Background Greenhouse Gas Technical Report
Ocean Beach Community Plan Update PEIR

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AIR ANALYSES

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Acronyms and Abbreviations

10^3ft^2	thousand square feet
AP-42	Compilation of Air Pollution Emission Factors
BAU	business as usual
CAFE	Corporate Average Fuel Economy
CalEEMod™	California Emissions Estimator Model
CalRecycle	California Department of Recycling
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAS	Climate Action Strategy
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEUS	California Commercial End Use Survey
CFC	chlorofluorocarbons
CH_4	methane
CMAP	2012 City of San Diego Climate Mitigation and Adaptation Plan
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
DU	dwelling units
eGRID	Emissions & Generation Resource Integrated Database
EMFAC	Emission Factor Model
EPA	United States Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbons
IPPC	Intergovernmental Panel on Climate Change
LCFS	Low Carbon Fuel Standard
$MtCO_2e$	million tonnes of carbon dioxide equivalents
MWh	Megawatt hours
N_2O	nitrous oxide
OBCPU	Ocean Beach Community Plan Update
OBPP	Ocean Beach Precise Plan
PEIR	Programmatic Environmental Impact Report
PFC	perfluorocarbons
ppb	parts per billion

Acronyms and Abbreviations

ppm	parts per million
RASS	Residential Appliance Saturation Study
RCP	Regional Comprehensive Plan
RFS	Renewable Fuel Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SDAPCD	San Diego Air Pollution Control District
SDG&E	San Diego Gas & Electric
SDGP	San Diego General Plan
SF_6	sulfur hexafluoride
t	abbreviation for tonne (or metric ton)
tCO_2e	tonne of carbon dioxide equivalents
TDM	Transportation Demand Management
TIS	Traffic Impact Study
tonne	metric ton (1.102 U.S. tons)
UNFCCC	United Nations Framework Convention on Climate Change
VMT	vehicle miles traveled

SECTION 1.0 – INTRODUCTION

1.1. PROJECT PURPOSE

The purpose of this Greenhouse Gas Technical Report (Report) is to describe the existing conditions and potential effects the Ocean Beach Community Plan Update (OBCPU) on climate change from greenhouse gas (GHG) emissions. This Report will be used as a technical appendix to the Programmatic Environmental Impact Report (PEIR) for the OBCPU to evaluate potential effects associated with greenhouse gas emissions. In accordance with California Environmental Quality Act (CEQA) and City guidelines, this analysis evaluates the significance of the proposed OBCPU in terms of (1) the OBCPU's potential to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and (2) the OBCPU's potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

1.2. PROJECT DESCRIPTION

The proposed project is an update to the Ocean Beach Community Plan (Plan). The project is designed to revise the Plan with respect to organization and content for consistency with the General Plan, to amend the Plan Land Use Map with related zone changes to reflect amendments and correct inconsistencies between existing land uses and the Community Plan, and to amend the Ocean Beach Public Facilities Financing Plan. The proposed project would rezone 99 parcels (approximately 21 acres) from RS-1-7 to RM -1-1. The existing zone allows for single dwelling unit (du) density of 9/du per acre for a maximum build out of approximately 189 units. The proposed Community Plan Update would change the zoning to allow up to 15/du per acre and would result in the maximum build out of approximately 315 units, or a net increase of 126 dwelling units. In total, the proposed community plan could accommodate an additional 1,399 dwelling units.

The draft Plan sets out a long-range vision and comprehensive policy framework for how the community of Ocean Beach could develop and maintain the qualities that define Ocean Beach over the next 20 to 30 years. The draft Plan provides policy direction for future development and been guided by the City of Villages growth strategy and citywide policy direction contained within the City of San Diego's General Plan (2008).

1.3. SUMMARY OF RESULTS

With regard to the first CEQA question, i.e., to evaluate the potential for the OBCPU to generate GHG emissions that may have a significant effect on the environment, GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod™), Version 2011.1.1. This model estimates GHG emissions from construction and operational emissions sources.

Using CalEEMod™, the emissions were estimated from the OBCPU Plan Area in current conditions and in the proposed OBCPU Plan Area in future conditions, i.e. buildout. Using land-use configuration currently in place in the Plan Area, GHG emissions in 2010 were estimated to be 155,792 tonnes of carbon dioxide equivalents (tCO_2e). Using the OBCPU's proposed land-use configuration, GHG emissions in 2030 were estimated to be 143,949 tCO_2e. Therefore, the OBCPU does not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

With regard to the second CEQA question pertaining to potential for the OBCPU to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, the OBCPU contain policies that would reduce GHG emissions from transportation and operational building uses (related to water and energy consumption, and solid waste generation, etc.) that are consistent with the goals and strategies of local and State plans, policies, and regulations aimed at reducing GHG emissions from land use and development.

SECTION 2.0 – BACKGROUND INFORMATION

To evaluate the incremental effect of the OBCPU on Statewide emissions and global climate change, it is important to have a basic understanding of the nature of the global climate change problem.

2.1. UNDERSTANDING GLOBAL CLIMATE CHANGE

Climate change is a change in the average weather of the earth that may be measured by changes in wind patterns, storms, precipitation, and temperature. Constituent gases that trap heat in the Earth's atmosphere are called GHGs, analogous to the way a greenhouse retains heat. GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which would otherwise have escaped into space. Without these natural heat-trapping effects of GHGs, the earth's surface would be about 34 degrees Fahrenheit (°F) cooler. This phenomenon, known as the "Greenhouse Effect," is responsible for maintaining a habitable climate. However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations, greatly enhancing the greenhouse effects, which results in a trend of unnatural warming of the Earth's natural climate known as global warming or global climate change.

Global climate change is driven by forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. Positive forcing tends to warm the surface while negative forcing tends to cool it. A feedback is "an internal climate process that amplifies or dampens the climate response to a specific forcing"[1].

All GHGs are not equal in their effects on global climate change. A system of multipliers had to be devised to enable warming effects of different gases to be compared. Each GHG is assigned a Global Warming Potential (GWP). The cumulative warming effect of an emission of a mass unit of carbon dioxide (CO_2) is assigned the value of 1. Effects of emissions of a mass unit of non-CO_2 GHGs are estimated as multiples. The GWP of a gas is essentially a measurement of the radiative forcing of a GHG compared with the reference gas, CO_2. Thus GHG emissions are presented as an equivalent to CO_2, or CO_2e. A CO_2e is the mass emissions of an individual GHG multiplied by its GWP. GHGs are often presented in units called tonnes[2] (t) of CO_2e (tCO_2e).

2.2. GREENHOUSE GASES OF PRIMARY CONCERN

There are numerous GHGs, both naturally occurring and manmade. The United Nations Framework Convention on Climate Change (UNFCCC) established an international agreement to GHG reductions called the Kyoto Protocol[3] whose main aim was to contain emissions of the main anthropogenic (i.e., human-emitted) GHGs in ways that reflect underlying national differences in GHG emissions, wealth,

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1 Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties. National Research Council of the National Academies, Climate Research Committee, Board on Atmospheric Sciences and Climate, Committee on Radiative Forcing Effects on Climate. The National Academies Press, Washington, D.C.

2 Tonnes are sometimes labeled metric tons in the United States

3 The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan, and entered into force on 16 February 2005.

and capacity to make the reductions. The UNFCCC's ultimate objective was the stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol concentrated their efforts on four specific GHGs, i.e. CO_2, methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6) and two groups of gases; i.e. hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

CO_2, CH_4, and N_2O are the GHGs of primary concern in this analysis. CO_2 would be emitted by the proposed OBCPU due to the combustion of fossil fuels in vehicles (including construction), from electricity generation and natural gas consumption, water use, and from solid waste disposal. Smaller amounts of CH_4 and N_2O would be emitted from the same OBCPU operations.

2.2.1 Carbon Dioxide (CO_2)

The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s, each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations CO_2 were stable at 280 parts per million (ppm). The Intergovernmental Panel on Climate Change (IPCC) indicates that concentrations were 379 ppm in 2005, an increase of more than 30 percent. Left unchecked, the IPCC projects that concentration of CO_2 in the atmosphere could increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources. This could result in an average global temperature rise of at least 3.6 ºF.

2.2.2 Methane (CH_4)

CH_4 is an extremely effective absorber of radiation, though its atmospheric concentration is less than CO_2 and its lifetime in the atmosphere is brief (10 to 12 years), compared with some other GHGs. CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of CH_4. Other anthropogenic sources include fossil-fuel combustion and biomass burning.

2.2.3 Nitrous Oxide (N_2O)

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the average global concentration was 314 parts per billion (ppb). N_2O is produced naturally by microbial processes in soil and water, including those reactions that occur in nitrogen-containing fertilizer. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O is used as an aerosol spray propellant, e.g., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh, in rocket engines and in racecars.

2.2.4 Other GHGs

2.2.4.1 Chlorofluorocarbons (CFC)

CFCs are nontoxic, nonflammable, insoluble, and chemically un-reactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source. They were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Because of the discovery that they are able to destroy stratospheric ozone, an ongoing global effort to halt their production was undertaken and has been extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

2.2.4.2 Hydrofluorocarbons (HFC)

HFCs are synthesized chemicals that are used as a substitute for CFCs. Out of all of the GHGs; HFCs are one of three groups with the highest GWP. Prior to 1990, the only significant emissions of HFCs were HFC-23. The use of HFC-134a is increasing due to its use as a refrigerant.

2.2.4.3 Perfluorocarbons (PFC)

PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

2.2.4.4 Sulfur Hexafluoride (SF_6)

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest GWP of any gas evaluated, 23,900 times that of CO_2. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

SECTION 3.0 – EXISTING CONDITIONS

3.1. ENVIRONMENTAL SETTING

3.1.1 State and Regional GHG Inventories

The California Air Resources Board (CARB) performs statewide GHG inventories. The inventory is divided into nine broad sectors of economic activity: agriculture, commercial, electricity generation, forestry, high GWP emitters, industrial, recycling, and waste, residential, and transportation. Emissions are quantified in million tCO_2e ($MtCO_2e$). A new edition of California's greenhouse gas emission inventory was released April 6, 2012. It includes emissions estimates for years 2000 to 2009. Table 1 shows the estimated statewide GHG emissions by sector for the inventory years 2000 and 2009. To give the numbers some perspective, I have included the original 1990 emissions[4] on which also represent the AB-32 goals for 2020.

