



Del Mar Climate Action Plan

ADOPTED JUNE 6, 2016

Del Mar Climate Action Plan

Prepared for:



City of Del Mar
1050 Camino Del Mar
Del Mar, California 92014

Prepared by:

ATKINS
3570 Carmel Mountain Road, Suite 300
San Diego, California 92130

Funded in part by:



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Credits and Acknowledgements

CITY OF DEL MAR

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Management Services Director
Kathleen A. Garcia,
Planning & Community Development Director
Jon Terwilliger, Senior Management Analyst
Scott Gerdes, Management Intern
Anders Imboden, Management Intern (Former)

ATKINS

Michael Hendrix, Project Director
Sarah Favrot, Project Manager
Chryss Meier, Senior Scientist
Zhe Chen, Environmental Scientist
Elizabeth Brown, Engineer
Debra Surrell, Senior Operations Coordinator
Jenifer Sullivan, Technical Editor

ENERGY POLICY INITIATIVES CENTER (EPIC) – UNIVERSITY OF SAN DIEGO

Nilmini Silva-Send, PhD, Assistant Director/Adjunct Professor
Yichao Gu, Technical Policy Analyst
Elizabeth Johnston, Graduate Student

SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)

Allison Wood, Associate Regional Energy/Climate Planner

SAN DIEGO GAS AND ELECTRIC COMPANY (SDG&E)

Kimberly Burke, Customer Programs Advisor

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ARB	California Air Resources Board
BAU	Business-As-Usual
°C	degrees Centigrade
CALGreen	California’s Green Building Standard Code
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CH ₄	Methane
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
EE	energy efficiency
EEM	energy efficient mortgages
EPIC	Energy Policy Initiatives Center of University of San Diego
EIR	Environmental Impact Report
EO	Executive Order
USEPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FHFA	Federal Housing Finance Agency
GHG	greenhouse gas
GWP	global warming potential
HERO	Home Energy Renovation Opportunity
HVAC	Heating, venting, and air conditioning
IPCC	Intergovernmental Panel on Climate Change
kW	kilowatts
kWh	kilowatt hours
LCFS	Low Carbon Fuel Standard
LED	Light-emitting diode
LEED	Leadership in Energy & Environmental Design
MPO	metropolitan planning organization
MT	metric tons
MTCO ₂ e	metric tons of carbon dioxide equivalent
N ₂ O	nitrous oxide
OBF	On-Bill Financing
OPR	California Office of Planning and Research

ACRONYMS AND ABBREVIATIONS

PACE	Property Assessed Clean Energy
PPA	Power Purchase Agreement
ppb	parts per billion
ppm	parts per million
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas & Electric
VMT	vehicle miles traveled

EXECUTIVE SUMMARY

The City of Del Mar recognizes that our current way of life is changing our community, the region, the state, the country, and the world as we face rising temperatures, sea level rise, more extreme weather, and a less healthy environment. This Climate Action Plan (CAP) measures the impacts of our current life style (especially energy sources and transportation) and lays out a roadmap to reduce those impacts through a combination of local and state-mandated measures. The goal of the measures laid out in the Del Mar CAP is to ensure a safe, healthy, vibrant future for our citizens, their children, and their grandchildren. The CAP sets targets for more efficient use of our energy resources for 2020 and 2035; the plan will take almost 20 years to have its full impact. Nevertheless, we need to begin reducing our environmental impacts now.

The CAP was designed to meet the State of California's goal of reducing greenhouse gas emissions to 1990 levels by 2020. Greenhouse gases (GHG) are generated by the burning of fossil fuels like gasoline, diesel fuel, or natural gas during the generation of electrical power or the driving of vehicles that run on these fuels. Releasing GHG into the atmosphere is the major cause of global warming, and major reductions will be required just to slow the increase in annual temperatures that has already begun: 2015 was the warmest year ever recorded by a large margin, and the 39th consecutive year with a global temperature above the 20th century average. The CAP's goal for 2035 is to reduce GHG generation to at least 50 percent below Del Mar's baseline 2012 values, and to continue further reductions to meet the state goal of 80 percent reduction below statewide 1990 values by 2050.

The key to a successful CAP are the steps the City and each Del Mar resident can take to reduce energy consumption, change to cleaner energy sources, and make wise transportation choices. Energy use is the City's biggest contributor to GHG emissions (36 percent of our 2012 baseline). Installing rooftop solar, joining a Community Choice Energy plan (also called Community Choice Aggregation or CCA) to purchase clean energy at a lower cost, upgrading buildings and appliances to conserve energy, and making all these steps convenient and easy for our residents will make a big impact. The new Del Mar City Hall is planned to have solar panels and battery storage capacity to assist in reaching a zero net-energy goal and set an example for new development projects.

