

# City of Carlsbad Climate Action Plan Annual Report

Reporting Year 3: July 1, 2018 - June 30, 2019

August 2019

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## **I. Introduction**

The purpose of this document is to provide an update on the status of the Climate Action Plan (CAP) implementation that occurred during the current 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. Given that CAP implementation is tied to the budget cycle, staff chose the fiscal year calendar to be the reporting period. This Year 3 annual report covers the FY 18-19 reporting period (July 1, 2018 to June 30, 2019).

## **II. Background on Climate Action Plan**

The City of Carlsbad's Climate Action Plan (CAP) was adopted on Sept. 22, 2015, along with the General Plan Update and associated Environmental Impact Report. The purpose of the CAP is to describe how greenhouse gas (GHG) emissions within Carlsbad will be reduced in accordance with statewide targets.

Chapter 2 of the CAP contains information about the 2011 GHG inventory conducted at the time of CAP development. 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, 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.

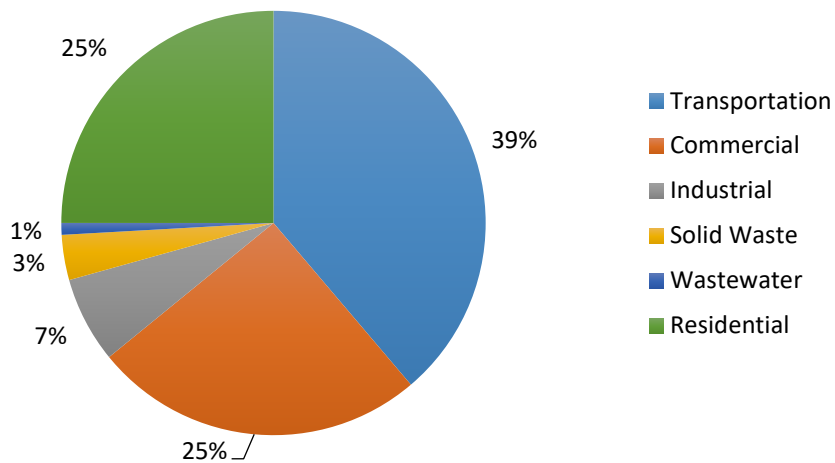
Chapter 4 of the CAP describes the additional Measures and Actions that the city must pursue to reach its GHG emissions reduction targets.

To implement these additional Measures and Actions, the city needed to identify and allocate appropriate funding. Therefore, subsequent to 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 of 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. CAP implementation is a team effort involving a number of city departments and divisions, coordinated by the CAP Administrator. The interdepartmental CAP implementation team consists of Public Works (PW) – General Services, PW – Traffic and Mobility, PW – Environmental Management, PW – Utilities, Community and Economic Development – Planning, Parks & Recreation, Finance, City Attorney

and City Manager - Communications. This team meets on an on-going basis to discuss CAP implementation activities and opportunities for collaboration.

The city conducted its first GHG inventory in 2005, which is attached to the CAP as Appendix A. As part of the CAP preparation, the city updated the 2005 inventory and prepared a 2011 inventory. Figure 1 and Table 1 below show the 2011 GHG emissions graphically and in tabular form for the entire city, including emissions from both municipal operations and the community. Municipal operations constituted approximately 1% of all GHG emissions in 2011. Since there are several different types of GHG, GHG emissions are typically expressed in metric tons of carbon dioxide equivalent (MTCO<sub>2e</sub>) to allow for standardization and comparison.

**Figure 1 – 2011 Community GHG Emissions by Sector**



**Table 1 – 2011 Community GHG Emissions by Sector**

Sector	GHG Emissions (MTCO <sub>2e</sub> )
Residential	176,405
Commercial	178,712
Industrial	46,248
Transportation	273,745
Solid Waste	21,719
Landfill	2,598
Wastewater	6,317
<b>Total</b>	<b>705,744</b>

Of the total emissions in 2011, 96% are attributed to the residential, commercial, industrial and transportation sectors (e.g. buildings and automobiles). This emissions profile by sector is typical of other cities; therefore, similar to most other CAPs, Carlsbad's CAP focuses primarily on GHG emissions reduction strategies on these sectors.

Forecasts for the Carlsbad CAP were conducted for 2020 and 2035 GHG emissions using the Statewide Energy Efficiency Collaborative (SEEC) model. The CAP used the 2005 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 emissions reductions derived from state and federal policies, such as low carbon fuel standards, building energy code requirements and the state's requirement for utilities to provide electricity from renewable energy sources (known as the Renewable Portfolio Standard or RPS).

The Carlsbad CAP considered another category of anticipated GHG emissions reduction from the 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 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 S-3-05 (EO S-3-05) and the Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. EO S-3-05 calls for a reduction to 1990 levels by 2020 and 80% below 1990 levels by 2050. For Carlsbad, the targets are 15% below the 2005 baseline by 2020 and 49% below the 2005 baseline by 2035.

The additional GHG emissions 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, will result in the modeled GHG emissions reductions also shown in Table 2.

**Table 2 – CAP Measures and GHG Reductions**

<b>Measure Letter</b>	<b>GHG Reduction Measures</b>	<b>GHG Reduction in 2020 (MTCO2e)</b>	<b>GHG Reduction in 2035 (MTCO2e)</b>
A	Install residential photovoltaic (PV) systems	2,896	10,136
B	Install commercial and industrial PV systems	3,810	13,336
C	Promote building cogeneration for large commercial and industrial facilities	305	1,067
D	Encourage single-family residential efficiency retrofits	323	1,132
E	Encourage multi-family residential efficiency retrofits	100	351
F	Encourage commercial and city facility efficiency retrofits	5,251	18,377
G	Promote commercial and city facility commissioning, or improving building operations	5,251	18,377
H	Implementation of Green Building Code	51	179
I	Replace Incandescent bulbs with LED bulbs	6,257	21,900
J	New construction residential and commercial solar water heater/heat pump installation and retrofit of existing residential	3,315	11,604
K	Promote Transportation Demand Management	6,728	23,549
L	Increase zero-emissions vehicle travel	15,474	54,158
M	Develop more citywide renewable energy projects	1,309	4,580
N	Reduce the GHG intensity of water supply conveyance, treatment and delivery	1,705	5,968
O	Encourage the installation of greywater and rainwater systems	344	1,205
<b>Total GHG Reductions</b>		<b>53,199</b>	<b>185,919</b>



### III. CAP Measures and Actions

The CAP Measures listed in Table 2 can be grouped into four strategy areas: Energy Efficiency, Renewable Energy, Transportation and Water. For each of the Measures, there are detailed Actions that, taken together, should result in the anticipated GHG emissions reductions. Each of the Actions has an implementation timeframe. Short-term Actions should be completed within the first two years of CAP implementation; mid-term Actions should be completed within five years; and, long-term Actions begin implementation in the first two to five years but will not be completed within that timeframe.