Table 1 – California GHG Emissions by Sector for 1990, 2000, and 2009

Economic Sector	State GHG Emissions in $MtCO_2e$ and percent of total					
	1990		2000		2009	
Agriculture & Forestry	16.9	*4%*	29.1	*6%*	32.3	*7%*
Commercial	14.4	*3%*	12.8	*3%*	14.3	*3%*
Electricity Generation (In State)	49.1	*11%*	61.0	*13%*	56.2	*12%*
Electricity Generation (Imports)	61.6	*14%*	46.2	*10%*	48.4	*11%*
Industrial	103.0	*24%*	103.8	*22%*	89.3	*20%*
Residential	29.7	*7%*	30.1	*6%*	28.6	*6%*
Transportation	150.7	*35%*	171.7	*37%*	172.9	*38%*
Unspecified Remaining[5]	1.3	*0%*	8.9	*2%*	14.7	*3%*
Recycling and Waste	N/A		N/A		N/A	
High GWP	N/A		N/A		N/A	
Subtotal	**426.6**		**463.6**		**456.8**	
Forestry Sinks	-6.7		-4.5		-3.8	
Total	***419.9***		***459.2***		***453.0***	

As shown in Table 1, statewide GHG net emissions totaled 420 $MtCO_2e$ in 1990, 459 $MtCO_2e$ in 2000, and 453 $MtCO_2e$ in 2009. In addition, the 2020 GHG emissions were forecasted to be 597 $MtCO_2e$ in 2020 if no mitigation actions were taken. According to the California Greenhouse Gas Emissions Inventory: 2000-2009 Staff Report[6], while total emissions have increased by 5.5 percent from 1990 to 2009, emissions decreased by 5.8 percent from 2008 to 2009 (485 to 457 $MtCO_2e$). Per capita emissions

[4] California Greenhouse Gas Inventory for 1990-2004 — by Sector and Activity. California Air Resources Board. Last Updated: Monday, November 19, 2007.

[5] Unspecified includes emissions from evaporative losses and Ozone Depleting Substance (ODS) substitute use, which could not be attributed to an individual sector.

[6] California Greenhouse Gas Emissions Inventory: 2000-2009. California Air Resources Board. December 2011.

in California have slightly decreased from 2000 to 2009 (by 9.7 percent), but the overall 9 percent increase in population during the same period offsets the emission reductions.

The forestry sector is unique because it not only includes emissions associated with harvest, fire, and land use conversion (sources), but also includes removals of atmospheric CO_2 (sinks) by photosynthesis, which is then bound (sequestered) in plant tissues. As seen in Table 1, the forestry sector consistently removes CO_2 from the atmosphere statewide. As a result, although decreasing over time, this sector represents a net sink, removing a net 6.5 $MtCO_2e$ from the atmosphere in 1990, a net 4.5 $MtCO_2e$ in 2000, and a net 3.8 $MtCO_2e$ in 2009.

A San Diego regional emissions inventory was prepared by the University of San Diego, School of Law, Energy Policy Initiative Center that took into account the unique characteristics of the region. Their 2006 emissions inventory for San Diego is duplicated below in Table 2. The sectors included in this inventory are somewhat different from those in the statewide inventory. Similar to the statewide emissions, transportation-related GHG emissions contributed the most countywide, followed by emissions associated with energy use.

Table 2 – San Diego GHG Emissions in 2006

Sector	**$MtCO_2e$**	***(% of total)***
Agriculture/Forestry/Land Use	0.7	*2.0%*
Waste	0.7	*2.0%*
Electricity	9.0	*25.3%*
Natural Gas Consumption	3.0	*8.4%*
Industrial Processes & Products	1.6	*4.5%*
On-Road Transportation	16.0	*45.0%*
Off-Road Equipment & Vehicles	1.3	*3.7%*
Civil Aviation	1.7	*4.8%*
Rail	0.3	*0.8%*
Water-Borne Navigation	0.1	*0.4%*
Other Fuels/Other	1.1	*3.1%*
Total	***35.5***	

3.1.2 Existing OBCPU Plan Area GHG Emissions

A baseline analysis of the existing GHG emissions from the OBCPU Plan Area land uses and associated traffic was performed using the CalEEMod™, Version 2011.1.1. This is the same methodology as that used for estimating GHG emissions resulting from proposed OBCPU buildout.

In brief, CalEEMod™ is a computer model that estimates GHG emissions from mobile (i.e., vehicular) sources, area sources (fireplaces, woodstoves, and landscape maintenance equipment), energy use (electricity and natural gas used in space heating and cooling, ventilation and lighting; and plug-in appliances), water use, and solid waste disposal. Emissions are estimated based on land use information input to the model by the model user. The input land use information consists of land use subtypes (such as the residential subtypes of single-family residential and multi-family medium-rise residential) and their

unit or square footage quantities. Other inputs include the air basin, climate zone, setting (urban, suburban, or rural), and utility provider (in this case San Diego Gas & Electric, or SDG&E). In various places, the user can input additional information and/or override the default assumptions to account for project- or location-specific parameters. For this estimate of existing GHG emissions, the model default parameters including vehicle trip lengths and energy intensity factors were not changed.

Table 3 – Existing and Proposed Future Land Uses in Ocean Beach

CalEEMod™ Land Use Category	Metric	Existing	Proposed	Difference
Apartments Low Rise	DU	601	606	5
Apartments Mid Rise	DU	5,621	6,442	821
Arena	Acre	0.84	0.84	0
Automobile Care Center	10^3ft^2	37.2	18.8	-18.4
Banks	10^3ft^2	14.7	10.2	-4.5
Park	Acre	19.2	19.4	0.2
Convenience Market	10^3ft^2	6.4	3.0	-3.4
Pharmacy Drug Store	10^3ft^2	20	0	-20
Elementary School	Student	600	600	0
Fast Food with Drive Thru	10^3ft^2	3.2	3.2	0
Government Office Building	10^3ft^2	8.3	9.3	1.0
Gasoline/Service Station	pump	21	21	0
General Office Building	10^3ft^2	67.7	67.7	0
High Turnover (Sit Down Restaurant)	10^3ft^2	58	43.7	-14.3
Junior College (2yr)	10^3ft^2	29.9	26.7	-3.2
Medical Office Building	10^3ft^2	25.8	25.8	0
Motel	Rooms	152	152	0
Place of Worship	10^3ft^2	70.6	70.6	0
User Defined Commercial (self-service carwash)	Stall	5	0	-5
Single Family Housing	DU	1,602	2,090	488
Strip Mall[7]	10^3ft^2	534.9	611.7	76.8
Supermarket	10^3ft^2	31.2	16.2	-15.0

DU = dwelling unit 10^3ft^2 = thousand square feet

Land use descriptions in the OBCPU Plan Area for existing and future proposed conditions were obtained from data supplied by the City for the Traffic Impact Study[8] (TIS). Table 3 lists the current and proposed

[7] Strip mall was used as a catch-all for several business types that did not have specific CalEEMod™ categories, such as tire store, furniture store, and nursery.

land use distributions for the OBCPU Plan Area. To accommodate input requirements in CalEEMod™, some uses were combined into appropriate model categories.

The complete calculations of existing GHG emissions, including the CalEEMod™ input parameters and reported results, are included in Attachment 1 and summarized below.

3.1.2.1 Vehicle Emissions

As identified in the TIS, approximately 128,177 total vehicle trips are assumed to occur daily in association with the proposed OBCPU area. Based on this quantity of trips and the trip rates for each land use subtype identified above and the default CalEEMod™ trip lengths as inputs to CalEEMod™, almost 231 million vehicle miles are traveled (VMT) each year. This equates to a total of 110,017 tCO_2e of GHGs that are being emitted annually by vehicles associated with existing on-site land uses.

3.1.2.2 Energy Use Emissions

Based on the existing land use inputs identified in Table 3 and average electricity and natural gas consumption rates in CalEEMod™, the proposed OBCPU area's existing buildings were estimated to emit approximately 27,168 tCO_2e of GHGs in 2010 from the OBCPU area. Of this total, approximately 8,940 tCO_2e were generated from natural gas combustion and 18,226 tCO_2e were generated from electricity use.

3.1.2.3 Area Source Emissions

In this analysis, estimated area source emissions were primarily from hearth emissions. Data for actual was not available and only natural gas usage would actually contribute to GHG emissions, as wood burning is considered biological CO_2 and is considered just releasing sequestered CO_2. This analysis used existing CalEEMod™ defaults with the exception of no wood burning and estimated that in 2010, all existing area sources emitted approximately 10,328 tCO_2e of GHGs.

3.1.2.4 Water Use Emissions

Based on the existing land use inputs identified in Table 3 and default water use rates and embodied energy intensities, CalEEMod™ estimates that the embodied energy needed to supply and treat existing annual water consumption in the OBCPU area in 2010 generated approximately 4,894 tCO_2e of GHGs.

3.1.2.5 Solid Waste Emissions

Existing solid waste generation within the OBCPU area was estimated by CalEEMod™ by multiplying the land use inputs identified in Table 3 with average waste generation rates obtained from the California Department of Recycling (CalRecycle). The existing annual solid waste generation in the OBCPU area was thus estimated to be 7,423 tons. CalEEMod™ estimates that GHG emissions associated with disposing of this amount of waste would generate 3,385 tCO_2e in 2010.

[8] Ocean Beach Buildout Conditions Traffic Impact Study, Final Report. Wilson & Company. July 2012.

3.1.2.6 Total Existing OBCPU Area GHG Emissions

The results of the analysis described above indicate that the existing OBCPU area uses are currently generating approximately 155,792 tCO_2e annually as shown in Potential Environmental Effects

According to the IPCC's) Working Group II Report, worldwide average temperatures are likely to increase by 3 °F to 7 °F by the end of the 21st century. However, a global temperature increase does not directly translate to a uniform increase in temperature in all locations on the earth. Regional climate changes are dependent on multiple variables, such as topography. One region of the Earth may experience increased temperature, increased incidents of drought, and similar warming effects, whereas another region may experience a relative cooling. According to the IPCC Report, climate change impacts to North America may include diminishing snowpack, increasing evaporation, exacerbated shoreline erosion, exacerbated inundation from sea level rising, increased risk and frequency of wildfire, increased risk of insect outbreaks, increased experiences of heat waves, and rearrangement of ecosystems, as species and ecosystem zones shift northward and to higher elevations.

– Plan Area GHG Emissions in 2010

Sector	Tonnes CO_2e
Mobile	110,017
Energy Use	27,168
Area Sources	10,328
Water Use	4,894
Solid Waste Disposal	3,385
Total	***155,792***

3.1.3 Potential Environmental Effects

According to the IPCC's) Working Group II Report[9], worldwide average temperatures are likely to increase by 3 °F to 7 °F by the end of the 21st century. However, a global temperature increase does not directly translate to a uniform increase in temperature in all locations on the earth. Regional climate changes are dependent on multiple variables, such as topography. One region of the Earth may experience increased temperature, increased incidents of drought, and similar warming effects, whereas another region may experience a relative cooling. According to the IPCC Report[10], climate change impacts to North America may include diminishing snowpack, increasing evaporation, exacerbated shoreline erosion, exacerbated inundation from sea level rising, increased risk and frequency of wildfire, increased risk of insect outbreaks, increased experiences of heat waves, and rearrangement of ecosystems, as species and ecosystem zones shift northward and to higher elevations[11].

[9] Climate Change 2007: Impacts, Adaptation, and Vulnerability. Website http://www.ipcc.ch/ipccreports/ar4-wg2.htm

[10] *ibid*

[11] *ibid*

3.1.3.1 California Implications

Even though climate change is a global problem and GHGs are global pollutants, the effects of climate change on California have been studied. California direct impacts include temperature increases that are expected to be more pronounced in the summer and in inland areas[12]; a 12 to 35 percent decrease in precipitation in Northern California[13]; an estimated range of sea level rise along the California Coast between 43 and 69 inches by 2100[14]; and increased pH of oceans due to CO_2 absorption[15].