Better transportation choices include providing more charging stations for battery-electric vehicles, supporting new fueling stations when clean hydrogen fueled vehicles become more widely available, encouraging more frequent and convenient public transit options, and promoting pedestrian and biking routes.

Reducing water use and waste sent to the landfill will help meet the CAP goals. Getting water to Del Mar and waste to landfills are both energy intensive. Reducing water consumption and waste generation results in a reduction of GHGs from energy consumption. In addition, regional efforts to capture methane (a potent GHG) from landfills will be supported. The CAP supports a zero waste policy to be reached by 2035.

The CAP is a living document that will be updated every five years to measure progress and capture new technologies and opportunities. Most importantly, success depends upon every Del Mar resident making their best effort to reduce their impact and contribute to a cleaner, healthier community.

Although 2035 may seem like a long time in the future, we cannot reach our goals unless we start right now.

Inventories

The first step in completing the CAP was to update the City’s 2005 greenhouse gas (GHG) emissions inventory. In 2015, the City completed the 2012 and 2013 emissions inventories for community-wide sectors. Due to the availability of data and the effects of the San Onofre Nuclear Generating Station closure on energy sources in 2012, the 2012 and 2013 data sets were averaged to derive the baseline year (2012) inventory. The results of the 2012 inventory are shown in Figure ES-1, below. Sector-level emissions for 2012 are shown in Table ES-1, below.

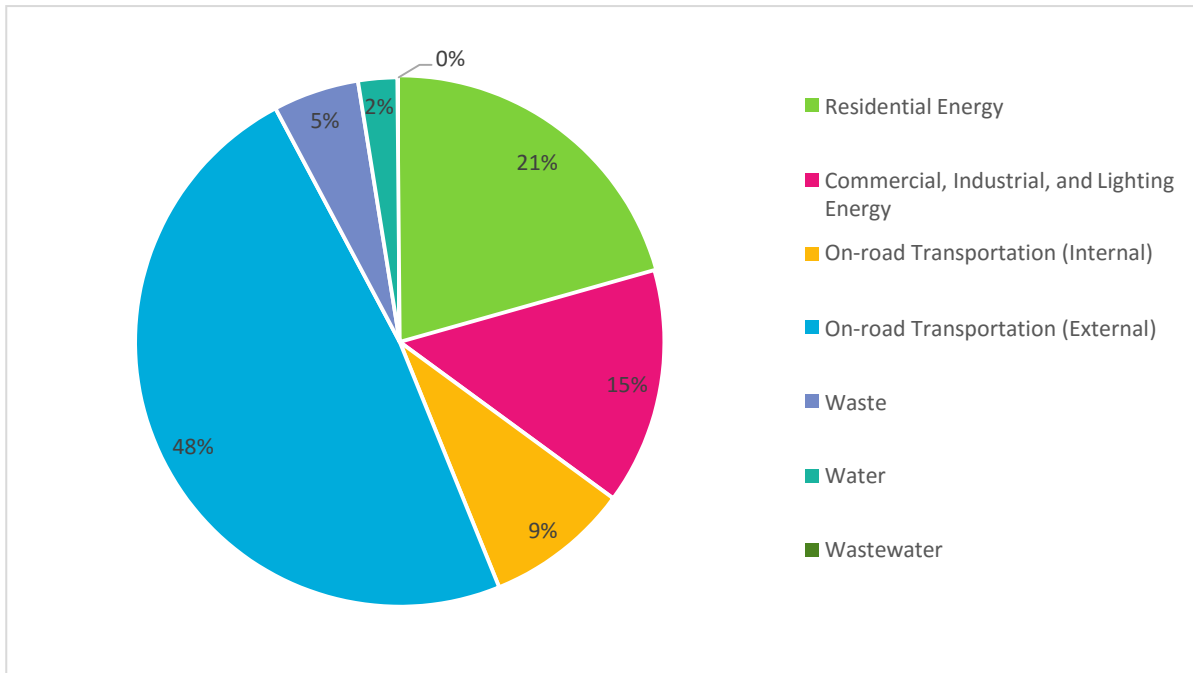


FIGURE ES-1 Community GHG Emissions by Sector for the Baseline Year (2012)

