13.B.6 Climate Action Plan

TOGETHER WE PLAN NATIONAL CITY

CLIMATE ACTION PLAN

FOCUSED GENERAL PLAN UPDATE

NOVEMBER 2022

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CLIMATE ACTION PLAN

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1. INTRODUCTION

The City of National City has joined an increasing number of communities in developing plans to address climate change at a local level. This Climate Action Plan Update (CAP Update) addresses the major sources of greenhouse gas (GHG) emissions in National City and sets forth a detailed and long-term strategy that the City and community can implement to help the State achieve its GHG emissions reduction targets. Implementation of this CAP Update will guide National City's actions to reduce its contribution to global climate change and will support the State of California's ambitious emission reduction targets. The CAP Update will also be utilized for tiering and streamlining future development in National City pursuant to California Environmental Quality Act (CEQA) Guidelines 15152 and 15183.5.

This chapter provides background information about climate change policy, climate change science, the effects and impacts of climate change, regulatory actions on climate change, and existing climate action efforts in National City.

1.1 CLIMATE ACTION PLAN OVERVIEW

Climate Action Plans (CAPs) are comprehensive roadmaps that outline specific activities an agency or City will undertake to reduce greenhouse gas emissions. CAPs first identify and calculate the inventory of existing GHG emissions, and build upon that information to plan a strategic framework for reducing the greatest amount of emissions in the most cost effective manner. As part of this strategic framework, CAPs provide reduction goals or targets, measures to reach these goals, and an implementation plan for ensuring measures are executed.

2011 CLIMATE ACTION PLAN

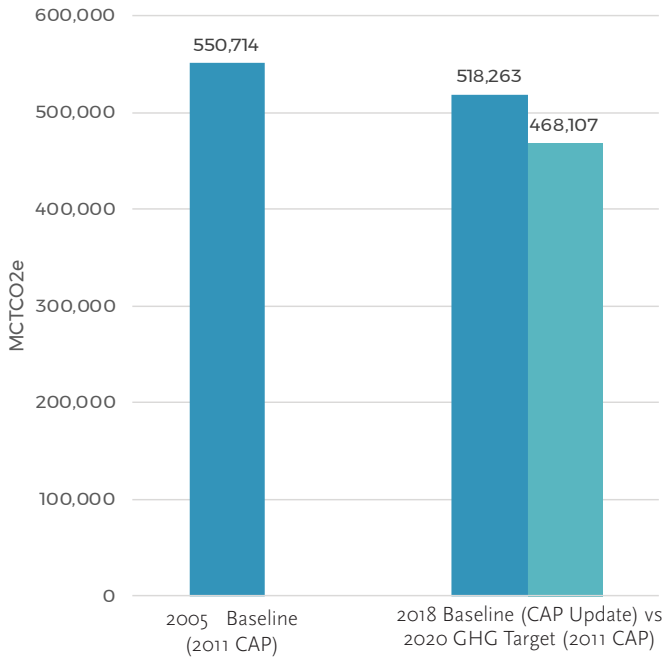
In May of 2011, National City adopted the National City Climate Action Plan (2011 CAP) to provide guidance to the City to achieve GHG emissions aligned with State reduction targets and to respond and adapt to climate change associated with increasing global GHG emissions. National City and the International Council on Environmental Initiatives (ICLEI) prepared a baseline GHG emissions inventory for the

year 2005. The 2005 baseline totaled in 550,714 metric tons of carbon dioxide equivalent (MCTCO2e) emissions or 9.9 MTCO2e per capita. The 2011 CAP concluded that National City would have to reduce 2005 baseline conditions by 15% (or 82,607 MTCO2e) by the year 2020, with additional reductions by the year 2030.

2023 CLIMATE ACTION PLAN UPDATE

This CAP Update builds upon the goals of the 2011 CAP and provides an updated baseline emissions inventory for the City. As shown in Figure CAP-1 below, baseline emissions (year 2018) for National City totaled 518,263 MTCO2e or 8.51 MTCO2e per capita. In comparison, the 2005 baseline conditions totaled 550,714 MTCO2e or 9.9 MTCO2e per capita. The GHG emissions target identified in the 2011 CAP for year 2020 was 468,107 MTCO2e. When comparing the 2020 target to baseline conditions in 2018, the City reached approximately 40% of the goal.

Figure CAP-1: GHG Baseline Comparisons (2005 vs 2018)



Since the adoption of the 2011 CAP, there has been a decrease in GHG emissions from the transportation, solid waste, and water sectors of National City. This decrease in emissions may be a result of increases in fuel efficiency and successful water-saving and recycling measures. However, there has been an increase in GHG emissions from the residential and commercial/industrial sectors of National City which was mainly as a result of economic and residential growth.

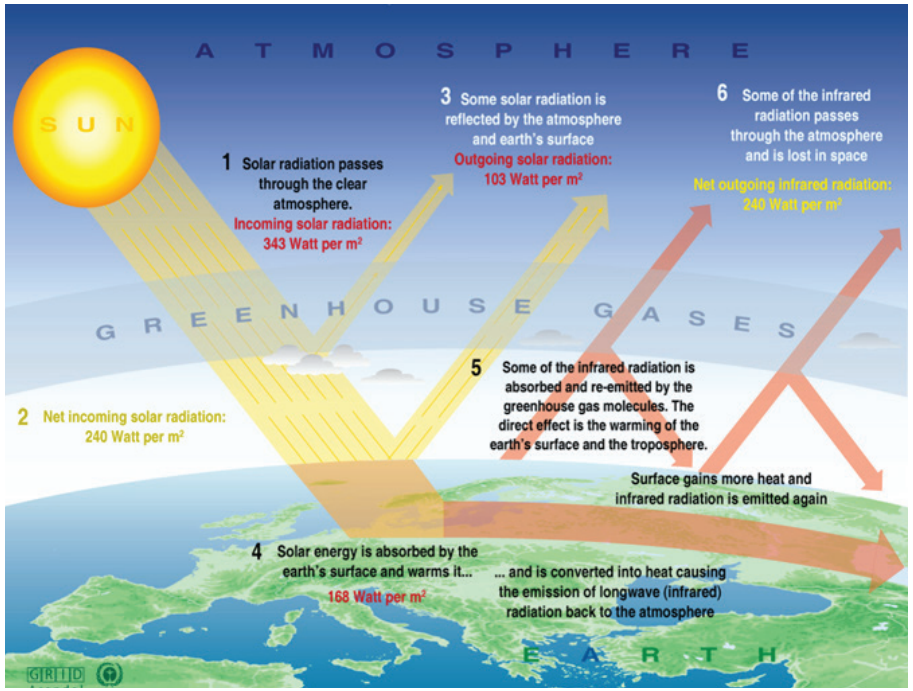
This CAP Update concludes National City would have to reduce 2018 baseline conditions 40% by 2030 and 80% by 2050 to align its reductions with Statewide targets. These reduction targets equate to 310,959 MTCO2e by 2030 (4.5 MTCO2e per capita) and 103,653 (1.21 MTCO2e per capita) by 2050. Chapter 2 provides a more detailed discussion on the calculated emissions forecast for future years and each sector's emission forecast (residential, commercial, industrial, transportation, solid waste, water and wastewater).

Chapter 3 outlines objectives and measures to help reduce GHG emissions within National City. New measures for this CAP Update were developed by building upon, revising, or removing measures from the 2011 CAP. Chapter 4 includes implementation and monitoring measures to ensure GHG reducing goals are attainable.

1.2 CLIMATE CHANGE SCIENCE

The Earth's atmosphere is composed of naturally-occurring and anthropogenic (human-induced) GHGs that trap heat in the atmosphere and regulate the Earth's temperature. This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate on Earth. GHGs present in the Earth's lower atmosphere play a critical role in maintaining the earth's temperature as they trap some of the longwave infrared radiation emitted from the Earth's surface which otherwise would have escaped to space, as shown in Figure CAP-2.

Figure CAP-2: The Greenhouse Effect



Source: UNEP/GRID-Arendal, http://maps.grida.no/go/graphic/greenhouse_effect.

Water vapor and carbon dioxide (CO_2) are the most abundant GHGs in the atmosphere. The gases that are widely seen as the principal contributors to human-induced climate change are CO_2, nitrous oxide (N_2O), CH_4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor and CO_2 are the most abundant GHGs in the atmosphere. The gases that are widely seen as the principal contributors to anthropogenic climate change are CO_2, nitrous oxide (N_2O), CH_4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). While human activity results in the release of some GHGs that occur naturally, such as CO_2 and CH_4, other gases, like HFCs, PFCs, and SF_6, are human-made.

The combustion of fossil fuels and deforestation release carbon, in the form of CO_2, into the atmosphere that historically has been stored underground in sediments or in surface vegetation. With the accelerated increase of fossil fuel combustion and deforestation since the industrial revolution of the 19th century, concentrations of GHGs have increased exponentially in the atmosphere. Increases in the atmospheric concentrations of GHGs in excess of natural ambient concentrations contribute to the enhancement of the natural greenhouse effect.

This enhanced greenhouse effect has contributed to global warming, which is an increased rate of warming of the earth's surface temperature. Specifically, increases in GHGs lead to increased absorption of longwave infrared radiation by the earth's atmosphere and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Warming of the Earth's lower atmosphere induces large-scale changes in ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other large-scale changes to the earth system that are collectively referred to as climate change.

Global climate change is thought to be the driving force behind changes in precipitation patterns, rising temperatures, shrinking polar ice caps, sea-level rise, and other impacts to biological resources and humans. Chapter 2 of this document provides a summary of National City's GHG emissions and its local contribution to global climate change. Section 1.3 of this Chapter discusses the predicted climate change effects on National City.

1.3 EFFECTS AND IMPACTS OF CLIMATE CHANGE

In addition to causing an increase in average global surface temperature, rising levels of greenhouse gases have a destabilizing effect on a number of different micro-climates, conditions and systems. The increase in the temperature of the oceans is projected to accelerate the water cycle, thereby increasing the severity and rate of both storms and drought, which, along with decreased snowpack, could disrupt ecosystems, agricultural systems and water supplies.

Although climate change is a global problem and the severity of the effects of climate change in coming decades is uncertain, projections suggest that, within California, climate change will result in significant impacts to the environment and ecosystems, which in turn will have major economic implications. Below is a summary of the potential effects of climate change in California and National City, specifically.

1.3.1 RISING TEMPERATURES

Historically, California has experienced warm temperatures during July and August; however, as the climate changes, it is likely that occurrences of warm temperatures will extend from June to September.[1] Increasing temperatures and more frequent heat waves will have serious implications for electricity demand and emergency response in California.

1. California Climate Change Center, 2009, Climate Action Team Biennial Report, Draft, page 1.5.

1.3.2 SEA LEVEL RISE

A rise in sea level is already occurring in California, with a rise of 3 to 8 inches recorded in the last century. Sea level along the San Diego County coast is expected to rise approximately 1 ft by mid-21st century, and 3 ft or potentially much higher by 2100.[2] Portions of National City is within the coastal zone, and impacts from sea level rise may include flooding, storm surge, and erosion. Coastal habitats such as salt marshes and rocky intertidal areas will be exposed to more sea water. In Southern California, where 91% of wetlands have already been lost and many remaining wetlands are stressed by pollution, invasive species, and altered hydrology, sea level rise poses yet another threat to coastal wetland habitats.[3]

1.3.3 WATER SUPPLY

Based on current projections for growth and consumption levels, demand for water is expected to significantly outpace the supply available from all sources, in part because of climate change. Extended and more frequent drought conditions would reduce local groundwater supplies about 7% per year on average and increase the San Diego region's dependence on imported water from distant sources like the Colorado River and Sacramento-San Joaquin River Delta. Climate change is also projected to reduce the amount of water available from these imported sources. Recent projections for the Colorado River range from a 6 to 45% decline by 2050 as a result of the changing climate. Spring snowmelt, which historically provided a reliable supply of water after winter storms, will likely be lower due to an expected 25% snowpack reduction in the Sierra Nevada Mountains by 2050.[4]

2. https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-009_SanDiego_ADA.pdf
3. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 3.
4. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 5.

Other environmental factors may limit the amount of water available for export to the San Diego region. For example, efforts such as the CALFED Bay-Delta Program are trying to balance water supply needs with environmental goals supporting freshwater habitat for fish and other wildlife in the Delta. Overall, the San Diego region faces a possible water supply shortfall of 18% by 2050.[5]

1.3.4 AIR QUALITY

Studies have shown a link between heat and the formation of ground-level ozone, the primary component of "smog." By 2050, the San Diego region is expected to experience greater exposure to ground-level ozone due to a climate change-induced increase in number of hot and sunny days. Increased ground-level ozone tends to aggravate asthma and increase airway reactivity and inflammation[6].

1.3.5 WILDFIRES

The existing habitat and climate conditions make the San Diego region vulnerable to extreme fire events. Warmer temperatures and more frequent droughts caused by climate change will intensify wildfire conditions, marked by drier, more flammable vegetation and longer periods of hot, dry Santa Ana winds. By 2050, these conditions are expected to result in larger, more frequent, and longer-lasting wildfires, during summer and especially fall, when Santa Ana wind intensity is at its highest. Larger, more frequent, and longer lasting wildfires are expected to result in loss of human life, up to billions of dollars in property damage, business closures, increased fire-fighting and emergency services costs, and expensive recovery and restoration efforts.[7]

5. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 5.
6. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 7.
7. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 6.

1.3.6 PUBLIC HEALTH

Warmer temperatures and changes in precipitation, resulting from climate change, have serious public health implications. Research suggests that the most serious effects will be related to increased frequency of extreme condition such as more intense heat waves. Severe heat conditions paired with poor air quality could increase the number of heat-related deaths, illnesses and asthma attacks throughout the state.

1.3.7 AGRICULTURE

San Diego's unique topography creates a wide variety of microclimates supporting over 200 different agricultural commodities. Between now and 2050, climate change could impact our region's agriculture, and exacerbate our water supply situation, by increasing demand for irrigation to meet higher evaporative demand associated with warmer and drier conditions. Climate change will also change the geographic distribution of crop pests, though understanding the potential for crop loss from pests requires further research.[8]

1.3.8 ECOSYSTEMS AND WILDLIFE

Along with one other county, the San Diego region has the most plants and animals at risk of extinction in the continental United States. While in many cases human population growth and development have fragmented critical habitat areas, the impacts of climate change will compound the threats facing already vulnerable plant and animal species. Though most species are often able to adapt to changing conditions, unnaturally rapid shifts in temperature, sea level rise, and drought due to climate change may outpace the ability of some species to adapt and survive

8. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 3.

Due to rising temperatures and changes in precipitation, chaparral and coastal sage scrub are expected to seek to move to higher elevations where temperatures are cooler, and precipitation is greater. Associated animal species will adjust their ranges, though oftentimes not concurrently with the vegetation, potentially resulting in a new mix of species and ecosystems. Projected increases in non-native grasses and fire frequency could also substantially reduce the range and extent of future shrublands.[9]

The "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" is defined by the IPCC as adaptation.

