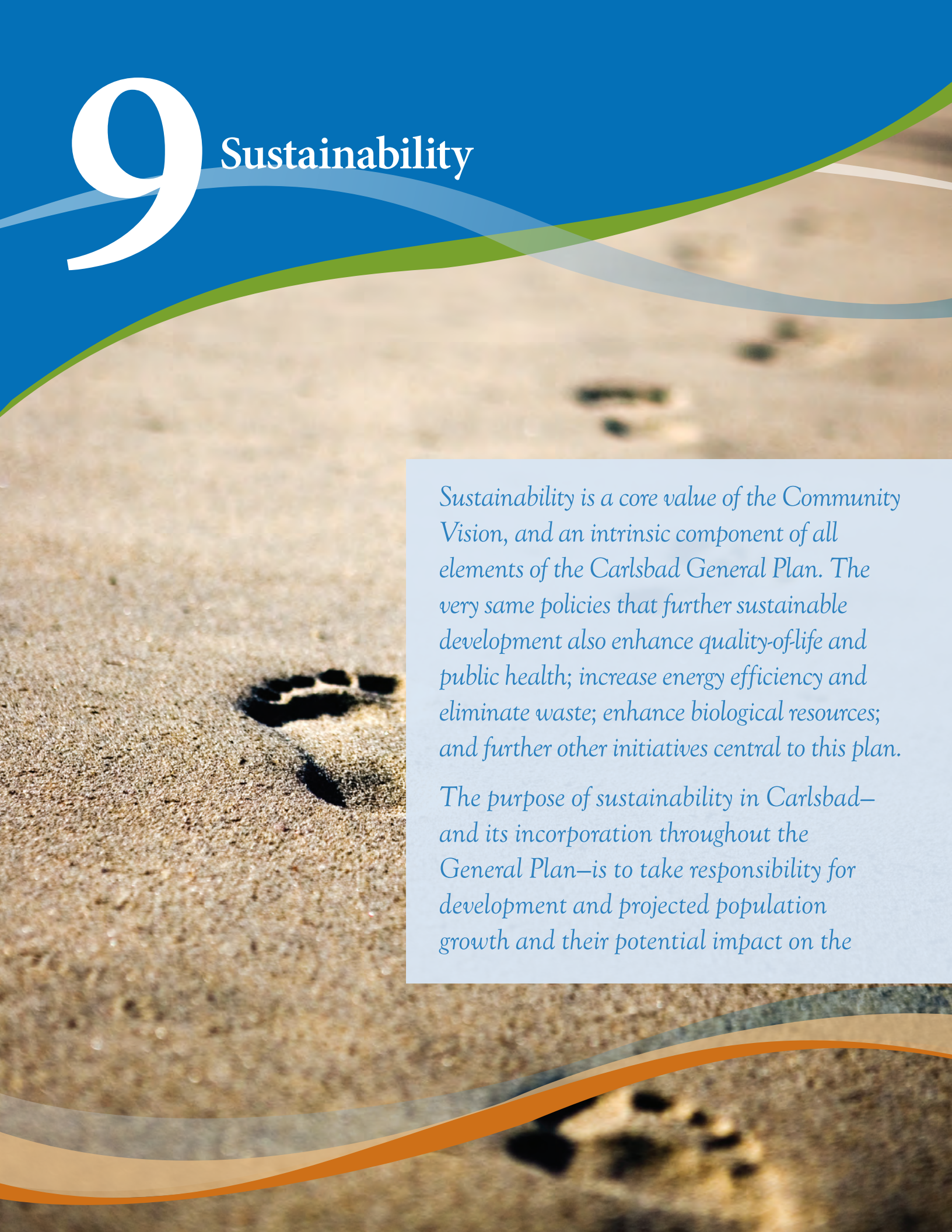
9 Sustainability



Sustainability is a core value of the Community Vision, and an intrinsic component of all elements of the Carlsbad General Plan. The very same policies that further sustainable development also enhance quality-of-life and public health; increase energy efficiency and eliminate waste; enhance biological resources; and further other initiatives central to this plan.

The purpose of sustainability in Carlsbad–and its incorporation throughout the General Plan–is to take responsibility for development and projected population growth and their potential impact on the

environment. By implementing sustainable design measures and policies, Carlsbad can reduce its contribution to global climate change, minimize its reliance on fossil-fuel sources, decrease consumption of natural resources, while promoting active living and access to healthy food and demonstrating its commitment and leadership on sustainability.

Because policies more directly related to topics such as mobility and land use are addressed in other elements, those elements should be consulted along with the Sustainability Element for a full understanding of General Plan sustainability initiatives.

This element, like others in the General Plan, is policy and action-oriented, with limited background material. A comprehensive analysis of sustainability in Carlsbad was performed in 2010 as part of the work effort leading to this General Plan, and is presented in Working Paper #1: Sustainability.

9.1 Introduction

Background and Purpose

Sustainability can be defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Since sustainability is an integral part of the Carlsbad General Plan, sustainability policies are included within each of the elements as appropriate. The Sustainability Element provides the overarching framework, and includes policies focused on topics central to sustainability not covered elsewhere. This element provides the overarching framework for sustainability in Carlsbad and outlines policies focused on:

- Climate change and greenhouse gases (GHG) reduction;
- Water conservation, recycling, and supply;
- Green building;
- Sustainable energy and energy security; and
- Sustainable food.

