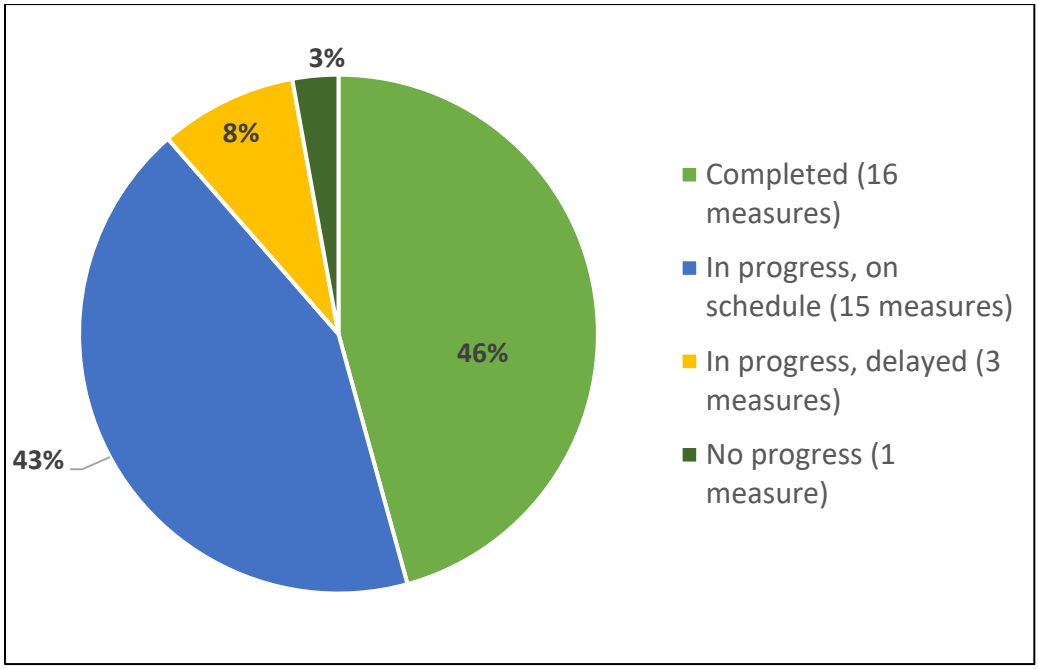

Figure 2. AR7 CAP Action Status

II. Background

The City of Carlsbad's CAP was adopted on Sept. 22, 2015, along with the General Plan Update and associated Environmental Impact Report (EIR). The purpose of the CAP is to describe how GHG emissions within Carlsbad will be reduced in accordance with statewide targets. The CAP was updated and amended on July 14, 2020 (CAP Amendment No. 1). This amendment revised the GHG inventory and reduction targets and forecast, updated reductions from existing measures, added a new reduction measure, and incorporated new regional and statewide

[2] A list of CAP measures can be found in Table 2 and implementation status of each measure and action can be found in Appendix A.

[3] Actions categorized as "completed" met the implementation goals in the time indicated in the CAP; however, some of these actions continue to be implemented and are denoted as such. Actions with an "ongoing" implementation timeframe were assumed to be "in progress" versus "completed", since implementation of the measures continues for the duration of CAP implementation.

guidance and protocols; an Addendum to the EIR was also prepared. Since CAP Amendment No. 1 is the currently adopted CAP, its details are reflected throughout this report.

Chapter 2 of the CAP contains information about the 2012 GHG inventory. A GHG inventory identifies the major sources and overall magnitude of GHG emissions in the city using standard modeling methods and protocols. Typical inputs include electricity consumed, natural gas consumed, vehicles miles traveled (VMT), solid waste disposed, wastewater treated, and potable and recycled water used.

Chapter 3 of the CAP contains a discussion of the forecasting used to determine the city's GHG targets for 2020 and 2035, as well as the GHG reductions anticipated by state and federal policies and certain General Plan policies.

Chapter 4 of the CAP describes the additional measures and actions that the city must pursue to reach its GHG emissions reduction targets.

To implement these additional measures and actions, the city needed to identify and allocate appropriate funding. Therefore, after CAP adoption, staff contracted with University of San Diego's Energy Policy Initiatives Center (EPIC) to study incremental internal costs to the city for CAP implementation. All the participating city departments and divisions were surveyed to quantify the resources needed to effectively implement the CAP.

On Feb. 23, 2016, staff presented the findings of the study to City Council and noted that these costs would be included in subsequent departmental budget requests. Most recently, on Oct. 11, 2022, the City Council approved the Five-Year Strategic Plan with policy goals to reflect the most important priorities of the community, with sustainability and the natural environment included as one of those values. GHG emissions are included as a key performance indicator and implementation of the CAP is listed as a strategic objective.

CAP implementation is a team effort involving several city departments and divisions, coordinated by the CAP Administrator. The interdepartmental CAP implementation team consists of: Public Works (PW) Branch – Fleet & Facilities, Traffic and Mobility, Environmental Sustainability and Utilities; Community Services – Community Development, Parks & Recreation; Administrative Services – Finance; City Attorney; and City Manager – Communication & Engagement.

Figure 3 and Table 1 below show the 2012 GHG emissions graphically and in tabular form for the entire city, including emissions from both municipal operations and the community. Municipal operations constitute approximately 1% of all GHG emissions. Since there are several different types of GHGs, GHG emissions are typically expressed in $MTCO_2e$ to allow for standardization and comparison.

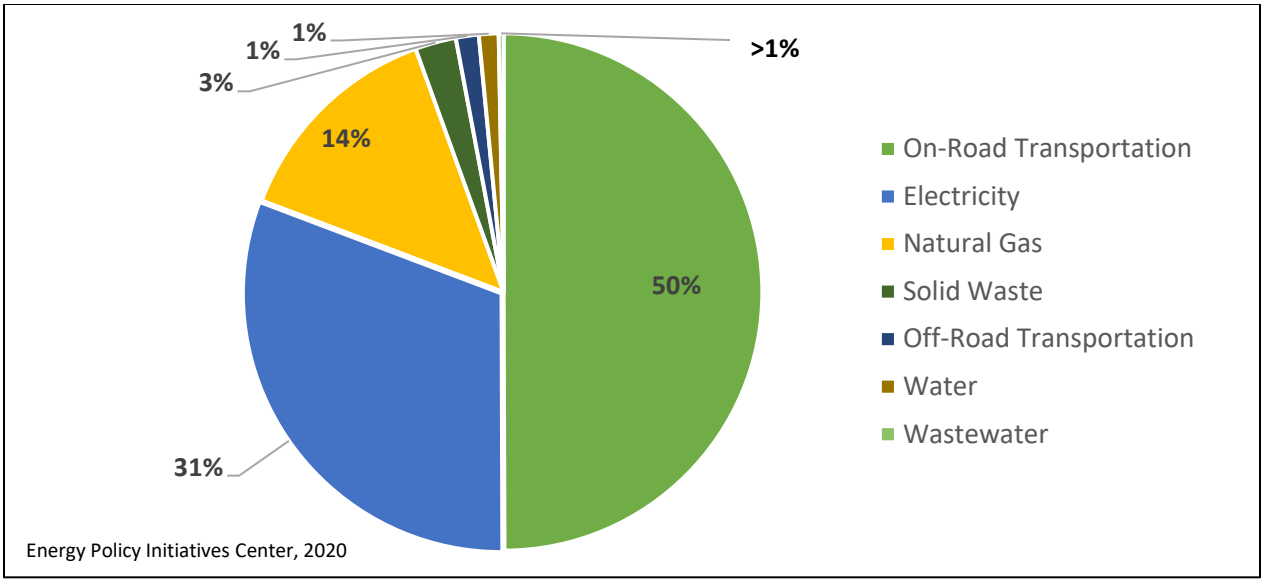

Figure 3 – 2012 Community GHG Emissions by Sector

Table 1 – 2012 Community GHG Emissions by Sector

Emissions Category	GHG Emissions ($MTCO_2e$)	Percentage of Total Emissions (%)
On-Road Transportation	488,000	49.9
Electricity	301,000	30.8
Natural Gas	134,000	13.7
Solid Waste	25,000	2.5
Off-Road Transportation	14,000	1.4
Water	12,000	1.2
Wastewater	3,000	<1
Total	**977,000**	**100**
Emissions in each category are rounded. Sum may not add up to totals due to rounding.		
Energy Policy Initiatives Center, 2020		

Of the total emissions in 2012, 97% are attributed to the residential, commercial, industrial, and transportation sectors (e.g., buildings, automobiles). This emissions profile by sector is typical of other cities; therefore, like most other CAPs, Carlsbad's CAP focuses primarily on GHG emission reduction strategies in these sectors.