In fact, the California Emergency Management Agency prepared a Guide[16] focusing on understanding the ways in which climate change can affect a community to assist local agencies effectively project vulnerability. These impacts are organized into seven related "sectors."

- **Public Health, Socioeconomic, and Equity Impacts –** consisting of the public health and socioeconomic impacts of heat events, average temperature change, intense rainstorms, reduced air quality, and wildfires on people, focusing on groups who are most sensitive to these impacts because of both intrinsic factors (e.g., age, race/ethnicity, gender) and extrinsic factors (e.g., financial resources, knowledge, language, occupation).

- **Ocean and Coastal Resources –** such as sea level rise, intensification of coastal storms, and ocean acidification may affect ocean and coastal resources. Potential environmental impacts of these changes include coastal flooding/ inundation, loss of coastal ecosystems, coastal erosion, shifts in ocean conditions (pH, salinity, etc.), and saltwater intrusion.

- **Water Management –** such as altered timing and amount of precipitation and increased temperatures that influence the availability of water supply. In addition, the sector includes an evaluation of the role that intense storms and rapid snowmelt can play in flooding.

- **Forest and Rangeland –** such as an influence on forest health and wildfire. In forest ecosystems, climate change can alter the species mix, moisture and fuel load, and number of wildfire ignitions. These changes in wildfire character are related to a range of forest health indicators such as growth rate, invasive species, erosion, and nutrient loss.

- **Biodiversity and Habitat –** affecting terrestrial and freshwater aquatic habitats and the species that depend on them. Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species' ranges, loss of ecosystem functions, and changes in growing ranges for vegetation.

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12 2009 California Climate Adaptation Strategy. California Natural Resources Agency. Retrieved from: http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf

13 *Ibid.*

14 *Ibid.*

15 Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Orr, JC, VJ Fabry, O Aumont, L bopp, SC Doney, RA Feely, A Gnanadesikan, N Gruber, A Ishida, F Joos, and others. Nature 437(7059): 681-686. 2005.

16 California Adaptation Planning Guide: Defining Local & Regional Impacts. California Emergency Management Agency. July 2012.

- **Agriculture –** the potential to influence both crop and livestock operations. Climate change can affect agriculture through extreme events (e.g., flooding, fire) that result in large losses over shorter durations, or through more subtle impacts such as changes in annual temperature and precipitation patterns that influence growing seasons or livestock health.

- **Infrastructure –** increasing the likelihood of both delays and failures of infrastructure. Infrastructure provides the resources and services critical to community function. Roads, rail, water (pipes, canals, and dams), waste (sewer, storm, and solid waste), electricity, gas, and communication systems are all needed for community function.

3.2. GREENHOOUSE GASES

3.2.1 GHG Emission Levels

In 2004, total worldwide GHG emissions were estimated to be 20,135 $MtCO_2e$, excluding emissions/ removals from land use, land use change, and forestry. In 2004, GHG emissions in the U.S. were 7,074 $MtCO_2e$. In 2009, California emitted 456.8 $MtCO_2e$, including imported electricity and excluding combustion of international fuels and carbon sinks or storage. The major source of GHGs in California is transportation, contributing 38 percent of the State's total GHG emissions. Industrial is the second largest source, contributing a total of 20 percent of the State's GHG emissions. Figure 1 shows the distribution of emissions for the 2009 GHG inventory.

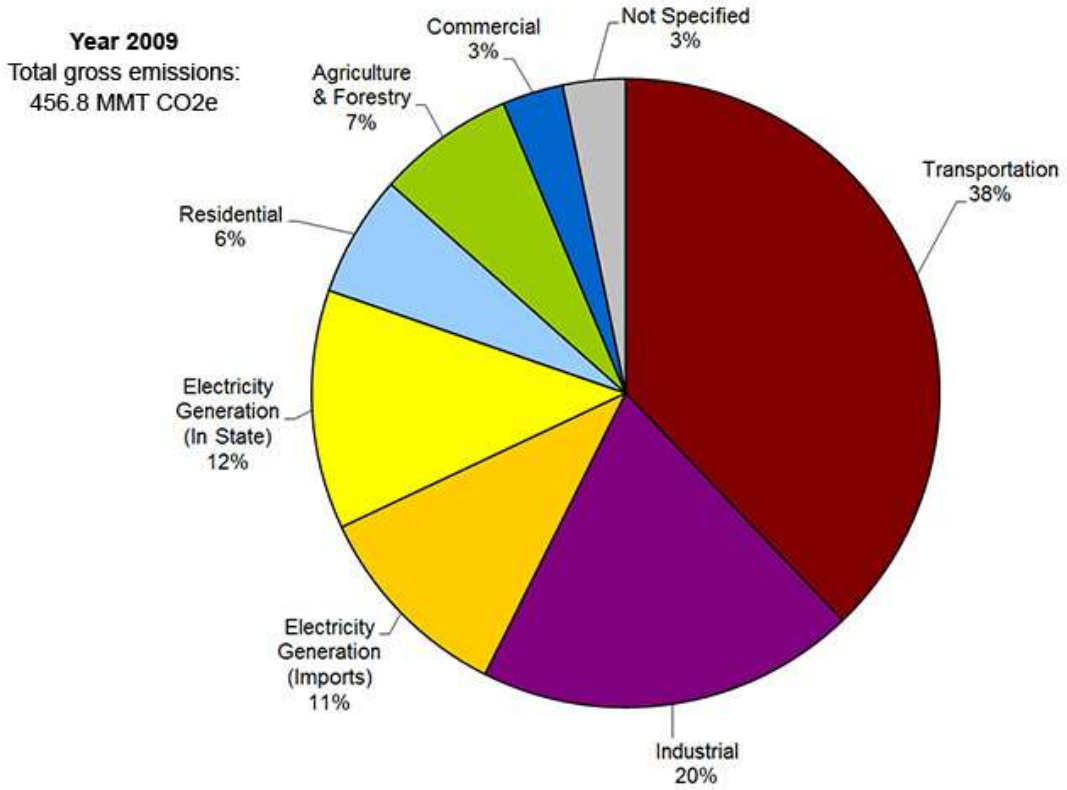

Figure 1 – Year 2009 California GHG Emissions

SECTION 4.0 – CLIMATE CHANGE / GREENHOUSE GASES REGULATORY CONTEXT

4.1. FEDERAL CLIMATE CHANGE LEGISLATION

4.1.1 Endangerment and Cause or Contribute Findings

On December 7, 2009, the Administrator or the Environmental Protection Agency (EPA) signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act. The Findings assert:

- Current and projected concentrations of the mix of six key GHGs — CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 — in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the endangerment finding.
- The combined emissions of CO_2, CH_4, N_2O, and HFCs from new motor vehicles and motor vehicle engines contribute to the atmospheric concentrations of these key GHGs and hence to the threat of climate change. This is referred to as the cause or contribute finding.

4.1.2 CAFE and GHG Standards for Model Years 2017 and Beyond

EPA and the National Highway Traffic Safety Administration are taking coordinated steps to enable the production of a new generation of clean vehicles--from the smallest cars to the largest trucks--through reduced greenhouse gas emissions and improved fuel use with the adoption of the Corporate Average Fuel Economy (CAFE) and Greenhouse Gas Emissions Standards for Model Years 2017 and Beyond. Together, the enacted and proposed standards are expected to save more than six billion barrels of oil through 2025 and reduce more than 3,100 million metric tons of carbon dioxide emissions.

4.1.3 Renewable Fuel Standard (RFS) program

EPA is also responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. By 2022, the RFS program will reduce greenhouse gas emissions by 138 $MtCO_2e$, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by $41.5 billion.

4.1.4 Prevention of Significant Deterioration and Title V Operating Permit Programs

On May 13, 2010, EPA set greenhouse gas emissions thresholds to define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit covered facilities to the nation's largest greenhouse gas emitters: power plants, refineries, and cement production facilities.

4.1.5 GHG Inventory and Reporting Programs

EPA collects various types of greenhouse gas emissions data. This data helps policy makers, businesses, and the Agency track greenhouse gas emissions trends and identify opportunities for reducing emissions and increasing efficiency.

- The Inventory of U.S. Greenhouse Gas Emissions and Sinks, provides the United States' official estimate of total national-level greenhouse gas emissions. This report tracks annual U.S. GHG emissions since 1990.
- The Greenhouse Gas Reporting Program collects and publishes emissions data from individual facilities in the United States that emit greenhouse gases in large quantities.

4.1.6 Partnerships and Initiatives

EPA is reducing GHG emissions and promoting a clean energy economy through highly successful partnerships and common-sense regulatory initiatives.

- Developing Commonsense Regulatory Initiatives: EPA is developing common-sense regulatory initiatives, to reduce GHG emissions and increase efficiency. For example, EPA's vehicle greenhouse gas rules, will save consumers $1.7 trillion at the pump by 2025, and eliminate six billion tCO_2e.
- Partnering With the Private Sector: Through voluntary energy and climate programs, EPA's partners reduced over 345 $MtCO_2e$ in 2010 alone - equivalent to the emissions from 81 million vehicles - and saving consumers and businesses of about $21 billion.

4.2. STATE CLIMATE CHANGE LEGISLATION

4.2.1 Low Carbon Fuel Standard Program

The State of California amended Section 95486, Title 17 of the California Code of Regulations adding a Low Carbon Fuel Standard (LCFS). The purpose of this regulation was to implement a low carbon fuel standard, which will reduce GHG emissions by reducing the full fuel-cycle, carbon intensity of the transportation fuel pool used in California.

4.2.2 Assembly Bill (AB 1493)

AB 1493 (Pavley), enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB would apply to 2009 and later model year vehicles. CARB estimates that the regulation would reduce climate change emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030[17].

4.2.3 Assembly Bill 32 (AB 32)

In 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as AB 32. AB 32 focuses on reducing GHG emissions in California. GHGs, as defined under AB 32, include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. CARB is the state agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming in order to reduce emissions of GHGs. AB 32 also requires that by January 1, 2008, CARB must determine what the statewide GHG emissions level was in 1990, and it must approve a Statewide GHG emissions limit so it may be applied

[17] Review of the California Ambient Air Quality Standard for Ozone, October 2005 Revision. California Air Resources Board. October 27, 2005.

to the 2020 benchmark. CARB approved a 1990 GHG emissions level of 427 $MtCO_2e$, on December 6, 2007 in its Staff Report. Therefore, in 2020, emissions in California are required to be at or below 427 $MtCO_2e$.