1.4 REGULATORY FRAMEWORK

In response to human-induced climate change mounts, agencies and organizations from the federal, state and local levels have been working to develop and implement solutions to control GHG emissions and slow global warming. The major efforts are described in this section and summarized in Table CAP-1.

1.4.1 FEDERAL LAWS AND REGULATIONS

The United States has implemented federal regulations or policies related to GHG emissions. In December 2009, Environmental Protection Agency (EPA) Administrator Lisa Jackson, signed findings that elevated concentrations of the six key GHGs in the atmosphere endanger public health and welfare of current and future generations, and that the combined emissions of GHGs from new motor vehicles contribute to the GHG air pollution that endangers public health and welfare.[10]

While the final endangerment finding does not automatically impose any requirements, it allows EPA to finalize proposed GHG emission standards for light-duty vehicles, which were proposed in conjunction with the Department of Transportation's Corporate Average Fuel Economy (CAFE) standards earlier in 2009.[11]

1.4.2 STATE LAWS AND REGULATIONS

California has been a leader among states in passing legislation to reduce GHG emissions and slow climate change. In 2005, Governor Schwarzenegger signed Executive Order S-3-05, which established the goals of reducing emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. The Executive Order identified the California Environmental Protection Agency (Cal/EPA) as the lead coordinating State agency for establishing climate change emission reduction targets in California, and designated a "Climate Action Team," a multi-agency group of State agencies, to implement Executive Order S-3-05.

In April 2015, Executive Order B-30-15 was signed, which established a new GHG emissions reduction target of 40% below 1990 levels by 2030. This Executive Order also directed the California Air Resources Board (CARB) to update the Assembly Bill (AB) 32 Scoping Plan to reflect the 2030 target.

To continue California's impressive effort in reducing GHG emissions, a new mid-term target was signed in September 2016. Senate Bill (SB) 32 established a new emissions reduction target that targets to lower GHG emission levels 40% below 1990 levels by 2030. This new mid-term target helped to put California on a trajectory towards meeting the goal of reducing statewide emissions to 80% below 1990 levels by 2050.

9. California Climate Change Center, 2009, Climate Change-Related Impacts in the San Diego Region by 2050, page 6.
10. U.S. Environmental Protection Agency website, "EPA's Endangerment Finding," http://www.epa.gov/climatechange/endangerment/downloads/Endanger mentFinding_LegalBasis.pdf, accessed on March 29, 2010.
11. U.S. Environmental Protection Agency website, http://epa.gov/climate change/endangerment.html, accessed on March 29, 2010.

In addition to legislation setting statewide GHG reduction targets, SB 375 was signed in 2008 to augment AB 32 by promoting efficient regional transportation and land use planning efforts. SB 375 establishes emissions reduction goals for which regions can plan; encourages metropolitan planning organizations (MPOs) to integrate their housing, transportation, and regional land use plans with GHG reduction goals; and provides incentives for governments and developers to implement compact and efficient growth patterns. The San Diego Association of Governments (SANDAG) adopted San Diego Forward: The Regional Plan that integrates the Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) in October 2015.

To effectively address the challenges that a changing climate will bring, the State also prepared the 2009 California Climate Adaptation Strategy, which highlights climate risks and outlines possible solutions that can be implemented throughout the State. This Strategy was updated in 2014 and is now known as Safeguarding California. In 2015, the State also developed the Safeguarding California Implementation Action Plans. Federal and State regulations relevant to this CAP are identified in the table below.

Table CAP-1: Regulatory Framework

Date	Legislation	Description
Federal		
2007	Federal Clean Air Act	In 2007, the U.S. Supreme Court ruled that CO_2 is an air pollutant as defined under the CAA, and the U.S. Environmental Protection Agency has the authority to regulate emissions of GHG.
2009	Federal Corporate Average Fuel Economy (CAFE)	The federal CAFE Standards determine the fuel efficiency of certain vehicle classes in the U.S.
State		
1978	California Building Efficiency Standards Title 24 Part 6	Title 24, Part 6 of the California Code of Regulations, Energy Efficiency Standards for Residential and Nonresidential Buildings, was established in 1978 to address a legislative mandate to reduce the State's energy consumption. The standards are updated roughly every three years to incorporate new energy efficiency goals, methods, and technologies.
2002	Assembly Bill 1493	Assembly Bill (AB) 1493, Clean Car Regulations (commonly known as the "Pavley law"), directed the California Air Resources Board (CARB) to adopt regulations to decrease GHG emissions from new passenger vehicles and light duty trucks.

Date	Legislation	Description
2006	Assembly Bill 32	California Global Warming Solutions Act of 2006. Requires Air Resources Board (ARB) to adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020. ARB shall adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with this program. AB 32 directs Climate Action Team established by the Governor to coordinate the efforts set forth under Executive Order S-3-05 to continue its role in coordinating overall climate policy.
2007	Senate Bill 97	Directs Governor's Office of Planning and Research to develop CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions."
2008	Senate Bill 375	Requires Air Resources Board to develop regional GHG emission reduction targets for passenger vehicles. ARB is to establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations.
2011	Senate Bill X1-2	Directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources per year to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2013, 25% by December 31, 2016, and 33% by December 31, 2020. The new RPS goals applies to all electricity retailers in the state including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. This new RPS preempts the California Air Resources Boards' 33 percent Renewable Electricity Standard.

Date	Legislation	Description
2011	AB 341	AB 341 sets forth the requirements of the statewide mandatory commercial recycling program. Municipal jurisdictions must implement a commercial solid waste recycling program that consists of education, outreach and monitoring of businesses, and report the progress achieved.
2012	Advanced Clean Cars Program	In January 2012, CARB approved the Advanced Clean Cars program, which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025.
2014	AB 1826	AB 1826 requires all businesses to recycle their organic waste materials by April 1, 2016. This mandate helps California in achieving their overall waste diversion (75% by 2020) and greenhouse gas emission reduction goals
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2015	Senate Bill 350	"Clean Energy and Pollution Reduction Act of 2015 Establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030."
2016	SB 1383	SB 1383 established statewide waste reduction targets to achieve a 50 percent reduction in the disposal of organic waste from 2014 levels by 2020 and a 75 percent reduction by 2025. The law also requires 20 percent of edible food waste to be recovered for human consumption by 2025.
2016	Assembly Bill 197	"Greenhouse gas regulations Prioritizes direct emission reductions from large stationary sources and mobile sources."

Date	Legislation	Description
2017	SB 379	Beginning January 1, 2017, SB 379 requires California cities and counties, upon the next revision of their local hazard mitigation plan, to include climate adaptation and resiliency strategies in the safety elements of their general plans.
2017	SB 379	Beginning January 1, 2017, SB 379 requires California cities and counties, upon the next revision of their local hazard mitigation plan, to include climate adaptation and resiliency strategies in the safety elements of their general plans. The bill requires the safety element update to include a set of goals, policies, and objectives for their communities based on a vulnerability assessment, as well as implementation measures to increase community resilience to climate change. The safety element update can incorporate these components by reference from an adopted local hazard mitigation plan and/or climate adaptation plan.
2020	EO N-79-20	Executive Order N-79-20 sets goals for the State 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035, 100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks, and the State will transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.
2022	Advanced Clean Cars II	The proposed regulation requires 100% of new cars and light trucks sold in California to zero-emission vehicles, defined as zero tailpipe emission vehicles and plug-in hybrid electric vehicles. The regulation will also amend the Low-emission Vehicle Regulations to include increasingly stringent standards for gasoline cars and heavier passenger trucks to continue to reduce smog-forming emissions.
2022	2022 Climate Change Scoping Plan	The proposed scoping plan lays out the most recently recommended suite of policies needed to help the State achieve its GHG reduction targets. The proposed scenario builds on existing programs for the deployment of clean fuels and technologies, and for the first time brings California's forests, wetlands, and agricultural lands into the process with the potential to leverage sustainable management to use these landscapes for carbon storage. This update aims to more effectively integrate equity and environmental justice throughout, and to ensure that vulnerable communities are not disproportionately impacted by climate change.

1.4.3 REGIONAL POLICIES AND MEASURES

SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG) REGIONAL COMPREHENSIVE PLAN

The Regional Comprehensive Plan (RCP) serves as the long-term planning framework for the San Diego region. It provides a broad context in which local and regional decisions can be made that move the region toward a sustainable future – a future with more choices and opportunities for all residents of the region.[12]

SANDAG SAN DIEGO REGIONAL TRANSPORTATION PLAN AND SUSTAINABLE COMMUNITIES STRATEGY

In October 2015, SANDAG adopted the San Diego Forward: The Regional Plan (Regional Plan), a roadmap to grow and evolve, and prioritize 35 years of regional projects. Over the next 35 years, through 2050, the Regional Plan projects that about $204 billion in local, state, and federal tax dollars will be available to build a comprehensive, interconnected transportation system that provides more transportation choices.

Along with the Regional Plan, the Board adopted the SCS pursuant to SB 375. The SCS charts a course toward lower greenhouse gas emissions related to cars and light trucks and proposes other measures to make the San Diego region more environmentally sustainable.

SANDAG CLIMATE ACTION STRATEGY

The Climate Action Strategy (Strategy) is a guide for SANDAG on climate change policy. The Strategy identifies a range of potential policy measures – "tools in the toolbox" – for consideration as SANDAG updates long-term planning documents like the RTP and Regional Comprehensive Plan, and as local jurisdictions update their General Plans and other community plans.

The Strategy helps SANDAG identify land use, transportation, and related policy measures and investments that could reduce greenhouse gases from passenger cars and light-duty trucks as part of the development of a SCS for the 2050 Regional Transportation Plan in compliance with Senate Bill 375. Potential policy measures also are identified for buildings and energy use, protecting transportation and energy infrastructure from climate impacts, and to help SANDAG and local jurisdictions reduce greenhouse gases from their operations.[13]

SANDAG REGIONAL ENERGY STRATEGY

The Regional Energy Strategy (RES) serves as the energy policy blueprint for our region through 2050. It established long term goals in eleven topic areas including energy efficiency, renewable energy, distributed generation, transportation fuels, land use and transportation planning, border energy issues, and the green economy. Using RES' guiding principles and taking into consideration the myriad of policy measures recommended across the energy topics, six early actions were identified for SANDAG and local governments to focus on in the near term. These six early actions include building retrofit programs to improve energy efficiency, energy efficiency financing programs, utilizing government partnerships to improve energy efficiency in government facilities, supporting land use and transportation activities that reduce energy use, supporting electric charging infrastructure, and supporting the use of reclaimed water.

In 2014, a technical update of the RES was completed in order to inform development of San Diego Forward: The Regional Plan. This technical update demonstrates progress toward attaining the RES goals, updates existing conditions and future projections data, and recommends priorities for moving forward.

12. https://www.sandag.org/index.asp?projectid=1&fuseaction=projects.detail

13. https://www.sandag.org/index.asp?projectid=337&fuseaction=projects.detail

SANDAG REGIONAL ALTERNATIVE FUELS, VEHICLES, AND INFRASTRUCTURE REPORT

Infrastructure needs were identified in a 2009 assessment of how to accelerate deployment of alternative fuel vehicles in and around San Diego entitled the Regional Alternative Fuels, Vehicles and Infrastructure Report. The report recommended public – private partnerships and collaborative approaches to infrastructure planning and increasing alternative fuels in fleets. Its findings were incorporated into the regional energy and climate strategies.[14]

PORTSIDE COMMUNITY EMISSIONS REDUCTION PLAN

The Portside Community Emissions Reduction Plan (Portside CERP) serves as a program to reduce pollution exposure in communities based on environmental, health, and socioeconomic information. The Portside CERP contains information and strategies intended to reduce both air pollution emissions and community exposure to air pollution.[15]

1.5 EXISTING CLIMATE ACTION EFFORTS IN NATIONAL CITY

National City actively demonstrates its support and commitment to reducing the City's GHG emissions. The 2011 CAP identified business as usual (BAU) GHG emissions for years 2005, 2020, and 2030. Based on this analysis, the City adopted measures that demonstrates their commitment to align and meet statewide targets.

The 2011 CAP identified five focus areas to target GHG emission reductions. These five focus areas include transportation, residential, commercial/industrial, solid waste, and water and wastewater. Examples of GHG emission reduction actions executed from the 2011 CAP include a Property Assessed Clean Energy (PACE) financing program to encourage energy efficiency retrofits in existing buildings, an active weatherization improvement program, bicycle parking in new projects, and a reduction of parking standards for mixed use projects. These measures, as well as others not listed here, have been or are in the process of being implemented.

1.6 PUBLIC OUTREACH AND ENGAGEMENT

Community members play an important role in helping to reduce local GHG emissions. Therefore, it is crucial to conduct public outreach and engagement activities during the development of the CAP update. Public outreach assists the City in both providing timely information to as well as receiving input from local residents, stakeholders, and/or other interested parties. Public engagement efforts for the CAP Update consisted of virtual public workshops and stakeholder interviews. Community members were able to participate in two virtual public workshops where information on the CAP Update was provided. These public workshops also provided community members the opportunity to prioritize and provide feedback or suggestions on GHG reduction measures. Table CAP-2 provides an overview of the CAP Update public engagement and stakeholder outreach efforts.

Table CAP-2: Public Outreach and Engagement Efforts

Date	Time	Description
November 17, 2020	2:00pm - 3:00pm	Zoom Stakeholder Meeting
February 11, 2021	1:00pm - 2:30pm	Zoom Internal Meeting
March 23, 2021	5:00pm - 7:00pm	Zoom Webinar, Public Workshop
March 24, 2021	10:00am - 12:00pm	Zoom Webinar, Public Workshop
October 19, 2022	2:00pm - 3:00pm	Stakeholder Interview

14. https://www.sandag.org/index.asp?projectid=339&fuseaction=projects.detail
15. https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/AB_617/Portside%20Environmental%20Justice%20DRAFT%20CERP%20Oct%202020.pdf

1.7 BENEFITS OF IMPLEMENTING GHG EMISSION REDUCTION MEASURES

While climate change is happening worldwide, reducing GHG emissions on a local level can make an impactful difference. Addressing climate change requires a network of partnerships between local governments, agencies, businesses, and residences to work collectively and actively to achieve the goals set forth in this CAP. This section provides a discussion on the different benefits when communities work together to address climate change.

1.7.1 SAVING MONEY

In addition to helping reduce the impacts of climate change, measures taken to reduce GHG emissions have other important benefits. The most obvious of these is the potential for significant cost savings. Many of the measures in this plan "pay for themselves" quickly by reducing direct costs, such as fuel or energy used, and also indirect costs such as maintenance. For instance, a "right-sized" vehicle fleet is less expensive to purchase and fuel, while also being less costly to maintain. Encouraging energy efficiency, public transit use, building improvements, and other measures will also result in lower energy and water bills for residents and employers as well.

1.7.2 ENHANCING RESOURCE SECURITY AND RESILIENCY

A key strategic side benefit of climate change mitigation activities is enhanced energy security through reduction in total demand. This will put less strain on the energy system as a whole as we transition to clean renewable energy.