TABLE ES-1 Communitywide GHG Emissions by Sector for the Baseline Year (2012)		
Sector	Emissions (MTCO ₂ e)	Percent of Inventory
Residential Energy	11,518	20.6%
Commercial, Industrial, and Lighting Energy	8,066	14.4%
On-road Transportation (Internal) ¹	4,921	8.8%
On-road Transportation (External) ²	27,003	48.3%
Waste	2,936	5.3%
Water	1,331	2.4%
Wastewater	81	0.1%
Total	55,855	100.0%
1. Emissions from miles within Del Mar Boundary		
2. Emissions from miles outside Del Mar Boundary, trips starting or ending in Del Mar		

Forecasts and Target Setting

The next step in the process was to estimate future emissions in the City and establish GHG reduction targets. Consistent with the State of California’s adopted AB 32 GHG reduction target, the City has set a goal to reduce emissions back to 1990 levels by the year 2020. This target was calculated as a 15-percent decrease from 2012 levels, as recommended in the AB 32 Scoping Plan. A longer-term goal was established for 2035. The goal for 2035 is to reduce emissions to 50 percent below 2012 levels, which would put the City on a path toward the state’s long-term goal to reduce emissions to 80 percent below 1990 levels by 2050 (see Table ES-2, below).

TABLE ES-2 Emission Reduction Targets for Community Operations		
Target Metric	Horizon Year	
	2020	2035
Reduction Percent	15%	50%
Emissions Goal (MTCO _{2e})	47,477	27,928

The City’s future emissions were estimated using population and VMT growth. Growth indicators used are shown by sector in Table ES-3.

TABLE ES-3 Growth Indicators for 2012, 2013, 2020, and 2035					
Sector	Indicator	2012	2013	2020	2035
Residential Energy; Commercial, Industrial, and Lighting Energy; Solid Waste; Water; Wastewater	Population	4,171	4,213	4,399	4,672
Transportation	Vehicle Miles Traveled per Day	178,855	179,146	180,989	186,151

Future emissions estimates also included reductions that would happen with implementation of legislation adopted at the state level. That is, some level of emission reduction is anticipated within the City as a result of policies implemented at the state level, including:

- Low Carbon Fuel Standard
- Assembly Bill (AB) 1493 and Advanced Clean Cars
- California Building Code Title 24
- California Renewable Energy Supply Policies
- Pump Price of Gasoline
- California Air Resources Board Tire Pressure Program

The resulting projected emissions are considered an “adjusted” business-as-usual (Adjusted BAU) forecast. Historic emissions, Adjusted BAU forecast, and 2020 and 2035 targets are shown in Figure ES-2, below. The Adjusted BAU forecasts indicate that additional measures will be needed to meet the 2020 and 2035 goals.