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 cross over 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,” 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 almost a third of the planned GHG emissions reductions.

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

During the reporting period, staff continued to make progress in implementing the energy efficiency related Measures. On March 12, 2019, City Council adopted energy efficiency ordinances for major renovations of existing residential and non-residential buildings. PW – General Services upgraded seven heating, ventilation and air conditioning (HVAC) units at the Faraday Center. LED lighting was installed at the Carlsbad City Library, Safety Training Center and Oak Avenue paint shop area. West facing windows at the Safety Training Center were tinted.

#### 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 about one-fifth of the planned GHG emissions reductions.

Measures A, B, C, J and M relate to community and city renewable energy improvements. These Measures include ordinances requiring PV systems in new residential and non-residential construction and existing commercial buildings, cogeneration in larger non-residential buildings, alternative energy water heating systems, citywide renewable energy projects, and promotion of renewable energy rebate and incentive programs. Cogeneration involves the generation of electricity and another form of energy, such as using steam to provide heating for a building.

On March 12, 2019, City Council adopted ordinances requiring installation of solar photovoltaic (PV panels) for all new non-residential development and major renovations of existing non-residential buildings, as well as alternative energy water heating for all new residential and non-residential development

### C. Transportation

There are two primary facets of GHG emissions reductions related to transportation. The first is to reduce the number of miles a vehicle is driven. Each mile driven represents an emission of GHG. Reducing the length of trips, or the need to use a motorized vehicle, can significantly reduce GHG emissions. The second facet of transportation-related GHG emissions is to reduce or eliminate the GHG emissions coming from vehicles. Known as low- or zero-emissions vehicles, these automobiles include alternative-fueled vehicles, hybrids and electric vehicles. Taken together, reduction of vehicle miles traveled and tailpipe emissions represents the largest single GHG emissions reduction strategy area. In the Carlsbad CAP, transportation-related Measures total over 40% of the planned GHG emissions reductions.

Measures K and L address the transportation related GHG emissions reductions. Measure K relates to reducing vehicle miles traveled and is closely tied to the policies contained in the General Plan Mobility Element. On Feb. 26, 2019, the City Council approved a Transportation Demand Management (TDM) plan and ordinance. Staff released a Request for Proposals in March 2019 to solicit TDM consulting services.

Measure L involves reducing tailpipe emissions through an increase in the proportion of low- and zero-emission vehicles on the road. On March 12, 2019, City Council adopted an ordinance requiring installation of electric vehicle (EV) charging infrastructure for all new residential and non-residential development and major renovations of existing residential buildings. Other activities during the reporting period included the purchase of ten plug-in hybrid city fleet vehicles and installation of 20 fleet and employee EV charging stations, 10 at the Faraday Center and 10 at the Carlsbad City Library.

## 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.

The Carlsbad Municipal Water District (CMWD) analyzes energy usage of their pumps and endeavors to increase energy efficiency of equipment whenever it is replaced. During the reporting period, a sewer pump stations was removed and the Automated Metering Infrastructure system was optimized and commissioned. 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 electric vehicles, a critical component to reducing GHG emissions is encouraging members of the public to engage in behaviors that reduce GHG emissions. Bike lanes, pedestrian improvements and transit expansion only reduce GHG emissions if people use them.

Measures C, D, E, F, G, and I all contain Actions related to public outreach and education. During the reporting period, staff continued work on a multi-year, research-based strategy to achieve measurable changes in public behavior, resulting in reduced GHG emissions. Concurrent with the long-term strategy, staff implemented several short-term public outreach and education tactics, including:

- Article in Carlsbad Business Journal
- News releases promoting GHG reduction measures and environmental events in local media
- Mailed advisory letter to over 180 building owners regarding AB 802 energy benchmarking and reporting requirements
- Informational materials available at city facilities.
- A website with information and resources
- Participation in the Carlsbad Chamber of Commerce Green Business Expo.
- Presentations at local, regional and statewide meetings, including the City of Carlsbad Planning Commission and City Council, Southwestern HOAs, Carlsbad Sustainability Coalition, Building Industry of America (BIA) North County Legislative Committee, San Diego Association of Governments (SANDAG) Regional Planning Committee, and the SEEC Forum.

## IV. New Development Projects

The CAP serves as an environmental review tiering document pursuant to Section 15183.5 of the California Environmental Quality Act (CEQA) Guidelines. According to the CAP, any discretionary project that will have GHG emissions greater than 900 MTCO<sub>2</sub>e must either demonstrate consistency with the CAP or submit a project-specific GHG analysis for review and approval.

During the reporting period, the Planning Division continued to implement the Climate Action Plan Consistency Checklist and accompanying Guidance for Demonstrating Consistency with the Climate Action Plan – For Discretionary Projects Subject to CEQA. The Checklist and Guidelines are available at: <http://www.carlsbadca.gov/services/building/forms/default.asp>.

The CAP states that new projects demonstrated to emit less than 900 MTCO<sub>2</sub>e would not contribute considerably to cumulative climate change impacts, and therefore do not need to demonstrate consistency with the CAP. No development projects approved during the reporting period met or exceeded the 900 MTCO<sub>2</sub>e threshold.

## V. 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 emissions reductions targets for 2020 and 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. For example, monitoring for Measures D, E, F and G require San Diego Gas and Electric (SDG&E) electric and natural gas energy usage. Monitoring for Measure L requires vehicle miles traveled (VMT) model output data. The energy usage and VMT data will be collected during the biannual GHG inventory process, conducted by SANDAG, and reported in the corresponding CAP Annual Report.