Many of the actions identified here to mitigate GHG emissions will also help National City's government, businesses, and residents to adapt to a changing climate. For example, extreme and prolonged heat waves can put considerable strain on the reliability of energy delivery in peak periods, possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across the City, such service disruptions are less likely, and the City will be able to better cope with those situations.

1.7.3 AIR QUALITY BENEFITS

Many sources of GHG emissions are simultaneously responsible for a variety of other pollutants such as particulate matter (PM10 and PM2.5), ozone, and nitrogen oxides. While GHG emissions from stationary industrial sources and mobile transportation sources contribute to global climate concerns, emissions of harmful air pollutants contribute to more localized impacts. Ozone and ozone precursors such as nitrogen oxide have been linked to respiratory illness. Exposure to particulate matter contributes to both respiratory and cardiovascular conditions. Many communities have been disproportionately impacted by long-term exposure to these sources of air pollution combined with economic or historic barriers to participation in clean air decisions and solutions. Many GHG reduction strategies are designed to limit the combustion of fossil fuels, which will in turn reduce air pollutant emissions from these same processes.

1.7.4 CREATING JOBS

Renewable energy is a growing sector. According to the 2019 Clean Jobs America analysis of energy jobs data, nearly every U.S. state saw an increase in clean energy jobs in 2018, combining to add about 110,000 net new jobs for a growth rate of 3.6%.[16] Similarly, new green sectors such as sustainable tourism, green construction, and urban agriculture can provide job opportunities that didn't exist in the past. These climate protection measures can spur business and job growth during the design, manufacture, and installation of energy efficient technologies and other green sectors.

1.7.5 IMPROVING PUBLIC HEALTH

Climate change mitigation activities, particularly those related to transportation, help to clean the air by reducing vehicle emissions and therefore improve public health. Mitigation activities also can help to engender a greater degree of transportation choice for National City residents. More transit options combined with transit-oriented development practices make for a more vibrant, livable community with shorter commute times and more opportunities for active transport. This creates more connected and resilient neighborhoods.

16. Environmental Entreprenuers, https://e2.org/reports/clean-jobs-america-2019/

2. EMISSIONS INVENTORY AND FORECAST

This chapter summarizes National City's inventory of GHG emissions for the baseline year of 2018. It also includes a discussion on the methodology, the forecast for GHG emissions under business as usual (BAU) conditions in 2030 and 2050, as well as guides the City forward by producing emission targets for 2030 and 2050.

2.1 EMISSIONS INVENTORY

The main objective for establishing a GHG emissions inventory is to provide a baseline forecasting projection (i.e., BAU) that is used to predict future trends. By comparing statewide emissions reduction target to the baseline emissions inventory, the delta remaining can be found and quantified. This delta becomes the City's goal for emissions reduction in order to reach statewide goals or targets. Quantifying this delta helps to inform the City in developing, evaluating, and implementing strategies and actions to meet the target.

2.2 METHODOLOGY

The first step is to understand the sources and amount of GHG emissions generated from activities within the City (baseline). The base year used for this CAP is 2018. National City's inventory was conducted using the US Community Protocol for Accounting and Reporting of GHG Emissions, which allows local governments to systematically estimate and track GHGs from energy and waste related activities at the community-wide scale. The 2018 base year is generally representative of 2021 conditions. Though vehicle miles traveled (VMT) may have increased slightly between 2018 and 2021, the GHG emissions associated with VMT have improved between 2018 and 2021 due to improvements in vehicle efficiency and emission standards, thus 2018 conditions are generally equivalent to 2021 conditions. The methodology for obtaining the 2018 GHG emissions inventory is described in further detail below.

2.2.1 EMISSIONS ANALYSIS SOFTWARE

To facilitate local government efforts to identify and reduce GHG emissions, ICLEI developed the ClearPath tool, which is an online - cloud-based tool that estimates emissions derived from energy consumption and waste generation within a community. The ClearPath tool uses national EPA emission factors for stationary fuels and allows a user to enter their own utility specific emission factors for electricity use. Emissions are aggregated and reported in terms of CO_2 equivalent units, or CO_2e. Converting all emissions to CO_2e units allows for the consideration of different GHGs in comparable terms. For example, methane is 85 times more powerful than CO_2 in its capacity to trap heat, so the model converts one ton of methane emissions to 85 tons of CO_2e.

The emissions coefficients and methodology employed by the ClearPath tool are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (IPCC), the U.S. Voluntary Greenhouse Gas Reporting Guidelines, and, for emissions generated from solid waste, the U.S. EPA's Waste Reduction Model (WARM).

The ClearPath tool has been and continues to be used by over 250 U.S. local governments to estimate GHG emissions. The ClearPath tool is the upgraded version of the CACP software many California local governments used to conducted inventories prior to 2015. However, although the software provides National City with a sophisticated and useful tool, calculating emissions from energy use with precision depends on the data received.

2.2.2 INVENTORY DATA SOURCES AND CREATION PROCESS

An inventory of GHG emissions requires the collection of information from a variety of sectors and sources. For community electricity and natural gas data, ICLEI consulted San Diego Gas & Electric Company (SDG&E). Transportation data was based on the SANDAG regional transportation model. Solid waste data was provided by EDCO, and wastewater data was provided by Metro Wastewater JPA. Water data was provided by the local water service provider, Sweetwater Authority.

Calculating National City's community-wide energy emissions includes the consumption of electricity even though it is produced elsewhere. The decision to calculate emissions in this manner reflects the general philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

2.3 NATIONAL CITY'S COMMUNITY-WIDE GHG EMISSIONS

National City's community-wide GHG emissions inventory includes emissions from activities taking place within the City limits. However, for the purpose of this document, the inventory excludes the jurisdictional boundaries of the Navy and Port of San Diego. GHG emission sectors in this inventory include residential, commercial/industrial, transportation, solid waste, and water/wastewater.

National City's 2018 community GHG emissions totaled in 518,263 metric tons of carbon dioxide equivalent ($MTCO_2e$) or 8.51 $MTCO_2e$ per capita. The sector with the greatest contribution to global climate change was transportation accounting for 53.7% of the City's total GHG emissions or 304,070 $MTCO_2e$. Commercial energy source emissions contributed to 29% of the City's overall emissions, or 153,235 $MTCO_2e$. In comparison, National City's 2005 community-wide GHG emissions totaled in 550,714 $MTCO_2e$ or 9.9 $MTCO_2e$ per capita. Transportation accounted for 359,029 $MTCO_2e$ (65%) and commercial emissions accounted for 139,029 (25.2%). Figure 3 and Table 3 identifies GHG emissions in 2018 for each sector.

2.3.1 TRANSPORTATION

Transportation emissions were calculated for both on- and off-road vehicles and equipment in National City. On-road transportation emissions were derived from local jurisdiction VMT data and regional vehicle and travel characteristics. Off-road transportation emissions were obtained from the CARB model using data for San Diego County.

2.3.2 COMMERCIAL/INDUSTRIAL

Commercial and industrial emissions include electricity and natural gas. Commercial energy consumption for 2018 resulted in a total of 153,738 MTCO2e, or approximately 29.1% of total community-wide emissions. Natural gas is typically used in the commercial/industrial sector to head buildings, fire broilers, and generate electricity, while electricity is used for lighting, heating, and to power appliances and equipment.

2.3.3 RESIDENTIAL

Community-wide residential emissions include electricity and natural gas. Residential energy consumption for 2018 resulted in a total of 49,872 MTCO2e, or approximately 9.4% of total community-wide emissions.

2.3.4 SOLID WASTE

Emissions from the solid waste sector are an estimate of methane generation from the decomposition of municipal solid waste and alternative daily cover sent to the landfill in the base year (2018). These emissions are not generated in the base year but will result from the decomposition of 2018 waste over the full 100+ year cycle of its decomposition. About 75% of landfill methane emissions are captured through landfill gas collection systems; however, the remaining 25% escape into the atmosphere.[17]

In 2018, the solid waste sector constituted 2% of the total GHG emissions for the National City community, producing an estimated 10,492 MTCO2e emissions.

2.3.5 WATER & WASTEWATER

Emissions from the water sector are based on the amount of energy used to pump and convey water to National City in 2018.

Emissions from the wastewater sector are an estimate of methane and nitrous oxide generated in the process of wastewater treatment. These emissions occur at treatment facilities outside the jurisdictional boundaries and "downstream" from the National City community where the wastewater is generated. In the San Diego region, about 71% of wastewater treatment me-thane emissions are captured through biogas collection systems; however, the remaining 29% escape into the atmosphere.[18]

The water and wastewater sector contributed 1,091 MTCO2e emissions, constituting 0.2% of the total community GHG emissions for National City in 2018.

17. U.S. EPA AP 42.

18. University of San Diego Energy Policy Initiatives Center, 2008, San Diego County Greenhouse Gas Inventory.

Figure CAP-3: Community-Wide Emissions Inventory (2018)

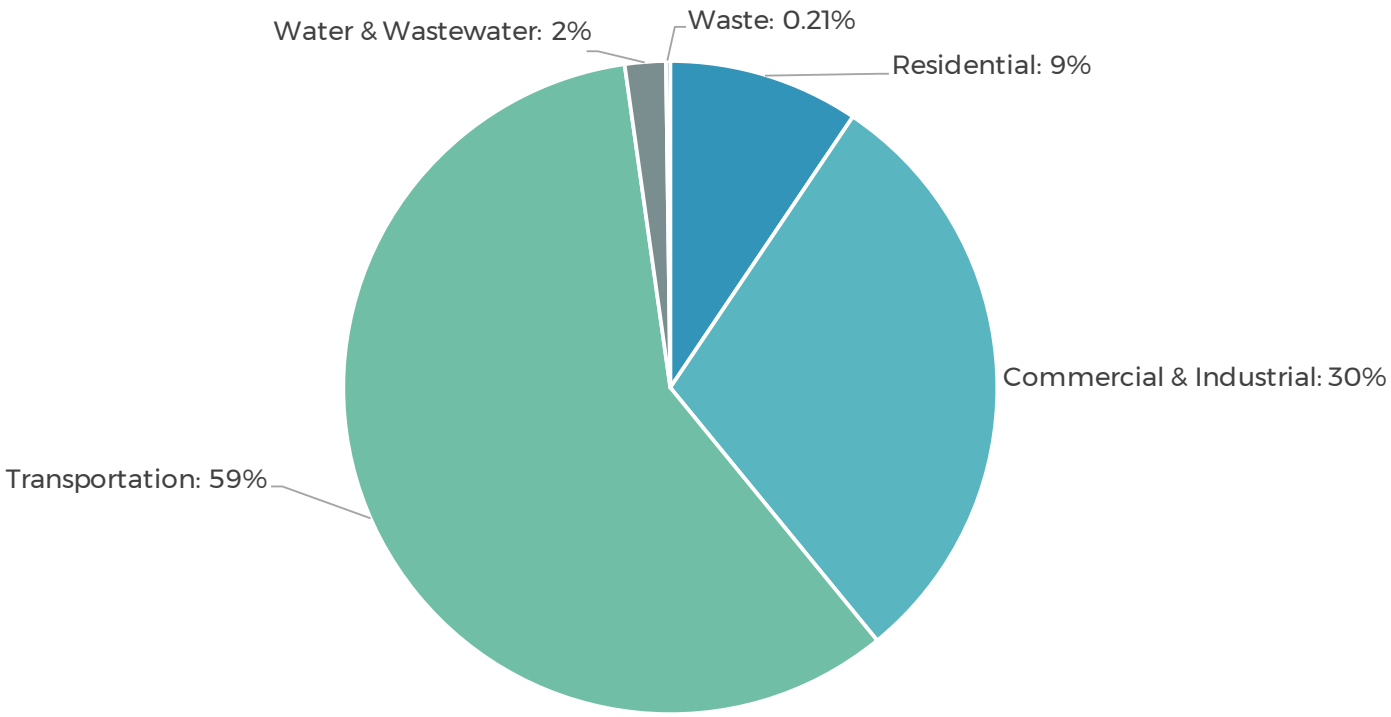


Table CAP-3: Community-Wide Emissions Inventory (2018)

Sector	Metric Tons of CO_2e	Percentage of Total (%)
Transportation	304,070	59
Commercial/ Industrial	153,738	30
Residential	48,872	9
Solid Waste	104,92	2
Water & Waste-water	1,091	0.2
Total	**518,263**	**100.0%**

2.4 NATIONAL CITY'S EMISSIONS FORECASTS

This section discusses the forecasts for GHG emissions in National City in both 2030 and 2050. The 2030 and 2050 BAU forecasts are provided in order to maintain consistency with the CARB Climate Change Scoping Plan (2017). BAU emission projections provide an estimate for future levels assuming the only reductions are from State measures that are currently in place. Through GHG projections, National City and the community can better understand the scale of local reductions needed to achieve statewide GHG reduction targets, in addition to legislative actions. These emission forecasts include the addition of 49.5 acres of land due to a 2021 annexation.

2.4.1 GROWTH RATES

GHG emission projections were based on population growth estimates from the SANDAG Series 13 Regional Growth Forecast. The Forecast Module in the ClearPath tool includes a Compound Growth Rate Calculator to calculate the population growth rate for the years 2030 and 2050. This calculation was completed to get the growth rate of 1.1% from 2018 to 2030 and 1% from 2018 to 2050. Once these population growth rates were calculated, the growth rate was then entered into the Forecast Growth Rate Factor Set to be applied to the emissions from each fuel in each inventory sector. To calculate per capita emissions, the total forecasted emissions from the ClearPath tool was divided by the 2018 population and projected population for both 2030 and 2050. Further details on population growth used for emissions projections can be found in Appendix A, Methodology.

2.4.2 LEGISLATIVE REDUCTION MEASURES

In addition to the BAU scenario, a scenario was developed to include the effects of a variety of legislative actions targeted to reduce GHG emissions. These legislative reduction measures include:

- Renewables Portfolio Standard
- Title 24 Energy Efficiency Standards and State Green Building Standards Code
- Clean Car Regulations (Assembly Bill 1493, 2002)
- Low Carbon Fuel Standard
- Executive Order N-79-29
- Advanced Clean Cars II Rule

A detailed description of these legislative measures is included in Chapter 1 and an analysis on how they were included in the City's BAU and mitigated GHG emissions forecasts can be found in Appendix A, Methodology. Table CAP-4 illustrates the forecasted GHG emissions for the years 2030 and 2050.

As shown in the Table CAP-4, implementation of State and federal legislative measures will help contribute to the City's reduction of GHG emissions. By year 2030, emissions are projected to decrease by approximately 10%; by 2050, emissions are projected to decrease by approximately 1% compared to 2018 levels.

2.5 EMISSION REDUCTION TARGETS

This section presents the GHG emissions reduction target for National City for the years 2030 and 2050. Many factors were considered when selecting National City's reduction targets, including international, state, and regional goals for emissions reductions. Ultimately, the City strived to choose a target that aligns with State targets.