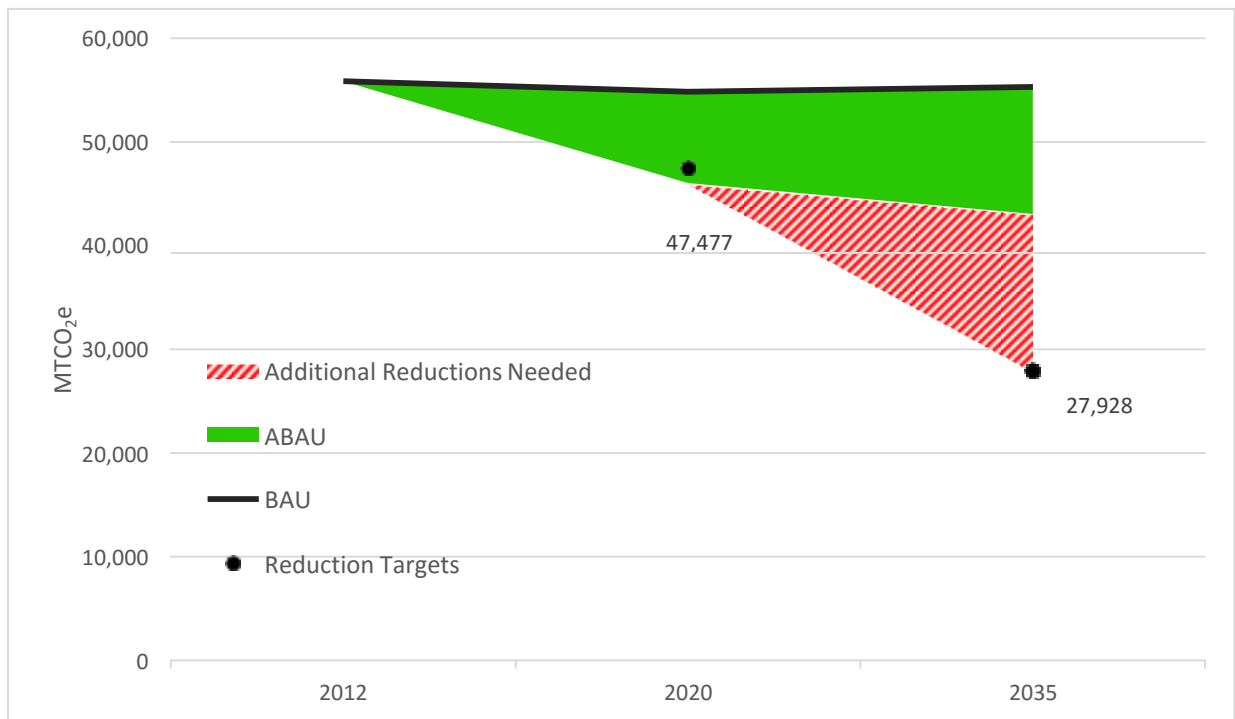


FIGURE ES-2 Community Emissions Inventories, Projections, and Targets

Reduction Measures

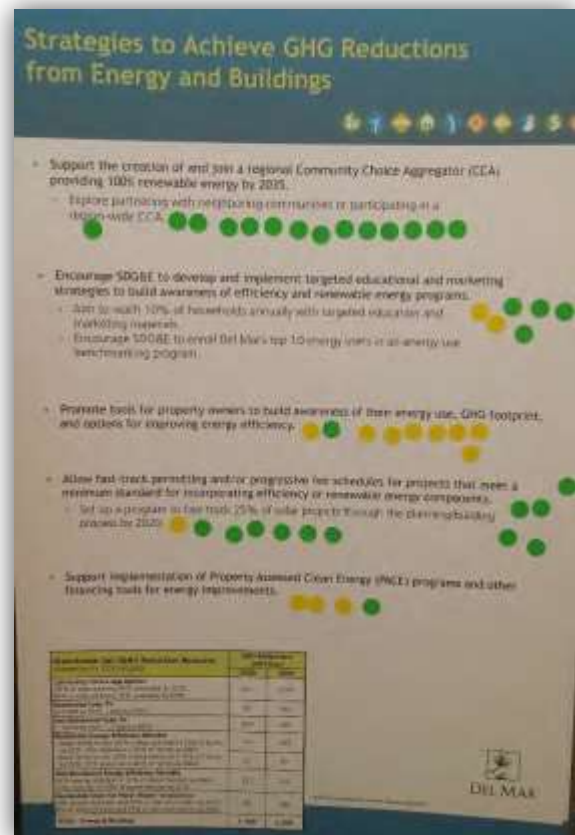
The City has already demonstrated its commitment to conserve energy and reduce emissions through a variety of programs and policies. Programs include implementing water-efficient landscape ordinances and promoting multiple energy efficiency financing programs that will allow home and business owners to obtain low-interest loans for implementing energy efficiency in their buildings. These measures encourage energy efficiency, water conservation, and efficient transportation. Table ES-4, below, summarizes the reductions from measures that would be achieved through community strategies. Details on the proposed strategies are included in Chapter 3 – Reduction Measures.

TABLE ES-4 Reductions from Community GHG Strategies		
Community Sectors	Emission Reductions (MTCO ₂ e)	
	2020 Horizon	2035 Horizon
Energy and Buildings	1,966	6,546
Water and Waste	856	1,863
Transportation	4,750	8,893
Urban Tree Planting	117	234
Total Community Reductions	7,689	17,536

Acronyms:
MTCO₂e = metric tons of carbon dioxide equivalent

Based on input from the community at the CAP Workshop and Sustainable Lifestyle Resource Fair on September 24, 2015 and evaluating the measures that seem to have the greatest potential greenhouse gas reduction, the Sustainability Advisory Board recommended the following strategies as the focus for phase one of CAP implementation:

- Pursuing increased use of renewable energy sources, including exploration of community choice aggregation;
- Facilitating the planning and building application process for installation of photovoltaic panels and energy efficiency retrofits;
- Developing a zero-waste program/policy;
- Implementing a “complete streets” approach in designing modifications to arterial streets, and in other locations as potentially feasible;
- Exploring installation of roundabouts; and
- Possible implementation of an urban tree-planting program.