### A. Renewable Energy

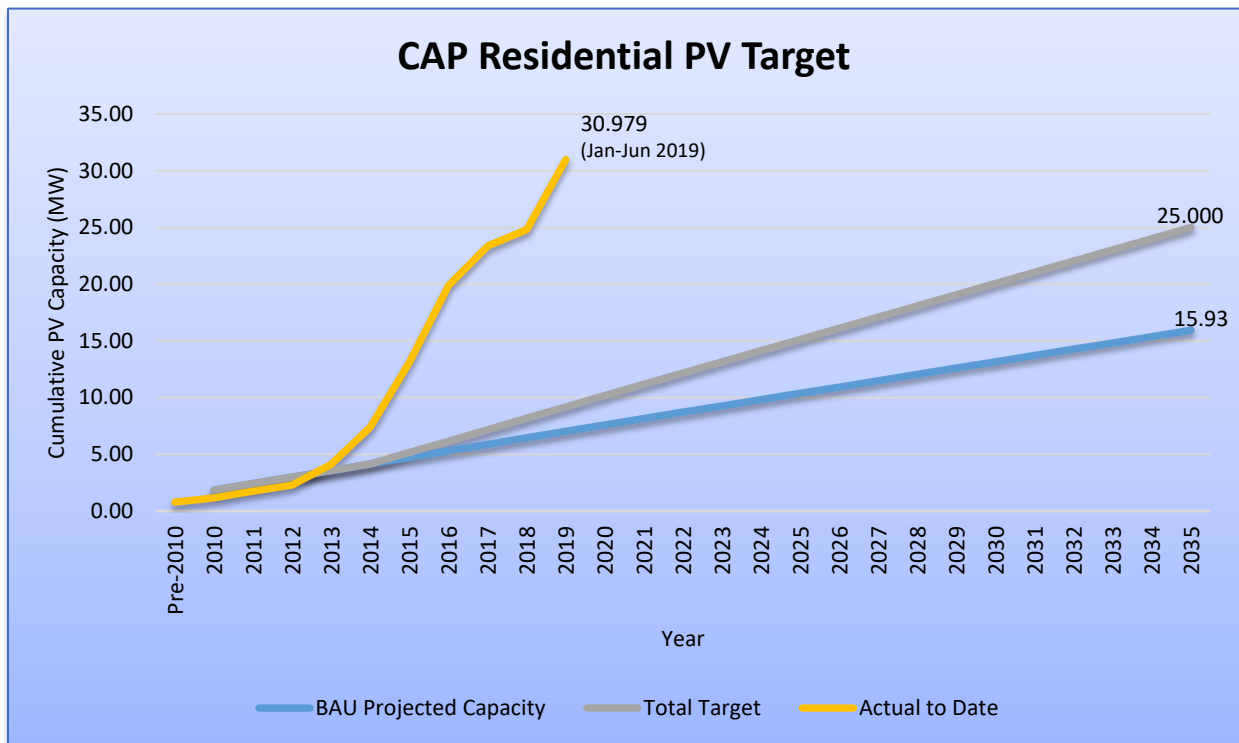
Measures A and B involve increasing the amount of residential and non-residential solar PV systems in Carlsbad. Data for the reporting period were obtained from the permit activity in the city's EnerGov system. Table 3 shows the number and capacity in kilowatts (kW) of PV system installations in the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

**Table 3 – PV System Installations in Reporting Year 3 (FY 18-19)**

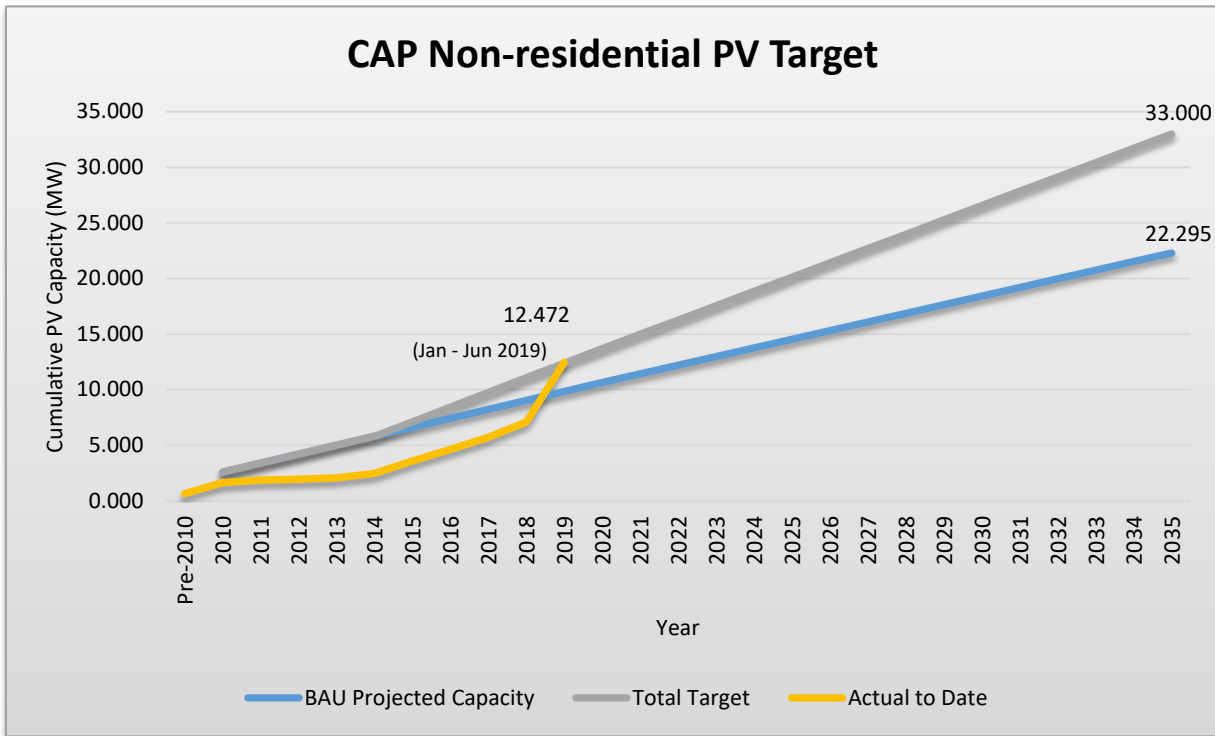
Sector	Total Finaled Permits	Total Capacity (kW)	Highest Capacity Project (kW)	Lowest Capacity Project (kW)	Median Project Capacity (kW)
Residential	966	6,183.0	21.6	1.3	6.0
Non-residential	23	5,384.4	1,000.0	8.4	133.2