EPIC conducted forecasts for the Carlsbad CAP for 2020 and 2035 GHG emissions. The CAP used the 2012 inventory as the baseline. The first step in forecasting is to determine what is known

as the “Business-As-Usual” (BAU) projection. This projection is the amount of GHG emissions increase anticipated over time due to population and job growth and vehicular traffic levels. The forecast then deducts the anticipated emission reductions derived from state and federal policies, such as low carbon fuel standards, building energy code requirements, and requirements for utilities to provide electricity from renewable energy sources; these reductions are known as the “legislatively adjusted BAU”, as shown in Figure 4.

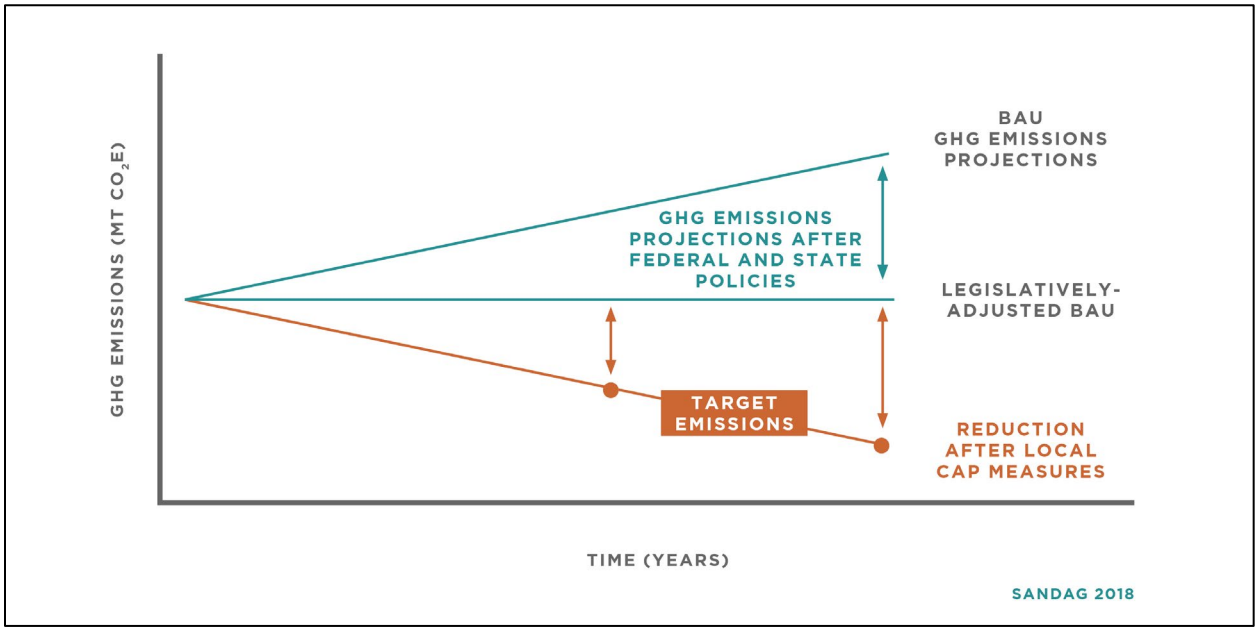

Figure 4. Sample CAP projections and targets

The Carlsbad CAP considered another category of anticipated GHG emissions reduction from the BAU and legislatively adjusted BAU projections: additional General Plan policies and actions. These policies and actions deal with the transportation sector and include bikeway and pedestrian system improvements, traffic calming, parking facilities and policies, and transportation system improvements. After deducting these anticipated GHG emissions reductions from the BAU projection, the model then calculates the amount of additional GHG emissions reductions needed to reach the 2020 and 2035 targets.

The statewide targets used for the CAP are taken from Executive Order (EO) S-3-05 and the Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. Collectively they call for a reduction to 1990 levels by 2020 and 80% below 1990 levels by 2050. For Carlsbad, the targets are 4% below the 2012 baseline by 2020 and 52% below the 2012 baseline by 2035. Prior to 2020, Carlsbad had surpassed the reductions needed to meet the 2020 goal.

The additional GHG emission reductions necessary to reach the targets are known as the CAP measures; these measures are noted in Table 2. Each measure has actions, which once implemented by the city, should result in the modeled GHG emissions reductions, also shown in

Table 2. Since CAP Amendment No. 1 removed some of the measures included in the 2015 CAP, the measures have some letters "missing."

Table 2 – CAP Measures and GHG Reductions

Measure Letter	GHG Reduction Measures	GHG Reductions in 2035 ($MTCO_2e$)
B	Install commercial and industrial photovoltaic (PV) systems	4,457
D	Encourage single-family residential efficiency retrofits	7,986
E	Encourage multi-family residential efficiency retrofits	3,993
F	Encourage commercial and city facility efficiency retrofits	7,579
I	Replace Incandescent bulbs with light-emitting diode (LED) bulbs	22
J	New construction residential and commercial solar water heater/heat pump installation & retrofit of existing residential	2,813
K	Promote Transportation Demand Management	6,325
L	Increase zero-emission vehicles travel	49,912
M	Develop more citywide renewable energy projects	2,774
N	Reduce the GHG intensity of water supply conveyance, treatment and delivery	713
O	Encourage the installation of greywater and rainwater systems	137
P	Implement Community Choice Energy	56,207
Total GHG Reductions		**142,918**

III. CAP Measures and Actions

The CAP measures listed in Table 2 can be grouped into four strategy areas: Energy Efficiency, Renewable Energy (including Clean Electricity), Transportation, and Water. For each of the

measures, there are detailed actions that, taken together, should result in the anticipated GHG emission reductions.

The following section describes the progress made by the city in implementing the CAP measures and actions, organized by the different strategy areas. A more detailed description of activities conducted for each CAP action, along with the 2035 performance goals for each measure, is contained in Appendix A of this report. The activities involving public outreach and education are described in a separate section, since those efforts encompass all strategy areas.

A. Energy Efficiency

Energy efficiency is an important component to reducing energy consumption and lowering GHG emissions. The State of California's Energy Commission (CEC) has adopted a "loading order," or a prioritized list of actions needed to reduce energy use, and energy efficiency is at the top of the list. For Carlsbad, energy efficiency CAP measures account for approximately 15%[4] of the planned GHG emission reductions.

Measures D, E, F, and I all deal with energy efficiency, both in community and municipal operations. These measures call for ordinances mandating energy efficiency improvements in residential and non-residential construction, implementation of energy conservation measures in city facilities, and promotion of energy efficiency rebate and incentive programs.

B. Renewable Energy

The provision of energy through distributed renewable sources can significantly reduce the need for electricity from the grid and, therefore, lower GHG emissions. The CEC's loading order prioritization of energy efficiency is to lessen the amount of energy used, thereby minimizing the size and cost of the renewable energy system needed to power the building. According to the CAP, renewable energy measures will account for approximately 46%[5] of the planned GHG emission reductions.