Adaptation

The City recognizes that planning sustainably is more than reducing GHG emissions; it also requires being prepared for changes that would impact the community’s quality of life, use of resources, and economy. Furthermore, the City understands that regardless of current and future mitigation efforts, climate change will still occur. In an effort to reduce vulnerability and build resilience, the City has identified adaptation strategies in six vulnerable sectors: Public Health & Safety, Water Availability, Coastal Flooding, Wildfire, Natural Systems & Wildlife, and Electrical Demand. Details on the proposed strategies are included in Chapter 4 – Adaptation.

Implementation

Finally, the Del Mar Climate Action Plan as a document is not enough to meet the reduction goals. The CAP must be implemented. The Implementation Chapter of the CAP identifies the process for implementing and monitoring for success, which may require measures to be adjusted, as necessary. The six key components of implementation are summarized in Figure ES-3, below. Upon successful implementation of this CAP, the City will demonstrate the potential economic, social, and environmental benefits of increasing energy efficiency and providing environmental stewardship within the community.



FIGURE ES-3 Key Components of Implementing the Del Mar Climate Action Plan



Chapter 1 Introduction

The City of Del Mar (City) is committed to continuing to provide a high quality of living in a way that supports sustainable land use patterns, healthy living, and community character. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, and enhancing access to

PURPOSE

The Del Mar CAP has three primary purposes:

1. Present the City's plan for achieving sustainability by utilizing resources effectively and reducing greenhouse gas (GHG) emissions.
2. Identify and prepare for local impacts of climate change through adaptation strategies.
3. Provide a framework for the City to effectively implement this CAP by promoting economic competitiveness, obtaining funding for program implementation, and tracking and monitoring the progress of CAP implementation over time.

sustainable transportation modes, the City can keep dollars in its local economy, create new green jobs, and improve community quality of life in sustainable ways. To that end, the City has implemented a number of sustainability and conservation efforts and seeks to continue those efforts through local planning and partnerships. The Del Mar Climate Action Plan (CAP) integrates the City's past and current efforts with future efforts to grow and thrive sustainably.

Climate Change Science

Climate change is a term used to describe large-scale shifts in patterns in the Earth's climate system, and is measured by alterations in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past. Although the climate has historically responded to natural drivers, recent climate change has been unequivocally linked to increasing concentrations of greenhouse gases in the Earth's atmosphere.

Gases that trap heat in the atmosphere are called greenhouse gases (GHGs) because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Human-generated (anthropogenic) GHG emissions significantly contribute to the changes in the global climate, which has a number of physical and environmental effects. Effects associated with global climate change include sea level rise, increase in frequency and intensity of droughts, and increased temperature. In California, climate change effects also include increased risk of large wildfires, exacerbation of air quality problems, and an increase in extreme weather events. Increased GHG emissions are largely the result of increasing energy consumption, particularly through the combustion of fossil fuels, such as coal, natural gas, and petroleum.

The Intergovernmental Panel on Climate Change (IPCC) assesses scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC identifies six key GHG compounds: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFC), sulfur hexafluoride (SF₆), and hydrofluorocarbons (HFC). The first three (CO₂, CH₄, N₂O) are emitted by common activities, such as on-road travel, and are reported in this CAP as further described below.

Each GHG has a different capacity to trap heat as well as different atmospheric lifetimes. Therefore, the global warming potential (GWP) of each GHG is compared with a reference gas. Carbon dioxide is the reference gas used for GWP, and has a GWP of one. Methane's GWP of 25 indicates that methane has 25 times greater warming effects than CO₂ on a molecule per molecule basis.

GHG emissions generally are reported in metric tons (MT) of CO₂ equivalents (CO₂e). A CO₂e is calculated using the mass emissions of an individual GHG multiplied by its GWP. The calculation of the CO₂e is a consistent methodology for comparing GHG emissions, since it normalizes various GHG emissions to a consistent reference gas.

Carbon Dioxide (CO₂) is the most important anthropogenic GHG and accounts for more than 75 percent of all anthropogenic GHG emissions. Its atmospheric lifetime of 50 to 200 years ensures that atmospheric concentrations of CO₂ will remain elevated for decades, even after mitigation efforts to reduce GHG concentrations are implemented. The primary sources of anthropogenic CO₂ in the atmosphere include the burning of fossil fuels (including motor vehicles), gas flaring, cement production, and land use changes (e.g., deforestation, oxidation of elemental carbon). CO₂ can be removed from the atmosphere by photosynthetic organisms (e.g., plants and certain bacteria). Atmospheric CO₂ has increased from a preindustrial concentration of 280 parts per million (ppm) to 397 ppm in 2014.¹