Relationship to State Law

Sustainability is not a state-mandated general plan element. However, state law permits general plans to include any element pertinent to a city's planning. Since sustainability is a core value of the Carlsbad Community Vision and a high priority of the community, the General Plan includes this Sustainability Element. In accordance with the Government Code, this element is consistent with and carries the same weight as the other elements.

Relationship to Community Vision

The Sustainability Element is most closely tied to the following objective in the Carlsbad Community Vision:

Core Value 6: Sustainability. Build on the city's sustainability initiatives to emerge as a leader in green development and sustainability. Pursue public/private partnerships, particularly on sustainable water, energy, recycling, and foods.

Relationship to Other General Plan Elements

The theme of sustainability resonates throughout the General Plan, but in particular in the Land Use and Community Design; Mobility; and the Open Space, Conservation, and Recreation elements. The Land Use and Community Design Element establishes sustainable development patterns that seek to decrease dependency on the automobile; this theme is furthered through the Mobility

Element that includes policies to promote pedestrian and bicycle movement. The Open Space, Conservation, and Recreation Element includes policies addressing air quality, biological resources conservation, and stormwater management and flooding, all of which are closely tied to sustainability.

Relationship to Climate Action Plan

Concurrently with this General Plan, the city developed a Climate Action Plan (CAP) that proactively outlines the city's strategy for reducing greenhouse gas (GHG) emissions and climate change impacts. While the General Plan outlines broad strategies and underscores the city's commitment to GHG reduction, the CAP includes specific GHG reduction targets and programs, correlated with the GHG analysis in the Environmental Impact Report for the General Plan.

Relationship to City of Carlsbad Sustainability and Environmental Guiding Principles

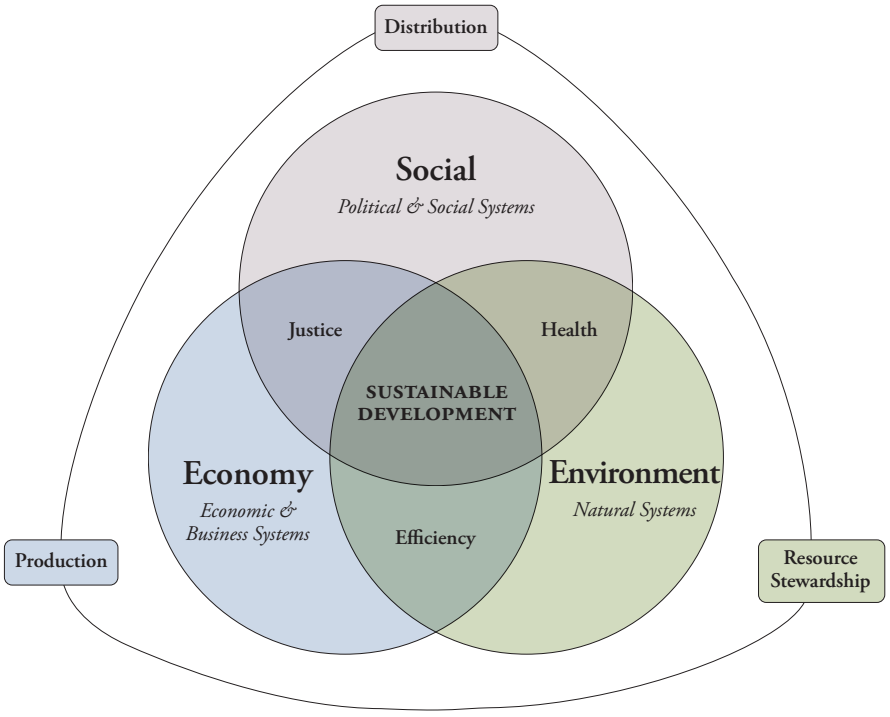
In 2007, the Carlsbad City Council adopted a set of sustainability and environmental guiding principles (Resolution No. 2007-187) in order to help guide city investments, activities, and programs. These principles were taken into account in the development of the General Plan and are reflected in the plan's goals and policies.

9.2 Organizing Frameworks

Sustainability Framework

A cohesive framework for sustainability needs to incorporate not only environmental, but also social and economic considerations, as diagrammed in Table 9-1, and described as follows:

- **Environment.** Ecological or environmental conservation—including the issue of climate change—is what many people think of first when they hear the term sustainability today. This approach to sustainability involves reducing dependence on fossil fuels, and protecting, enhancing and monitoring the health of the natural environment.
- **Economy.** Successful conservation efforts often depend on economic motivation; communities protect a natural resource if they know that in the sustainable management of the resource lies their own economic security. Economic sustainability encompasses the ability of an organization, community, or government to improve economic stability and vitality on a local, regional, and even national scale.
- **Social.** The social element of sustainability typically refers to the distribution of costs and benefits across all segments of society, and speaks to the basic needs of humans for fulfillment as individuals—including safety and security as well as access to a community where people feel they belong and can participate.



In Carlsbad, sustainability is based on achieving a long-term balance among the environmental, economic, and social needs of the community.