Measures B, J, M, and P relate to community and city renewable energy improvements and increasing the amount of renewable energy on the electrical grid. These measures include ordinances requiring solar photovoltaic (PV) systems in new non-residential construction and existing commercial buildings, alternative energy water heating systems, citywide renewable energy projects, promotion of renewable energy rebate and incentive programs, and participation in a community choice energy program.

C. Transportation

There are two primary facets of GHG emission reductions related to transportation. The first is to reduce the number of miles a vehicle is driven. Reducing the length of trips and/or the need

[4] This value is rounded.
[5] This value is rounded.

to use a motorized vehicle can significantly reduce GHG emissions. The second facet is to reduce or eliminate the GHG emissions coming from vehicles. Known as low- or zero-emission vehicles (ZEVs), these automobiles include alternative-fueled vehicles, hybrids, and electric vehicles (EVs). In the CAP, transportation-related measures account for approximately 39%[6] of the planned GHG emission reductions.

Measures K and L address transportation-related GHG emission reductions. Measure K relates to reducing vehicle miles traveled (VMT) and is closely tied to policies contained in the General Plan Mobility Element. These measures include implementing the Transportation Demand Management (TDM) ordinance for non-residential development that meets the ordinance's trip threshold; data from this ordinance is tracked through the city's online permit database. These measures also include implementing elements of the TDM Plan and making updates to the TDM Handbook, as needed.

Measure L involves reducing tailpipe emissions through an increase in the proportion of low-emission vehicles and ZEVs on the road. Staff continued implementation of an ordinance requiring installation of EV-charging infrastructure for all new residential and non-residential development and major renovations of existing residential buildings; data for this ordinance is tracked in the city's online permit database. However, the 2022 California Building Code expanded the number, location, and dimension of required EV parking spaces and "EV-ready" spaces. 2023 was the first year this became a mandatory part of the state's Building Code, therefore fewer permits were subject to the city's reach code.

D. Water

Water conservation can lower GHG emissions because movement of water and wastewater requires energy. Measures N and O promote increasing energy efficiency in the potable water, recycled water, and wastewater conveyance systems and using greywater and rainwater collection systems. In the Carlsbad CAP, water measures account for less than 1%[7] of the planned GHG emissions reductions.

The Carlsbad Municipal Water District (CMWD) analyzes energy usage of their pumps and endeavors to increase energy efficiency of equipment whenever it is replaced. Implementation of the actions associated with Measures N and O will continue in the mid- to long-term timeframe.

E. Public Outreach and Education

In addition to the provision of energy-efficient buildings or the availability of PV systems and EVs, a critical component to reducing GHG emissions is encouraging members of the public to

[6] This value is rounded.
[7] This value is rounded.

engage in behaviors that reduce GHG emissions. Bike lanes, pedestrian improvements, and transit expansion only reduce GHG emissions if people use them. Measures D, E, F, and I all contain actions related to public outreach and education.

IV. Monitoring

Monitoring of CAP implementation can be divided into three general areas: 1) progress on implementing the CAP Actions; 2) progress on reaching the CAP measures' performance goals; and 3) progress in reaching the CAP GHG emission reduction targets for 2035.

A detailed description of the activities undertaken to implement the CAP actions is contained in Appendix A. Regarding the CAP measures and their corresponding performance goals, there is variability in the monitoring data sources. This data will be collected during the biennial GHG inventory process, conducted by SANDAG, and reported in the corresponding CAP Annual Report.

A. Renewable Energy

Measure B involves increasing the amount of solar PV systems in Carlsbad. Data for the reporting period were obtained from the city's online permit database. Table 3 shows the number and capacity in kilowatts (kW) of PV system installations in the residential and non-residential sectors during the reporting period.

Table 3 – PV System Installations in Reporting Period 7 (Jan. 1, 2023 – Dec. 31, 2023)

Sector	Total Finaled Permits (#)	Total Capacity (kW)	Highest Capacity Project (kW)	Lowest Capacity Project (kW)	Median Project Capacity (kW)
Residential	1,816	12,216.05	26.4	0.73	5.2
Non-residential	20	5,243.64	723.60	3.24	126.20

As of January 2020, the California Building Code requires PV in new residential construction, which is a contributing factor to the increase in residential PV. Because of this legislation, CAP Amendment No. 1 removed the residential PV measure and subsequent target. Figure 5 shows the non-residential PV installations as it relates to the CAP projections and target. The data was obtained from the city's online permit database.

As seen in Figure 5, the non-residential installations currently exceed the trend line amount for reaching the CAP target of 33.54 MW of capacity by 2035. Through 2023, 25.06 MW have been installed.

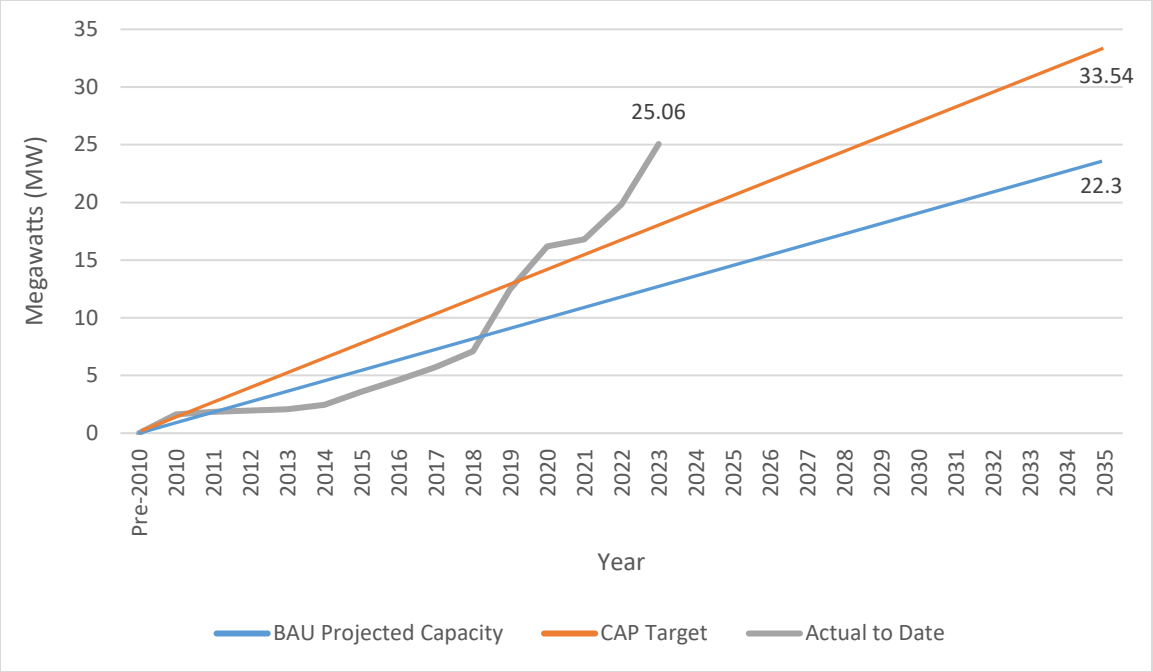

Figure 5 – Non-residential PV Installations and CAP Projections and Target

B. Electric Vehicles

CAP Measure L involves promoting an increase in the proportion of ZEV miles traveled, specifically EVs, of total VMT. One way to promote an increase in EV ownership and use is to increase the number and locations of publicly available EV charging stations.