Methane (CH₄), the main component of natural gas, is the second most abundant GHG and has a GWP of 25. Sources of anthropogenic emissions of CH₄ include using natural gas, burning fossil fuels, landfill outgassing, certain agricultural practices, and mining coal. Certain land uses also function as both a source and a sink for CH₄. For example, the primary terrestrial source of CH₄ is wetlands, whereas undisturbed, aerobic soils act as a CH₄ sink (i.e., they remove CH₄ from the atmosphere). Atmospheric CH₄ has increased from a pre-industrial concentration of 715 parts per billion (ppb) to 1,820 ppb in 2014.²

Nitrous Oxide (N₂O) is a powerful GHG, with a GWP of 298. Anthropogenic sources of N₂O include combustion of fossil fuels, agricultural processes (e.g., fertilizer application), and nylon production. In the United States, more than 70 percent of N₂O emissions are related to agricultural soil management practices, particularly fertilizer application. N₂O concentrations in the atmosphere have increased nearly 21 percent, from pre-industrial levels of 270 ppb to 326 ppb in 2014.³

Benefits of the Climate Action Plan

This CAP benefits the City in many direct and indirect ways.

- **Local Control**—This CAP allows the City to identify strategies to reduce resource consumption, costs, and GHG emissions in all economic sectors in a way that maintains local control over the issues and fits the character of the community. It also may position the City for funding to implement programs tied to climate goals.
- **Energy and Resource Efficiency**—This CAP identifies opportunities for the City to increase energy efficiency and lower GHG emissions in a manner that is most feasible in the community. Reducing energy consumption through increasing the efficiency of energy technologies, reducing energy use, and using alternative sustainable sources of energy are effective ways to reduce GHG emissions. Energy efficiency also provides opportunities for cost-savings.

¹ NOAA. 2015. Annual Greenhouse Gas Index (AGGI), <http://www.esrl.noaa.gov/gmd/aggi/aggi.fig2.png>

² Ibid.

³ Ibid.

- **Increased Public Health**—Many of the GHG reduction strategies identified in this CAP also have local public health benefits. Benefits include local air quality improvements; creating a more active community through implementing sustainable living practices; and reducing health risks, such as heat stroke, which is elevated by climate change impacts such as increased extreme heat days.
- **Demonstrating Consistency with State GHG Reduction Goals**—A GHG reduction plan may be used as GHG mitigation in a General Plan to demonstrate that the City is aligned with state goals for reducing GHG emissions to a level considered less than cumulatively considerable.

Regulatory Setting

International, federal, and state actions to stabilize GHG emissions and reduce impacts associated with climate change have been implemented beginning as early as 1988. The government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

Federal

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In 2007, the U.S. Supreme Court held that the United States Environmental Protection Agency (USEPA) has authority to regulate GHGs (*Massachusetts v. Environmental Protection Agency, Docket No. 05–1120*). As such, the U.S. Supreme Court ruled that the USEPA is allowed to regulate CO₂ and other GHGs as pollutants under Section 202(a)(1) of the federal Clean Air Act.

State

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (ARB), a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control and climate change programs within California. In this capacity, ARB conducts research, sets the California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. ARB establishes emissions standards for motor vehicles sold in California, consumer products, and various types of commercial equipment.

EXECUTIVE ORDER S-3-05

On June 1, 2005, California Governor Arnold Schwarzenegger announced through Executive Order (EO) S-3-05, the following GHG emissions targets:

- By 2010, California shall reduce GHG emissions to 2000 levels
- By 2020, California shall reduce GHG emissions to 1990 levels
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels

EXECUTIVE ORDER B-30-15

On April 29, 2015, California Governor Jerry Brown announced through EO B-30-15, the following GHG emissions target:

- By 2030, California shall reduce GHG emissions to 40 percent below 1990 levels

The emission reduction target of 40 percent below 1990 levels by 2030 is an interim-year goal to make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050.

ASSEMBLY BILL 1493, CLEAN CAR STANDARDS

Known as “Pavley I,” Assembly Bill (AB) 1493 standards were the nation’s first GHG standards for automobiles. AB 1493 requires the ARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible. Additional strengthening of the Pavley standards (referred to previously as “Pavley II,” now referred to as the “Advanced Clean Cars” measure) has been proposed for vehicle model years 2017 to 2025. Together, the two standards are expected to increase average fuel economy to roughly 43 miles per gallon by 2020 (and more for years beyond 2020).