Sustainability as General Plan Framework

Although sustainability is only one of the Carlsbad Community Vision core values, in a certain sense it underlies almost all of the core values, and provides a conceptual framework for the city's long-range planning. For instance, one core value urges the city to "prioritize protection and enhancement of open space and the natural environment", while another seeks to "promote active lifestyles and community health by furthering access to trails, parks, beaches, and other recreational opportunities." These core values are environmental and social sustainability priorities.

Another core value seeks to "increase travel options through enhanced walking, bicycling, and public transportation systems," and to "enhance mobility through increased connectivity and transportation management." This core value supports social sustainability by increasing access for people of all incomes and physical abilities, and it supports environmental sustainability by helping Carlsbad to reduce car trips and their associated emissions, and increase trips on foot, by bicycle, and by public transportation. Other core values support economic and social sustainability, for example by striving to "build on the city's culture of civic engagement, volunteerism, and philanthropy" and "strengthen the city's strong and diverse economy and its position as an employment hub in San Diego County".

Thus, sustainability can be seen as a key organizing framework, or prism through which policies in different elements of the General Plan can be viewed. As described in the General Plan Introduction, the General Plan is organized into elements structured around the core values of the Carlsbad Community Vision; and Table 1-1 shows the relationship of each General Plan element to the core values. Table 9-1 shows the relationship of each General Plan element to sustainability.

TABLE 9–1: GENERAL PLAN ELEMENT AND SUSTAINABILITY RELATIONSHIP

GENERAL PLAN ELEMENT								
Land Use and Community Design	Mobility	Open Space, Conservation and Recreation	Noise	Public Safety	Arts, History, Culture, and Education	Economy, Business Diversity, and Tourism	Sustainability	Housing

Most Closely Related to Sustainability

Closely Related to Sustainability

Sustainability as a Guiding Principle of City Operations

The concept of sustainability in Carlsbad precedes the development of this General Plan, and the city has implemented several cost-effective and efficient programs to promote sustainability, including[1]:

- **Energy and Clean Air.** The city has replaced some 7,000 sodium streetlights with high efficiency induction lights, and is pursuing a hydro-electric power project, solar energy for city pools, and hybrid vehicles for the city's fleet.
- **Solar Power for Commercial Facilities.** The city is a participant in CaliforniaFIRST, which finances energy and water improvements for commercial properties.
- **Clean Creeks, Lagoons and the Ocean.** Carlsbad's Storm Water Protection Program works to keep creeks, lagoons and oceans clean and free from pollutants. Storm drains are not connected to the sanitary sewer system or treatment facilities. Urban runoff and the pollutants it carries flow directly into the city's creeks, lagoons, and the ocean.
- **Water Conservation.** The Carlsbad Municipal Water District continues to implement conservation programs that reduce water demand and lessen dependency on imported water supplies.
- **Water Supply and Recycling.** Carlsbad's future quality of life depends on having a reliable and affordable supply of water. Prolonged drought, environmental problems and legal restrictions on use of water from the Colorado River and the Bay-Delta in Northern California have necessitated development of new water supplies. The Carlsbad Desalination Project and the city's recycling efforts are described in Section 9.4: Water Conservation, Recycling, and Supply. supplies. The Carlsbad Desalination Project and the city's recycling efforts are described in Section 9.4: Water Conservation, Recycling, and Supply.

1 More details on these can be found at http://www.carlsbadca.gov/services/environmental/pages/sustainable-city.aspx

Natural drainage and sustainable landscaping.

9.3 Climate Change and Greenhouse Gas (GHG) Reduction

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer). Gases that trap heat in the atmosphere are often called GHGs. The greenhouse effect traps heat in the troposphere through a threefold process as follows: short-wave radiation emitted by the sun is absorbed by the earth; the earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation, emitting some of it into space and the rest back toward the earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the earth is the underlying process of the greenhouse effect. Principal GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and water vapor (H_2O). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Since different gases contribute to the greenhouse effect in different proportions, the term CO_2E (carbon dioxide equivalent) provides the reference frame based on comparison to CO_2's contribution.

The greenhouse effect is a natural process that contributes to regulating the earth's temperature. Without it, the temperature of the earth would be about 0°F (–18°C) instead of its present 57°F (14°C) and unlikely to support human life in current form. Global climate change concerns are focused on the potential effects of climate change and how communities can mitigate effects and adapt to change in the short and long term.

Greenhouse Gas Emissions

Contributors

In 2010, the United States produced 6,822 million metric tons of CO_2E (MMT CO_2E) (EPA 2012). The primary GHG emitted by human activities in the United States is CO_2, representing approximately 84 percent of total GHG emissions. The largest source of CO_2, and of overall GHG emissions, is fossil-fuel combustion, which accounted for approximately 94 percent of the CO_2 emissions and 78 percent of overall GHG emissions in 2010.

According to the 2009 GHG inventory data compiled by the California Air Resources Board (CARB) for the 2000-2009 California Greenhouse Gas Inventory, California emitted 457 MMT CO_2E of GHGs, including emissions resulting from out-of-state electrical generation (CARB 2011). The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities.