Under the current "business as usual" (BAU) scenario, statewide emissions are increasing at a rate of approximately 1 percent per year as noted below. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 $MtCO_2e$
- 2004: 480 $MtCO_2e$ (an average 11-percent reduction needed to achieve 1990 base)
- 2008: 495 $MtCO_2e$ (an average 14-percent reduction needed to achieve 1990 base)
- 2020: 596 $MtCO_2e$ BAU (an average 28-percent reduction needed to achieve 1990 base)

Under AB 32, CARB published its Final Expanded List of Early Action Measures to Reduce GHG Emissions in California[18]. Discrete early action measures are currently underway or are enforceable by January 1, 2010. Early action measures are regulatory or non-regulatory and are currently underway or to be initiated by CARB in the 2007 to 2012 timeframe. CARB has 44 early action measures that apply to the transportation, commercial, forestry, agriculture, cement, oil and gas, fire suppression, fuels, education, energy efficiency, electricity, and waste sectors[19]. Action measures include strategies affecting vehicular activity, such as diesel anti-idling, alternative fuels, heavy-duty vehicle emissions reduction measures; measures involving landfill methane capture, hydrogen vehicles, building efficiency improvements; and improvements to cement manufacturing. Of those early action measures, nine are considered discrete early action measures, as they are regulatory and enforceable by January 1, 2010. CARB estimates that the 44 recommendations are expected to result in reductions of at least 42 $MtCO_2e$ by 2020, representing approximately 25 percent of the 2020 target.

4.2.4 Senate Bill 1368 (SB 1368)

In 2006, the State Legislature adopted Senate Bill 1368 (SB 1368), which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements longer than 5 years for energy from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard, since such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower GHG emissions associated with California's energy demand, since it will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the above-referenced performance standard for GHG emissions.

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[18] Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration. California Air Resources Board. October 2007.

[19] Climate Action Team Proposed Early Actions to Mitigate Climate Change in California. Climate Action Team. April 20, 2007.

4.2.5 Senate Bill 375 (SB 375)

SB 375 passed the Senate on August 30, 2008 and was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions and contributes over 40 percent of the GHG emissions in California, with automobiles and light trucks alone contributing almost 30 percent. SB 375 indicates that GHGs from automobiles and light trucks can be reduced by new vehicle technology. However, significant reductions from changed land use patterns and improved transportation also are necessary. SB 375 states that "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

4.2.6 Cap-and-Trade Program

The cap-and-trade regulation will reduce GHG from major emission sources (covered entities) by setting a firm cap on GHG emissions while employing market mechanisms to cost-effectively achieve the emission reduction goals. The cap for GHG emissions from major sources will commence in 2013 and decline over time, achieving GHG emissions reductions throughout the program's duration. The cap is measured in tCO_2e. Covered entities will be allocated some permits to emit (allowances), able to buy allowances at auction, purchase allowances from others, or purchase offset credits.

The development of this program included a multi-year stakeholder process and consideration of potential impacts on disproportionately impacted communities. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. The Program includes market monitoring activities such as a Compliance Instrument Tracking System Service; quarterly allowance auctions; a Compliance Offset Program designed to give offset credits to GHG reductions or sequestered carbon that meet regulatory criteria; an Adaptive Management Plan focusing on localized air quality impacts from the regulation and forest impacts from the U.S. Forest Protocol; and a Voluntary Renewable Electricity Program.

4.2.7 California Climate Adaptation Strategy

In 2009, California adopted a statewide Climate Adaptation Strategy that focuses on seven sectors: Public Health, Biodiversity and Habitat, Oceans and Coastal Resources, Water, Agriculture, Forestry, and Transportation and Energy. The State's efforts to address extreme climate events focuses on strengthening the State's planning and disaster preparedness efforts and explores reasonable and practical actions to make our communities safer and more resilient to climate change.

4.3. LOCAL EFFORTS

4.3.1 San Diego Association of Governments (SANDAG)

4.3.1.1 Climate Action Strategy

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

The CAS helps SANDAG identify land use, transportation, and related policy measures and investments that could reduce GHGs from passenger cars and light-duty trucks as part of the development of a Sustainable Communities Strategy (SCS) for the 2050 RTP 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 GHGs from their operations.

4.3.1.2 Sustainable Communities Strategy

The SCS is a new element of the RTP required by SB 375, and will demonstrate how development patterns and the transportation network, policies, and programs can work together to achieve the GHG emission targets for cars and light trucks that will be established by CARB, if there is a feasible way to do so. As the region's Metropolitan Planning Organization, if SANDAG cannot meet the targets through the SCS, then the region is required to develop an Alternative Planning Strategy that demonstrates how the emission targets could be achieved.

The SCS lays out how the region will meet GHG reduction targets set by CARB. CARB's targets call for the region to reduce per capita emissions seven percent by 2020 and 13 percent by 2035 from a 2005 baseline. There are no mandated targets beyond 2035.

4.3.2 City of San Diego

4.3.2.1 2012 City of San Diego Climate Mitigation and Adaptation Plan (CMAP)

The CMAP identifies strategies and measures to meet GHG reduction targets, and lists general approaches to adapt to a changing climate. Mitigation is reducing GHG emissions now in order to slow the rate of increase in the atmosphere and adaptation is the response to the changes that are occurring because of the excessive human-induced GHGs that have been collecting in the atmosphere for the past 100 years. The CMAP is currently pending adoption.

SECTION 5.0 – SIGNIFICANCE CRITERIA AND ANALYSIS METHODOLOGIES

5.1. DETERMINING SIGNIFICANCE

The current CEQA Guidelines Appendix G Environmental Checklist includes the following two questions regarding assessment of GHG emissions:

1) Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
2) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs?

As stated in the Guidelines, these questions are "intended to encourage thoughtful assessment of impacts and do not necessarily represent thresholds of significance"[20]. To date, there have been no local, regional, State, or federal regulations establishing a threshold of significance to determine project-specific impacts of GHG emissions. The CEQA Guidelines require Lead Agencies to adopt GHG thresholds of significance. When adopting these thresholds, the amended Guidelines allow Lead Agencies to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence, and/or to develop their own significance threshold.

The City has not adopted its own GHG Thresholds of Significance for CEQA and is following guidance from the California Air Pollution Control Officers Association (CAPCOA) report CEQA & Climate Change[21] for interim screening criteria to determine when a GHG analysis would be required and information from the CARB Scoping Plan and BAU 2020 Forecast to determine when a cumulatively significant contribution of GHGs has occurred.

Although the criteria discussed below are interim guidance, they represent a good faith effort to evaluate whether GHG impacts from a project are significant, taking into account the type and location of the proposed development, the best available scientific data regarding GHG emissions, and the current statewide goals and strategies for reduction of GHG emissions. It is also important to note that the San Diego Air Pollution Control District (SDAPCD) has not provided guidance on the quantification of GHG emissions or emissions thresholds for the San Diego Region.

5.1.1 CAPCOA Conservative Screening Criterion

The City is currently using a 900 tonne screening criterion for determining when a GHG analysis is required, based on the CAPCOA report CEQA & Climate Change. The CAPCOA report references the 900 tonne guideline as a conservative threshold for requiring further analysis and mitigation. This emission level is based on the amount of vehicle trips, the typical energy and water use, and other factors associated with projects. CAPCOA identifies the following project types in Table 4 that are estimated to

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[20] Title 14, Division 6, Chapter 3 Guidelines for Implementation of the CEQA, Appendix G, VII Greenhouse Gas Emissions

[21] CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. California Air Pollution Control Officers Association. January 2008.

emit approximately 900 tCO_2e annually as shown. Projects that meet the following criteria are not required by the City to prepare a GHG technical analysis report.

Table 4 – Screening Criteria for GHG Analysis and Mitigation

Project Type	Project Size*
Single Family Residential	50 dwelling units
Apartments/Condominiums	70 dwelling units
General Commercial Office Space	35,000 square feet
Retail Space	11,000 square feet
Supermarket/Grocery Space	6,300 square feet

* Project size that generates approximately 900 tonnes of GHGs per Year

The screening level presented in Table 4 is primarily useful in simpler, single-type projects. More complex projects, such as this OBGPU should make every attempt to quantify estimated emissions and, if estimated to emit more than 900 tCO_2e annually would be required by the City to prepare a GHG technical analysis report.

5.1.2 Further Analysis Demonstrating a 28.3-percent Reduction in BAU

For projects that do not meet the criteria outlined in Table 4 or emit GHGs in excess of 900 tCO_2e, the City has determined that a project would be consistent with the State's goal to reduce GHG emissions to 1990 levels by 2020, as established in AB 32, if the project demonstrates it can reduce its GHG emissions by 28.3 percent compared to a 2020 BAU scenario. This is based on CARB's 2020 BAU forecast model developed in 2008, which represents the net GHG emissions that would be expected to occur without any GHG project reducing features or mitigation.

5.1.3 Other Threshold Considerations

5.1.3.1 Efficiency and Bright Line Thresholds

The City's 28.3 percent reduction in GHG emissions relative to BAU goal is considered a "performance" threshold. Other GHG performance thresholds, as well as other types of GHG thresholds, have been considered by other jurisdictions. For example, the County of San Diego has completed a recent update to its Guidelines for Determining Significance for Climate Change which includes not only a 16 percent performance threshold (based on the updated BAU forecast and Scoping Plan), but also includes a 4.32 tCO_2e "efficiency" threshold (i.e., a per capita threshold) and a 2,500 tCO_2e "bright line" (i.e., maximum level, operational emissions only) threshold for projects in the County. Similar efficiency or bright line thresholds could be applicable to projects in the City; but have not yet been identified.

5.1.3.2 GHG Regulatory Program Updates

In addition to revisions to the BAU forecast and Scoping Plan, there have also been court cases subsequent to 2008 affecting what regulatory programs designed to reduce GHG emissions statewide can be implemented and/or attributed toward a project's analysis of whether it meets the applicable BAU threshold. For example, CARB's implementation of the LCFS GHG reduction program has been impeded

by recent litigation. In December 2011, a preliminary injunction blocking CARB's implementation of the LCFS was granted. On April 23, 2012, the Ninth Circuit Court of Appeals overturned the injunction pending a ruling on the merits of the case. While there is no injunction currently in place, the City has determined there is sufficient legal uncertainty with this program that projects cannot rely on taking credit for CARB's implementation of the LCFS program when analyzing whether or not it meets the BAU threshold.

5.2. METHODOLOGY AND ASSUMPTIONS

GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod™) Version 2011.1.1 released by CARB in March 2011. CalEEMod™ was developed by the CARB and an air quality consultant, with the participation of several State air districts including the South Coast Air Quality Management District (SCAQMD) and the SDAPCD.

As stated by CARB,

> "the purpose of CalEEMod™ it to provide a uniform platform for government agencies, land use planners, and environmental professionals to estimate potential emissions associated with both construction and operational use of land use projects. It is intended that these emission estimates are suitable for use in CEQA compliant documents for air quality and climate change impacts. CalEEMod™ utilizes widely accepted models for emissions estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources such as the EPA's Compilation of Air Pollution Emission Factors (AP-42) emission factors, CARB vehicle emissions models, studies commissioned by California agencies such as the CEC and CalRecycle."

In brief, the model estimates criteria air pollutants and GHG emissions by multiplying emission source intensity factors by estimated quantities of emission sources based on the land use information entered by the user in the first module of the model. In the first module, the user defines the specific land uses that will occur at the project site. The user also selects the appropriate land use setting (urban or rural), operational year, air basin, and utility provider. The input land uses, size features, and population are used throughout CalEEMod™ in determining default variables and calculations in each of the subsequent modules. The subsequent modules include construction (including off-road vehicle emissions), mobile (on-road vehicle emissions), area sources (woodstoves, fireplaces, consumer products [cleansers, aerosols, solvents], landscape maintenance equipment, architectural coatings), water and wastewater, and solid waste. Each module comprises multiple components including an associated mitigation module to account for further reductions in the reported baseline calculations. These reductions are linked to several of the quantifiable mitigation measures identified in a CAPCOA report on quantifying greenhouse gas mitigation measures[22].