The California Air Resources Board (CARB) administers the Air Quality Improvement Program (AQIP), intended to fund clean vehicle and equipment projects, air quality research, and workforce training. One of the AQIP programs is the Clean Vehicle Rebate Program (CVRP). Administered by the Center for Sustainable Energy (CSE), the CVRP provides rebates for the purchase or lease of clean vehicles. CVRP participation statistics can be used to gauge EV ownership. Figure 6 shows the annual CVRP participation within Carlsbad, expressed through number of rebates, from March 2011 through November 2023, after which the CVRP stopped accepting new applications[8].

[8] Center for Sustainable Energy (2023). California Air Resources Board Clean Vehicle Rebate Project, Rebate Statistics. Data last updated Jan. 23, 2024. Retrieved Feb. 14, 2024 from https://cleanvehiclerebate.org/en/rebate-statistic

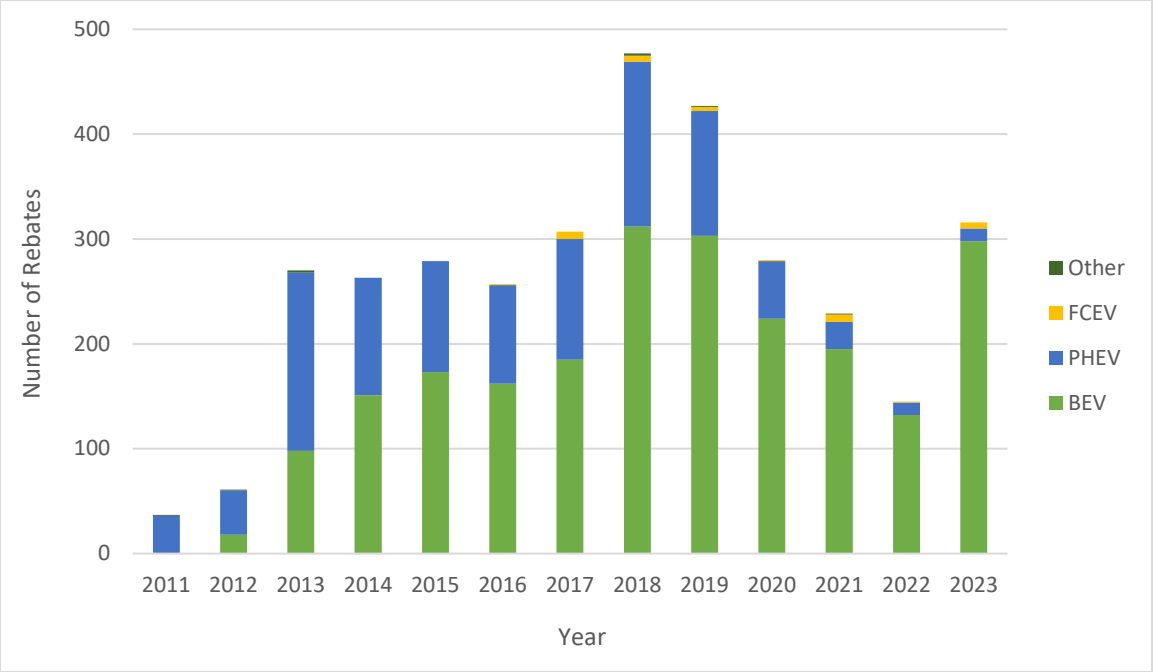

Figure 6 – CVRP Participation in Carlsbad – March 2011 through November 2023[9]

Data for the reporting period is available from January 2023 to November 2023, and CVRP participation is available in Table 4. The city also continues to acquire clean vehicles as part of its fleet conversion strategy; during the reporting period, the city purchased six plug-in hybrid electric vehicles (PHEVs) and EVs.

Table 4. CVRP participation in Carlsbad – January 2023 to November 2023

Clean Vehicle Type	Number of Rebates
Battery electric vehicle (BEV)	298
Plug-in hybrid electric vehicle (PHEV)	12
Fuel cell electric vehicle (FCEV)	6
Other	0

C. General Plan Transportation Policies

In addition to the CAP Measures and Actions described in Section III of this report, the CAP also relies upon implementation of some transportation-related General Plan policies for GHG reductions. These policies involve bikeway system improvements, pedestrian improvements and increased connectivity, traffic calming, parking facilities and policies, and transportation

[9] BEV = battery-electric vehicle; PHEV = plug-in hybrid electric vehicle; FCEV = fuel-cell electric vehicle; other = non-highway, motorcycle & commercial BEV.

improvements. While the overall GHG reduction of these General Plan policies is relatively small (approximately 7.6% of 2035 reductions), it is important to track progress in completing these improvements because they contribute to increased and multimodal mobility within the city.

During the reporting period, green paint was installed at 37 bike lane locations throughout the city, six miles of new bike lanes were installed, and over 16 miles of bike lanes were improved through the east/west corridors resurfacing and restriping effort. The city currently has 195.19 miles of bikeways, as shown in Figure 7.

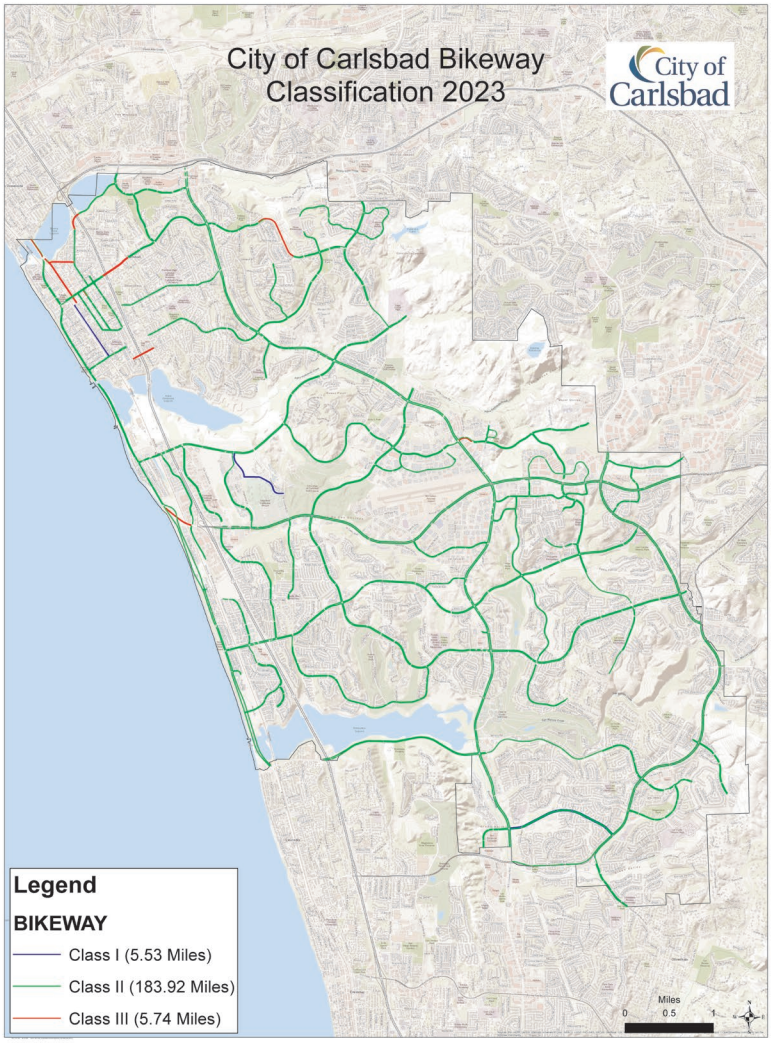

Figure 7 – Bikeways by Classification

Parking Facilities and Policies

On Sept. 26, 2017, the City Council accepted a Parking Management Plan (PMP) for the Carlsbad Village, Barrio and Beach Area, which contains many of the parking policies described in the CAP. Implementation of the plan will occur through the Carlsbad Village and Barrio Master Plan, which was adopted by the City Council on July 24, 2018. The recommendations in the PMP include hiring a parking program manager, incentivizing shared and leased parking, reducing parking requirements, allowing bicycle parking as a replacement for required parking, and installing digital parking locator infrastructure and wayfinding signs.