State and local factors considered in selecting the target reduction percentage included estimation of the effects of implemented and planned programs and policies, an approximate assessment of future opportunities to reduce emissions, statewide targets established in the Global Warming Solutions Act of 2006 (AB 32), Senate Bill (SB) 32, and Executive Orders S-3-05 and B-30-15. Statewide reduction policies set the following short- and long-term goals for reducing state-wide GHG emissions:

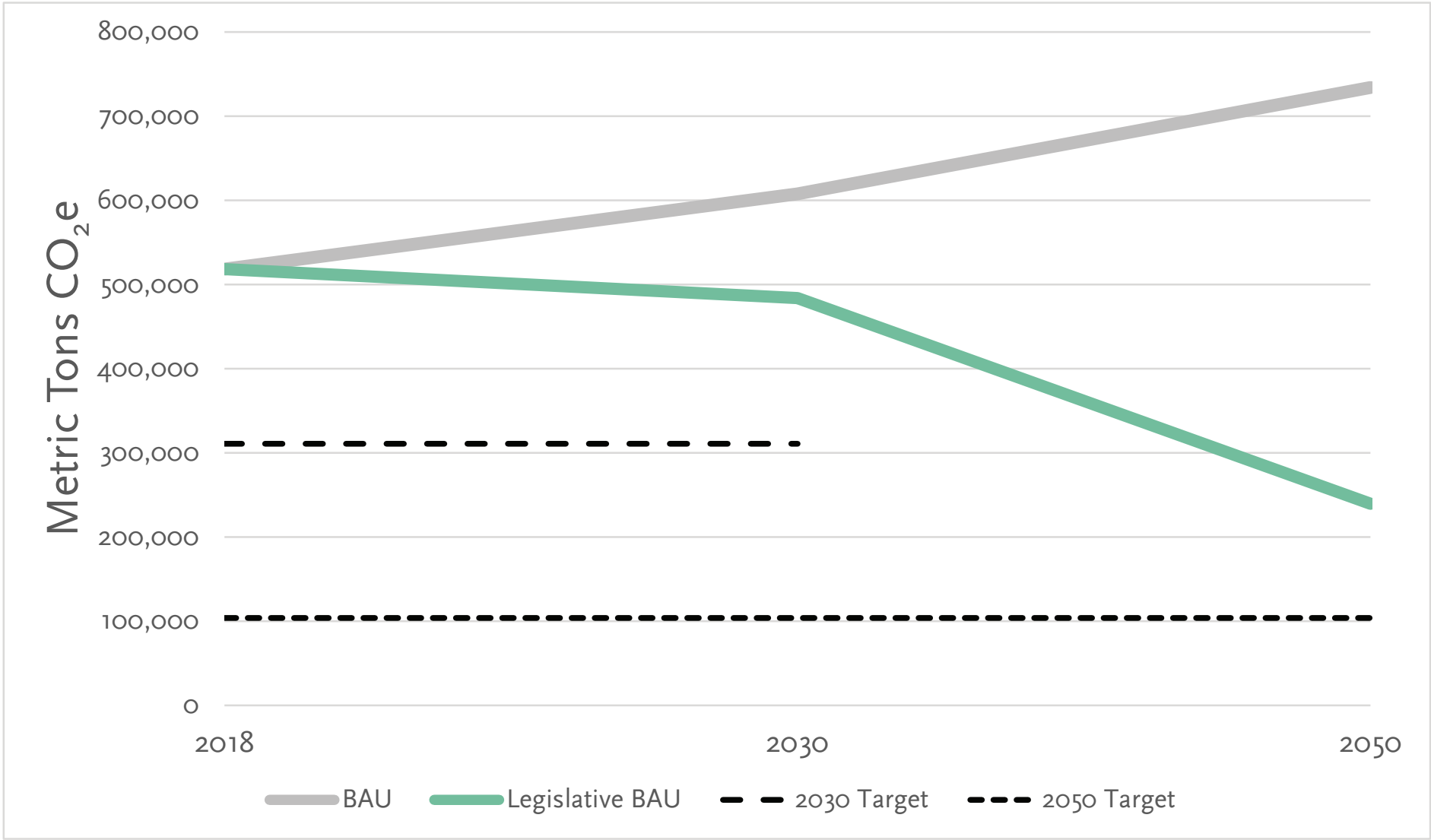
- 1990 levels by 2020;
- 40% below 1990 levels by 2030; and
- 80% below 1990 levels by 2050.

National City has adopted a reduction target of 40% below 2018 baseline emission levels by the year 2030, and 80% below 2018 baseline emission levels by the year 2050 (see Figure CAP-4 for more detail).

Table CAP-4: BAU and Legislative Reduction Measures Forecasts (MTCO2e)

Sector	2018 BAU	2030	2050
		BAU Forecast	BAU Forecast
Transportation	304,070	265,445	282,384
Commercial/ Industrial	153,738	141,968	163,056
Residential	48,872	43,761	49,972
Solid Waste	104,92	11,952	14,441
Water & Wastewater	1,091	1,244	1,487
Total	**518,263**	**464,356**	**511,340**
Change from 2018 (%)	**-**	**-10%**	**-1%**

Figure CAP-4: National City BAU and Legislative BAU Forecasts




YIELD

3. EMISSION REDUCTION STRATEGIES, GOALS, AND ACTIONS

This chapter presents the GHG emission reduction measures that the City of National City will implement in order to achieve the emission reduction target for the year 2030 and additional reductions by the year 2050.

The City is challenged with reducing greater amounts of GHG emissions with limited resources. Therefore, the City has identified measures based on careful consideration of emission reductions needed to achieve the target, existing priorities and resources, and the potential costs of various emission reduction projects.

Community-wide measures are divided into the following focus areas: transportation, residential and commercial/industrial energy, renewable energy, solid waste, and water/wastewater. In each focus area, a series of objectives with supporting strategies and actions are explored. An "Objective" is a goal, end result, or target and a "Strategy" is an implementing action of the objective. Each strategy then defines the "Lead Actor", an agency, department, or individual responsible for implementing the strategy as well as a "Metric" used for measuring the strategy's success.

3.1 COMMUNITY-WIDE GHG EMISSION REDUCTIONS

This CAP Update accounts for existing plans, programs, and activities that National City already incorporates to reduce emissions. The 2011 CAP included 55 emission reducing strategies which have been revised, removed or expanded upon in this CAP Update.

The residential, commercial/industrial, transportation and land use, solid waste, and water and wastewater sectors discussed below include measures that will reduce GHG emissions. In total, implementation of the CAP measures will reduce GHG emissions by 185,171 metric tons of CO2e (MTCO2e) from the 2030 BAU forecast. This reduction combined with reductions from legislative actions meets the target of 310,958 MTCO2e. By 2050, implementation of the CAP measures will reduce GHG emissions by 138,532 MTCO2e from the 2050 BAU forecast, which meets the 2050 target of 103,653 MTCO2e when combined with legislative actions. A summary of the reductions by sector is provided in Table CAP-5 below.

Table CAP-5: Community-Wide GHG Emission Reductions

Strategy	2018	2030	2050
Transportation	304,070	188,409	11,242
Commercial/ Industrial	153,738	74,377	56,594
Residential	48,872	22,788	17,344
Solid Waste	10,492	11,907	14,367
Water & Wastewater	1,091	1,231	1,487
Emissions avoided from CAP measures		-185,171	-138,516
Emissions avoided from Federal and State Regulations		-123,888	-494,705
Total Reductions		-309,059	-633,221
% Below 2018 Baseline Emissions		-42%	-81%

Table CAP-6: GHG Reduction Range

Symbol	GHG Reduction	Range Description
	Small Impact Range	Emissions reductions for a short duration
	Medium Impact Range	Varying emissions reductions over longer durations
	Large Impact Range	High emissions reduction over life of CAP

Table CAP-7: GHG Reduction Co-Benefit

Symbol	Co-Benefit
	High potential to support jobs and prosperity
	High potential to advance equity
	High potential to improve local environmental quality
	High potential to improve health

3.2 EMISSION REDUCTION FRAMEWORK

Calculating expected emissions reductions for each objective requires making assumptions about degree of implementation, technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or strategy. To address this uncertainty and provide a simple but useful reference for reduction potential, a series of symbols and percentage ranges has been devised to represent the emission reductions associated with each objective and its strategies:

Strategies that fall into the large impact range have high potential for emissions reductions over the life of the CAP, and strategies categorized as the low impact range are expected to have a lower reduction in emissions or would occur for a shorter amount of time. Strategies in the medium impact range are expected to have long-lasting impacts at a variety of reduction levels.

In addition to measuring the GHG reduction potential, each strategy is also evaluated for other benefits, or "co-benefits", such as public health, equity and justice, jobs and prosperity, or environmental conversation. The symbols in the Table below will indicate which co-benefits a measure will generate.

3.3 EFFICIENT TRANSPORTATION & LAND USE

The following measures are intended to reduce vehicle miles traveled, reduce GHG emissions and improve air quality through a variety of strategies, including efficient land use patterns; provisions to increase transit ridership, walking, and bicycling; urban forests/street trees; and use of alternative fuels.

Besides emitting GHGs, transportation fossil fuels also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting our health. Transportation accounts for 59% of National City's total GHG emissions. With the transportation and land use measure listed below, emissions will be reduced by over 115,000 MTCO2e by 2030 and 292,000 MTCO2e by 2050, when combined with legislative reductions.

Table CAP-8: Transportation and Land Use Objectives

Objective	Supporting Strategies	Supports Adaptation	Co-Benefits	Reduction Potential
TLU-1. Reduce Vehicle Miles Traveled	TLU-1.1, TLU-1.2, TLU-1.3, TLU-1.4, TLU1.5, TLU-1.6, TLU-1.7, TLU-1.8	Y		
TLU-2. Encourage Clean Transportation	TLU-2.1, TLU-2.2, TLU-2.3, TLU-2.4, TLU-2.5	Y		
TLU-3. Promote the Completion of Transportation Studies	TLU-3.1, TLU-3.2	Y		
TLU-4. Encourage parking restrictions and prioritizations	TLU-4.1, TLU-4.2	Y		
TLU-5. Promote Vehicle and driver efficiency	TLU-5.1, TLU-5.2	Y		

Table CAP-9: Transportation and Land Use Strategies

TLU-1. Reduce Vehicle Miles Traveled				
Encourage the expansion and improvement of alternative transit networks to reduce vehicle miles traveled.				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
TLU-1.1	Encourage high density and mixed-use development in Transit Priority Areas.			VMT Reduced
TLU-1.2	Reduce parking requirements in Transit Priority Areas to discourage the use of single-occupancy vehicles.			VMT Reduced
TLU-1.3	Develop and periodically update a Transportation Demand Management Plan for different sectors of the City.			VMT Reduced
TLU-1.4	Support the San Diego Metropolitan Transit Service (MTS) in expanding or making performance improvements (i.e. decrease headway times, increase number of stops) to existing transit service in National City.			VMT Reduced
TLU -1.5	Continue to implement bicycle corridor improvements and supportive infrastructure.			VMT Reduced
TLU -1.6	Improve access to bike share and electric scooters.			VMT Reduced
TLU -1.7	Implement pedestrian infrastructure and prioritize improvements in Transit Priority Areas to increase commuter walking opportunities.			VMT Reduced
TLU -1.8	Identify gaps in the City's existing pedestrian network and address pedestrian improvement opportunities.			VMT Reduced
TLU -1.9	Incorporate the "Complete Streets" principal to capital projects and plans.			VMT Reduced
TLU -1.10	Implement strategies that prioritize parking for high occupancy vehicles (HOVs) – carpools, vanpools and transit vehicles.			VMT Reduced
TLU-1.11	Continue to encourage employers to institute programs that provide financial incentives (i.e. Parking Cash Out, Travel Allowances, Transit and Rideshare benefits, and Reduced Employee Parking Subsidies) for commuters to reduce their vehicle trips and use alternative transportation modes like walking, bicycling, public transit and carpooling, often as an alternative to subsidized employee parking.			VMT Reduced
TLU-1.12	Encourage employers to institute telework programs and alternative work schedules to reduce commuting during peak hours.			VMT Reduced

Table CAP-9: Transportation and Land Use Strategies Continuation

TLU-2. Encourage Clean and Efficient Transportation **Encourage the adoption of clean transportation (i.e. electrical vehicles), infrastructure, and efficient transportation practices.**				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
TLU -2.1	Encourage all new residential, governmental, and commercial buildings to be electric vehicle ready (i.e. charging stations, preferred parking, etc.).		Development Services Department and Private Developers	Electric vehicle registration
TLU-2.2	Support the installation of electric vehicle charging stations in existing residential and commercial developments.			Electric vehicle registration
TLU-2.3	Continue to implement and improve streamlined permitting requirements, standardized design guidelines and siting criteria for all types of electric charging stations.			Electric vehicle registration
TLU-2.4	Implement perferred parking for electric vehicles.		Development Services Department	Electric vehicle registration
TLU-2.5	Educate the community on fuel-efficiency or “eco-driving” practices.			
TLU-2.6	Encourage the reduction of idling times for commercial vehicles and construction equipment.			
TLU-2.7	Encourage the conversion of public transportation fleets and maintenance vehicles from gas to electric.		Development Services Department	Electric vehicle registration
TLU-2.8	Continue to implement traffic-calming projects (e.i., replace stop-controlled intersections with roundabouts) to facilitate efficient traffic conditions.			
TLU-2.9	Continue to coordinate traffic signals to facilitate efficient traffic conditions.			

3.4 RESIDENTIAL AND COMMERCIAL/INDUSTRIAL BUILDING EFFICIENCY

Energy consumed in residential buildings accounts for 9% of National City's total GHG emissions while commercial/industrial buildings account for 30%. Improving the efficiency of residential, commercial, and industrial building stock will contribute significantly to achieving National City's GHG reduction target. This section focuses on opportunities to retrofit existing buildings, increase the quality of new construction, and to ensure that future activities in these sectors are compatible with our community's climate protection goals.