According to the report titled, "Indicators of Climate Change in California (August 2013; Cal/EPA)", climate change is having a significant and measurable impact on California's environment. Climate change is occurring throughout California, from the Pacific Coast to the Central Valley to the Sierra Nevada Mountains. Impacts of a warmer climate include decreasing spring snowmelt runoff, rising sea levels along the California coast, shrinking glaciers, increasing wildfires, and warming lakes and ocean waters. Terrestrial, marine and freshwater biological systems are strongly influenced by climate, particularly warming. Plants and animals reproduce, grow and survive within specific habitat ranges defined by climatic and environmental conditions. Changes in these conditions may threaten the ability of species to survive or thrive.

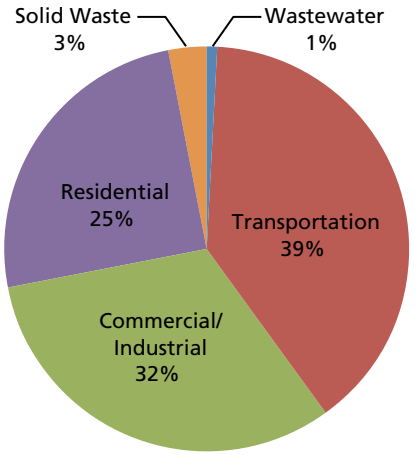
City of Carlsbad GHG Emissions

Table 9-2 and Chart 9-1 show GHG emissions in Carlsbad, based on a greenhouse gas emissions inventory initially conducted by the city in 2009 (for calendar year 2005 emissions), and updated in 2013 (for CY 2011 emissions). According to the analysis, the Carlsbad community emitted approximately 705,744 metric tons of CO_2E in 2011. The transportation sector was the largest source of emissions, generating approximately 273,745 metric tons of CO_2E, or 39 percent of total 2011 emissions. Transportation sector emissions are the result of diesel and gasoline combustion in vehicles traveling with trips either entirely within the boundaries of Carlsbad, or with one trip-end in the city. Electricity and natural gas consumption within the commercial/industrial sector, the second greatest source of 2011 emissions, generated 224,960 metric tons of CO_2E, or 32 percent of the total. Similarly, electricity and natural gas use in Carlsbad's residential sector produced 176,405 metric tons of CO_2E, or 25 percent of total community emissions. The remaining 4 percent of emissions are estimated methane emissions from the solid waste, and wastewater sectors.

TABLE 9–2: CARLSBAD 2011 GHG EMISSIONS BY SECTOR (METRIC TONS CO_2e)

SECTOR	GHG EMISSIONS ($MTCO_2e$)	% OF TOTAL
Transportation	273,745	39%
Commercial / Industrial	224,960	32%
Residential	176,405	25%
Solid Waste	24,317	3%
Wastewater	6,317	1%
TOTAL	**705,744**	

CHART 9-1: CARLSBAD 2011 GHG EMISSIONS BY SECTOR



GHG Reduction Regulatory Framework

There are a multitude of laws and regulations pertaining to GHG reduction at the federal and state level, regulating measures from vehicle fuel efficiency to building and appliance energy efficiency. From a planning perspective, the chief statutes at the state level are: Assembly Bill (AB) 32 or the California Global Warming Solutions Act of 2006, which establishes state emissions limits equivalent to the 1990 levels, which are to be achieved by 2020; and Senate Bill (SB) 375 (2008) which addresses GHG emissions associated with the transportation sector through development of regional transportation and sustainability plans. Additionally, the Governor's Executive Order S-3-05 (EO S-3-05) establishes a target to reduce GHG emissions to 80 percent below 1990 levels by 2050.

Climate Change and Planning

As previously defined, climate change refers to a change in the average global climate that may be measured by wind patterns, storms, precipitation, and temperature over a long period of time. The United States Environmental Protection Agency's (U.S. EPA) indicators of climate change include GHGs; weather and climate changes; changes in ocean levels and currents; snow and ice melt and accumulation; and society and ecosystems, including changing seasons. In California, some of the potential impacts of global warming may include loss in snow pack with accompanying decrease in water supply, sea level rise, more extreme heat days per year, more high ozone level days, more frequent large forest fires, and more drought years.

Climate Action Planning

The City of Carlsbad has taken a proactive approach to creating a sustainable and healthy quality of life in balancing social, economic, and environmental needs of the community. The city's efforts toward sustainability related to climate change and GHG reductions include efficient use of non-renewable resources through use of hybrid vehicles, energy efficient streetlights, and development of renewable energy sources (such as the hydroelectric power project at Maerkle Reservoir); development of drought resistant water supplies; reduction in the city's waste stream; and measures to promote clean air and water.

The City of Carlsbad Climate Action Plan (CAP) presents a proactive city strategy toward reducing greenhouse gas emissions and climate change impacts. Analysis conducted for the CAP shows that General Plan strategies and policies will help Carlsbad achieve its year 2020 GHG reduction targets (consistent with state target of 1990 levels by 2020). However, additional measures are needed for the city to achieve 80 percent reduction below 1990 levels consistent with (EO S-3-05); the CAP outlines strategies and programs to achieve the 2050 target.