The most recent parking studies of the downtown area Parking Study identified that the parking demand increased from earlier years in some beach and business areas, but that the conclusions and recommendations were the same. Additionally, a new state law was enacted in 2022 (Assembly Bill or AB 2097) that prohibits a local jurisdiction from imposing or enforcing minimum parking requirements for projects within one-half mile of a major transit stop or high-quality transit corridor, with exceptions. Therefore, AB 2097 restricts a local government's ability to provide parking standards in most of the Carlsbad Village and Barrio Master Plan area due to its proximity to the Carlsbad Village Coaster station. City staff is currently reviewing the associated plans to ensure consistency with state law, while adequately managing existing and future parking demands in the downtown area.

Transportation Improvements

During the reporting period, staff continued to develop the programs and projects identified in the Sustainable Mobility Plan. The Sustainable Mobility Plan consolidates decades of planning and community input to plan the city's future active transportation networks, improve transportation-related safety, reduce GHG emissions and VMT, and shift how residents get around the city away from private automobiles toward modes that are more sustainable. Some of the specific actions completed during the reporting period include:

- To balance the needs of all roadway users, the city has resurfaced and restriped approximately 16 miles of several east-west roadways throughout the city, which included travel lane narrowing, and in some cases a reduced number of car lanes and expanded bike lanes and buffer areas between bike and car lanes
- Implementation of 10 new traffic calming projects citywide to reduce speeding in residential neighborhoods
- Installation of 2,551 feet of new sidewalks
- Continued development of Safe Routes to School plans for four schools in the city including Hope Elementary, Jefferson Elementary, Sage Creek High School and Aviara Oaks Elementary / Middle Schools

- Provided 24 e-bike safety courses for over 1,000 middle and high school students in coordination with the Carlsbad Unified School District
- Initiated key program recommendations from the Sustainable Mobility Plan, including the annual active transportation monitoring program, adult cycling education and Growth Management Plan monitoring
- Coordinated with the Carlsbad Tourism Business Improvement District to launch a sustainable transportation initiative including a complimentary electric shuttle service available to hotel guests staying in Carlsbad, which is a service that aims to provide a convenient and sustainable travel option for visitors

D. New Development Projects

The CAP serves as an environmental review tiering document, or "Qualified CAP," pursuant to Section 15183.5 of the California Environmental Quality Act (CEQA) Guidelines. $MTCO_2e$ must either demonstrate consistency with the CAP or submit a project specific GHG analysis for review and approval.

To evaluate project CAP consistency, the Planning Division uses the CAP Consistency Checklist (Checklist) and accompanying Guidance for Demonstrating Consistency with the CAP – For Discretionary Projects Subject to CEQA (Guidance). The Checklist and Guidance are available at: http://www.carlsbadca.gov/services/building/forms/default.asp.

During the reporting period, no projects exceeded the 900 $MTCO_2e$ threshold; therefore, no projects were subject to CEQA CAP compliance review.

V. GHG Emissions Inventories

As part of its Climate program, SANDAG coordinates with local jurisdictions to prepare biennial GHG inventories. These inventories are based upon energy consumption data from San Diego Gas & Electric (SDGE), VMT modeling data from SANDAG, and other information such as waste disposal and water consumption. These inventories, along with other local GHG reduction activity, are released as a jurisdiction-specific "ReCAP Snapshot." To date, SANDAG has released 2016, 2018, and 2020 Snapshots[10], though the 2020 ReCAP Snapshot was incomplete[11]. A 2022 Snapshot is expected later in 2024. Figure 8 shows the 2016, 2018, and 2020 Snapshot data.

[10] All ReCAP Snapshot data are available on SANDAG's website at: https://opendata.sandag.org/stories/s/pd9g-cay7

[11] The SANDAG 2020 ReCAP Snapshots state that "on-road transportation has been omitted due to the lack of suitable data for the 2020 year…the Covid-19 pandemic had extreme effects on regional transportation and the [Activity Based Model] had no way of anticipating these effects" and that the observed data available "does not have enough detail to provide accurate VMT estimates for individual jurisdictions within the region."

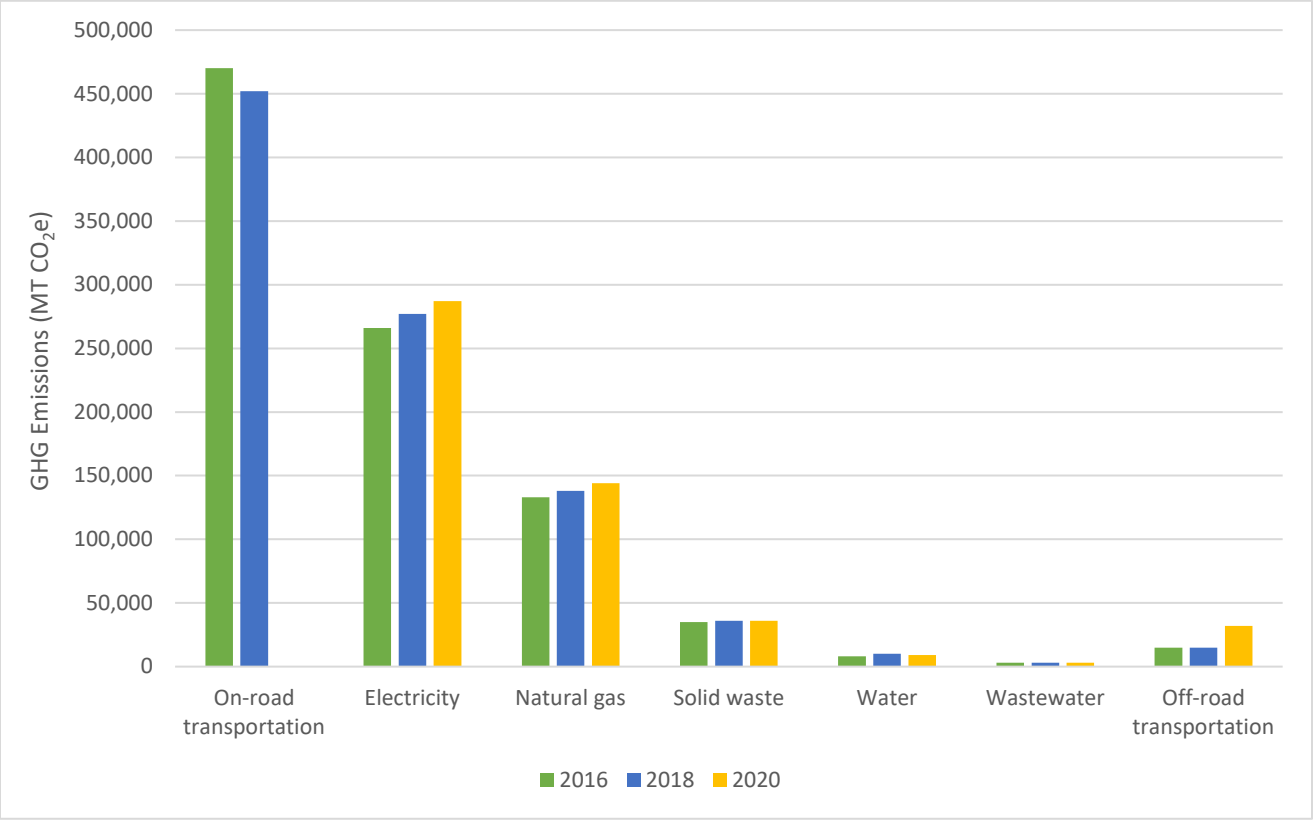

Figure 8– 2016, 2018, and 2020 Community GHG Emissions by Sector[12]

As discussed in Section I of this report, the CAP sets goals to reduce GHG emissions by 4% below the 2012 baseline by 2020 (a reduction of approximately 39,080 $MTCO_2e$) and 52% below baseline by 2035 (a reduction of approximately 508,040 $MTCO_2e$). The most recent complete GHG inventory from 2018 shows the city surpassing its 2020 targets with a 4.8% reduction in GHG emissions (a reduction of approximately 47,000 $MTCO_2e$). This trendline can be seen in Figure 1 in Section I.