Table CAP-10: Residential and Commercial/Industrial Building Efficiency Objectives

Objective	Supporting Strategies	Supports Adaptation	Co-Benefits	Reduction Potential
RCB-1. Existing Buildings	RCB-1.1, RCB-1.2, RCB-1.3, RCB-1.4, RCB-1.5, RCB-1.6	Y		
RCB-2. New Buildings	RCB-2.1, RCB-2.2	Y		

Table CAP-11: Residential and Commercial Building Efficiency Strategies

RCB-1. Existing Development **Retrofit existing buildings to achieve a 70% reduction in energy use by 2038.**				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
RCB-1.1	Educate and encourage building owners to use the Free Resources and Energy Business Evaluation (FREBE) program to help improve energy and water efficiency.			Electricity, natural gas, and water usage records
RCB-1.2	Utilize the building inspection and business license renewal process to distribute educational information on energy-efficiency upgrades.			Electricity and natural gas usage records
RCB-1.3	Continue to provide an energy financing program to encourage energy efficient retrofits in existing buildings.			Electricity and natural gas usage records
RCB-1.4	Educate the community of energy efficiencies and improvements including: » Energy audits that inform building owners and residents of their energy usage and methods of reducing energy usage; » Peak demand and the associated environmental and monetary costs as a result; and » Benefits of using solar water heating.			Electricity and natural gas usage records

Table CAP-11: Residential and Commercial Building Efficiency Strategies Continuation

RCB-1.5	Increase the number of homes weatherized per year by providing low- or no-cost weatherization improvements for low-income households.			Electricity and natural gas usage records
RCB-1.6	Develop and implement performance standards for exterior lighting of commercial and industrial buildings and parking lots, which include minimum and maximum lighting levels while providing a safe environment.			Electricity and natural gas usage records
RCB-2. New Development **Encourage new development is built to maximum energy efficiency.**				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
RCB-2.1	Encourage private development projects to exceed the energy efficiency requirements of CalGreen by providing technical assistance, financial assistance and other incentives.			Electricity and natural gas usage records
RCB-2.2	Encourage LEED certification for all new commercial and industrial buildings.			Electricity and natural gas usage records

3.5 RENEWABLE ENERGY PRODUCTION

Broadly speaking, the use of fossil fuels for energy (including electricity, heating, transportation, and other uses) is the single largest contributor to GHG emissions and climate change. Fossil fuels still supply a considerable share of energy for electricity, heating, transportation, and other energy-producing uses. Energy production is a cross-cutting focus area in that nearly all activities that take place in the community require energy of some sort. Fossil fuel combustion contributes to GHG emissions in all sectors. While SDG&E is working hard to increase the percentage of electricity generated through renewable sources, opportunities also exist for citizens and National City local government to produce small-scale renewable energy or fuels, offsetting the need for fossil fuels. This focus area is limited to energy production exclusively – objectives and strategies that focus on end use energy efficiency are included in other focus areas. The programs and projects within this focus area are designed to spur local government and community investment in renewable energy sources including those that produce electricity, heat, and mobile fuels.

Table CAP-12: Renewable Energy Production Objectives

Objective	Supporting Strategies	Supports Adaptation	Co-Benefits	Reduction Potential
RE-1. Establish or join a Community Choice Energy Program	RE-1.1, RE-1.2, RE-1.3, RE-1.4, RE-1.5, RE-1.6, RE-1.7	Y		

Table CAP-13: Renewable Energy Production Strategies

RE-1. Establish or Join a Community Choice Energy Program **Launch or join a CCE Program with renewable electricity sources.**				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
RE-1.1	Launch or join a CCE Program with renewable electricity sources as a percentage of overall energy supplies equal to or greater than the current percentage of renewable electricity provided by SDG&E and 80% customer participation.			CCE participation
RE-1.2	Encourage restricting new natural gas lines in buildings.			Electricity and natural gas usage records
RE-1.3	Support building electrification codes.			Electricity and natural gas usage records
RE-1.4	Implement solar panels in existing city-owned facilities (schools, libraries, etc.).			Electricity usage records
RE-1.5	Pursue economic incentives and creative financing for renewable energy projects.			Electricity usage records
RE-1.6	Reduce costs to permit alternative energy generation projects.			Electricity usage records
RE-1.7	Encourage removing barriers for renewable energy production, including: » Building and development codes, design guidelines, and zoning ordinances » Work with related agencies, such as fire, water, health and others that may have policies or requirements that adversely impact the development or use of renewable energy technologies			Electricity usage records

3.6 SOLID WASTE EFFICIENCY

Emissions from solid waste material directly contribute 0.21% of National City's total GHG emissions. Additionally, embodied energy within the items that we throw away might be harnessed through reuse and recycling of materials. It is in National City's long-term interest to expand recycling facilities and enable re-use of construction materials and other goods. This section focuses on opportunities to reduce waste, reuse materials, and recycle what cannot be reused.

Table CAP-14: Solid Waste Efficiency Objectives

Objective	Supporting Strategies	Supports Adaptation	Co-Benefits	Reduction Potential
SW-1. Divert Solid Waste from Landfills	SW-1.1, SW-1.2, SW-1.3, SW-1.4, SW-1.5, SW-1.6, SW-1.7, SW-1.8	Y		

Table CAP-15: Solid Waste Efficiency Strategies

SW-1. Divert Solid Waste from Landfills **Implement zero waste initiatives to reduce waste disposal from residents and businesses.**				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
SW-1.1	Retain green waste recycling programs.			Solid waste volume records
SW-1.2	Educate owners and residents of multi-family housing about recycling requirements and opportunities.			Solid waste volume records
SW-1.3	Establish and retain an active composting plan and curbside composting project through the EDCO waste collection service.			Solid waste volume records
SW-1.4	Continue working with EDCO to encourage waste audits and waste reduction plans for existing and new commercial developments.			Solid waste volume records
SW-1.5	Encourage zero food waste in schools.			Solid waste volume records
SW-1.6	Encourage recycling food waste from the community kitchen to be used as compost in community gardens.			Solid waste volume records
SW-1.7	Implement and retain bio-solid waste programs.			Solid waste volume records
SW-1.8	Establish community-wide quarterly e-waste and recyclable events.			Solid waste volume records

3.7 WATER AND WASTEWATER MANAGEMENT

Energy is used to pump, transport, and treat water and wastewater which results in GHG emissions. Emissions from water and wastewater accounts for approximately 0.21% of National City's total emission inventory.

This focus area does not include the methane collection system; please refer to Energy Production focus area for this project.

Table CAP-16: Water & Wastewater Management Objectives

Objective	Supporting Strategies	Supports Adaptation	Co-Benefits	Reduction Potential
WW-1. Reduce community-wide potable water consumption	WCR-1.1, WCR-1.2, WCR-1.3, WCR-1.4, WCR-1.5	Y		

Table CAP-17: Water & Wastewater Management Strategies

WW-1. Reduce community-wide potable water consumption				
Implement strategies for reducing potable water consumption in National City				
Strategy Number	**Strategy**	**Benefits**	**Lead Actor**	**Metric**
WW-1.1	Promote and educate the community on water efficient landscaping and weather based irrigation devices.			Water usage records
WW-1.2	Utilize the business license renewal process to provide educational information on ways to reduce water use and improve water efficiency.			Water usage records
WW-1.3	Identify and support programs that re-use gray water.			Water usage records
WW-1.4	Implement stormwater capture systems (i.e., sidewalk gardens or green spaces) to reduce reliance on imported water.			Water usage records
WW-1.5	Continue to provide a water financing program to encourage water efficient retrofits in existing buildings and prioritize low-income households.			Water usage records

3.8 MITIGATED EMISSIONS FORECAST

This CAP Update accounts for existing plans, programs, and activities that National City already incorporates to reduce emissions. The 2011 CAP included 55 emission reducing strategies which have been revised, removed or expanded upon in this CAP Update. Table 12 summarizes the emissions reductions achieved by implementation of all local reduction measures. As shown, the identified measures would reduce emissions to levels that meet the CAP goals of 60% of 2018 inventory by 2030 and 20% of the 2018 inventory by 2050. The majority of the GHG reduction strategies would be implemented in the near-term and are assumed to continue to the year 2050. Certain reduction measures would continue to achieve further reductions throughout the forecast horizon while others exceed their useful life. For example, while electrification of new construction would be anticipated to last indefinitely; but reductions from electrification of major renovations would not continue after the existing building supply has completely turned over. The effectiveness of some strategies are reduced in the future due to the planned implementation of legislative actions. For example, legislative actions that reduce vehicle emissions are so effective in 2050 that strategies that reduce vehicle miles traveled do not achieve as much emissions reduction as the same actions would in 2030.

As shown in Figures CAP-5 and CAP-6, below, the City will meet their communitywide reduction goals for 2030 and 2050. Figure CAP-5 presents the emissions by sector and clearly demonstrates the dramatic reductions in the transportation sector due to legislative actions.

Figure CAP-5: National City Mitigated Forecast

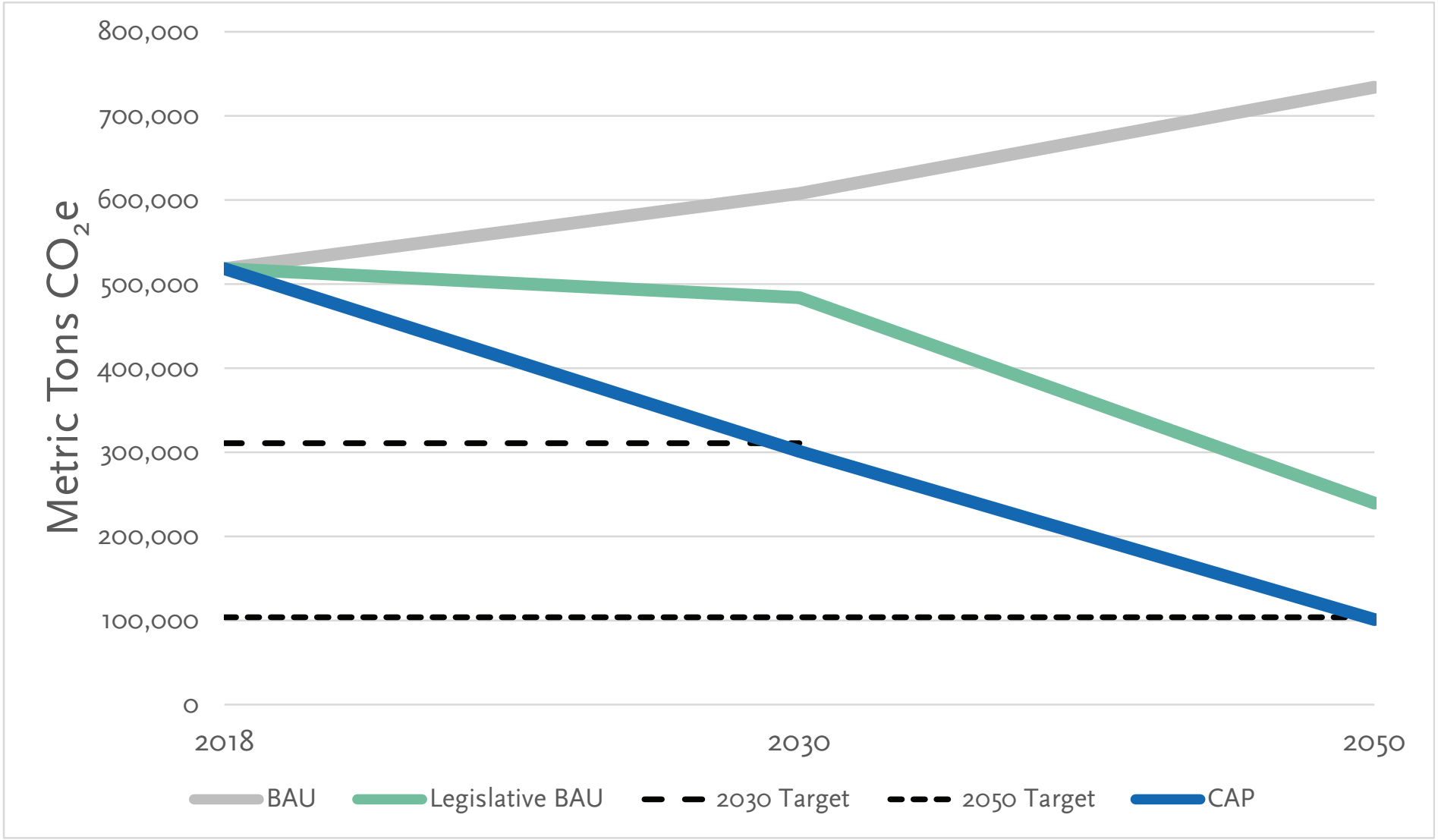
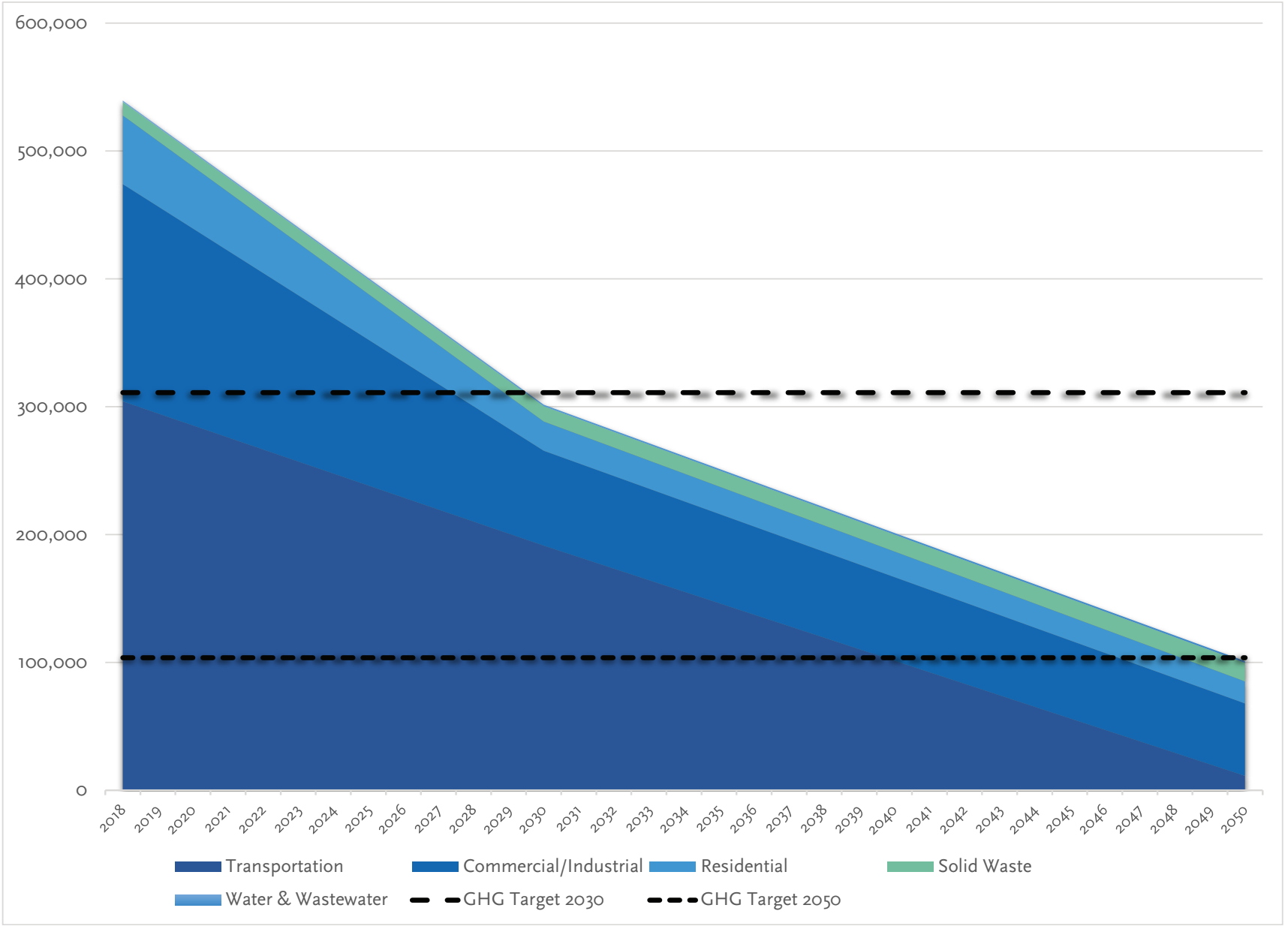


Figure CAP-6: National City Mitigated Forecast Emissions by Sector

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4. NEXT STEPS

Climate change is one of the most critical challenges facing society today. Overcoming climate change will require substantial efforts from government, organizations, and individuals. Meeting National City's reduction target will require both persistence and adaptability. The City needs to prioritize actions; mobilize residents, business owners and staff; and work with neighboring jurisdictions and regional agencies to create workable solutions. The previous chapters present and analyze reduction measures intended to reduce GHG emissions in National City. As described in Chapter 3, implementation of the CAP measures will exceed the reduction targets for both the community and government operations emissions. These measures represent the hard work and initiative of the City of National City to go above and beyond normal practice by proactively addressing our relationship to global climate change. This chapter outlines the next steps for implementation and monitoring that will be taken to ensure the GHG emission reduction measures in National City are realized .