Figures 2 and 3 show the residential and non-residential PV installations as they relate to the CAP projections and target. The data were obtained from SDG&E grid interconnections and the city’s EnerGov system. The residential PV installations far exceed the CAP projections and are greater than the 2035 target of 25 megawatts (MW) of capacity. Beginning in January 2020, California building code will require PV in new residential construction, which will contribute to the continuing increase in residential PV. The non-residential installations currently meet the trend line amount for reaching the CAP target. The significant increase in non-residential PV during the reporting period is mostly due to three large installations, which were required to include PV through the discretionary permit review process. The city’s newly adopted non-residential PV ordinance will require all new non-residential construction and major renovations to include PV, thereby increasing the projects subject to the PV requirement.

**Figure 2 - Residential PV Installations and CAP Projections and Target**



**Figure 3 – Non-residential PV Installations and CAP Projections and Target**

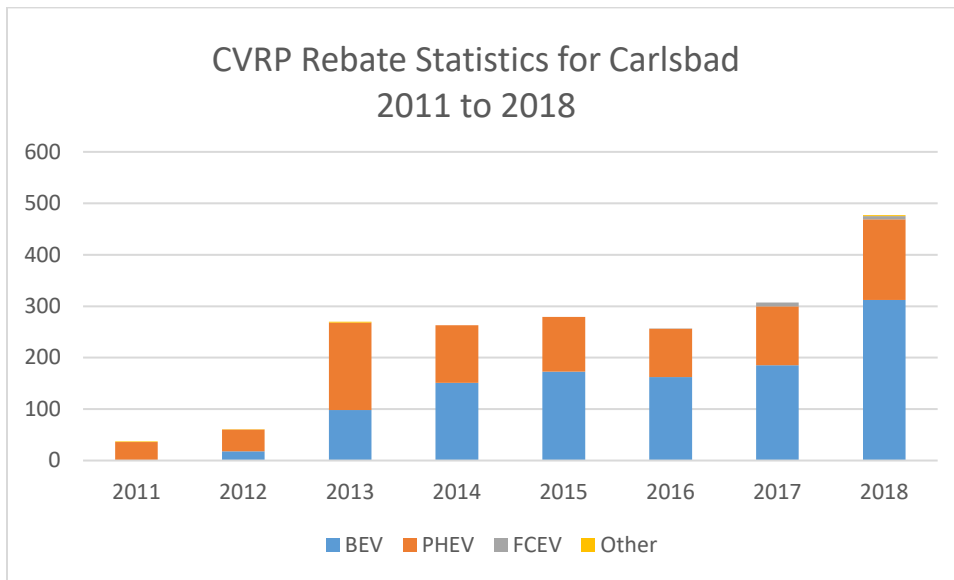


**B. Electric Vehicles**

CAP Measure L involves promoting an increase in the proportion of zero-emission vehicle (ZEV) miles traveled, specifically EV, of the 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), CVRP provides rebates for the purchase or lease of clean vehicles. CVRP participation statistics can be used to gauge EV ownership. Figure shows the annual CVRP participation within Carlsbad from program inception to 2018.

**Figure 4 – CVRP Participation in Carlsbad – 2011 to 2018**



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

Data for the reporting period is available from July 1, 2018 to March 31, 2019. CVRP participation was as follows: BEV = 253; PHEV = 115; FCEV = 3; Other = 1. The city is also acquiring clean vehicles are part of fleet conversion strategy. During the reporting period, the city purchased 10 plug-in hybrid electric vehicles, which replaced existing combustion engine vehicles.

The CAP Annual Report for Reporting Year 2 (FY 17-18) contained a locational analysis of existing and future public EV charging stations. Several public (unrestricted access) and workplace/fleet (restricted access) EV charging stations were added to the inventory during the reporting period, as shown in Table 4.

**Table 4 – Electric Vehicle Charging Station Installations in Reporting Year 3 (FY 18-19)**

Location	EV Service Provider	Access	Number/Type of Ports
Ralph’s Supermarket	Volta	Unrestricted	Two L2
The Square at Bressi Ranch	ChargePoint	Unrestricted	15 L2
LiFT Business Park	ChargePoint	Unrestricted	Seven L2
Nemko	ChargePoint	Restricted	6 L2
St. Patrick’s Parish Center	Greenlots	Restricted	Eight L2
Carlsbad Supercharger	Tesla	Tesla only	20 DCFC
Legoland Castle Hotel	Non-networked	Guests only	14 L2
Pacific Vista Commerce Center	ChargePoint	Restricted	24 L2

Location	EV Service Provider	Access	Number/Type of Ports
Laurel Tree Apartments	ChargePoint	Unrestricted	6 L2
ThermoFisher	ChargePoint	Restricted	20 L2
2051 Palomar	ChargePoint	Restricted	20 L2
City of Carlsbad Faraday Center	Greenlots	Restricted	10 L2
Carlsbad City Library	Greenlots	Restricted	10 L2

L2 = Level 2 chargers; DFCF = DC fast chargers

With the exception of the ThermoFisher and City of Carlsbad charging stations, all other workplace/fleet installations were constructed through SDG&E’s Power Your Drive program. The installations at the two city facility sites were constructed through the Electrify America program.

### C. Transportation General Plan Policies

In addition to the CAP Measures and Actions described in Section III, 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 improvements. While the overall GHG reduction of these General Plan policies is relatively small (less than 4.5% of 2035 reductions) it is important to track progress in completing these improvements because they contribute increased and multimodal mobility within the city.