[12] Methodologies used to calculate GHG emissions for different emission sectors change from inventory year to inventory year; therefore, comparisons to other years should be done with that understanding. Specific details about what data sources have changed from inventory to inventory are available in SANDAG's ReCAP Snapshots.

VI. CAP Update

Following the direction of the City Council, staff have been working with a consultant to prepare a comprehensive update to the Climate Action Plan since 2021[13]. This update is intended to meet two state targets: to reduce emissions to 50% below 2016 levels by 2035 and to reduce emissions to 85% below 2016 levels by 2045. During the reporting period, the consultant's team and staff prepared an updated greenhouse gas inventory and projections, analyzed and developed potential measures to be included in the updated Climate Action Plan, shared the potential measures with the public and the City Council, and received input on the potential measures. Staff had begun reviewing this public input and preparing an implementation cost analysis by the end of the reporting period.

Staff plan to share a public draft of the updated Climate Action Plan, appendices, and environmental document by early summer 2024. After a review period, staff anticipate presenting the final Climate Action Plan to the Planning Commission and the City Council in late summer 2024.

VII. Conclusion

During the seventh CAP reporting period, staff continued to make progress in carrying out the CAP measures and actions. With the CAP update expected to be completed in summer 2024, this will be the final Annual Report for this existing CAP. Moving forward, a new Annual Report focusing on the measures included in the CAP Update will be provided following the adoption of the CAP Update.

[13] On April 19, 2022, the City Council directed staff to use a customized run of SANDAG's most recent activity-based model in the Climate Action Plan update to forecast the impact of potential actions. This was done to align with the land use assumptions and analysis prepared to support the Housing Element rezoning program, as well as to avoid additional staff time and consultant costs. The customized data from SANDAG was significantly delayed and staff did not receive the necessary data until spring 2023.

Appendix A

CAP AR7 Implementation Activities

by Measure and Action

CAP Measures and Actions 2035 Performance Goals for Measures		Progress Indicators	CAP AR7 Implementation Activities and Status
Timeframes in CAP: *Short-term = 1 - 2 years* *Mid-term = 2 - 5 years* *Short to Long-term & Mid to Long-term = begun but not completed in 5 years* *Ongoing = continue for the duration of CAP implementation*		*Types of data collected to measure progress*[14]	*Implementation status:* *Complete* *In progress, on schedule* *In progress, delayed* *Not started*
B - Promote installation of commercial and industrial photovoltaic systems Promote installation of commercial and industrial PV systems to produce an additional 11.24 MW above projected amounts by 2035.			
B-1	Implement and enforce Title 18, Chapter 18.30, Section 18.30.130 of the Carlsbad Municipal Code, mandating solar photovoltaic energy generation systems on new non-residential buildings. *(Ongoing)*	MW installed PV	Staff continued to implement the solar PV ordinance adopted by City Council as Ordinance No. CS-347. This ordinance requires all new non-residential buildings to install solar PV systems to offset a portion of their electricity requirements. In 2023, 5.24 MW of PV was installed on non-residential buildings (see Table 3). (*In progress, on schedule)*
B-2	Implement and enforce Title 18, Chapter 18.30, Section 18.30.130 of the Carlsbad Municipal Code, mandating solar photovoltaic energy generation systems on existing non-residential buildings undergoing major renovations. *(Ongoing)*	MW installed PV	Staff continued to implement the solar PV ordinance adopted by City Council as Ordinance No. CS-347. This ordinance requires existing non-residential buildings that undergo major renovations or additions to install solar PV systems to offset a portion of their electricity requirements. In 2023, 5.24 MW of PV was installed on non-residential buildings (see Table 3). (*In progress, on schedule)*
D - Encourage single-family residential efficiency retrofits Encourage single-family retrofits with the goal of 50% energy reduction compared to baseline in 30% of the total single-family homes citywide (approximately 10,000 single-family homes out of total of 35,000.)			
D-1	Publicize available incentive and rebate programs, such as SDG&E's Residential Energy Efficiency Program, on the city's website and by other means. *(Short-term)*	Promotional activities conducted	Staff continued to maintain a website with rebate and incentive information and promoted this information at various events. *(Complete)*
D-2	Create a citywide "Energy Challenge," similar to the Department of Energy's Better Buildings Challenge, to promote cost-effective energy improvements, while having residents and building owners commit to reducing energy consumption. *(Short-term)*	Program launch Promotional activities conducted	The city continued promoting its Home Energy Score Assessment Program, which offers residents a free, customized assessment to measure their home's energy use and identify ways to conserve energy and save money. During the reporting period, 52 assessments were completed, covering 110,262 square feet. Staff will continue to implement this pilot program as funding is available. *(Complete)*

[14] As stated in the CAP, "Progress indicators will be confirmed as part of the implementation of each measure. If a recommended progress indicator is found to be infeasible to collect or track, an alternative indicator will be identified." Since CAP Amendment No. 1 was adopted, no alternative indicators have been identified.

		Number of program participants and/or sq. footage of buildings in program	
D-3	Implement and enforce Title 18, Chapter 18.30, Section 18.30.30, mandating energy efficiency measures in existing residential buildings undergoing major renovations. *(Ongoing)*	Number and/or sq. footage of existing homes retrofitted	Staff continued to implement the energy efficiency ordinance adopted by City Council as Ordinance No. CS-347. This ordinance requires specified energy efficiency measures in all major residential renovations. In 2023, 25 residential building permits issued for major renovations had energy efficiency measures included as a part of the renovation. *(In progress, on schedule)*
E - Encourage multi-family residential efficiency retrofits Encourage multi-family retrofits with the goal of 50% energy reduction compared to baseline in 30% of the total multi-family homes citywide (approximately 5,000 single-family homes out of total of 17,000.)			
E-1	See D-1 above	See D-1 above	See D-1 above
E-2	See D-3 above	See D-3 above	See D-3 above
E-3	See D-3 above	See D-3 above	See D-3 above
F - Encourage commercial and city facility efficiency retrofits Encourage commercial and city facility efficiency retrofits with the goal equivalent to a 40% energy reduction in 30% of commercial square footage citywide and in city-owned buildings by 2035.			
F-1	Undertake a program of energy efficiency retrofits for city-owned buildings, with the goal of 40% reduction in energy use, beginning with retrofits that would result in most substantial energy savings. *(Short-term)*	Sq. footage of buildings retrofitted % energy use reduction	Staff surpassed the 40% reduction goal in the previous reporting period. Moving forward, staff will continue to make energy efficiency retrofits in city-owned buildings. (*Complete)*
F-2	Promote available incentive and rebate programs, such as SDG&E's Energy Efficiency Business Rebates and Incentives Program, on the city's website and by other means. *(Short-term)*	Promotional activities conducted Number of program	Staff continued to maintain a website with information on rebates and incentives. *(Complete)*