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

AB 32 requires ARB to reduce statewide GHG emissions to 1990 levels by 2020. As part of this legislation, ARB was required to prepare a “Scoping Plan” that demonstrates how the state will achieve this goal. The Scoping Plan was adopted in 2011 and, in it, local governments were described as “essential partners” in meeting the statewide goal, recommending a GHG reduction level 15 percent below 2005 to 2008 levels by 2020.

SENATE BILL 97

Senate Bill (SB) 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. The legislation directed the California Office of Planning and Research (OPR) to develop draft CEQA Guidelines “for the mitigation of GHG emissions or the effects of GHG emissions” and directed the Resources Agency to certify and adopt the State CEQA Guidelines.

This CAP is not intended to be a “qualified” CAP that has undergone CEQA review. Rather, it is an “aspirational document” and not considered a part of the City’s General Plan or as part of a regulatory program. The adoption of this CAP does not constitute a “project” under CEQA because it is an “aspirational document”, it does not mandate any regulatory compliance, and is not likely to result in any direct or indirect physical change in the environment. If this CAP is not supported by CEQA review and evaluation, it will not be eligible to be relied upon by developers as part of their CEQA mitigation measures for greenhouse emissions, nor will the City be able to enforce compliance with the Climate Action Plan. Reduction measures detailed in this CAP will undergo environmental review prior to implementation, as necessary.

EXECUTIVE ORDER S-1-07, LOW CARBON FUEL STANDARD

Executive Order S-01-07 mandates: (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and (2) that a low carbon fuel standard (LCFS) for transportation fuels be established in California. ARB developed the LCFS regulation pursuant to the authority under AB 32 and adopted it in 2009.

EXECUTIVE ORDER S-13-08, THE CLIMATE ADAPTATION AND SEA LEVEL RISE PLANNING DIRECTIVE

Executive Order S-13-08 provides clear direction for how the state should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Adaptation Strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies.
- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform state planning and development efforts.
- Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects.
- Initiate studies on critical infrastructure and land-use policies vulnerable to sea level rise.

CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 6

CCR Title 24, Part 6 (California's Energy Efficiency Standards for Residential and Nonresidential Buildings) (Title 24), was established in 1978 to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not intended originally to reduce GHG emissions, electricity production by fossil fuels and natural gas use results in GHG emissions. Energy efficient buildings require less electricity and natural gas. Therefore, increased energy efficiency results in decreased GHG emissions.

The California Energy Commission adopted 2008 Standards on April 23, 2008, in response to AB 32. The Standards were adopted to (1) provide California with an adequate, reasonably priced, and environmentally sound supply of energy; (2) pursue California energy policy, which states that energy efficiency is the resource of first choice for meeting California's energy needs; (3) meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of state building codes; and (4) meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.

SENATE BILL 375, SUSTAINABLE COMMUNITIES STRATEGY

SB 375 provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans (RTPs) developed by metropolitan planning organizations (MPOs) to incorporate a sustainable communities strategy (SCS) in their plans. The goal of the SCS is to

reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. SB 375 also includes provisions for streamlined CEQA review for some infill projects, such as transit-oriented development.

CALGREEN BUILDING CODE

CCR Title 24, Part 11 (California's Green Building Standard Code) (CALGreen), was adopted in 2010 and went into effect January 1, 2011. CALGreen is the first statewide mandatory green building code. It significantly raises the minimum environmental standards for construction of new buildings in California. The mandatory provisions in CALGreen will reduce the use of volatile organic compound-emitting materials, strengthen water conservation, and require construction waste recycling.

SENATE BILL X7-7

SB x7-7 requires water suppliers to reduce urban per capita water consumption 20 percent from a baseline level by 2020.

RENEWABLE PORTFOLIO STANDARD

The Renewable Portfolio Standard (RPS) requires energy providers to derive 33 percent of their electricity from qualified renewable sources by 2020. This is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) from utilities across the state; however, potential GHG reductions from this legislation were not applied to the electricity in San Diego Gas & Electric (SDG&E) service territory due to the uncertainty in SDG&E's generation sources after the closure of the San Onofre Nuclear Generating Station.

Regional

SAN DIEGO ASSOCIATION OF GOVERNMENTS

San Diego Association of Governments (SANDAG) is the council of governments and transportation planning agency for San Diego County and the 18 cities located within its territory. SANDAG is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system countywide. As the MPO and Regional Transportation Planning Agency (RTPA), SANDAG supports freeway construction projects, regional and local road improvements, train and bus transportation, railroad crossings, call boxes, ridesharing, congestion management efforts and long-term planning studies.