4.1 IMPLEMENTATION

While some of the actions within the National City CAP are well underway, over the coming months, National City will engage with community members, businesses, institutions, and other stakeholders through a Climate Action Planning Task Force to prepare a more detailed implementation plan for strategies outlined within this CAP and for any prerequisite actions needed to begin Plan implementation.

These prerequisite actions include:

- Creating citizen advisory groups for programs that require considerable community engagement.
- Gathering bids for contracted services and equipment.
- Making necessary changes to local policies, ordinances, or existing programs, including staffing.

4.2 MONITORING

Establishing a monitoring process enables National City to track the impacts of the actions included in the plan and compare estimated impacts to what is actually achieved in terms of energy savings, renewable energy production, and GHG emissions reduction. Assessing the implementation status of the actions will allow determination of whether the action is performing well and to identify corrective measures. This process is also an opportunity to understand barriers to implementation and identify best practices or new opportunities in moving forward.

Action reports occur every two years and will only include status updates on the overall strategy, the mitigation action plan, and the adaptation action plan. The full monitoring report will occur every four years and in addition to the components in the action report, will include an updated community and municipal GHG inventory. This will help National City track its GHG emissions reduction progress. With the approval of this CAP in 2023, the first monitoring action report will be due in 2025 and the first full monitoring report with the updated GHG inventories will be due in 2027. Ideally, the most recent GHG inventories should be no more than four years old.

4.3 PLAN ADAPTATION, RE-INVENTORY

As part of the update process mentioned above, the City will comprehensively update its 2018 GHG inventory to evaluate progress toward meeting its GHG reduction goals. This includes data collection in each of the primary inventory sectors (electricity demand, natural gas use, regional vehicle miles traveled, solid waste disposal, water and wastewater, and municipal facilities), and comparing the inventory to the City's baseline GHG emissions. Information will be consolidated in a database or spreadsheet that can be used to evaluate the effectiveness of individual reduction measures. Early identification of effective strategies and potential issues will enable the City to make informed decisions on future priorities, funding, and scheduling.

4.4 FUNDING

One of the main barriers to seeing through an implementation plan is lack of available funds. There are multiple grant and loan programs through State, federal, and regional sources to combat climate change. With the establishment of this plan for action, National City is in a position to apply for funding to implement the supporting measures in a timely fashion. Funding sources may include the San Diego Association of Governments, as a well as State and federal agencies with similar programs.

Attachment 1. CAP Emissions Methodology

National City Climate Action Plan: Emissions Modeling Methodology

This emissions modeling methodology describes the processes used to develop the baseline greenhouse gas (GHG) emissions inventory, the business as usual (BAU) forecasts, the legislative BAU forecasts, and the mitigated forecasts that include reductions achieved by the strategies outlined in the Climate Action Plan (CAP).

Emissions were estimated for each inventory sector: Transportation & Mobile Sources, Residential energy, Commercial energy, Industrial energy, Solid Waste, and Water & Wastewater. These baseline estimates were all conducted using ICLEI USA's ClearPath tool, unless otherwise specified, which allows for future forecasts based on assumptions applied to baseline inventories. The CAP follows the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), developed by ICLEI USA[1].

2018 Baseline Inventory Methodology

A baseline GHG emissions inventory was included in the previously adopted National City CAP (2011). This baseline inventory was updated with more recently available data that more closely reflects the current land use, utility use, and general activity within National City. 2018 was most recent year for which complete data was available at the time of preparation of the CAP Update. This section outlines the methodology used to estimate the baseline 2018 emissions for each inventory sector.

Transportation

The emissions associated with on-road transportation were calculated in ClearPath using the estimated City of National City vehicle miles traveled (VMT) Annual VMT for 2018. Average weekday VMT for the City for year 2016 was provided by the San Diego Association of Governments (SANDAG) using the Series 14 Forecast and activity-based model (ABM2+). SANDAG allocates the VMT derived from ABM2+ to the City of National City using the Origin-Destination (O-D) method, which estimates miles traveled based on where a trip originates and where it ends to attribute on-road emissions to cities and regions.

O-D VMT allocated to National City includes all miles traveled for trips that originate and end within National City limits (referred to as Internal-Internal), and half of the miles traveled for trips that either begin within National City and end outside the City (referred to as Internal-External), or vice versa (referred to as External-Internal). In accordance with the methodology, VMT from trips that begin and end outside National City that only pass through the City limits (referred to as External-External) are not included in the total City VMT. The total average weekday VMT were multiplied by 347 to adjust from average weekday VMT to average annual VMT, which includes weekends.

The 2018 VMT was estimated by applying growth rates to the 2016 values derived from the Highway Performance Monitoring System (HPMS)[2]. The derivation of the 2018 VMT values is summarized in Table A-1.

[1] ICLEI, U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, https://icleiusa.org/us-community-protocol/

[2] Caltrans, Highway Performance Monitoring System Data, https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system

Table A-1 Baseline Year VMT

	VMT by Trip Type (miles/weekday)			Daily CAP VMT	Annual VMT CAP VMT
Year	Internal-Internal (I-I) Trips	External-Internal/Internal-External (I-E/E-I) Trips	External-External Trips (Informational only, excluded from City VMT)	Total City VMT (100% I-I + 50% I-E/E-I) (miles per weekday)	Total City VMT (miles per year)
2016	92,060	2,960,454	80,366,924	1,572,287	545,583,630
2018	Not estimated for analysis.				583,050,360

Energy Use

Energy use data from San Diego Gas and Electric (SDGE) was available for 2018 by zip code. Mapping tools were used to determine the percentage of land area within each zip code that is within the National City boundary. This percentage was applied to data for each zip code to determine the residential electricity use, commercial electricity use, residential natural gas use, and commercial natural gas use within the National City boundary, as summarized in Table A-2 . Natural Gas usage from industrial sources was not able to be provided due to privacy concerns.

Table A-2 Baseline Year Energy Use

Zip Code	Percent of Zip Code Area within National City	Total Electricity Usage by zip Code (kWh)	National City Electricity Usage by Zip Code (kWh)	Total Natural Gas Usage by Zip Code (therms)	National City Natural Gas Usage by zip Code (therms)
91902 R	0.76%	35,815,908	272,201	6,298,594	47,870
91902 C	0.76%	17,281,693	131,341	0	0
91910 R	0.46%	110,568,609	508,616	14,141,134	65,049
91910 C	0.46%	142,143,771	653,861	0	0
91910 I	0.46%	200,523,173	922,407	0	0
91950 R	90.45%	68,973,147	62,386,211	6,688,850	6,050,065
91950 C	90.45%	202,414,194	183,083,638	22,511,327	20,361,495
92118 R	0.26%	47,797,713	124,274	5,738,776	14,921
92118 C	0.26%	47,341,519	123,088	0	0
92154 R	1.05%	98,730,433	1,036,670	8,099,953	85,050
92154 C	1.05%	150,501,144	1,580,262	845,063	8,873
92154 I	1.05%	110,260,998	1,157,740	0	0
National City Residential Total			64,327,972		6,262,954
National City Commercial Total			185,572,191		20,370,358
National City Industrial Total			2,080,147		0

Solid Waste

The Solid Waste sector of the inventory includes emissions from total waste generation (wet tons) and composted green waste (tons) generated by City activities. Total tonnage of solid waste hauled from National City customers in the year 2018 was provided by EDCO. Table A-3 presents the tons of solid waste sent to landfills and tons of recycled waste that were used in the ClearPath model to estimate the emissions generated from these sources.

Table A-3 Baseline Year Solid Waste Data

Description	Tons
Waste sent to landfill	45,707
Waste recycled	519.86
Waste composted	1843.14

Water and Wastewater

The Water & Wastewater sector of the inventory includes emissions energy usage from potable water supply and the wastewater treatment facility, and combustion and flaring of digester gas. System-wide usage data from Sweetwater Authority and Point Loma Treatment Center were acquired for the year 2018. This data was scaled based on the National City portion of the population served to estimate the usage specific to National City for the baseline Inventory calculations, as shown in Table A-4. These values were used in the ClearPath model to estimate annual CO2e from the water and wastewater sector.

Table A-4 Baseline Year Water and Wastewater Data

Parameter	System Value	System Population	Community Population	National City Value
Electricity Usage (Sweetwater)	5,995,000 kWh	196,061	62257	1,903,646 kWh
Volume of water delivered	1,573 million gallons	196,061	62257	499.5 million gallons
Electricity Usage (Point Loma)	18,943,757 kWh	2,300,000	61,431	505,971 kWh
Natural Gas Usage (Point Loma)	231,697 therms	2,300,000	61,431	6,188.4 therms
Volume of water treated	4.5 million gallons	2,300,000	61,431	
Volume digester gas produced and combusted	3,100,000 scf/day	2,300,000	61,431	82.8 scf/day
Percent CH4 in digester gas	62%			62%

Note: CH4 = methane, scf/day = standard cubic feet per day

Baseline Results and Reduction Targets

Values described in the previous tables were entered into the ClearPath model. ClearPath estimated emissions by sector for the year 2018, as summarized in Table A-5. Reduction targets were based on the 2018 total emissions of 518,263 MTCO2e.

Table A-5 National City 2018 Baseline Emissions Inventory by Sector

Sector	Metric Tons of CO_2e
Transportation	304,070
Commercial/Industrial	153,738
Residential	48,872
Solid Waste	10,492
Water & Wastewater	1,091
2018 Total	518,263
2030 Target (40% reduction)	310,958
2050 Target (80% reduction)	103,653

Note: Columns may not add to totals due to rounding.

Business As Usual (BAU) Forecast Methodology

The BAU forecast evaluates the projected future emissions, assuming no reduction strategies are in place while the population and industry continues to grow. The Forecast Module in the ClearPath tool includes a Compound Growth Rate Calculator to calculate the population growth rate for the years 2030 and 2050, which is applied to each sector to estimate future emissions. In 2019 National City annexed 49.5 acres of land. Excluding this increased area and its associated land uses would underestimate future emissions. An alternative baseline inventory, referred to as the 2018b inventory, was developed that includes emissions from the annexation. Although the 2018b inventory does not represent the conditions in 2018, it was used to develop the 2030 and 2050 forecasts for the anticipated National City boundary for future analysis years. The ClearPath forecasts were all performed using growth rates applied to the 2018b inventory.

2018b Inventory

As described above, a 2018b Inventory was developed as a baseline to forecast emissions for 2030 and 2050. Adjustments were made to the energy sector only.

The energy use data provided by SDGE was scaled by zip code, as described in the 2018 Baseline Inventory Methodology. Mapping tools were used to determine the percentage of land area within each zip code that is within the updated National City boundary that included the annexed land. The scaling exercise summarized in Table A-2 was updated to reflect 100% of the area within zip code 91950 is within National City limits. Table A-6 presents the development of the energy use inputs for the 2018b Inventory.

Table A-6 Development of 2018b Energy use inputs

Zip Code	Percent of zip code area within National City	Total usage by zip code (kWh)	National City usage by zip code	Total usage by zip code (kWh)	National City usage by zip code
91902 R	0.76%	35,815,908	272,201	6,298,594	47,870
91902 C	0.76%	17,281,693	131,341	0	0
91910 R	0.46%	110,568,609	508,616	14,141,134	65,049
91910 C	0.46%	142,143,771	653,861	0	0
91910 I	0.46%	200,523,173	922,407	0	0
91950 R	100%	68,973,147	68,973,147	6,688,850	6,688,850
91950 C	100%	202,414,194	202,414,194	22,511,327	22,511,327
92118 R	0.26%	47,797,713	124,274	5,738,776	14,921
92118 C	0.26%	47,341,519	123,088	0	0
92154 R	1.05%	98,730,433	1,036,670	8,099,953	85,050
92154 C	1.05%	150,501,144	1,580,262	845,063	8,873
92154 I	1.05%	110,260,998	1,157,740	0	0
National City Residential Total			70,914,907		6,901,739
National City Commercial Total			204,902,746		22,520,200
National City Industrial Total			2,080,147		0

VMT was not modified for the 2018b Inventory. The VMT data analysis used for the 2018 Baseline Inventory was based on vehicle trips with an origin or destination located within the 2018 National City boundary. A traffic analysis has not been updated to include the annexed area. It is not expected that the additional area would cause a significant change in VMT, as compared to the 2018 data.

Table A-7 demonstrates the differences in GHG emissions between the 2018 Base Inventory presented in the CAP and the 2018b inventory used to estimate the GHG emissions for the forecast years.

Table A-7 Comparison of 2018 Emissions Inventory to 2018b Inventory Used for Forecasts

Sector	2018 Metric Tons of CO_2e	2018b Metric Tons of CO_2e
Transportation	304,070	304,070
Commercial/Industrial	153,738	169,849
Residential	48,872	53,863
Solid Waste	10,492	10,493
Water & Wastewater	1,091	1,091
Total	518,263	539,367

Note: Columns may not add to totals due to rounding.

Growth Factors

Emissions forecasts were created for each inventory sector: residential energy, commercial energy, industrial energy, transportation & mobile sources, solid waste and water & wastewater. These

forecasts were all conducted in the Forecast Module of ICLEI USA's ClearPath tool, based on population growth estimates from the SANDAG Series 13.

The ClearPath model uses 5-year increment growth and emission factors (factor sets). Basic growth indicators included forecasted population, VMT, commercial jobs, industrial jobs, and municipal jobs. Emission factor indicators were developed for vehicle emission factors and electricity intensity factors to reflect the effects of California vehicle emission standards, California's Advanced Clean Cars Program (which includes the Zero-Emission Vehicle Program), and the Renewable Portfolio Standard (RPS).

The Forecast Module ClearPath includes a Compound Growth Rate Calculator to calculate the population growth rate for the years 2030 and 2050. This calculation was completed to get the growth rate of 1.1% from 2018 to 2030 and 1% from 2018 to 2050. Once these population growth rates were calculated, the growth rate was then entered into the Forecast Growth Rate Factor Set to be applied to the emissions from each fuel in each inventory sector. The growth factors were applied to the entries included in the 2018b Inventory.