#### Bikeway and Pedestrian System Improvements

There were several improvements to the bikeway and pedestrian system during the reporting period. In addition to the installation of a rectangular rapid flashing beacon for pedestrian crossing at the intersection of Alicante Road and Lapis Road, major projects included:

2018-19 Slurry Seal – Added a four-foot buffer to existing bike lanes on both sides along Poinsettia Lane, from El Camino Real to Melrose Drive.

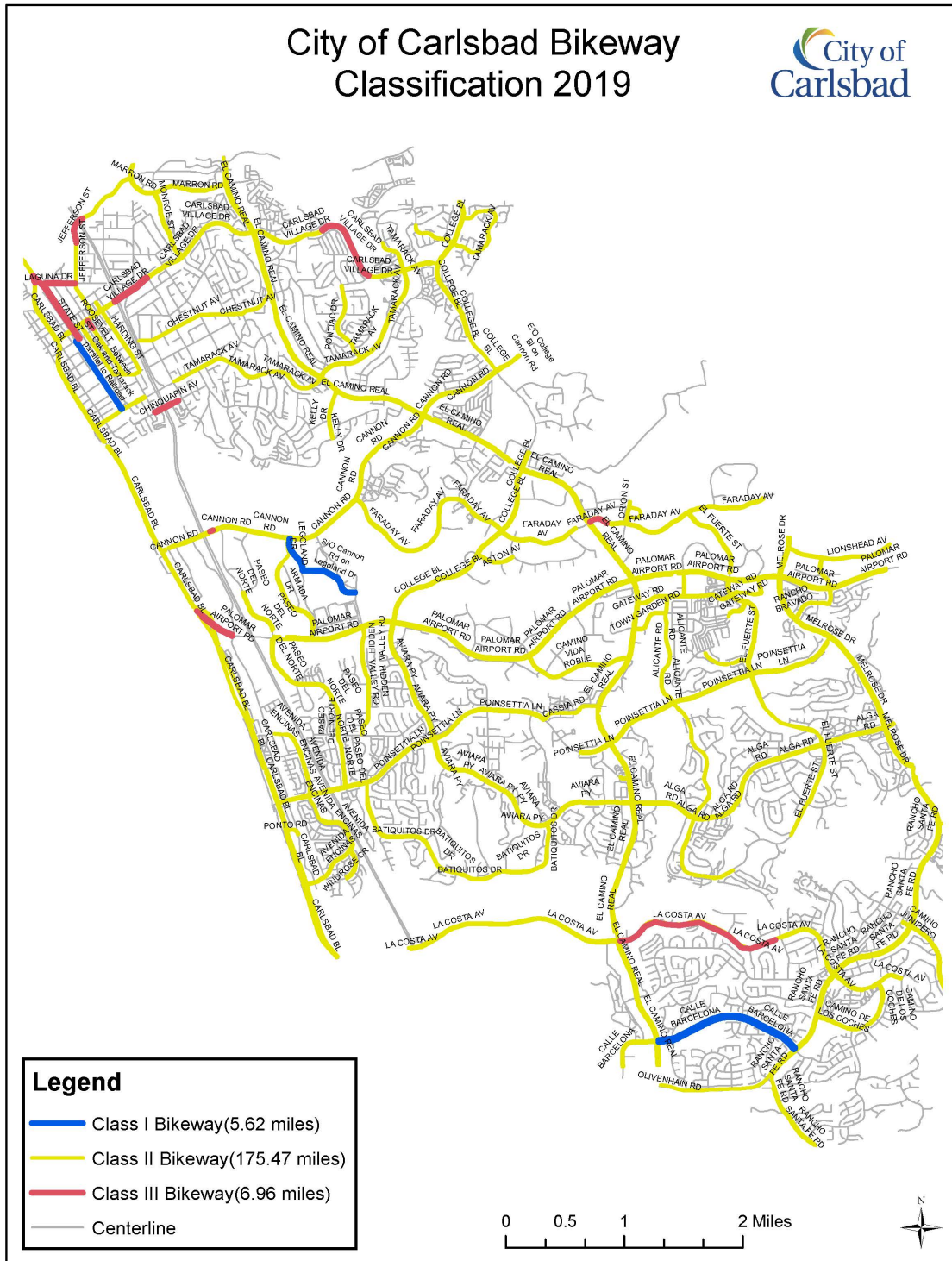
2018 Concrete Replacement:

- Replaced 14 non-compliant and damaged curb ramps
- Replaced over 5,000 linear feet of broken or uplifted sidewalk (approximately 25,000 square feet)
- Relocated light pole, removed tree and installed missing piece of sidewalk on La Costa Avenue to complete pedestrian path.

The city currently has 188.05 miles of bikeways, as shown in Figure 5. A total of 6.02 miles of bikeways were added to the system during the reporting period.



Figure 5 – 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 (adopted by City Council on July 24, 2018). The recommendations in the PMP include hiring a parking program management 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.

### Transportation Improvements

During the reporting period, staff continued coordination with North County Transit District (NCTD) in the finalization of the city's Trolley Feasibility Study and the development of the Carlsbad Connector, a first mile/last mile service connecting the Poinsettia Commuter Rail Station to the employment centers in the city's industrial parks.

## **VI. GHG Emissions Inventory and Forecast**

As stated in the CAP Annual Report 2, dated August 2018, the city is participating in SANDAG's Climate Planning Services GHG inventory program and will receive a no-cost GHG inventory every two to three years. As of June 30, 2019, the 2016 inventory was not received and, therefore, it is not included in this annual report for Reporting Year 3 (July 1, 2018 – June 30, 2019).

The SANDAG-prepared 2016 inventory will differ from the GHG inventory contained in the CAP in several ways. It will include emissions from energy used for water conveyance and treatment. It will also include the electricity-related emissions from the Claude "Bud" Lewis Desalination Plant, which was not operational in 2011 when the CAP emissions were calculated. Lastly, the methodology for deriving transportation-related emissions, or VMT, used in the 2016 inventory is different from that used in the CAP.