Climate Adaptation Planning

Adaptation refers to change to minimize consequences of adversity. Three primary effects of a changing climate that are particular threats to the City of Carlsbad: drought, fire, and rising sea level. Some of the city's current efforts to adapt to these effects of climate change include actively pursuing water desalination opportunities, investing in a recycled water system that provides 20 percent of the city's water supply, requiring Class I fire-resistant roofs for new construction, enforcing a strict fire code and 60-foot setbacks on fire breaks, and restricting development within the 100-year floodplain. Efforts are also underway by the Federal Emergency Management Agency (FEMA) to better delineate coastal flooding threats, as part of the California Coastal Analysis and Mapping Project / Open Pacific Coast Study. The Safety Element provides details and policies to mitigate hazards, including fire, rising sea levels, and flooding.

9.4 Water Conservation, Recycling and Supply

Water Conservation and Recycling

Water is one of the most basic and critical resources for life. Water provides sustenance for humans, and plants and animals; habitats for many species; and is necessary for agriculture and many aspects of everyday living.

In California, as in many other parts of the world, fresh water is becoming scarce as a growing population demands more of it, and new buildings and roads simultaneously reduce its quality (through run-off) and availability (through reduced groundwater infiltration and decreasing snow packs). Water rights and access have been a source of concern in the western United States for centuries. At the same time, the practice of importing drinking water has become less politically acceptable because of equity impacts, and energy used in transporting water—water-related energy use consumes 19 percent of California's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year. This is especially true of the San Diego region, which relies on imported water transported hundreds of miles to meet 80 percent of its water needs. A sustainable water supply for Carlsbad is one that can meet the needs of the community without jeopardizing regional wildlife, habitats, agriculture, or other ecosystem functions, or the energy supply, now and in the future.

A few specific sustainable water approaches of particular interest to Carlsbad are:

- **Water conservation.** Beneficial reduction in water loss, use, or waste. A water conservation measure is an action, behavioral change, device, technology, or improved design or process implemented to reduce water loss, use, or waste.
- **Water recycling.** Reusing treated wastewater for beneficial purposes such as irrigation, industrial processes, toilet flushing, and replenishing groundwater basins (referred to as groundwater recharge).
- **Gray water reuse.** Untreated household wastewater that comes from bathtubs, showers, bathroom washbasins, clothes washing machines, and even kitchen sinks, and which is re-used for non-potable water applications such as sub-surface irrigation and toilet flushing. As such, it is another form of water recycling, but one without an intermediate treatment process.

" Examples of recycled water use: golf courses (top) and the Flower Fields (bottom).

Water Supply and Diversification

The Carlsbad Municipal Water District (CMWD) water service area covers approximately 85 percent of the City of Carlsbad and includes an area of about 32 square miles. Water service to the southeast corner of the city is provided by the Olivenhain Municipal Water District (OMWD). The Vallecitos Water District (VWD) provides service to the Meadowlark area along the eastern city boundary.

CMWD imports water through the San Diego County Water Authority (SDCWA) for its potable water needs. SDCWA gets approximately 50 percent of its water from the Colorado River, 30 percent from the State Water Project (Bay-Delta), and about 20 percent from local supplies. The imported water supply (representing 80 percent of the San Diego region's water supply) is vulnerable to drought and water supply shortages. Therefore, SDCWA has been working with its 24 local member retail agencies to develop local supplies. Efforts to increase local supplies in Carlsbad are described below.

Carlsbad Desalination Project

The desalination project in Carlsbad is a 50-million gallon a day seawater desalination plant intended to supply the San Diego region with approximately 7 percent of its drinking water needs. The project will be the first large-scale desalination plant on the west coast and the largest of its kind in the western hemisphere. It will be located next to the Encina Power Plant at the corner of Carlsbad Boulevard and Cannon Road. The project has received final approvals from every required regulatory and permitting agency in the state, including the California Coastal Commission, State Lands Commission and Regional Water Quality Control Board. A 30-year Water Purchase Agreement is in place between SDCWA and project developers for the entire output of the plant. CMWD has an option to purchase desalinated water directly from the operator, which could comprise up to approximately 9 percent of the district's water portfolio. Construction on the plant and pipeline is under way and the project will be delivering water by 2016.

Groundwater

CMWD currently does not use any local groundwater and surface water supplies, although in the past both types of water sources have been used. Prior to 1957, the Carlsbad Mutual Water Company supplied local surface water from Lake Calavera and groundwater from the San Luis Rey River Mission Groundwater Basin to the City of Carlsbad.

Of the groundwater basins available to CMWD, the San Luis Rey River Mission Groundwater Basin has the most potential for a viable water resource. For CMWD's use, the water would need to be treated by a low-pressure membrane, reverse osmosis process to achieve treated water quality. When last evaluated, this process was not cost effective. However, the CMWD is currently re-evaluating groundwater extraction feasibility as technology continues to improve and imported water costs continue to increase.

State, Regional, and Local Programs

California Gray Water Regulations

The 2007 California Plumbing Code, Chapter 16A: Nonpotable Water Reuse Systems, establishes minimum requirements for the installation of gray water systems in residential occupancies that are regulated by the California Department of Housing and Community Development. The standards provide flexibility designed to encourage the use of gray water and allow small gray water systems to be installed in homes without a construction permit, substantially reducing the barriers to installing small residential gray water systems in California.