		participants and/or sq. footage of buildings retrofitted % energy use reduction	
F-3	Implement and enforce Title 18, Chapter 18.21, Section 18.21.155, mandating energy efficiency measures in new non-residential buildings and existing non-residential buildings undergoing major renovations. *(Ongoing)*	% energy use reduction	Staff continued to implement the energy efficiency ordinance adopted by City Council as Ordinance No. CS-347. This ordinance requires specified energy efficiency measures in all new and certain existing nonresidential buildings undergoing major renovations. In 2023, 24 commercial building permits issued for major renovations had energy efficiency measures included as part of the renovations. *(In progress, on schedule)*
I - Promote replacement of incandescent and halogen bulbs with LED or other energy efficient lamps Replace 50% of incandescent and halogen light bulbs citywide with LED or similarly efficient lighting by 2035.			
I-1	Replace 50% of incandescent or halogen light bulbs in city facilities with LED or similarly efficient lighting, or follow SANDAG Energy Roadmap recommendations for lighting in city facilities, whichever results in greater energy savings. *(Short-term)*	Building sq. footage upgraded Number of fixtures replaced	Staff met the 50% replacement goal during the previous reporting period. Moving forward, staff will continue to replace lighting as identified in this CAP measure and action. *(Complete)*
I-2	Promote the use of LED or other energy efficient lamps by publicizing rebate programs and information from SDG&E on the benefits of the use of LED or other energy efficient lighting on the city's webpage. *(Short-term)*	Promotional activities conducted	Staff continued to maintain a website with information about rebates and incentives. *(Complete)*
I-3.i	Evaluate the feasibility of adopting a minimum natural lighting and ventilation standard, developed based on local conditions. *(Mid-term)*	Feasibility study conducted	In 2018, the Center for Sustainable Energy (CSE) performed a qualitative feasibility evaluation for natural lighting and ventilation. CSE determined that it would be difficult to provide a cost-effective natural ventilation requirement that goes beyond the 2019 Building Energy Efficiency Standards. CSE noted that nonresidential natural lighting is well-governed in state codes, reducing the need for additional local standards. Daylighting in residential spaces is less likely to be cost-effective than in nonresidential spaces because the code assumes occupants are not typically present in residential spaces during the day to take advantage of daylighting; therefore, the cost of these

			controls may not be offset by the savings. The feasibility assessment also concluded that there are no known reach codes that include natural lighting and/or natural ventilation requirements that go beyond current code requirements. *(Complete)*
I-3.ii	Demonstrate natural lighting and ventilation features in future facility upgrade or new construction. *(Mid-term)*	Number of buildings with natural lighting and ventilation features % energy use reduction	Staff are incorporating natural lighting and ventilation in the future Orion Center, which is a Public Works and Parks operations and maintenance facility that will be constructed near the Fleet Maintenance Facility. *(In progress, delayed)*
J - New construction residential and commercial solar water heater/heat pump installation & retrofit of existing residential Install solar water heaters or heat pumps on all new residential and commercial construction. Retrofit up to 30% of existing homes and commercial buildings to include solar water heaters or heat pumps.			
J-1	Promote the installation of residential solar water heaters and heat pumps by publicizing incentive, rebate and financing programs, such as PACE programs and the California Solar Initiative for renovations of existing buildings by posting this information on the city's website and by other means. *(Short-term)*	Promotional activities conducted Solar heater/heat pump installations	Staff continued to maintain a website with incentive, rebate and financing program information. *(Complete)*
J-2	Implement and enforce Title 18, Chapter 18.30, Sections 18.30.150 and 18.30.170, mandating alternative water heating requirements in new residential and non-residential buildings. *(Ongoing)*	Solar heater/heat pump installations MW installed PV	Staff continued to implement the water heating ordinance adopted by City Council as Ordinance No. CS-347. This ordinance requires new residential and nonresidential buildings to install solar thermal water heating or electric heat pump water heaters for water heating needs. In 2023, 7 permits were issued that resulted in the installation of alternative water heaters in new construction projects (5 residential [3 single-family and 2 multi-family totaling 117 units], 2 non-residential). The PV installed for these projects totaled 0.12 MW (115.16 kW for residential and 5 kW for commercial). *(In progress, on schedule)*
K - Promote transportation demand management strategies Promote Transportation Demand Management Strategies with a goal of achieving a 10% increase in alternative mode use by workers in Carlsbad, for a total of 32% alternative mode use.			

K-1	Implement the citywide transportation demand management (TDM) plan and strategies. *(Ongoing)*	TDM plan adopted TDM participation rates % VMT reduced	In 2023, the Carlsbad Commuter program (program) coordinated TDM efforts with 45 employers and property managers in the city. Approximately 8,000 employees work for employers that have completed and are implementing TDM plans under the TDM ordinance. The program continued to deliver relevant TDM strategies, content development, and tactics that matched the continually changing commuter behavior patterns that have evolved from the COVID-19 pandemic. The program promoted local and regional transportation campaigns including Bike to Work Day, Carpooling, and Safer Streets Together by developing and distribution promotional materials and hosting outreach events. The program engaged directly with an estimated 500 commuters at in-person outreach events. The program maintained partnerships with regional transportation agencies and service providers to monitor and relay ongoing service changes due to national, state, and local protocols that affected transit and other modal availability. The program maintained and promoted a comprehensive system of digital resources to help employers implement carpool programs, active transportation programming, and hybrid work. The program promoted their ongoing campaign, Balanced Work, which provides employers, managers, and business leaders with leading resources to implement a hybrid workforce. *(In progress, on schedule)*
K-2	Implement and enforce Title 18, Chapter 18.51, mandating TDM improvements and strategies for non-residential development. *(Ongoing)*	TDM participation rates % VMT reduced	The TDM ordinance efforts for 2023 include the development of additional updates to the TDM handbook, the approval of 11 additional TDM plans and 29 baseline surveys. 17 of the 29 worksites exceeded their 2020-2025 Sustainable Mode Share goals. Six properties conducted follow-up surveys in fall 2023 with five out of six exceeding their mode share goal. All six employers showed a reduction in per capita VMT from the baseline survey. The average sustainable mode share was 41% compared to the average baseline mode share of 24%. *(In progress, on schedule)*
L - Promote an increase in the amount of zero-emissions vehicle travel Promote an increase in the amount of ZEV miles traveled from a projected 4.5% to 25% of total VMT by 2035.			
L-1	Working with industry partners, construct a "PV to EV" pilot project to install a PV charging station at a city facility (such as Faraday Center) to charge city ZEVs. The purpose of the pilot project would be to evaluate the feasibility of incorporating more ZEV into the city's fleet. *(Short-term)*	kW installed PV Number of ZEV charging units	Staff continues to assess the feasibility of a direct "PV to EV" pilot project(s). *(In progress, delayed)*