In addition to the changes in GHG inventory components and derivation, the CARB issued new guidance on GHG emissions target setting and forecasting through their 2017 Climate Change Scoping Plan. Issued in November 2017, the Scoping Plan aligns the forecasting and target setting protocols in accordance with California's 2030 GHG emissions targets. The city contracted with EPIC to use the 2016 GHG inventory to forecast GHG emissions, derive targets, and evaluate the city's progress in reaching its targets. EPIC will use the Scoping Plan guidance to derive the updated targets and forecasts. Once the 2016 inventory is received, and the targets and forecast are established, staff will present the findings to the City Council and make recommendations on updating CAP Measures and Actions if needed.

## **VII. Summary**

During the third year of CAP implementation, staff continued to make progress in carrying out the CAP Measures and Actions. During the next fiscal and reporting year, staff will continue to work and coordinate with consultants, SANDAG, SDG&E and other regional and business partners to further CAP implementation and continue to lower GHG emissions.

# **Appendix A**

## **FY 18-19 CAP Implementation Activities by Measures and Actions**

CAP Measures and Actions 2035 Performance Goals for Measures		FY 18-19 CAP Implementation Activities by Measures and Actions
<p><i>Timeframes in CAP:</i>  Short-term = 1 - 2 years  Mid-term = 2 - 5 years  Short to Long-term &amp; Mid-Long-term = begun but not completed in 5 years</p>		
<p><b>A - Promote installation of residential photovoltaic systems</b>  Promote installation of residential PV systems to produce an additional 9.1 MW above already projected amounts, or the equivalent of 2,682 more homes with PV systems, by 2035.</p>		
A-1	<p>Temporarily - for a period of one year - suspend residential and commercial PV system permit fees, together with a publicity campaign to promote PV systems installation. <i>(Short-term)</i></p>	<p>This action was deemed unnecessary due to the already increasing volume of residential and commercial PV permits. Permit fees for Carlsbad are proportionate or lower than fees in other San Diego region jurisdictions. In 2015, City Council adopted Ord. CS-285, which streamlined the permitting process for small residential rooftop solar energy systems.</p>
A-2	<p>On a continuing basis, ensure that regulatory provisions - such as complying with regulations for zoning, structure height, permit submittal and review, etc. - do not hinder residential and commercial PV system installation. <i>(Short to Long-term)</i></p>	<p>Staff will continue to evaluate the zoning regulations and permitting process to ensure there is no hindrance of PV installations.</p>
A-3	<p>Adopt an ordinance, similar to those passed by Lancaster and Sebastopol, which requires new homes to install PV panels to offset a portion of their energy use. <i>(Short-term)</i></p>	<p>In December 2018, the California Building Standards Commission added a requirement to the 2019 statewide building codes that all new low-rise residential buildings in California will be equipped with solar systems. The requirement will take effect on Jan. 1, 2020. In February 2019, city staff recommended that the City Council adopt the statewide residential PV requirement rather than develop a local PV ordinance for residential buildings. In making the recommendation, staff noted that the CAP's 2035 goal for 25 megawatts of installed residential PV was reached in 2018.</p>
<p><b>B - Promote installation of commercial and industrial photovoltaic systems</b>  Promote installation of commercial and industrial PV systems to produce an additional 10.7 MW above projected amounts, or roughly 15% of projected commercial and industrial electricity use.</p>		

B-1	Adopt a commercial energy conservation ordinance requiring all new nonresidential developments with more than 50 cars surface parked or on roofs of parking structures to use PV panels over at least half of the surface/roof-parked cars or provide equivalent energy conservation/generation by other means (over and above other requirements). <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-347, which requires all new nonresidential buildings to install solar PV systems to offset a portion of their electricity requirements. The ordinance was submitted to the California Energy Commission for review on March 14, 2019 and will be enforceable once it is approved by the Commission. As of June 30, 2019, the ordinance was scheduled for approval at the Commission's Aug. 14, 2019, business meeting.
B-2	Adopt an ordinance requiring existing nonresidential developments to install PV panels to offset a portion of their energy use. <i>(Mid-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-347, which requires existing nonresidential buildings that undergo major renovations or additions to install solar PV systems to offset a portion of their electricity requirements. The ordinance was submitted to the California Energy Commission for review on March 14, 2019 and will be enforceable once it is approved by the Commission. As of June 30, 2019, the ordinance was scheduled for approval at the Commission's Aug. 14, 2019, business meeting.

**C - Promote building cogeneration for large commercial and industrial facilities**  
Promote building cogeneration for large commercial and industrial facilities, with the goal of producing 6.9 MW by 2035.

C-1	Promote cogeneration by publicizing grant opportunities and financial incentives, such as the Self-Generation Incentive Program and feed in tariffs for cogeneration systems, for renovations of existing buildings by posting these on the city's website and by other means. <i>(Short-term)</i>	Staff maintained a website to promote existing programs such as the Self-Generation Incentive Program.
C-2	Install cogeneration systems on all city facilities that can benefit from the installation of these systems and apply for funding through the Energy Efficiency Financing for Public Sector Projects program, or other similar funding sources. <i>(Mid to Long-term)</i>	Staff evaluated the effectiveness of cogeneration systems on city facilities and no facilities met the minimum criteria needed for useful cogeneration.
C-3	Require cogeneration systems for large commercial and industrial facilities that have on-site electricity production, both for new construction and retrofits. <i>(Mid-term)</i>	Staff is assessing the types of projects that could be subject to this Action, both existing and in the future.

**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. <i>(Short-term)</i>	Staff maintained a website, made community presentations, and published articles in newsletters and newspapers.
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. <i>(Short-term)</i>	Staff continued work on a multi-year, research-based strategy to achieve measurable changes in public behavior, resulting in reduced GHG emissions. A program such as this could become part of that strategy, based on the findings of research being conducted.
D-3	Adopt a residential energy conservation ordinance, which requires residential property owners to conduct and disclose an energy audit at the time of major renovations (as defined by the ordinance,) to ensure that homes and residential developments meet specified low cost energy efficiency measures - such as requisite ceiling insulation, insulated pipes, water heater blankets and exterior door stripping. <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-347, which requires specified energy efficiency measures in all major residential renovations. The ordinance was submitted to the California Energy Commission for review on March 14, 2019 and will be enforceable once it is approved by the Commission. As of June 30, 2019, the ordinance was scheduled for approval at the Commission's Aug. 14, 2019, Business Meeting.