California Urban Water Conservation Council

All three water districts that serve the City of Carlsbad—CMWD, OMWD, and VWD—are signatories to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). Those signing the MOU pledge to develop and implement 14 comprehensive conservation best management practices (BMPs).

Example of water use reduction: artificial turf on athletic fields (top); example of water loss reduction: parking lot with porous paving (bottom).

Integrated Regional Water Management

The Integrated Regional Water Management (IRWM) program is a local water resources management approach aimed at securing long-term water supply reliability within California by first recognizing the inter-connectivity of water supplies and the environment, and then pursuing projects yielding multiple benefits for water supplies, water quality, and natural resources. The San Diego IRWM program is an interdisciplinary effort by water retailers, wastewater agencies, stormwater and flood managers, watershed groups, the business community, Native American tribes, agriculture, and regulatory agencies to coordinate water resource management efforts and to enable the San Diego region to apply for grants tied to the Department of Water Resources IRWM program. The City of Carlsbad has participated in the organization of the program locally, and in planning, coordination, and supporting watershed activities related to the IRWM.

Local Programs and Projects

Recycled Water

Under the recycled water retrofit project, the city installs recycled water lines to serve existing development in areas of the city where recycled water is available. On a voluntary basis, water customers may pay to upgrade their irrigation systems to use recycled water. The recycled water delivered within the CMWD service area has received an advanced level of treatment known as tertiary treatment, which creates a finished product that is safe for landscape irrigation and other non-drinking uses. However, because it is only used for non-drinking

purposes, recycled water must be delivered through a pipeline system separate from the regular water system.

Water Supply

CMWD's 2012 Water Supply Master Plan provides a comprehensive assessment of water system facilities and demands, and identifies required improvements to 2035. It identifies deficiencies in the system, confirms facility sizing, and recommends a future capital improvement program based on updated water demand projections.

Carlsbad Power Plant and site of the Carlsbad Desalination Plant.

9.5 Green Building

Definition

According to the U.S. EPA, in the United States, buildings account for 39 percent of total energy use, 12 percent of the water consumption, 68 percent of electricity consumption, and 38 percent of the CO_2 emissions. Green building is a concept centered on the role of the built environment in reducing energy use during construction and operation; because of the interconnected nature of sustainability, green building intersects with many different sustainability issues. "The built environment has a vast impact on the natural environment, human health, and the economy. By adopting green building strategies, we can maximize both economic and environmental performance. Green construction methods can be integrated into buildings at any stage, from design and construction, to renovation and deconstruction. However, the most significant benefits can be obtained if the design and construction team takes an integrated approach from the earliest stages of a building project."[2]

Furthermore, green building may also target improvements in occupant health and productivity through mechanisms including higher air quality, daylighting, and other benefits. As the Carlsbad community expressed in the Carlsbad Community Vision, green building is a multifaceted way the city can make progress toward numerous sustainability objectives.

Key Regulatory Context

Building development is highly regulated in the United States, and particularly in California. There are environmental regulations such as the Clean Air Act and Clean Water Act that impose standards regarding how development interfaces with these environmental resources. But more specifically, there are also building codes and standards adopted locally that govern the design and construction of structures. Some of these standards are mandatory, others voluntary. A few key examples are described below, drawn from the national, state, and regional context.

California Green Building Standards Code (Title 24, Part 11)

In January 2010, the California Building Standards Commission adopted the first-in-the-nation mandatory Green Building Standards Code (CALGREEN). The purpose of the code is to improve public health, safety and general welfare by enhancing the design and construction of buildings in the following categories: 1) planning and design, 2) energy efficiency, 3) water efficiency and conservation, 4) material conservation and resource efficiency, and 5) environmental air quality.

2 http://www.epa.gov/greenbuilding/pubs/whybuild.htm

The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal, and demolition of every new building or structure throughout California. CALGREEN requires that every new building constructed in California reduce indoor water use by 20 percent compared to existing standards (with voluntary goal standards for 30, 35 and 40 percent reductions), divert 50 percent of construction waste from landfills, and install low pollutant-emitting materials. Optional standards that can be adopted, at the city's discretion, include CALGREEN Tier 1 and Tier 2 standards; these each include a series of measures that go beyond the basic CALGREEN code.

CALGREEN also requires separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects and mandatory inspections of energy systems (e.g., heat furnace, air conditioner, and mechanical equipment) for nonresidential buildings of more than 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies. The California Air Resources Board estimates that the mandatory provisions will reduce GHG emissions (CO_2 equivalent) by three million metric tons in 2020.

The city uses the California Building Code and the new CALGREEN Code to review proposed development and renovations.

LEED™

Leadership in Energy and Environmental Design (LEED) is an internationally-recognized rating system for certifying the design, construction, and operation of high performance buildings; one of several in use across the globe, but probably the most popular in the United States. LEED building certification is available for all building types, including new construction and major renovations, core and shell, educational buildings, retail, commercial interiors, existing buildings, and homes.

The LEED program is a point-based system. Building projects earn points for satisfying green building criteria within specific credit areas. Projects also may earn regional priority bonus points for implementing green building strategies that address important local environment issues. Each certification rating system is organized into five environmental categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. An additional category—innovation in design (or operation)— focuses on sustainable building expertise as well as design measures not covered in the other categories.