BAU Forecast Emissions

For each sector, the population growth rate was applied to the baseline usage values (VMT, residential electricity use, solid waste tonnage, etc.). For calculating emissions, ClearPath will first impute the relationship between the Usage value and the value for CO2e. Forecasted emissions are calculated based on the forecasted Usage value while maintaining the relationship between the two as a constant.

The BAU forecast summarized in Table A-8 assumes that the CO2e emission rates for each sector will be constant over time and does not account for any improvements due to regulations or technology such as vehicle emissions standards or the transition to renewable energy sources.

Table A-8 BAU Emissions for Forecast Years

Sector	2030 Metric Tons of CO_2e	2050 Metric Tons of CO_2e
Transportation	342,633	413,939
Commercial/Industrial	191,390	231,220
Residential	60,694	73,325
Solid Waste	11,823	14,284
Water & Wastewater	1,231	1,487
Total	607,771	734,255

Note: Columns may not add to totals due to rounding.

Legislative BAU Forecast Methodology

The Legislative BAU Forecast was developed using the same methodology as the BAU Forecast with the addition of applying the impacts of federal and State regulations that will reduce GHG emissions in the forecast years. Emissions reductions due to legislative actions were estimated in ClearPath for the electricity usage and transportation sectors.

The impacts of the RPS were applied to residential, commercial, and industrial electricity use. For the Legislative BAU forecasts, baseline electricity intensity factors in ClearPath were replaced with values derived from the requirements set forth in Senate Bill 100 that requires a minimum RPS mandated energy mix of 60 percent renewables by 2030 and 100% carbon-free resources by 2045.

The combination of federal fuel economy standards, California-specific emissions standards, and State mandates that will limit the sales of fossil fuel-powered passenger vehicles and trucks will result in a dramatic reduction of vehicle emissions by 2050. Vehicle emission factors sets that include the decay rate (or negative growth rate) as a result of currently adopted emissions reduction programs were derived from the California Air Resource Board's (California ARB) motor vehicle emission inventory program, EMFAC2021[3].

To quantify the change in carbon intensity and VMT for each fuel type, EMFAC2021 was run using defaults applicable to the SANDAG planning region for 2020 to 2050. The EMFAC2021 model incorporates local vehicle mix and all applicable fuel economy and vehicle emission standards that were adopted as of 2020. For each 5-year interval, growth rates were developed by calculating the total change in carbon intensity (CO2e in grams per mile) and the change in VMT over 5 years. These values were used to calculate the annual growth rate for the periods stated in Table A-9, which were used in ClearPath to estimate emissions for the legislative BAU scenario. A negative growth rate signifies a decrease in carbon intensity or VMT. The changes were only applied to gasoline and diesel vehicles. Vehicles fueled by other alternative fuels would not be impacted by the regulations considered.

Table A-9 Growth Rate Factors for Legislative BAU Calculations

	Gasoline Vehicles		*Diesel Vehicles*	
Forecast Year Interval	Carbon Intensity Annual Growth Rate	VMT Annual Growth Rate	Carbon Intensity Annual Growth Rate	VMT Annual Growth Rate
2020-2024	-1.4%	-0.4%	0.9%	1%
2025-2029	-1.5%	-0.4%	0.003%	1%
2030-2034	-1.1%	-0.3%	-0.7%	1%
2035-2039	-0.6%	-19.8%	-1.4%	-19.8%
2040-2044	-0.3%	-19.8%	-1.4%	-19.8%
2045-2050	-0.1%	-19.8%	-1.1%	-19.8%

[3] California Air Resources Board, EMFAC, https://arb.ca.gov/emfac/

Legislative BAU Forecast Emissions

The legislative BAU Forecast is summarized in Table A-10. Although significant reductions are achieved in the transportation and commercial and residential energy use sectors, more reductions are needed to meet the City's 2030 and 2050 targets.

Table A-10 Legislative BAU Emissions for Forecast Years

Sector	2030 Metric Tons of CO_2e	2050 Metric Tons of CO_2e
Transportation	285,099	10,751
Commercial/Industrial	141,968	163,056
Residential	43,762	49,972
Solid Waste	11,823	14,284
Water & Wastewater	1,231	1,487
Total	483,883	239,550

Note: Columns may not add to totals due to rounding.

Mitigated Forecast Methodology

The Mitigated Forecast estimates the total GHG emissions in 2030 and 2050 when the emission reduction strategies identified in the CAP are applied to the BAU with Legislative Actions Forecasts. The ClearPath tool was used apply reduction strategies for the residential, commercial/industrial, and solid waste sectors. Estimates for the transportation sector emissions were calculated outside of ClearPath, using the CARB EmFac2021 Model. Although the CAP includes emissions reduction strategies that apply to the water and wastewater sector, these were not quantified as part of this analysis.

The methodology used to quantify benefits from CAP strategies and develop the Mitigated Forecast are described for each emission sectors below.

Efficient Transportation and Land Use

Strategies that reduce GHG emissions from transportation and land use reduce GHG emissions by reducing VMT and by reducing the use of fossil fuels.

VMT reductions occur when single occupancy vehicular trips shift to a different mode of travel (transit, walking, biking); reductions in trip lengths occur, or trips are eliminated. A 2050 travel forecast was developed as part of the FGPU. The FGPU includes a travel demand model analysis that incorporates planned land use, projects, and policies in National City. VMT reductions resulting from many of the CAP strategies related to Efficient Transportation and Land Use were captured by assumptions within the FGPU analysis. VMT reductions that were not included in the travel forecast were estimated using information from the Handbook for Analyzing Greenhouse Gas Emissions Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (California Air Pollution Control Officers Association [CAPCOA], 2021).

A number of CAP strategies encourage residents and businesses to choose electric vehicles over fossil fuel vehicles. It was assumed that these strategies are needed to support the State's aggressive goals toward electric vehicle adoption. No additional emissions reductions were estimated for the use of electric vehicles beyond those already included in the Legislative BAU Forecasts.

Table A-11 notes which strategies are included in the VMT forecast, included in the EV adoption assumptions, or if additional assumptions were applied using ClearPath. Some strategies were not quantified due to lack of details as the strategies need further refinement.

Table A-11 Methods used to apply emissions reductions from Efficient Transportation and Land Use Strategies

Strategy	Description	Assumption	Source
TLU-1.1	Encourage high density and mixed-use development in Transit Priority Areas.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-1.2	Reduce parking requirements in Transit Priority Areas to discourage the use of single-occupancy vehicles.	Limiting residential parking supply reduces up to 13.7% of work commute trips	CAPCOA GHG Handbook[4]
TLU-1.3	Develop and periodically update a Transportation Demand Management Plan for different sectors of the city.	Reduction not quantified without specific projects identified. Some TDM features are assumed in travel demand modeling, but these are not related to specific sectors of the city.	
TLU-1.4	Support the San Diego Metropolitan Transit Service (MTS) in expanding or making performance improvements (i.e., decrease headway times, increase number of stops) to existing transit service in National City.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-1.5	Continue to implement bicycle corridor improvements and supportive infrastructure.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-1.6	Improve access to bike share and electric scooters	Implementing electric bikeshare program reduces up to 0.06% of work trips; Implementing scooter share reduces up to 0.07% of work trips	CAPCOA GHG Handbook
TLU-1.7	Continue to implement pedestrian infrastructure and prioritize improvements in Transit Priority Areas.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-1.8	Identify gaps in the City's existing pedestrian network and address pedestrian improvement opportunities.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-1.9	Incorporate the "Complete Streets" principal to capital projects and plans.	Included in travel demand modeling assumptions	FGPU Modeling

[4] CAPCOA, Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity, https://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf

Strategy	Description	Assumption	Source
TLE-1.10	Implement strategies that prioritize parking for high occupancy vehicles	Implementing voluntary commute trip reduction programs reduce up to 4% of work trips	CAPCOA GHG Handbook
TLE-1.11	Continue to encourage employers to institute programs that provide financial incentives for commuters to reduce their vehicle trips and use alternative transportation modes		
TLE-1.12	Encourage employers to institute telework programs and alternative work schedules to reduce commuting during peak hours.	Included in travel demand modeling assumptions	FGPU Modeling
TLU-2.1	Encourage all new residential, governmental, and commercial buildings to be electric vehicle ready (i.e., charging stations, preferred parking, etc.).	Included as part of assumption that electric vehicle adoption goals will be met. These strategies are needed to encourage the continued transition to electric vehicles. No additional reductions assumed.	
TLU-2.2	Support the installation of electric vehicle charging stations in existing residential and commercial developments.		
TLU-2.3	Continue to implement and improve streamlined permitting requirements, standardized design guidelines and siting criteria for all types of electric charging stations.		
TLU-2.4	Implement preferred parking for electric vehicles.		
TLU-2.5	Educate the community on fuel-efficiency or "eco-driving" practices.	Reduction not quantified. Minimizing idling and stop-and-go conditions reduces emissions at a scale that is small as compared to city-wide emissions.	
TLU-2.6	Encourage the reduction of idling times for commercial vehicles and construction equipment.	Reduction not quantified without specific data for expected idling times reductions.	
TLU-2.7	Encourage the conversion of public transportation fleets and maintenance vehicles from gas to electric.	Included as part of assumption that electric vehicle adoption goals will be met. These strategies are needed to encourage the continued transition to electric vehicles. No additional reductions assumed.	
TLU-2.8	Continue to implement traffic-calming projects (e. I, replace stop-controlled intersections with roundabouts) to facilitate efficient traffic conditions.	Reduction not quantified without specific projects identified. Minimizing idling and stop-and-go conditions reduces emissions	

Strategy	Description	Assumption	Source
		at a scale that is small as compared to city-wide emissions.	
TLU-2.9	Continue to coordinate traffic signals to facilitate efficient traffic conditions.	Reduction not quantified without specific projects identified. Minimizing idling and stop-and-go conditions reduces emissions at a scale that is small as compared to city-wide emissions.	

The 2050 VMT forecast within National City was developed as part of the FGPU using the land use assumptions of the preferred buildout scenario, based on a SANDAG Series 13 Forecast for regional VMT by jurisdiction. Consistent with the 2018 Baseline Inventory methodology, only VMT associated with trips with an origin and destination within the City was included (half of the VMT associated with trips with an origin or destination outside the City was included, and pass-through trips were excluded). 2030 CAP VMT was linearly interpolated between the 2050 CAP VMT and the 2018 VMT used to create the baseline inventory. Table A-12 summarizes the development of the VMT used for the mitigated forecasts.

Table A-12 VMT Used for Mitigated Forecast Estimates

	VMT by Trip Type (miles/weekday)			Daily CAP VMT	Annual VMT used in CAP Forecasts
Year	Internal-Internal (I-I) Trips	External-Internal/Internal-External (I-E/E-I) Trips	External-External Trips (Informational only, excluded from City VMT)	Total City VMT (100% I-I + 50% I-E/E-I) (miles per weekday)	Total City VMT (miles per year)
2018	Not interpolated.				583,050,360
2030	Not interpolated.				588,297,081
2050	100,248	3,240,666	92,485,762	1,720,581	597,041,615
2018 VMT described in Table A-1 2030 VMT interpolated between 2050 and 2018 values 2050 VMT from travel demand modeling representing preferred buildout scenario					

The VMT was further adjusted to include the potential reductions from strategies identified in Table A-3. It was assumed that all reductions applied to work trips, which were identified by FGPU modeling as 47% of vehicle trips in National City. Potential reductions in VMT from each strategy were derived from the CAPCOA GHG Handbook, as shown in Table A-13. The annual VMT with all reductions applied was determined for 2030 and 2050, and these values were multiplied by the emission rates described below in Table A-14 to estimate the total vehicle emissions in the forecast years.

Table A-13 Additional VMT Reductions from CAP Strategies

Strategy	% Reduction Applied to Work Trips	Annual VMT Reduced in 2030	Annual VMT Reduced in 2050
Reduced parking supply	13.7%	37,880449	38,443,510
Bikeshare	0.06%	165,900	168,366
Scootershare	0.07%	195,550	196,427
Commute Trip Reduction	4%	11,059,985	11,224,382
Total Reduction	17.8%	49,299,884	50,032,684
Annual VMT with all reductions applied		538,997,197	547,008,931

The mitigated emissions from the transportation sector were calculated using emission rates developed with EMFAC2021. ClearPath was not used for this calculation because the VMT for the forecast years was known, and not dependent on annual growth rates. EMFAC2021 was run using defaults applicable to the SANDAG planning region for 2030 and 2050. Emission rates for CO2e were obtained for each fuel type. Separate emission factors were developed for gasoline vehicles and diesel vehicles.

The average gasoline vehicle emission rates were further adjusted to include the effects of zero emission vehicle mandates adopted in 2022 by applying the expected percentage of electric vehicles in the fleet, according to California Air Resources Board projections[5]. The percentage of electric VMT in 2030 was credited only to gasoline emission rates and not to diesel emission rates to avoid double-counting electric vehicle penetration, but the credits were included for both fuel types in 2050 to account for widespread electric vehicle adoption.

Table A-14 Vehicle Emission Rates for Legislative BAU Calculations

Forecast Year	Fuel Type	Default Vehicle Emission Rate (g CO2e/mile)	Assumed Percent of Electric Vehicles in Fleet	Adjusted Vehicle Emission Rate (g CO2e/mile)
2030	Gasoline	322	7%	300
2030	Diesel	1,059	-	1,059
2050	Gasoline	246	100%	0
2050	Diesel	1,081	75%	289

Residential and Commercial/Industrial Building Efficiency

ClearPath was used to estimate the effects of energy efficiency programs. Multiple strategies have been identified that will contribute to residential and commercial energy efficiency. Many of the individual strategies would achieve reductions in each of the sectors used by ClearPath to calculate emissions: residential electricity use, commercial/industrial electricity use, residential natural gas use, and commercial/industrial natural gas use. The combined effects of the strategies listed in Table A- 15 were

[5] California Air Resources Board, Release Number 22-30, https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035

estimated with four user-defined reduction measures that calculated the effects of annual reduction values as described below.