L-2	Prepare a community-wide charging station siting plan, which evaluates site visibility and exposure, EV driving ranges, high volume destinations, locations with high ownership or interest in EVs, and cost of construction. *(Short-term)*	Siting Plan prepared	Staff continues to utilize the completed EV charging station site analysis to select locations for future charging stations. *(Complete)*
L-3	Construct ZEV charging stations based on the community-wide charging station siting plan described in L-2 above. The ZEV charging stations will be funded by grant funds when available, and the city will post signage directing ZEVs to charging stations. *(Mid-term)*	Number of charging stations installed kWh charging sessions	During the reporting period, staff continued to evaluate funding opportunities to construct EV charging stations. Utilizing the Power Your Drive for Fleets funds, SDGE completed construction of two fleet DC Fast Charging stations at the Fleet Maintenance Facility, which was the first time a municipality completed such a project in the SDGE region. *(In progress, on schedule)*
L-4	Offer dedicated ZEV parking, and provide charging stations adjacent to ZEV parking as identified in the community-wide charging station siting plan. *(Mid-term)*	Number of installed ZEV parking spaces/charging stations kWh charging sessions	An EV charging infrastructure ordinance was adopted by City Council as Ordinance No. CS-349, which requires new residential and nonresidential buildings, and major renovations to existing residential buildings, to install EV charging infrastructure. Staff continued to implement this ordinance during the reporting period. However, the 2022 California Building Code expanded the number, location, and dimension of required electric vehicle parking spaces and "EV-ready" spaces. 2023 was the first year this became a mandatory part of the state's Building Code, therefore fewer permits were subject to the city's reach code. In 2023, permits issued for residential buildings yielded 30 EV chargers (either charging stations, "EV ready", or "EV capable" wiring), and permits issued for nonresidential buildings yielded 15 EV chargers. *(In progress, on schedule)*
L-5	Adopt requirements for ZEV parking for new developments. *(Short-term)*	Number of installed ZEV parking spaces/charging stations kWh charging sessions	On March 12, 2019, an EV charging infrastructure ordinance was adopted by City Council as Ordinance No. CS-349, which requires new residential and nonresidential buildings to install EV charging infrastructure. However, the 2022 California Building Code expanded the number, location, and dimension of required electric vehicle parking spaces and "EV-ready" spaces. 2023 was the first year this became a mandatory part of the state's Building Code, therefore fewer permits were subject to the city's reach code. In 2023, permits issued for residential buildings yielded 30 EV chargers (either charging stations, "EV ready", or "EV capable" wiring), and permits issued for nonresidential buildings yielded 15 EV chargers. *(Complete)*
L-6	Implement and enforce Title 18, Chapter 18.21, Sections 18.21.140 and 18.21.150, mandating electric vehicle charging infrastructure in new residential and non-residential building and existing residential and non-residential buildings undergoing major renovations. *(Ongoing)*	Number of EV chargers installed	Staff continued to implement the EV charging infrastructure ordinance adopted by City Council as Ordinance No. CS-349, which requires new residential and nonresidential buildings, and major renovations to existing residential buildings, to install EV charging infrastructure. However, the 2022 California Building Code expanded the number, location, and dimension of required electric vehicle parking spaces and "EV-ready"

			spaces. 2023 was the first year this became a mandatory part of the state's Building Code, therefore fewer permits were subject to the city's reach code. In 2023, permits issued for residential buildings yielded 30 EV chargers (either charging stations, "EV ready", or "EV capable" wiring), and permits issued for nonresidential buildings yielded 15 EV chargers. *(In progress, on schedule)*
L-7	Update the city's Fleet Management Program to include a low and zero-emissions vehicle replacement/purchasing policy. Increase the proportion of city fleet low and zero–emissions VMT to 25% of all city-related VMT by 2035. *(Short-term)*	% LEV and ZEV fleet VMT	The 25% low- and zero-emission city-related VMT goal for this measure (including patrol vehicles) was surpassed in a previous reporting period and continues to grow. Staff continued to implement the fleet conversion plan. On Oct. 13, 2021, Administrative Order #3 (Fleet Management Program) was updated to include a vehicle acquisition policy to require the purchase of low- and zero-emission vehicles where feasible. The Five-Year Strategic Plan includes a 100% EV purchase requirement for all passenger vehicles beginning in FY 23/24. During the reporting period, a total of eight city vehicles, including four ICE vehicles, were replaced with hybrid alternatives (1 hybrid, 3 plug-in hybrid, 4 electric); all eight of these vehicles were purchased following the adoption of the Five-Year Strategic Plan. There were a total of 47 hybrid or electric fleet vehicles in the fleet at the end of the reporting period. (*Complete)*
M - Develop more citywide renewable energy projects Produce an equivalent amount of energy to power 2,000 homes (roughly equivalent to a 5% reduction) by 2035 from renewable energy projects.			
M-1	Conduct a feasibility study to evaluate citywide renewable energy projects and prioritize accordingly. *(Short-term)*	Feasibility study conducted	Leveraging SANDAG's Energy Engineering contract with TRC, a Microgrid Feasibility Study for the Carlsbad Safety and Service Center on Orion Way was completed and presented to City Council on June 12, 2018. If implemented, the microgrid would include enough renewable energy generation and energy storage to power the entire complex in case of a blackout. *(Complete)*
M-2	Incorporate renewable energy measures such as PV system installation on city buildings and parking lots, or microturbine installation on city facilities, with the goal of producing approximately 12,000 megawatt-hours per year. *(Mid to Long-term)*	MW installed renewable energy systems	In accordance with the city's solar PV ordinance, future city facilities will be required to incorporate renewable energy. The potential for retrofitting PV on existing buildings is evaluated when other improvements and/or renovations are planned. (*In progress, on schedule)*
M-3	Pursue available funding sources for the construction of renewable energy projects by the city, such as Energy Efficiency Financing for Public Sector Projects and SGIP. *(Mid to Long-term)*	Number of EEFP or SGIP-funded projects	City staff continually monitors potential funding sources to support CAP implementation, including renewable energy projects. *(In progress, on schedule)*

N - Reduce the GHG intensity of water supply conveyance, treatment and distribution Reduce the intensity of GHG emissions from water utilities (including water supply, wastewater, and recycled water) conveyance, treatment and distribution by 8% by 2035.			
N-1	Improve water utilities (including water supply, wastewater, and recycled water) conveyance, treatment and distribution, and other system improvements. *(Mid to Long-term)*	Number of water system improvement projects % energy use reduction	Incorporating energy efficiency into system improvements is standard practice for Carlsbad Utilities, which analyzes energy usage of their pumps and endeavors to increase energy efficiency of equipment whenever it is replaced. The potable water distribution system is almost completely gravity-fed. Specifically, CMWD receives treated water from the San Diego County Water Authority at the highest point in the system and uses gravity instead of electric pumps to move it downhill to customers throughout the city. The 2012 baseline inventory for the CAP had GHG emissions from water at 12,000 MT CO2e. The city has surpassed the 8% emissions reduction goal for Measure N (or a reduction of 960 MT CO_2e). The 2020 GHG inventory had emissions from water at 9,000 MT CO_2e. Staff will continue to improve water utilities conveyance, treatment and distribution, and other system improvements as identified in this CAP measures and action. *(Complete)*
O - Encourage the installation of greywater and rainwater systems Encourage the installation of greywater and rainwater collections systems with a goal of 15% of homes by 2035.			
O-1	Host workshops on greywater and rainwater collection systems through the Carlsbad Municipal Water District, or partner with existing workshop providers, for homeowners interested in installing systems suitable for their property. *(Mid-term)*	Number of workshops conducted % water use reduction	CMWD participated in a rain barrel rebate program with other north San Diego County water districts to encourage and provide financial incentive for rainwater collections systems. Details on the program can be found at: https://solanacenter.org/rain-barrels/ Carlsbad Utilities posted information on greywater systems on its website at: https://www.carlsbadca.gov/departments/utilities/water/water-conservation/gray-water. *(Complete)*
O-2	Create a greywater design reference manual, or provide links to an existing one, for the design of greywater and rainwater collection systems. *(Mid-term)*	Reference manual created % water use reduction	Staff updated the Utilities website to include a link to the County of San Diego's greywater design manual. *(Complete)*
O-3	Evaluate the feasibility of offering a rebate for residential greywater systems that require a permit to cover the cost of obtaining a permit. *(Mid-term)*	Feasibility study conducted	Staff continued evaluating the feasibility of this measure, but there are remaining legal questions around its funding. *(In progress, delayed)*

		Number of permit rebates issued % water use reduction	
P – Increase the proportion of clean electricity in community energy consumption Achieve 100% renewable electricity by 2030 for 95% of the residential bundled load and 85% commercial + industrial bundled load.			
P-1	Continue participation in the Clean Energy Alliance (CEA) Community Choice Energy program. *(Ongoing)*	Continued participation	The city continued participation in CEA, which launched in May 2021. (*In progress, on schedule)*
P-2	Explore the purchase of renewable energy credits if Community Choice Energy program is not reaching 2035 goal.	CCE participations rates and percentage of customers at 100% renewable energy	Staff will monitor program participation and implement this action if necessary. *(Not started)*