[22] Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures. California Air Pollution Control Officers Association. August, 2010.

5.2.1 Defining Project Characteristics and Land Use

In this module the user is prompted to enter the project's location, setting, climate zone, utility provider, and the specific land uses that will occur. For this analysis, the location was selected as the SDAPCD with an urban (versus suburban) setting, in climate zone 13, served by SDG&E. By identifying the utility provider, its specific energy intensity factors are loaded into the model's calculations. SDG&E's energy intensity factors are 780.89 lbs/Megawatt hours (MWh) for CO_2; 0.029 lbs/MWh for CH_4; and 0.011 lbs/MWh for N_2O.

Energy intensity values are used in CalEEMod™ to determine the GHG emissions associated with electricity use in various modules and are based on CARB's Local Government Operations Protocol for CO_2 and Emissions & Generation Resource Integrated Database[23] (eGRID) for CH_4 and N_2O values.

Table 3 lists the buildout land use quantities that were input to CalEEMod™ to estimate future OBCPU area GHG emissions. As shown in Table 3, the buildout totals include several existing land uses that would remain and not be redeveloped as part of the OBCPU, as well as anticipated new/redeveloped land uses. The Table shows the resulting difference between what is existing and what is proposed.

Emission estimates were calculated for the three GHGs of primary concern (CO_2, CH_4, and N_2O) that would be emitted from construction and the five primary operational sources that would be associated with Plan buildout: on-road vehicular traffic, use of fireplaces and consumer products, energy use (composed of electricity use and natural gas consumption), water use, and solid waste disposal.

5.2.2 Estimating Construction Emissions

Construction emissions were estimated only for the projected land uses that result in an increase. Construction activities emit GHGs primarily though combustion of fuels (mostly diesel) in the engines of off-road construction equipment and through combustion of diesel and gasoline in on-road construction vehicles and in the commute vehicles of the construction workers. Smaller amounts of GHGs are also emitted through the energy use embodied in any water use (for fugitive dust control) and lighting for the construction activity. Every phase of the construction process, including demolition, grading, paving, and building, emits GHG emissions, in volumes proportional to the quantity and type of construction equipment used. The heavier equipment typically emits more GHGs per hour of use than the lighter equipment because of their greater fuel consumption and engine design.

GHG emissions associated with each phase of project construction are calculated in CalEEMod™ by multiplying the total fuel consumed by the construction equipment and worker trips by applicable emission factors. CalEEMod™ forecasts the number and pieces of construction equipment that would be used given project-specific design. In the absence of project-specific construction information, needed equipment for all phases of construction are estimated based on the size of the land use subtype features entered in the land use module.

CalEEMod™ estimates construction emissions for each year of construction activity based on the annual construction equipment profile and other factors determined as needed to complete all phases of construction by the target completion year. As such, each year having reported construction emissions has

[23] http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

varying quantities of GHG emissions. However, as discussed in the SCAQMD's threshold guidelines[24], for the purposes of determining whether or not GHG emissions from affected projects are significant, construction emissions should be amortized over the life of the project, defined as 30 years, and added to the operational emissions. Estimates of the total emissions from construction activities (associated with the development of subsequent projects) estimated by CalEEMod™ were thus divided by 30 and then added to the operational emissions, in accordance with SCAQMD's threshold guidelines.

5.2.3 Estimating Vehicle Emissions

Transportation-related GHG emissions comprise the largest sector contributing to both inventoried and projected statewide GHG emissions, accounting for 38 percent of the projected total statewide 2020 BAU emissions. On-road vehicles alone account for 35 percent of forecasted 2020 BAU emissions. GHG emissions from vehicles come from the combustion of fossil fuels in vehicle engines. The CalEEMod™ model estimates vehicle emissions by first calculating trip rate, trip length, trip purpose, and trip type percentages (e.g., home to work, home to shop, home to other) for each land use type, based on the land use types and quantities entered by the user in the land use module. Default trip rates in CalEEMod™ are based on the Institute of Transportation Engineers Trip Generation 8th Edition trip rates for each respective land use category.

CalEEMod™ default vehicle emission factors and fleet mix are derived from the Emission Factors (EMFAC) 2007 model adjusted to account for Pavley and the LCFS. The adjustments for Pavley and LCFS are only applicable for future years and do not impact EMFAC values prior to these regulations' implementation. CalEEMod™ anticipates that most users will not edit these data. For this analysis, the CalEEMod™ default values that account for Pavley and LCFS were assumed to yield accurate estimates of the future OBCPU with GHG reductions scenarios (for both the No Change and Change land uses).

5.2.4 Estimating Energy Use Emissions

GHGs are emitted as a result of activities in buildings for which electricity and natural gas are used as energy sources. GHGs are generated during the generation of electricity from fossil fuels off-site in power plants. The emissions are considered indirect emissions, since they are not emitted directly at the source but are indirectly attributed to the source. Electric power generation accounts for the second largest sector contributing to both inventoried and projected statewide GHG emissions, comprising 24 percent of the projected total 2020 Statewide BAU emissions. A building source can have direct emissions when the emitting implement is located in the building, These are considered direct emissions and associated with that building. CalEEMod™ only estimates emissions from the direct combustion of natural gas. Fuel oil, kerosene, liquefied petroleum gas, and wood can also be used as fuels, but they generally contribute only small amounts, and thus CalEEMod™ does not account for their emissions. Use of these other fuels is not anticipated for Ocean Beach.

CalEEMod™ estimates GHG emissions from energy use by multiplying average rates of residential and non-residential energy consumption by the quantities of residential units and non-residential square footage entered in the land use module to obtain total projected energy use. This value is then multiplied by electricity and natural gas GHG emission factors applicable to the project location and utility provider.

[24] Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. South Coast Air Quality Management District. December 5, 2008.

Building energy use is typically divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting. Non-building energy use, or "plug-in energy use," can be further subdivided by specific end-use (refrigeration, cooking, office equipment, etc.). CalEEMod™ thus calculates electricity use by:

- Calculating energy use from systems covered by Title 24 (i.e., Heating, Ventilating, and Air Conditioning system, water heating system, and the lighting system);
- Calculating energy use from lighting use; and
- Calculating energy use from office equipment, appliances, plug-in electronics, and other sources not covered by Title 24 or lighting.
- Lighting is calculated separately, since it can be both part and not part of Title 24. Natural gas use is just distinguished in the model as Title 24 or Non-Title 24 similar to electricity consumption.

CalEEMod™ default energy values are based on the California Energy Commission (CEC)-sponsored California Commercial End Use Survey[25] (CEUS) and Residential Appliance Saturation Study[26] (RASS) reports, which identify energy use by building type and climate zone. Each land use type input to the land use module is mapped in the energy module to the appropriate CEUS and RASS building type. Because these studies are based on older buildings, adjustments have been made in CalEEMod™ to account for changes to Title 24 building codes. The default adjustment is to the current 2008 Title 24 energy code (part 6 of the building code).

5.2.5 Estimating Area Source Emissions

This CalEEMod™ module estimates the GHG emissions that would occur from the use of hearths, woodstoves, and landscaping equipment. This module also estimates emissions due to use of consumer products and architectural coatings that have volatile organic content. However, the use of consumer products and architectural coatings does not emit GHGs. The use of hearths (fireplaces) and woodstoves directly emits CO_2, CH_4, and N_2O from the combustion of natural gas, wood, or biomass. Various renewable fuels are used to produce heat but in estimating CO_2e, only the CH_4 and N_2O emission are used since the CO_2 emissions would have occurred eventually as the biomass decayed. These CO_2 emissions, labeled "from biogenic materials", are estimated and tracked, but are not included in calculations of CO_2e. CalEEMod™ estimates emissions from hearths and woodstoves only for residential uses based on the type and size features of the residential land use inputs.

The use of landscape equipment emits GHGs associated with the equipment's fuel combustion. CalEEMod™ estimates the number and type of equipment needed based on the number of summer days given the OBCPU's location as entered in the project characteristics module. The model defaults for hearths, woodstoves, and landscaping equipment were assumed.

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[25] California Commercial End-Use Survey. California Energy Commission. CEC-400-2006-005. March 2006

[26] 2009 California Residential Appliance Saturation Study. California Energy Commission. CEC- 200- 2010- 004. October 2010.

5.2.6 Estimating Water and Wastewater Emissions

The amount of water used and wastewater generated by a project has indirect GHG emissions associated with it. These emissions are a result of the energy used to supply, distribute, and treat the water and wastewater. In addition to the indirect GHG emissions associated with energy use, wastewater treatment can directly emit both methane and nitrous oxide.

The CalEEMod™ water/wastewater module estimates the land uses contribution to GHG emissions associated with supplying and treating the water and wastewater. Default rates of indoor and outdoor water use for each residential land use subtype in CalEEMod™ comes from Table ES-1 of the Pacific Institute's 2003 urban water conservation report[27] that gives water demand in gallons per dwelling unit type. Wastewater generation was similarly based on a reported percentage of total indoor water use. For a few land uses (place of worship, movie theater, civic center) where the Pacific Institute report did not provide sufficient data, CalEEMod™ uses the American Water Works Association Research Foundation's Commercial and Institutional End Uses of Water report.

5.2.7 Estimating Solid Waste Emissions

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. CalEEMod™ determines the GHG emissions associated with disposal of solid waste into landfills. Portions of these emissions are "from biogenic materials". To estimate the GHG emissions that would be generated by disposing of the solid waste associated with OBCPU buildout, the total volume of solid waste associated with each OBCPU alternative was first estimated in the model using waste disposal rates identified by CalRecycle. CalEEMod™ methods for quantifying GHG emissions from solid waste are based on the IPCC method using the degradable organic content of waste. Existing and OBCPU GHG emissions associated with waste disposal were calculated using default parameters from CalEEMod™.

[27] Waste Not, Want Not: The Potential for Urban Water Conservation in California. Pacific Institute. November 2003.

SECTION 6.0 – POTENTIAL IMPACT ANALYSIS

In accordance with CEQA and City guidelines, this analysis evaluates the significance of the proposed OBCPU by answering the two CEQA Guidelines Appendix G questions:

(1) Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

(2) Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

6.1. WOULD THE PROJECT GENERATE GHG EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT?

Impact Analysis

The same model, assumptions, and defaults were used to estimate the GHG emissions from the land uses listed in the proposed buildout (see Table 3). The projected GHG emissions that would be generated from the OBCPU were estimated using the methodology described above. The complete calculations including the input parameters are included in Attachment 1.

Vehicle Emissions

GHG emissions would be emitted from vehicles associated with OBCPU buildout and would come from the combustion of fossil fuels (primarily gasoline and diesel) in vehicle engines. The quantity and type of transportation fuel consumed, and the number of miles driven determines the amount of GHGs emitted from a vehicle. The method for calculating these emissions is described above.