**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
E-2	See D-2 above	See D-2 above
E-3	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. <i>(Short-term)</i>	Staff installed replacement LED lighting at the Carlsbad City Library, Safety Training Center and the Oak Avenue paint shop area. The west facing windows at the Safety Training Center were tinted. Staff replaced seven HVAC units at the Faraday Center.
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. <i>(Short-term)</i>	Staff maintained a website and published an article in the Carlsbad Business Journal.
F-3	Adopt a commercial energy conservation ordinance, which requires property owners to ensure that commercial buildings meet specified energy efficiency measures - such as requisite heating, ventilation, and air conditioning improvements, service water system requirements, and improved refrigeration equipment, at time of conducting major renovations (as defined by the ordinance). <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-347, which requires specified energy efficiency measures in all new and certain existing nonresidential buildings undergoing major renovations. The ordinance was submitted to the California Energy Commission for review on March 14, 2019 and will be enforceable once it is approved by the Commission. As of June 30, 2019, the ordinance was scheduled for approval at the Commission's Aug. 14, 2019, Business Meeting.

**G - Promote commercial and city facility commissioning**

Encourage commercial and city facility commissioning, or improving existing and new building operations, with the goal equivalent to a 40% energy reduction in 30% of commercial square footage citywide and in city-owned buildings by 2035.

G-1	Promote commercial commissioning programs on the city's website such as San Diego RCx, and similar programs for commercial buildings. <i>(Short-term)</i>	Staff maintained a website to promote these programs.
G-2	Commission city facilities to improve building operations and reduce energy costs, with a goal of 40% energy reduction in 30% of city facility square footage. <i>(Mid-term)</i>	The city is participating in SANDAG's Energy Roadmap program, which provides energy audits of city facilities and recommends possible energy conservation measures. During the reporting period, energy audits were conducted at the Calavera Hills and Stagecoach Community Centers.

**H - Implement green building measures**

Implementation of a 5% improvement in energy efficiency above the City of Carlsbad residential green building code (based on CALGreen, the statewide green building code), for new construction.



H-1	Adopt residential and commercial energy conservation ordinances requiring a 5% improvement in energy efficiency for residential and nonresidential new construction, above the existing City or Carlsbad green building code. <i>(Short-term)</i>	At the time of CAP adoption, the City of Carlsbad was requiring compliance with 2013 version of CalGreen. On June 27, 2017, the city adopted the 2016 version of CalGreen, which significantly increases energy efficiency of newly constructed buildings, far beyond the 5% called for in Action H-1. For example, single family homes constructed under the 2016 standards will use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards
<b>I - Promote replacement of incandescent and halogen bulbs with LED or other energy efficient lamps</b> 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. <i>(Short-term)</i>	Staff installed replacement LED lighting at the Carlsbad City Library, Safety Training Center and the Oak Avenue paint shop area area.
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. <i>(Short-term)</i>	Staff maintained a website, made community presentations, and published articles in newsletters and newspapers.
I-3.i	Evaluate the feasibility of adopting a minimum natural lighting and ventilation standard, developed based on local conditions. <i>(Mid-term)</i>	<p>In 2018, the 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. The primary reason is that, while natural ventilation could meet some of a nonresidential building's cooling load due to Carlsbad's moderate climate, the 2019 California state building code nevertheless requires that a building's mechanical ventilation system be sized to meet the full cooling load to ensure that safe indoor air quality is maintained. As such, the cost of providing natural ventilation would not be offset by a reduced mechanical ventilation system.</p> <p>With regards to natural lighting, CSE noted that nonresidential natural lighting is well-governed in state codes, reducing the need for additional local standards. Cost-effectiveness analysis typically</p>

		<p>includes recommendations to alter building geometry to allow more daylight into the space. Daylighting requirements that may impact the architectural design and layout are challenging to enforce and are susceptible to heightened industry resistance. Daylight dimming plus off lighting control is a simple, cost-effective measure provided in the 2019 Building Energy Efficiency Standards, as it does not require architectural geometry or design changes.</p> <p>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.</p> <p>There are no known reach codes that include natural lighting and/or natural ventilation requirements that go beyond current code requirements.</p> <p>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.</p>
I-3.ii	Demonstrate natural lighting and ventilation features in future facility upgrade or new construction. <i>(Mid-term)</i>	Staff is evaluating potential future city projects to demonstrate natural lighting and ventilation.
<p><b>J - New construction residential and commercial solar water heater/heat pump installation &amp; retrofit of existing residential</b>  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.</p>		
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. <i>(Short-term)</i>	Staff maintained a website, made community presentations, and published articles in newsletters and newspapers.
J-2	Adopt residential and commercial energy conservation ordinances requiring new residential and commercial buildings to install solar water heaters or heat pumps, or use alternative energy (such as PV-generated electricity) for water heating needs. <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance Nos. CS-347 and CS-348, which require new residential and nonresidential buildings to install solar thermal water heating or electric heat pump water heaters for water heating needs. The ordinances were submitted to the California Energy Commission for review on March 14, 2019. The ordinances will be enforceable once they are approved by the Commission. As of June 30, 2019, the ordinances were scheduled for approval at the Commission's Aug. 14, 2019, business meeting.