Table A- 15 Residential and Commercial/Industrial Building Efficiency Strategies

Strategy	Description	Assumption	Source
RCB-1.1	Educate and encourage building owners to use the Free Resources and Energy Business Evaluation (FREBE) program to help improve energy and water efficiency.	Combination of strategies will result in 70% increase in energy efficiency in all new construction and remodeling projects. New dwelling units and square footage of commercial space derived from preferred buildout scenario.	Number of new dwelling units and square footage of commercial space derived from preferred buildout scenario. Assumed 5% of existing residential and commercial building stock renovated each year. 70% energy savings estimated from EPA EnergyStar statistics
RCB-1.2	Utilize the building inspection and business license renewal process to distribute educational information on energy-efficiency upgrades.		
RCB-1.3	Continue to provide an energy financing program to encourage energy efficient retrofits in existing buildings and prioritize low-income households.		
RCB-1.4	Educate the community of energy efficiencies and improvements including: energy audits that inform building owners and residents of their energy usage and methods of reducing energy usage; peak demand and the associated environmental and monetary costs as a result; and benefits of using solar water heating		
RCB-1.5	Educate and encourage building owners to use the Free Resources and Energy Business Evaluation (FREBE) program to help improve energy and water efficiency.		
RCB-1.6	Utilize the building inspection and business license renewal process to distribute educational information on energy-efficiency upgrades.		
RCB-2.1	Continue to provide an energy financing program to encourage energy efficient retrofits in existing buildings and prioritize low-income households.		
RCB-2.2	Educate and encourage building owners to use the		

Strategy	Description	Assumption	Source
	Free Resources and Energy Business Evaluation (FREBE) program to help improve energy and water efficiency.		

For residential and commercial electricity usage, it was assumed that new development and major remodels would be 70% more energy efficient than the BAU scenario when CAP strategies are implemented. New development was defined as 1% growth each year, consistent with the BAU forecast, and major remodels were estimated as 5% of the 2018 building stock. To avoid overestimating reductions from major remodels, no reductions were taken after 2038 based on the assumption that the remodels would be of facilities that have already undergone improved efficiency projects. The annual reduction values are presented in Table A-16. The values were annualized for the periods 2019-2030 and 2031-2050 for entry in the ClearPath module.

Table A-16 Development of Electricity Usage Reduction Values

	Residential Electricity				Commercial Electricity			
Year	BAU Electricity Use (kWh)	Reductions from New Development (kWh)	Reductions from Major Remodels (kWh)	Annualized Reductions (kWh)	BAU Electricity Use (kWh)	Reductions from New Development (kWh)	Reductions from Major Remodels (kWh)	Annualized Reductions (kWh)
2018	70,914,907				204,902,746			
2019	71,624,056	501,368	2,482,022	3,011,906	206,951,773	1,448,662	7,171,596	8,702,652
2020	72,340,297	506,382	2,482,022	3,011,906	209,021,291	1,463,149	7,171,596	8,702,652
2021	73,063,700	511,446	2,482,022	3,011,906	211,111,504	1,477,781	7,171,596	8,702,652
2022	73,794,337	516,560	2,482,022	3,011,906	213,222,619	1,492,558	7,171,596	8,702,652
2023	74,532,280	521,726	2,482,022	3,011,906	215,354,845	1,507,484	7,171,596	8,702,652
2024	75,277,603	526,943	2,482,022	3,011,906	217,508,394	1,522,559	7,171,596	8,702,652
2025	76,030,379	532,213	2,482,022	3,011,906	219,683,478	1,537,784	7,171,596	8,702,652
2026	76,790,683	537,535	2,482,022	3,011,906	221,880,313	1,553,162	7,171,596	8,702,652
2027	77,558,589	542,910	2,482,022	3,011,906	224,099,116	1,568,694	7,171,596	8,702,652
2028	78,334,175	548,339	2,482,022	3,011,906	226,340,107	1,584,381	7,171,596	8,702,652
2029	79,117,517	553,823	2,482,022	3,011,906	228,603,508	1,600,225	7,171,596	8,702,652
2030	79,908,692	559,361	2,482,022	3,011,906	230,889,543	1,616,227	7,171,596	8,702,652
2031	80,707,779	564,954	2,482,022	1,614,795	233,198,438	1,632,389	7,171,596	4,665,818
2032	81,514,857	570,604	2,482,022	1,614,795	235,530,423	1,648,713	7,171,596	4,665,818
2033	82,330,005	576,310	2,482,022	1,614,795	237,885,727	1,665,200	7,171,596	4,665,818
2034	83,153,306	582,073	2,482,022	1,614,795	240,264,584	1,681,852	7,171,596	4,665,818
2035	83,984,839	587,894	2,482,022	1,614,795	242,667,230	1,698,671	7,171,596	4,665,818
2036	84,824,687	593,773	2,482,022	1,614,795	245,093,902	1,715,657	7,171,596	4,665,818
2037	85,672,934	599,711	2,482,022	1,614,795	247,544,841	1,732,814	7,171,596	4,665,818
2038	86,529,663	605,708	2,482,022	1,614,795	250,020,290	1,750,142	7,171,596	4,665,818
2039	87,394,960	611,765		1,614,795	252,520,493	1,767,643		4,665,818
2040	88,268,909	617,882		1,614,795	255,045,698	1,785,320		4,665,818
2041	89,151,599	624,061		1,614,795	257,596,155	1,803,173		4,665,818
2042	90,043,115	630,302		1,614,795	260,172,116	1,821,205		4,665,818
2043	90,943,546	636,605		1,614,795	262,773,837	1,839,417		4,665,818
2044	91,852,981	642,971		1,614,795	265,401,576	1,857,811		4,665,818
2045	92,771,511	649,401		1,614,795	268,055,591	1,876,389		4,665,818
2046	93,699,226	655,895		1,614,795	270,736,147	1,895,153		4,665,818
2047	94,636,218	662,454		1,614,795	273,443,509	1,914,105		4,665,818
2048	95,582,580	669,078		1,614,795	276,177,944	1,933,246		4,665,818
2049	96,538,406	675,769		1,614,795	278,939,723	1,952,578		4,665,818
2050	97,503,790	682,527		1,614,795	281,729,121	1,972,104		4,665,818

For residential and natural gas usage, it was assumed that new development and major remodels would be 70% more energy efficient than the BAU scenario when CAP strategies are implemented for the years 2019-2030. For the years 2031 through 2050, it was assumed that new development and major remodels would be 95% more energy efficient than the BAU scenario from the implementation of an ordinance that limits installation of natural gas in new development and major remodels. Similar to the methodology used for electricity usage, reductions from major remodels were not taken after 2038, to avoid potentially overestimating the reduction from future efficiency projects. The annual reduction values are presented in Table A-17. The values were annualized for the periods 2019-2030 and 2031-2050 for entry in the ClearPath module.

Table A-17 Development of Natural Gas Usage Reduction Values

	Residential Natural Gas Use				Commercial Natural Gas Use			
Year	BAU Natural Gas Use (therms)	Reductions from New Development (therms)	Reductions from Major Remodels (therms)	Annualized Reductions (therms)	BAU Natural Gas Use (therms)	Reductions from New Development (therms)	Reductions from Major Remodels (therms)	Annualized Reductions (therms)
2018	6,901,739				22,520,200			
2019	6,970,756	48,795	241,561	293,131	22,745,402	159,218	788,207	956,480
2020	7,040,464	49,283	241,561	293,131	22,972,856	160,810	788,207	956,480
2021	7,110,868	49,776	241,561	293,131	23,202,585	162,418	788,207	956,480
2022	7,181,977	50,274	241,561	293,131	23,434,611	164,042	788,207	956,480
2023	7,253,797	50,777	241,561	293,131	23,668,957	165,683	788,207	956,480
2024	7,326,335	51,284	241,561	293,131	23,905,646	167,340	788,207	956,480
2025	7,399,598	51,797	241,561	293,131	24,144,703	169,013	788,207	956,480
2026	7,473,594	52,315	241,561	293,131	24,386,150	170,703	788,207	956,480
2027	7,548,330	52,838	241,561	293,131	24,630,011	172,410	788,207	956,480
2028	7,623,813	53,367	241,561	293,131	24,876,311	174,134	788,207	956,480
2029	7,700,052	53,900	241,561	293,131	25,125,074	175,876	788,207	956,480
2030	7,777,052	54,439	241,561	293,131	25,376,325	177,634	788,207	956,480
2031	7,854,823	74,621	327,833	213,287	25,630,088	243,486	1,069,710	695,950
2032	7,933,371	75,367	327,833	213,287	25,886,389	245,921	1,069,710	695,950
2033	8,012,705	76,121	327,833	213,287	26,145,253	248,380	1,069,710	695,950
2034	8,092,832	76,882	327,833	213,287	26,406,706	250,864	1,069,710	695,950
2035	8,173,760	77,651	327,833	213,287	26,670,773	253,372	1,069,710	695,950
2036	8,255,498	78,427	327,833	213,287	26,937,481	255,906	1,069,710	695,950
2037	8,338,052	79,211	327,833	213,287	27,206,855	258,465	1,069,710	695,950
2038	8,421,433	80,004	327,833	213,287	27,478,924	261,050	1,069,710	695,950
2039	8,505,647	80,804		213,287	27,753,713	263,660		695,950
2040	8,590,704	81,612		213,287	28,031,250	266,297		695,950
2041	8,676,611	82,428		213,287	28,311,563	268,960		695,950
2042	8,763,377	83,252		213,287	28,594,678	271,649		695,950

	Residential Natural Gas Use				Commercial Natural Gas Use			
Year	BAU Natural Gas Use (therms)	Reductions from New Development (therms)	Reductions from Major Remodels (therms)	Annualized Reductions (therms)	BAU Natural Gas Use (therms)	Reductions from New Development (therms)	Reductions from Major Remodels (therms)	Annualized Reductions (therms)
2043	8,851,011	84,085		213,287	28,880,625	274,366		695,950
2044	8,939,521	84,925		213,287	29,169,431	277,110		695,950
2045	9,028,916	85,775		213,287	29,461,126	279,881		695,950
2046	9,119,205	86,632		213,287	29,755,737	282,680		695,950
2047	9,210,397	87,499		213,287	30,053,294	285,506		695,950
2048	9,302,501	88,374		213,287	30,353,827	288,361		695,950
2049	9,395,526	89,257		213,287	30,657,366	291,245		695,950
2050	9,489,482	90,150		213,287	30,963,939	294,157		695,950

Renewable Energy Production

The ClearPath reduction strategy modules were used to estimate the effects of participation in a community choice energy (CCE) program. It was assumed that there would be 50% participation for the years 2022 through 2025, and then 80% participation starting in 2026. These participation assumptions were applied to residential and commercial electricity use. The emissions reductions due to this program are more noticeable in the forecast year 2030. By 2050 the Renewable Power Standard Program requires all the State's electricity to come from carbon-free resources by 2045, so the CCE does not contribute to emissions reductions after 2045. Reductions were not estimated for the remaining strategies in Table A-18 regarding renewable energy production for the CAP. Potential emissions reductions within the energy sector once specific projects are identified.

Table A-18 Renewable Energy Production Strategies

Strategy	Description	Assumption	Source
RE-1.1	Launch or join a CCE Program with renewable electricity sources. Strive to reach a percentage of overall energy supply equal to or greater than the current percentage of renewable electricity provided by SDG&E with an 80% customer participation rate.	50% participation for years 2022-2025. 80% participation starting in 2026.	
RE-1.2	Encourage restricting new natural gas lines in buildings.	Reductions not quantified without specific program data to support energy reduction estimates.	
RE-1.3	Support building electrification codes.		

Strategy	Description	Assumption	Source
RE-1.4	Implement solar panels in existing city-owned facilities (schools, libraries, etc.)		
RE-1.5	Pursue economic incentives and creative financing for renewable energy projects.		
RE-1.6	Reduce costs to permit alternative energy generation projects.		
RE-1.7	Encourage removing barriers for renewable energy production, including: -Building and development codes, design guidelines, and zoning ordinances -Work with related agencies, such as fire, water, health, and others that may have policies or requirements that adversely impact the development or use of renewable energy technologies		

Solid Waste Efficiency

The goal of Strategies SW-1.1 through SW-1.8 is to reduce waste disposal from residents and businesses. Benefits of these strategies were estimated using the ClearPath tool, reduction factors recommended by the tool, and data from CalRecycle[6] estimating the waste profile for National City. The assumptions described in Table A-19 were entered into the reduction strategy modules ClearPath.

Table A-19 Solid Waste Efficiency Strategies

Strategy	Description	Assumption	Source
SW-1.1	Retain green waste recycling programs.	Reductions not quantified. Assume that future waste projections retain benefits from current recycling programs.	
SW-1.2	Educate owners and residents of multi-family housing about recycling	10% of landfill solid waste diverted from muti-family housing sources	10% reduction is ClearPath default, multi-family housing waste statistics from CalRecycle

[6] https://www2.calrecycle.ca.gov/WasteCharacterization/

Strategy	Description	Assumption	Source
	requirements and opportunities.		
SW-1.3	Establish and retain an active composting plan and curbside composting project through the EDCO waste collection service.	10% of total landfill solid waste diverted from residential sources	10% reduction is ClearPath default, residential waste statistics from CalRecycle
SW-1.4	Continue working with EDCO to encourage waste audits and waste reduction plans for existing and new commercial developments.	Reductions not quantified. Assume that future waste projections retain benefits from current recycling programs.	
SW-1.5	Encourage zero food waste in schools.	0.02 tons of waste reduced per student	ClearPath defaults for use of strategies applicable to schools, students affected based on US census data
SW-1.6	Encourage recycling food waste from the community kitchen to be used as compost in community gardens.	Reductions not quantified. Data not available for this specific waste production category.	
SW-1.7	Establish community-wide quarterly e-waste and recyclable events.	10% of landfill solid waste diverted from e-waste sources	10% reduction is ClearPath default, e-waste waste statistics from CalRecycle
SW-1.8	Implement and retain bio-solid waste programs.	Reductions not quantified without specific program data to support waste reduction calculations.	

Water and Wastewater Management

Strategies WW-1.1 through WW-1.5 aim to reduce the quantity of wastewater. Reductions were not quantified for these strategies the CAP forecast years. Water use contributes a small percentage to overall GHG emissions, and reductions within this sector would have a small impact on totals. Potential emissions reductions listed in can be estimated once specific projects are identified.

Table A-20 Water and Wastewater Management Strategies

Strategy	Description	Assumption	Source
WW-1.1	Promote and educate the community on water efficient landscaping and weather-based irrigation devices.	Reductions not quantified without specific program data to support water usage reduction calculations.	
WW-1.2	Utilize the business license renewal process to provide educational information on ways to reduce water use and improve water efficiency.		

Strategy	Description	Assumption	Source
WW-1.3	Identify and support programs that re-use gray water.		
WW-1.4	Implement stormwater capture systems (i.e., sidewalk gardens or green spaces) to reduce reliance on imported water.		
WW-1.5	Continue to provide a water financing program to encourage water efficient retrofits in existing buildings and prioritize low-income households.		

Mitigated Forecast Results

The Mitigated Forecast emissions for the forecast years 2030 and 2050 are summarized in Table A-21. When potential emissions reductions from all legislative actions and CAP strategies are included, National City is expected to meet the GHG reduction targets for both forecast years.

Table A-21 Mitigated Forecast Emissions for by Sector

Sector	2030 Metric Tons of CO_2e	2050 Metric Tons of CO_2e
Transportation	188,409	11,242
Commercial/Industrial	74,377	56,594
Residential	22,788	17,344
Solid Waste	11,907	14,367
Water & Wastewater	1,231	1,487
Total	298,712	101,034
Emissions Target	310,958	103,653
Target Met?	Yes	Yes

Note: Columns may not add to totals due to rounding.