Build It Green

Build It Green is a membership supported non-profit organization whose mission is to promote healthy, energy and resource-efficient homes in California. Build It Green has three strategic objectives: 1) drive policy development by partnering with government to establish credible and accessible green building policies that promote private sector innovation and provide consistent guidelines statewide; 2) increase supply of green homes by training building professionals on the latest best practices and connecting green product suppliers with consumers; and 3) stimulate consumer demand by increasing awareness of the benefits of green building and making "GreenPoint Rated" a trustworthy, recognized brand for green homes.

Capstone Advisors Corporate Headquarters, LEED Gold Certification for Existing Buildings.

Example of green design feature: parking lot designed to drain into a natural turf area that filters and treats pollutants with organic materials.

9.6 Sustainable Energy

Use of fossil fuels for energy is the primary contributor to GHG emissions. The United States, with less than 5 percent of the world population, consumes about 20 percent of global energy. Among states, California is the second largest consumer of energy, second only to Texas. However, California's per capita energy consumption is relatively low, in part due to mild weather that reduces energy demand for heating and cooling, and in part due to the government's energy-efficiency programs and standards. Petroleum and natural gas currently supply most of the energy consumed in California.

The concept of energy security is based on sensitivity to limited supplies, uneven distribution, and rising costs of fossil fuels such as petroleum. Energy insecurity is most frequently described, usually in terms of United States vulnerability to the political or social upheaval in energy-producing countries, as well as United States vulnerability to attacks on energy distribution infrastructure, accidents, and natural disasters. Increasing energy security usually means efforts to decrease demand for energy overall, decrease demand for energy that is supplied by less politically stable countries, increase the resiliency of our national infrastructure, and increase supply of more sustainable and stable energy sources.

Sustainable energy sources usually include all renewable sources, such as plant matter, solar power, wind power, wave power, geothermal power, and tidal power. It usually also includes technologies that improve energy efficiency. Energy conservation refers to efforts made to reduce energy consumption in order to preserve resources for the future and reduce pollution. Energy conservation can be achieved through increases in efficiency in conjunction with decreased energy consumption and/or reduced consumption from conventional energy sources. A few specific sustainable energy approaches of particular interest to Carlsbad are: renewable resources, conservation, and technological and business partnerships that would contribute to greater energy self-sufficiency in the region.

Examples of ways to reduce the city's energy use: solar technology (left) and energy efficient street lights (right).

9.7 Sustainable Food

Definition and Overview

Much like green development, the concept of a sustainable food system crosses over many different sustainability issues. For example, in the United States, obesity and diet-related chronic disease rates are escalating; public health is threatened by rising antibiotic resistance; chemicals and pathogens contaminate food, air, soil, and water; and natural resources such as fresh water and prime farmland are being depleted. These threats have human, social and economic costs that are growing, cumulative and unequally distributed. These issues all relate to the food system—what we eat and how it is produced and distributed.[3]

In some communities, healthy food access is a big issue, particularly where there are challenges to both physical proximity and affordability. Residents in communities with a more imbalanced food environment (where fast food restaurants and corner stores are more convenient than grocery stores) have more health problems and higher mortality than residents of areas with a higher proportion of grocery stores, other factors held constant. In addition, the presence of a supermarket in a neighborhood is linked to higher fruit and vegetable consumption and a reduced prevalence of overweight and obese individuals.

In terms of local nutrition, the San Diego countywide average percentage of children overweight for their age was only 8.8 percent in 2010, compared to a California average of 11.2 percent. In other similar indicators (e.g. adult overweight, prevalence of breastfeeding), San Diego County generally performs better than the state overall, though local Carlsbad data are not always available.

The Carlsbad Community Vision core value for sustainable food supports local agriculture, farmers' markets, and eating locally-grown food. These objectives touch on community concerns about other issues such as environmental quality, local economic development, neighborhood revitalization, and community connectedness. A sustainable food system perspective is particularly suited to approach "food" from all these perspectives, by looking at the broader picture and targeting several areas of influence, encompassing direct food access and quality, but also touching on production (farms and gardens), procurement (markets, stores, and city policies), transport (shipping methods and fuels, packaging, and other factors), and both consumer and business decision-making.

Examples of Carlsbad resources that support a healthy, sustainable food system: local agricultural businesses (top), and a community garden (bottom).

3 American Public Health Association Policy Statement," Toward a Healthy, Sustainable Food System", 2007, paraphrased.

Local Actions

The city's current (2013) sustainable food efforts include:

- A weekly farmers' market sponsored by the Carlsbad Village Business Association.
- Operating a community garden near downtown, and developing a second one in Calavera Hills.
- The Agricultural Conversion Mitigation Fee Grant Program which provides funding to support local agriculture.
- City leasing of underutilized city-owned land to farmers.
- Municipal Code inclusion of agricultural road side-stands as an allowed use.
- Proposition D (see the Land Use and Community Design Element), and various other policies and programs that support local agriculture.

Example of Carlsbad resources that support a healthy, sustainable food system: Carlsbad Village Farmers' Market.