**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	<p>Adopt a citywide TDM plan, as described in the General Plan Mobility Element, detailing a mix of strategies to reduce travel demand, specifically of single occupancy vehicles. SANDAG’s 2012 “Integrating Transportation Demand Management Into the Planning and Development Process” provides a guide to designing and implementing a TDM plan and will be used as a reference document to develop the city’s TDM plan. TDM strategies evaluated in the plan include parking ordinances, subsidized or discounted transit programs, transit marketing and promotion, carsharing, parking pricing, and bike parking. <i>(Short-term)</i></p>	<p>On Feb. 26, 2019, City Council adopted Resolution No. 2019-024, establishing a TDM plan, which provides an implementation framework for TDM throughout the city, including infrastructure, regulations and policies, guiding resources, and a TDM program for existing businesses.</p> <p>Also, through Resolution No. 2019-024, City Council authorized staff to issue a Request for Proposal (RFP) for TDM program consulting services. As of June 30, 2019, the consultant had been selected but not awarded the contract. The TDM consultant will develop a program evaluation framework, review development plans, monitor approved TDM plans, conduct outreach to existing businesses to develop voluntary TDM programs, and assess the feasibility of expanding the TDM program to HOAs, schools, etc. The consultant will also utilize best management practices to position Carlsbad as a regional TDM employment hub and expand the reach of TDM beyond the TDM ordinance and new development alone.</p>
K-2	<p>Adopt a TDM ordinance, defining a minimum trip generation threshold for nonresidential development projects. The city will set performance requirements for minimum alternative mode use based on project type. All projects above the threshold shall submit a TDM plan, which includes a description of how the minimum alternative mode use will be achieved and maintained over the life of the project. Potential TDM trip reduction measures can include carpool and vanpool ridesharing services; designated employees as contacts for trip reduction programs; providing a direct route to transit in coordination with NCTD; developing public-private transit partnerships; passenger loading zones; pedestrian connections; showers and clothes lockers; long-term bicycle parking and shuttle programs. <i>(Mid-term)</i></p>	<p>On March 12, 2019, City Council adopted Ordinance No. CS-350, which requires all nonresidential develop with a minimum trip generation to prepare and implement a TDM, including the provision of TDM amenities. The ordinance became effective on April 11, 2019.</p>

**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 15% 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. <i>(Short-term)</i>	Staff continues to assess the feasibility of a direct "PV to EV" pilot project(s). During the reporting period, staff received estimates for a transportable PV to EV unit and worked with local trade organizations to develop a Request for Information (RFI). The RFI will seek information on all forms of PV to EV projects.
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. <i>(Short-term)</i>	Staff prepared a mapping and travel distance analysis of existing and future EV charging sites and identified gaps in service areas. The locations of city-owned public properties and commercial centers that do not currently have EV charging infrastructure were then evaluated as to their ability to fill those gaps. The results of that mapping analysis is contained in Section V of the annual report.
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. <i>(Mid-term)</i>	On Dec. 18, 2018, City Council authorized city participation in the Electrify America program, which provided 20 staff/fleet charging stations; 10 at the Faraday Center and 10 at Carlsbad City Library. The charging stations were activated in May and June of 2019.
L-4	Offer dedicated ZEV parking, and provide charging stations adjacent to ZEV parking as identified in the community-wide charging station siting plan. <i>(Mid-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-349, which requires new residential and nonresidential buildings to install EV charging infrastructure. New one and two-family homes, and townhouses with attached private garages must have a complete circuit installed and ready for EV charging supply equipment (EVSE). Multifamily residential and nonresidential buildings must provide EVSE for up to 10% of its parking. The EV charging requirements also apply to certain major renovations of existing residential sites and buildings. The ordinance became effective on April 11, 2019.
L-5	Adopt requirements for ZEV parking for new developments. <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-349, which requires new residential and nonresidential buildings to install EV charging infrastructure. New one and two-family homes, and townhouses with attached private garages must have a complete circuit installed and ready for EVSE. Multifamily residential and nonresidential buildings must provide EVSE for up to 10% of its parking. The EV charging requirements also apply to certain major renovations of existing residential sites and buildings. The ordinance became effective on April 11, 2019.
L-6	Adopt a residential energy conservation ordinance, similar to Palo Alto, requiring the installation of EV chargers or pre-wiring in new residential construction and major renovations. <i>(Short-term)</i>	On March 12, 2019, City Council adopted Ordinance No. CS-349, which requires new one and two-family homes, and townhouses with attached private garages to have a complete circuit installed and ready for EVSE. Multifamily residential buildings must provide EVSE for up to 10% of its parking. The EV charging requirements also apply to major renovations of existing residential sites and buildings, as defined in the ordinance. The ordinance became effective on April 11, 2019.

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. <i>(Short-term)</i>	The fleet conversion program replaced 12 internal combustion engine vehicles with plug-in hybrids. Currently, the city's fleet includes 31 hybrid vehicles.
<p><b>M - Develop more citywide renewable energy projects</b> Produce an equivalent amount of energy to power 2,000 homes (roughly equivalent to a 5% reduction) by 2035 from renewable energy projects.</p>		
M-1	Conduct a feasibility study to evaluate citywide renewable energy projects and prioritize accordingly. <i>(Short-term)</i>	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.
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. <i>(Mid to Long-term)</i>	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.
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. <i>(Mid to Long-term)</i>	City staff continually monitors potential funding sources to support CAP implementation, including renewable energy projects. .
<p><b>N - Reduce the GHG intensity of water supply conveyance, treatment and distribution</b> Reduce the intensity of GHG emissions from water utilities (including water supply, wastewater, and recycled water) conveyance, treatment and distribution by 8% by 2035.</p>		
N-1	Improve water utilities (including water supply, wastewater, and recycled water) conveyance, treatment and distribution, and other system improvements. <i>(Mid to Long-term)</i>	Incorporating energy efficiency into system improvements is standard practice for Carlsbad Utilities. During this reporting period, energy savings have been realized through the removal of the Simsbury Sewer Lift Station by constructing a short extension to the service area gravity sewer system. In addition, the emergency generators at Knots Lane and North Batiquitos Lift Stations are being replaced with Tier 4 rated generators that will reduce nitrogen oxides emissions. Lastly, the full optimization and commissioning of the Automated Metering Infrastructure (AMI) allows for remote reading of 96% of CMWD's meter inventory. The deployment of AMI has significantly reduced the amount of internal combustion engine emissions due to reduction in monthly vehicle trips to generate data for a billing cycle.

**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. <i>(Mid-term)</i>	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: <a href="https://www.rainwatersolutions.com/products/northcounty">https://www.rainwatersolutions.com/products/northcounty</a>
O-2	Create a greywater design reference manual, or provide links to an existing one, for the design of greywater and rainwater collection systems. <i>(Mid-term)</i>	This is a mid-term action, planned for Years 3 - 5. There was no activity on this action during the reporting period.
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. <i>(Mid-term)</i>	This is a mid-term action, planned for Years 3 - 5. There was no activity on this action during the reporting period.