Table 3 shows that the proposed land uses for the Ocean Beach area would result in an increase of 1,314 residential dwelling units, a net increase of 1,000 square feet of retail/commercial uses, and various other minor changes. Using CalEEMod™ default trip rates and trip lengths there would be approximately 254,439,864 annual VMT. Since the annual VMT estimated in the base year CalEEMod™ run were only 230,977,729, there would be an estimated projected increase of 22,398,978 annual VMT, which represents approximately a 9.7 percent increase.

The increase in VMT is offset by the reduction that comes from the cleaning of the fleet, where natural attrition replaces dirtier older cars with cleaner new cars. In fact, using data from EMFAC2011[28] the 2030 fleet average CO_2 emission rates for San Diego County is projected to drop by over 30 percent over the 2010 rates. This is not only due to Pavley and LCFS but also the new fuel efficiency standards. Even without Pavley and LCFS, the emission rates drop almost 20 percent.

Subsequently, the CO_2e emissions from mobile sources from buildout conditions is only 91,507 tonnes, which is a 16.8 percent reduction from existing conditions of 110,017 tonnes.

[28] EMFAC2007 is used in the current version of CalEEMod for calculations. A new CalEEMod version, suing new EMFAC2011 numbers, is presently in Beta testing and not available at this time.

Energy Use Emissions

GHG emissions would be generated by the OBCPU buildout use of electricity and combustion of natural gas. The method for calculating these emissions is described above. CalEEMod™ estimates that the total annual energy consumption associated with the OBCPU at projected buildout would be approximately 30,382 tCO_2e, which represents an 11.8 percent increase from current conditions. Of this total, approximately 10,239 tCO_2e would be generated annually from natural gas combustion, and 20,143 tCO_2e from electricity use.

Area Source Emissions

Buildout land uses would emit GHGs from the area sources of landscape maintenance equipment and fireplaces. The method for calculating these emissions is described above. CalEEMod™ estimates that approximately 12,062 tCO_2e would be emitted annually given land use projections, which represents a 16.8 percent increase from current conditions.

Water Use Emissions

The supply and treatment of water to OBCPU area end users would consume energy, known as embodied energy. GHGs would be emitted from the generation of this embodied energy. The method for calculating these emissions is described above. CalEEMod™ estimates that the embodied energy needed to supply and treat future water use in the OBCPU area would emit 5,562 tCO_2e, which represents an 8.5 percent increase from current conditions.

Solid Waste Emissions

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. The method for calculating these emissions is described in above. CalEEMod™ estimates that projected land uses would generate approximately 3.672 tCO_2e associated with solid waste disposal, which represents a 13.7 percent increase from current conditions.

Construction Emissions

GHGs would be emitted from construction equipment, and worker and vendor vehicle trips associated with the development of new or renovated land uses. The method for calculating these emissions is described above.

Construction emissions estimates were calculated using only the land uses that would increase between current and buildout conditions. These land uses would include 1,000 square feet of Government Office Buildings, 76,800 square feet of Strip Mall, 5 Apartments Low Rise dwelling units, 821 Apartments Mid Rise dwelling units, and 488 Single Family Housing dwelling units. CalEEMod™ estimates that construction activities would generate a total of 23,944 tCO_2e during development of these land uses. For the purpose of this analysis total construction GHG emissions were divided by 30 years in order to identify annual construction GHG emissions. This is in accordance with SCAQMD's Interim Guidelines. Thus, annual construction GHG emissions associated with buildout of proposed land uses would approximate 765 tCO_2e each year.

Table 5 – Projected Plan Area GHG Emissions in 2030

Sector	Tonnes CO_2e
Mobile	91,507
Energy Use	30,382
Area Sources	12,062
Water Use	5,562
Solid Waste Disposal	3,672
Construction	765
Total	***143,949***

Total Projected OBCPU Emissions

Table 5 shows the total CO_2e emissions estimated to be generated in 2030 from the projected land uses in the OBCPU. As the total of 143,949 tCO_2e is a reduction from the 155,792 tCO_2e that was estimated to have been generated in 2010; therefore, the OBCPU does not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Therefore there is a less than significant effect.

6.2. WOULD THE PROJECT CONFLICT WITH AN APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GHGS?

Impact Analysis

6.2.1.1 Overview of Local and State GHG Reduction Measures

The regulatory plans and policies discussed extensively above aim to reduce national, State, and local GHG emissions by primarily targeting the largest emitters of GHGs: the transportation and energy sectors. The goals and regulatory standards discussed above are thus largely focused on the automobile industry and public utilities. For the transportation sector, the reduction strategy is generally three pronged: to reduce GHG emissions from vehicles by improving engine design; to reduce the carbon content of transportation fuels through research, funding, and incentives to fuel suppliers; and to reduce the miles vehicles traveled through land use change and infrastructure investments. The types of land use changes that can measurably reduce GHG emissions associated with vehicle use include: increased density; increased diversity (mixed-use); improved walkability design; improved transit accessibility; transit improvements; integration of below market-rate housing; and constrained parking. In CAPCOA's report on quantifying GHG reduction measures[29], many mitigation strategies are evaluated based on effectiveness. The effectiveness of these land-use strategies ranges from less than one percent up to a maximum 30 percent reduction in community wide VMT and are not additive.

[29] Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures. California Air Pollution Control Officers Association. August, 2010.

For the energy sector, the reduction strategies of local, State and national plans aim to reduce energy demand; impose emission caps on energy providers; establish minimum building energy and green building standards; transition to renewable non-fossil fuels; incentivize homeowners and builders; fully recover landfill gas for energy; expand research and development; and so forth. At the plan or project-level, policies or incentive programs for builders to exceed the current Title 24 energy efficiency standards, to install high efficiency lighting and energy-efficient plug-in appliances (for energy uses not subject to Title 24), and to incorporate on-site renewable energy generation can result in substantial GHG emissions reductions, up to 35 percent or more. Energy use associated with water consumption and wastewater treatment can also be reduced by applying an overall water reduction strategy (e.g., of 20% on indoor and outdoor water use) and/or policies and actions related to using reclaimed and gray water, installation of low-flow plumbing fixtures, use of water-efficient landscape design including turf reduction, and use of water-efficient irrigation systems. The institution of recycling and composting services can also reduce the energy embodied in the disposal of solid waste.

In addition to strategies aimed at reducing GHG emissions associated with vehicle and energy use, relevant local and State plans include GHG reduction strategies aimed at: reducing the heat island effect (and therefore energy-for-cooling demand) through urban forestry and shade tree programs; reducing area source emissions from woodstoves and fireplaces through stricter restrictions on fuel type and restriction against their use; and restricting the type of landscaping equipment used (such as use of only electric-powered lawn mowers, leaf blowers, and chain saws).

Additional policies and strategies focus on climate adaptation and include policies and strategies to increase climate adaptability and resilience through climate-sensitive building guidelines (e.g., through appropriate building orientation and glazing design), sea-level monitoring, and defensible building design.

6.2.1.2 Consistency with Local GHG Reduction Measures

As a Planning Area within the City of San Diego, Ocean Beach (PA#31) is governed by the Policies of the SDGP[30]. As the SDGP describes it, the General Plan is:

> "its constitution for development. It is the foundation upon which all land use decisions in the City are based. It expresses community vision and values, and it embodies public policy for the distribution of future land use, both public and private."[31]

The SDGP provides strategy, called the City of Villages, for how the City can enhance its many communities and neighborhoods as growth occurs over time. The City of Villages is a smart growth strategy which demonstrates a strong commitment to sustainable land use practices. Its strategy focuses growth into mixed-use villages, of different scales, that are linked to the transit system, while respecting San Diego's natural environment and wealth of distinctive neighborhoods.

Policies which address local GHG mitigation strategies in San Diego are integrated within the SDGP, which has issues dealing with the City of Villages strategy; GHG emissions and alternative modes of

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30 City of San Diego General Plan. Planning & Community Investment Department, City of San Diego. March 10, 2008.

31 City of San Diego General Plan: Strategic Framework. Planning & Community Investment Department, City of San Diego. March 10, 2008.

transportation; energy efficiency; urban heat island effect; waste management and recycling; and water management and supply. As described below, in several cases these policies are also consistent with key state GHG reduction plans, regulations, and recommended mitigation measures. An overview of relevant OBCPU elements and policies is outlined below.

Conservation Element

The purpose of the Conservation Element of the SDGP is to become an international model of sustainable development and conservation. Since climate change is a growing concern for cities around the world, the State and local governments have taken a leadership role in addressing mitigation and adaptation strategies for a changing climate. The Conservation Element sets forth a citywide vision that ties various natural resource-based plans and programs together using a village strategy of growth and development. It contains policies for sustainable development, preservation of open space and wildlife, management of resources, and other initiatives to protect the public health, safety and welfare.

Climate Change & Sustainable Development

The energy requirement to maintain the built environment contributes nearly half of the GHG emissions nationally, and the second highest source is from vehicle emissions, however, in San Diego, vehicle emissions constitute more than half of the region's GHG emissions. Additionally, buildings represent a significant portion of the nation's consumption of raw materials and waste output.

Following are some of the SDGP policies that are specifically pertinent to the OBCU Planning Area.

CE-A.2 – Reduce the City's carbon footprint. Develop and adopt new or amended regulations, programs, and incentives as appropriate to implement the goals and policies set forth in the General Plan to:

- Create sustainable and efficient land use patterns to reduce vehicular trips and preserve open space;
- Reduce fuel emission levels by encouraging alternative modes of transportation and increasing fuel efficiency;
- Improve energy efficiency, especially in the transportation sector and buildings and appliances;
- Reduce the Urban Heat Island effect through sustainable design and building practices, as well as planting trees (consistent with habitat and water conservation policies) for their many environmental benefits, including natural carbon sequestration;
- Reduce waste by improving management and recycling programs;
- Plan for water supply and emergency reserves.

CE-A.5 – Employ sustainable or "green" building techniques for the construction and operation of buildings.

a. Develop and implement sustainable building standards for new and significant remodels of residential and commercial buildings to maximize energy efficiency, and to achieve overall net zero energy consumption by 2020 for new residential buildings and 2030 for new commercial buildings. (See SDGP for list of factors).

CE-A.6 – Design new and major remodels to City buildings, and where feasible, long term building leases for City facilities, to achieve at a minimum, the Silver Rating goal identified by the Leadership in Energy and Environmental Design Green Building Rating System to conserve resources, including but not limited to energy and renewable resources.

CE-A.8 – Reduce construction and demolition waste in accordance with Public Facilities Element, Policy PF-I.2, or by renovating or adding on to existing buildings, rather than constructing new buildings.

CE-A.9 – Reuse building materials, use materials that have recycled content, or use materials that are derived from sustainable or rapidly renewable sources to the extent possible. (See SDGP for list of factors).

CE-A.10 – Include features in buildings to facilitate recycling of waste generated by building occupants and associated refuse storage areas. (See SDGP for specifics).

CE-A.11 – Implement sustainable landscape design and maintenance. (See SDGP for specifics).

CE-A.12 – Reduce the San Diego Urban Heat Island. (See SDGP for list of actions).

Open Space and Landform Preservation

The City's parks, open space, trails and pedestrian linkages are part of an integrated system that connect with regional and state resources and provide opportunities for residents and visitors to experience San Diego's open spaces.