9.8 Goals and Policies

Goals

9-G.1 Through implementation of the policies and programs in the General Plan, maintain a long-term balance among the three dimensions of sustainability—environmental, economic, and social—to ensure a vibrant, healthy, and prosperous community.

9-G.2 Undertake initiatives to enhance sustainability by reducing the community's greenhouse gas (GHG) emissions and fostering green development patterns—including buildings, sites, and landscapes.

9-G.3 Promote energy efficiency and conservation in the community.

9-G.4 Reduce the city's reliance on imported water.

9-G.5 Create a healthy, balanced, functional, and equitable food system for the entire Carlsbad community by:

- Reducing barriers and increasing access to locally-grown fruits and vegetables;
- Increasing communitywide knowledge of healthy food choices and behaviors.

9-G.6 Support the creation of community gardens throughout the community.

Policies

Climate Change and GHG

For policies related to flooding and sea level rise, see Safety Element.

9-P.1 Enforce the Climate Action Plan as the city's strategy to reduce greenhouse gas emissions.

9-P.2 Continue efforts to decrease use of energy and fossil fuel consumption in municipal operations, including transportation, waste reduction and recycling, and efficient building design and use.

Water Conservation, Recycling and Supply

9-P.3 Develop and implement a water sub-metering ordinance for new multi-family rental and mixed-use buildings.

9-P.4 Utilize irrigation and landscape design measures for the municipal golf course (Crossings at Carlsbad) that will result in decreased water consumption.

9-P.5 Undertake measures to expand the use of recycled water for landscape irrigation and commercial and industrial process water. Encourage potential future customers identified in the latest Recycled Water Master Plan to retrofit their water systems to utilize recycled water as it becomes available and cost-effective to do so.

9-P.6 Promote the use of on-site gray water and rainwater collection systems through education, expedited permitting review, fee exemptions and other measures.

9-P.7 Investigate the feasibility of developing full-functioning groundwater and sub-groundwater systems in the San Luis Rey River Mission Groundwater Basin and Cannon Well Field within or near Rancho Carlsbad in order to reduce the city's reliance on imported water.

Green Building

9-P.8 Promote energy conservation and retrofitting of existing buildings. Measures the city should consider for improving energy performance of existing buildings include, but are not limited to:

- Developing and implementing point-of-sale residential energy and water efficiency audits or upgrade requirements and/or incentives if necessary;
- Providing financial incentives and low-cost financing products and programs that encourage investment in energy efficiency and renewable energy within existing residential buildings; and
- Educating residents about the availability of free home energy audit programs and encourage implementation of audit findings.

9-P.9 Adopt a construction and demolition waste recycling ordinance that requires, except in unusual circumstances, all construction, demolition and renovation projects meeting a certain size or dollar value, to divert from landfills 100 percent of all Portland cement concrete and asphalt concrete and an average of at least 50 percent of all remaining non-hazardous debris from construction, demolition, and renovation projects.

9-P.10 Decrease the need for artificial cooling, heating and lighting, and promote outdoor lifestyles in Carlsbad's sunny and moderate climate by:

- Ensuring that the Zoning Ordinance provides for adequate private and common open spaces as part of multifamily developments.
- Encouraging residential and office buildings to have windows that open to the outside in all habitable rooms, and maximize the use of daylight.

9-P.11 Implement the city's Landscape Manual to mitigate urban heat island effects through maximum tree canopy coverage and minimum asphalt and paving coverage, particularly for denser areas like the Village and the Barrio, shopping centers, and industrial and other area with expansive surface parking.

Trees in parking lot can help combat urban heat island effects, help energy conservation, and enhance pedestrian comfort.

Sustainable Energy

9-P.12 Continue pursuit of sustainable energy sources—such as hydroelectricity, geothermal, solar, and wind power—to meet the community's needs.

9-P.13 Use the city's Climate Action Plan as the platform for delineating and implementing measures to improve energy conservation, and increase renewable energy use (such as solar) in existing and new development.

9-P.14 Support a regional approach to study the feasibility of establishing Community Choice Aggregation (CCA) or another program that increases the renewable energy supply and maintains the reliability and sustainability of the electrical grid.

Sustainable Food

9-P.15 Use zoning to establish incentives for locating healthy food grocery stores in neighborhood centers, and to increase communitywide healthy food access.

9-P.16 Seek ways to partner with regional community supported agriculture (CSA) programs as an alternative source of fresh and healthy fruits and vegetables for Carlsbad residents, particularly those with limited mobility, limited income, or those furthest from existing grocery stores.

9-P.17 Support home gardening and small-scale urban farming efforts by considering adoption of a home gardening and urban agriculture ordinance; or by otherwise ensuring that zoning allows for home gardens and small-scale urban farming; and provide residents with opportunities (e.g., online and library resources and workshops) to learn gardening basics and how to cook easy, healthy meals with fresh produce.

9-P.18 Incorporate community gardens as part of city parks and recreation planning, and work with the Carlsbad Community Gardens Collaborative and other organizations to facilitate the development, administration and operation of additional community gardens throughout the city.

9-P.19 Develop and implement a healthy food purchasing and vending policy for city facilities and operations that commits to selecting healthy, well-balanced meals and snacks for city-sponsored activities, meetings, and facilities.

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