CE-B.5 – Maximize the incorporation of trails and greenways linking local and regional open space and recreation areas into the planning and development review processes.

Coastal Resources

In the City, the Coastal Zone encompasses approximately 40,000 acres of public and private land and waters. Development in the coastal zone in California is governed by the California Coastal Act of 1976. The Coastal Act directs local governments to prepare Local Coastal Programs in accordance with the Act's policies. These policies are designed to guide development in the coastal areas, beach and lagoon resource management, public access, low-cost visitor-serving recreational uses and conservation of the unique qualities and nature of the coast.

CE-C.7 – Encourage conservation measures and water recycling programs that eliminate or discourage wasteful uses of water.

Water Resources Management

San Diego has a semi-arid coastal climate with coastal areas receiving an average of ten inches of rain annually. The City's historically reliable water supply is credited to its ability to import and store water supplies from the Colorado River and Northern California.

CE-D.1 – Implement a balanced, water conservation strategy as an effective way to manage demand by: reducing dependence on imported water supplies; maximizing the efficiency of existing urban water and agricultural supplies through conservation measures/programs; and developing alternative, reliable sources to sustain present and future water needs. (See SDGP for specifics).

CE-D.5 – Integrate water and land use planning into local decision-making, including using water supply and land use studies in the development review process.

Air Quality

The City has taken an additional step toward improving air quality beyond all the efforts on criteria pollutants by federal, State, and local agencies through participation in the Cities for Climate Protection program. The Climate Protection Action Plan is a component of this program, and is designed to improve local air quality and to reduce GHG emissions that contribute to climate change.

CE-F.2 – Continue to upgrade energy conservation in City buildings and support community outreach efforts to achieve similar goals in the community.

CE-F.3 – Continue to use methane as an energy source from inactive and closed landfills.

CE-F.4 – Preserve and plant trees and vegetation that are consistent with habitat and water conservation policies and that absorb CO2 and pollutants.

CE-F.6 – Encourage and provide incentives for the use of alternatives to single-occupancy vehicle use, including using public transit, carpooling, vanpooling, teleworking, bicycling, and walking. Continue to implement programs to provide City employees with incentives for the use of alternatives to single-occupancy vehicles.

Sustainable Energy

San Diego's main drivers of energy demand are population, economic development, housing, and land use. Establishing more local energy sources, with an emphasis on clean, renewable sources, will provide increased economic stability and environmental benefits. Using renewable energy sources reduces dependence on fossil fuels and also helps to reduce carbon dioxide and other gases in the atmosphere. Water conservation also helps reduce energy use, as almost 60 percent of the energy used by the City organization goes for pumping water and sewage.

CE-I.4 – Maintain and promote water conservation and waste diversion programs to conserve energy.

CE-I.5 – Support the installation of photovoltaic panels, and other forms of renewable energy production.

CE-I.6 – Develop emergency contingency plans, in cooperation with other local agencies and regional suppliers, to assure essential energy supplies and reduce non-essential consumption during periods of energy shortage.

CE-I.8 – Improve fuel-efficiency to reduce consumption of fossil fuels.

CE-I.10 – Use renewable energy sources to generate energy to the extent feasible.

Urban Forestry

The City's urban forest, comprised of publicly and privately owned trees, helps reduce energy consumption, improve air quality, reduce storm water runoff, decrease soil erosion, improve the pedestrian environment, reduce glare, and improve community image and aesthetics.

CE-J.1 – Develop, nurture, and protect a sustainable urban/community forest. (See SDGP for specifics).

CE-J.4 – Continue to require the planting of trees through the development permit process.

a. Consider tree planting as mitigation for air pollution emissions, storm water runoff, and other environmental impacts as appropriate.

Environmental Education

Education offers individuals the information they need to make informed decisions on how their everyday actions may affect the environment.

CE-N.4 – Publicize voluntary water and energy conservation measures that focus on reducing waste and decreasing the possibility of rationing and other undesirable restrictions.

CE-N.5 – Actively encourage public discussion of air quality policies, understanding that it is individual decisions that are an essential component to their success.

CE-N.7 – Support education programs on waste minimization, reuse, recycling and resource recovery that involve the media, schools, industry, government, and academia.

Land Use and Community Planning Element

The purpose of the Land Use and Community Planning Element of the SDGP is to guide future growth and development into a sustainable citywide development pattern, while maintaining or enhancing quality of life in our communities. Since the majority of the City is developed, infill development and redevelopment will play an increasingly significant role in providing needed housing, jobs, and services in our communities.

City of Villages Strategy

The City of Villages strategy is to focus growth into mixed-use activity centers that are pedestrian-friendly, centers of community, and linked to the regional transit system. Implementation of the City of Villages strategy is an important component of the City's strategy to reduce local contributions to greenhouse gas emissions, because the strategy makes it possible for larger numbers of people to make fewer and shorter auto trips.

Although there are no formally-designated mixed-use villages within Ocean Beach, the community's commercial districts have elements of Community and Neighborhood Village Centers as outlined in the General Plan. The Voltaire Street, Newport Avenue and the Point Loma Avenue Districts comprise vibrant commercial areas with residential units scattered above or near commercial uses. These areas, which are generally well-served by transit, have evolved over time into pedestrian-oriented public gathering spaces and should be preserved.

Following are some of the SDGP policies that are specifically pertinent to the OBCU Planning Area.

LU-A.2 – Identify sites suitable for mixed-use village development that will complement the existing community fabric or help achieve desired community character, with input from recognized community planning groups and the general public.

LU-A.4 – Locate village sites where they can be served by existing or planned public facilities and services, including transit services.

LU-A.8 – Determine at the community plan level where commercial uses should be intensified within villages and other areas served by transit, and where commercial uses should be limited or converted to other uses.

Balanced Communities and Equitable Development

Balanced communities can contribute toward achievement of a fair and equal society, and have the additional advantage of providing more people with the opportunity to live near their work.

LU-H.6 – Provide linkages among employment sites, housing, and villages via an integrated transit system and a well-defined pedestrian and bicycle network.

LU-H.7 – Provide a variety of different types of land uses within a community in order to offer opportunities for a diverse mix of uses and to help create a balance of land uses within a community.

Environmental Justice

Environmental justice is defined in federal and state law as "the fair treatment of people of all races, cultures and income levels with respect to the development, adoptions, implementation and enforcement of environmental laws, regulations and policies."

LU-I.9 – Design transportation projects so that the resulting benefits and potential burdens are equitable. Some of the benefits of transportation programs include improved accessibility, faster trips, more mobility choices, and reduced congestion. Common negative consequences include health impacts of air pollution, noise, crash-related injuries and fatalities, dislocation of residents, and division of communities.

LU-I.11 – Implement the City of Villages concept for mixed-use, transit-oriented development as a way to minimize the need to drive by increasing opportunities for individuals to live near where they work, offering a convenient mix of local goods and services, and providing access to high quality transit services.

Mobility Element

The purpose of the Mobility Element of the SDGP is to improve mobility through development of a balanced, multi-modal transportation network. An overall goal of the Mobility Element is to further the attainment of a balanced, multi-modal transportation network that gets us where we want to go and minimizes environmental and neighborhood impacts. Taken together, these policies advance a strategy for congestion relief and increased transportation choices in a manner that strengthens the City of Villages land use vision and helps achieve a clean and sustainable environment.

Walkable Communities

People enjoy walking in places where there are sidewalks shaded with trees, lighting, interesting buildings or scenery to look at, other people outside, neighborhood destinations, and a feeling of safety. Pedestrian improvements in areas with land uses that promote pedestrian activities can help to increase walking as a means of transportation and recreation. The policies below address safety, accessibility, connectivity, and walkability goals. More specific actions to implement these policies are recommended to be included in a citywide Pedestrian Master Plan.

Following are some of the SDGP policies that are specifically pertinent to the OBCU Planning Area.

ME-A.1 – Design and operate sidewalks, streets, and intersections to emphasize pedestrian safety and comfort through a variety of street design and traffic management solutions. (See SDGP for specifics).

ME-A.2 – Design and implement safe pedestrian routes.

a. Collaborate with appropriate community groups, and other interested private and public sector groups or individuals to design and implement safe pedestrian routes to schools, transit, and other highly frequented destinations. Implement needed improvements and programs such as wider and non-contiguous sidewalks, more visible pedestrian crossings, traffic enforcement, traffic calming, street and pedestrian lighting, pedestrian trails, and educating children on traffic and bicycle safety.

ME-A.3 – Engage in a public education campaign to increase drivers' awareness of pedestrians and bicyclists, and to encourage more courteous driving.

ME-A.6 – Work toward achieving a complete, functional and interconnected pedestrian network.

a. Ensure that pedestrian facilities such as sidewalks, trails, bridges, pedestrian-oriented and street lighting, ramps, stairways and other facilities are implemented as needed to support pedestrian circulation. (See SDGP for specifics).

ME-A.7 – Improve walkability through the pedestrian-oriented design of public and private projects in areas where higher levels of pedestrian activity are present or desired.

a. Enhance streets and other public rights-of-way with amenities such as street trees, benches, plazas, public art or other measures including, but not limited to those described in the Pedestrian Improvement Toolbox. (See SDGP for specifics).
b. Design site plans and structures with pedestrian-oriented features.
c. Encourage the use of non-contiguous sidewalk design where appropriate to help separate pedestrians from auto traffic. In some areas, contiguous sidewalks with trees planted in grates adjacent to the street may be a preferable design.
d. Enhance alleys as secure pathways to provide additional pedestrian connections.
e. Implement traffic calming measures to improve walkability

ME-A.8 – Encourage a mix of uses in villages, commercial centers, transit corridors, employment centers and other areas as identified in community plans so that it is possible for a greater number of short trips to be made by walking.

Transit First

A primary strategy of the SDGP is to reduce dependence on the automobile in order to achieve multiple and inter-related goals including: increasing mobility, preserving and enhancing neighborhood character, improving air quality, reducing storm water runoff, reducing paved surfaces, and fostering compact development and a more walkable city. Expanding transit services is an essential component of this strategy.

ME-B.1 – Work closely with regional agencies and others to increase transit ridership and mode share through increased transit service accessibility, frequency, connectivity, and availability. (See SDGP for specifics).

ME-B.3 – Design and locate transit stops/stations to provide convenient access to high activity/density areas, respect neighborhood and activity center character, implement community plan recommendations, enhance the users' personal experience of each neighborhood/center, and contain comfortable walk and wait environments for customers. (See SDGP for specifics).

ME-B.8 – Support efforts to use alternative fuels in transit vehicles to help implement air quality and energy conservation goals.

Transportation Demand Management

Transportation Demand Management (TDM) is a general term for strategies that assist in reducing the demand by single-occupant vehicles to increase the efficiency of existing transportation resources. TDM strategies are also a part of the City's overall effort to reduce vehicle emissions that degrade air quality and contribute to global climate change.

ME-E.1 – Support and implement TDM strategies including, but not limited to: alternative modes of transportation, alternative work schedules, and telework.

ME-E.2 – Maintain and enhance personal mobility options by supporting public and private transportation projects that will facilitate the implementation of TDM strategies.

ME-E.3 – Emphasize the movement of people rather than vehicles.

ME-E.4 – Promote the most efficient use of the City's existing transportation network.

ME-E.6 – Require new development to have site designs and on-site amenities that support alternative modes of transportation. Emphasize pedestrian and bicycle-friendly design, accessibility to transit, and provision of amenities that are supportive and conducive to implementing TDM strategies such as car sharing vehicles and parking spaces, bike lockers, preferred rideshare parking, showers and lockers, on-site food service, and child care, where appropriate.

ME-E.7 – Consider TDM programs with achievable trip reduction goals as partial mitigation for development project traffic and air quality impacts.

Bicycling

Of all trips taken by all transportation modes, the average length is five miles—about a 30-minute bicycle ride. Many of these trips could be taken by bicycling, provided adequate consideration has been given to cycling infrastructure.

ME-F.2 – Identify and implement a network of bikeways that are feasible, fundable, and serve bicyclists' needs, especially for travel to employment centers, village centers, schools, commercial districts, transit stations, and institutions. (See SDGP for specifics).

ME-F.4 – Provide safe, convenient, and adequate short- and long-term bicycle parking facilities and other bicycle amenities for employment, retail, multifamily housing, schools and colleges, and transit facility uses. (See SDGP for specifics).

ME-F.5 – Increase the number of bicycle-transit trips by coordinating with transit agencies to provide safe routes to transit stops and stations, to provide secure bicycle parking facilities, and to accommodate bicycles on transit vehicles.

Parking Management

Greater management of parking spaces can help achieve mobility, environmental, and community development goals.

ME-G.5 – Implement parking strategies that are designed to help reduce the number and length of automobile trips. Reduced automobile trips would lessen traffic and air quality impacts, including greenhouse gas emissions. (See SDGP for potential strategies).

Regional Coordination and Financing

The funding of necessary improvements to our transportation system is a major challenge. There are still many desired projects that are unfunded, such as neighborhood-based transit service (circulators and shuttles).

ME-K.6 – Require development proposals to provide a mix of multi-modal transportation facilities, where needed, in accordance with the policies established in the Public Facilities Element, Section C.

Public Facilities, Services, and Safety Element

The purpose of the Public Facilities, Services, and Safety Element of the SDGP is to provide the public facilities and services needed to serve the existing population and new growth. Following are some of the SDGP policies that are specifically pertinent to the OBCU Planning Area.

Wastewater

The City's wastewater system protects ocean water quality and the environment, supplements a limited water supply, and meets all federal and state standards.

PF-F.5 – Construct and maintain facilities to accommodate regional growth projections that are consistent with sustainable development policies.

Water Infrastructure

The City's potable water system serves the City and certain surrounding areas, including both retail and wholesale customers. In addition to delivering potable water the City has a recycled water use program to optimize the use of local water supplies, lessen the reliance on imported water, and free up capacity in the potable system.

PF-H.1 – Optimize the use of imported supplies and improve reliability by increasing alternative water sources to: provide adequate water supplies for present uses, accommodate future growth, attract and support commercial and industrial development, and supply local agriculture. (See SDGP for specifics).

Waste Management

A primary component of any integrated solid waste management strategy is waste reduction. As emphasized in State, county, and City laws and planning documents, the less waste material that is produced in the first place, the better, both from an economic and an environmental perspective. Waste reduction is essential in all facets of society, including the home, government and private offices, farms, manufacturing facilities, and entertainment establishments. It is the City's responsibility to manage the collection, recycling/composting, and disposal of waste materials.

PF-I.1 – Provide efficient and effective waste collection services. (See SDGP for specifics).

PF-I.2 – Maximize waste reduction and diversion. (See SDGP for specifics).

PF-I.3 – Provide environmentally sound waste disposal facilities and alternatives. (See SDGP for specifics).

Recreation Element

The goals and policies of the Recreation Element have been developed to take advantage of the City's natural environment and resources, to build upon existing recreation facilities and services, to help achieve an equitable balance of recreational resources, and to adapt to future recreation needs.

Following is an SDGP policy that is specifically pertinent to the OBCU Planning Area.

RE-A.7 – Establish a policy for park design and development which encourages the use of sustainable methods and techniques to address water and energy conservation, green buildings, low maintenance plantings and local environmental conditions, such as soil and climate.

Urban Design Element

Urban design describes the physical features that define the character or image of a street, neighborhood, community, or the City as a whole. Urban design is the visual and sensory relationship between people and the built and natural environment.

A major challenge for the City is to return to the traditional pedestrian-oriented forms of development but with modifications to reflect modern realities such as crime, safety and automobile dependency. A compact, efficient, and environmentally sensitive pattern of development becomes increasingly important as the City continues to grow. In addition, future development should accommodate and support existing and planned transit service.

Following are some of the SDGP policies that are specifically pertinent to the OBCU Planning Area.

General Urban Design

There are several urban design issues relating to existing City form and the compact and environmentally sensitive pattern of development envisioned in the City of Villages strategy. These issues provide a framework for the goals of the Urban Design Element.

UD-A.2 – Use open space and landscape to define and link communities.

a. Link villages, public attractions, canyons, open space and other destinations together by connecting them with trail systems, bikeways, landscaped boulevards, formalized parks, and/or natural open space, as appropriate.

UD-A.3 – Design development adjacent to natural features in a sensitive manner to highlight and complement the natural environment in areas designated for development.

n. Provide public pedestrian, bicycle, and equestrian access paths to scenic view points, parklands, and where consistent with resource protection, in natural resource open space areas.

UD-A.4 – Use sustainable building methods in accordance with the sustainable development policies in the Conservation Element.

UD-A.5 – Design buildings that contribute to a positive neighborhood character and relate to neighborhood and community context.

i. Maximize natural ventilation, sunlight, and views.

UD-A.8 – Landscape materials and design should enhance structures, create and define public and private spaces, and provide shade, aesthetic appeal, and environmental benefits.

a. Maximize the planting of new trees, street trees and other plants for their shading, air quality, and livability benefits.

b. Use water conservation through the use of drought-tolerant landscape, porous materials, and reclaimed water where available.

UD-A.9 – Incorporate existing and proposed transit stops or stations into project design. (See SDGP for specifics).

UD-A.10 – Design or retrofit streets to improve walkability, bicycling, and transit integration; to strengthen connectivity; and to enhance community identity.

Distinctive Neighborhoods and Residential Design

The design and quality of infill housing is critical to ensuring that new housing fits into our existing neighborhoods. New development, whether it is in the form of infill, redevelopment, or first-time development, should contribute to the creation and preservation of neighborhood character and creation of a sense of place.

UD-B.5 – Design or retrofit streets to improve walkability, strengthen connectivity, and enhance community identity. (See SDGP for specifics).

UD-B.6 – Utilize alleys to provide improved and alternative pedestrian access to sites. This would include consideration of a promenade or paseo design for alleys with enhanced landscaping, and residential units or uses that face the alleys to activate them as alternative pedestrian streets. This could provide an alternative function for alleys that is non-vehicular, but still provides linkages to other sites and uses and adds to a neighborhood's connectivity.

Mixed-Use Villages and Commercial Areas

The City of Villages strategy identifies a village as a mixed-use center of a community where residential, commercial, employment, and civic uses are present. The intent is that a high quality of urban design will achieve the maximum possible integration of uses and activities connected to the surrounding community fabric and the transit system.

UD-C.1 – In villages and transit corridors identified in community plans, provide a mix of uses that create vibrant, active places in villages.

c. Encourage placement of active uses, such as retailers, restaurants, cultural facilities and amenities, and other various services, on the ground floor of buildings in areas where the greatest levels of pedestrian activity are sought.

d. Encourage the provision of approximately ten percent of a project's net site area as public space, with adjustments for smaller (less than ten acres) or constrained sites. Public space may be provided in the form of plazas, greens, gardens, pocket parks, amphitheaters, community meeting rooms, public facilities and services, and social services.

UD-C.2 – Design village centers to be integrated into existing neighborhoods through pedestrian-friendly site design and building orientation, and the provision of multiple pedestrian access points.

UD-C.4 – Create pedestrian-friendly village centers. (See SDGP for specifics).

UD-C.6 – Design project circulation systems for walkability. (See SDGP for specifics).

UD-C.7 – Enhance the public streetscape for greater walkability and neighborhood aesthetics. (See SDGP for specifics).

In addition to the governing policies of the SDGP, the OBPP[32] includes Plan Recommendations that also govern activity in the Ocean Beach area. Following are some pertinent recommendations:

Commercial Element

- That the three commercial districts be contained in area in order to foster compactness and facilitate pedestrian orientation.
- That office and residential uses be encouraged, in addition to retail commercial, in the three districts, especially as mixed uses in the same structure.

Transportation Element

- That the car pool program being developed by the City should be implemented.
- That existing bus service be improved by reducing travel time and developing more direct links to various parts of San Diego.
- That consideration be given to the establishment of a public transit system connecting Ocean Beach as directly as possible with area college campuses.
- That intra-community transit service be established by the San Diego Transit Corporation, linking the various activity centers in Ocean Beach.
- That, upon development of parking reservoirs at the fringe of the community, public transit be instituted to transport beach users from their cars to the beach.
- That a bikeway be marked adjacent to the coast the entire length of Ocean Beach.
- That adequate signs be established to identify all bikeways.

[32] Ocean Beach Precise Plan and Local Coastal Addendum. San Diego Planning Department. April 2, 1975.

6.2.1.3 Consistency with State GHG Reduction Measures

California's AB 32 Scoping Plan encourages local governments to adopt a GHG emissions reduction goal consistent with the State's overall goal of reducing Statewide emissions to 1990 levels by 2020 (an approximate 15% reduction from today's levels). However, since 1990 data on a jurisdictional level may not be available, ARB suggests that local governments set their targets based on today's levels, using the most current and best available GHG emissions data for their jurisdictions.

Local governments are essential partners in achieving California's goals to reduce GHGs[33]. They have broad influence and, in some cases, exclusive authority over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the measures in the Scoping Plan to reduce GHG emissions rely on local government actions.

In fact, CARB has synthesized the potential role local government plays in implementing GHG reduction measures and demonstrates how local governments taking an environmental or sustainability approach to their decisions can greatly impact GHG emission reductions within their community.

CARB recommends local governments set local GHG reduction goals; develop Climate Action Plans; and adopt Best Practices. San Diego's CAS, SCS, and CMAP are consistent with this role.

CARB also proposes that local governments establish energy efficiency programs, reduce energy consumption, use renewable fuels, establish green building standards and practices, adopt environmentally preferable purchasing policies, increase diversion from landfills, control landfill methane emissions, improve municipal water system energy efficiency/usage, increase water recycling, incorporate GHG reduction into general plan policies, and promote transit incentive programs. All of these suggestions are present in the SDGP and other climate change programs and policies in the San Diego region.

The proposed OBCPU and the SDGP contain policies that would reduce GHG emissions from transportation and operational building uses (related to water and energy consumption, and solid waste generation, etc.) that are consistent with the goals and strategies of local and State plans, policies, and regulations aimed at reducing GHG emissions from land use and development. The level of impacts associated with potential plan conflict would therefore be less than significant.

[33] http://www.arb.ca.gov/cc/localgovernment/localgovernment.htm