Per SB 375, ARB set the following regional greenhouse gas emission reduction targets for SANDAG:

- 7-percent reduction from the 2005 per capita amount by 2020
- 13-percent reduction from the 2005 per capita amount by 2035

SANDAG subsequently adopted the 2050 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) to help California meet its climate goals and the requirements of SB 375. The 2050 RTP/SCS demonstrates a reduction in per capita GHG emissions of 14 percent by 2020 and 13 percent by 2035.

City Setting

The City of Del Mar is a coastal community in northern San Diego County. Surrounding cities include Solana Beach to the north and San Diego to the south and east.

The City of Del Mar is a community of approximately 4,000 residents.⁴ The City's population is approximately 89 percent White, 4.4 percent Hispanic, 3.1 percent Asian/Pacific Islander, and 3.0 percent two or more/other races. Nearly a quarter of the population is over the age of 65.

Plan Structure

The City of Del Mar Sustainability Advisory Board (SAB), a citizen committee appointed by the City Council, played a significant role in developing the CAP, including identifying the recommended greenhouse gas reduction targets and the list of recommended measures and strategies to meet the 2020 and 2035 reduction goals.

To seek community input on development of the CAP, the SAB hosted a workshop and Sustainable Lifestyle Resource Fair on September 24, 2015 at the Powerhouse Community Center. The workshop included an overview presentation explaining what a CAP is, why Del Mar is pursuing implementation of a CAP, work to date by the SAB, and proposed mitigation measures. Participants were then asked to provide input by way of a dot exercise on the measures they thought should be the highest priority and the measures they are least supportive of. Based on input from this workshop and evaluating the measures which seem to have the greatest potential greenhouse gas reduction potential, a series of phase one recommendations were identified.

The remainder of this CAP includes the following chapters:

- Chapter 2 summarizes the City's historic and future GHG emissions and the reduction targets the City has established.
- Chapter 3 details the reduction strategies that will be implemented to meet the reduction targets identified in Chapter 2.
- Chapter 4 describes the anticipated climate changes that the City will face and how the City can prepare for these changes with adaptation strategies.
- Chapter 5 includes the implementation of the measures, potential funding sources, and how the CAP will be monitored and updated over time.

⁴ Population and households are 2012 estimates from SANDAG's Series 13 Regional Growth Forecast.



Chapter 2 Emissions Inventory, Forecast, and Targets

GHG Emissions Inventory

Greenhouse gas (GHG) emissions inventories are the foundation of planning for future reductions. Establishing an inventory of emissions helps to identify and categorize the major sources of emissions produced over a single calendar year. A community inventory includes GHG emissions that result from the activities by residents and businesses in the city. The inventories identify the major sources of GHGs emissions caused by activities in sectors that are specific to community activities.

The City prepared community inventories for the years 2005, 2012, and 2013. Due to the availability of data and the effects of the San Onofre Nuclear Generating Station closure on energy sources in 2012, the 2012 and 2013 data sets were averaged to derive the baseline year (2012) inventory. A baseline year is established as a starting point against which other inventories may be compared and targets may be set. In addition, a detailed GHG Inventory and Forecast Report prepared by the Energy Policy Initiatives Center (EPIC) of the University of San Diego, which contains detailed methodology of the information summarized in this chapter, is included as Appendix A.

Baseline Year (2012) Community Emissions Summary

The community inventory includes the GHG emissions that result from activities within the community the City serves. The sectors evaluated in the inventory are provided in TABLE 1, below.

TABLE 1 Community Sectors Evaluated in the Inventory
<ul style="list-style-type: none"> ■ Residential Energy ■ Commercial, Industrial, and Lighting Energy ■ On-road Transportation (Internal and External) ■ Waste ■ Water ■ Wastewater

In the baseline year (2012), the City produced 55,855 MTCO_{2e} emissions. As shown in **FIGURE 1** and **TABLE 2**, below, the Transportation sector accounted for the greatest percentage of emissions: 9 percent from trips that occur wholly within Del Mar's boundary (Internal), and 49 percent from trips outside of Del Mar's Boundary but either start or end within the city (External). The Residential sector contributed approximately 21 percent of the baseline year emissions. The Commercial, Industrial, and Lighting Energy sector contributed about 14 percent of the City's emissions, producing 8,243 MTCO_{2e}. Waste and Water sectors contributed 5 percent and 2 percent of emissions, respectively, and the remaining Wastewater sector accounted for less than 1 percent of total emissions.

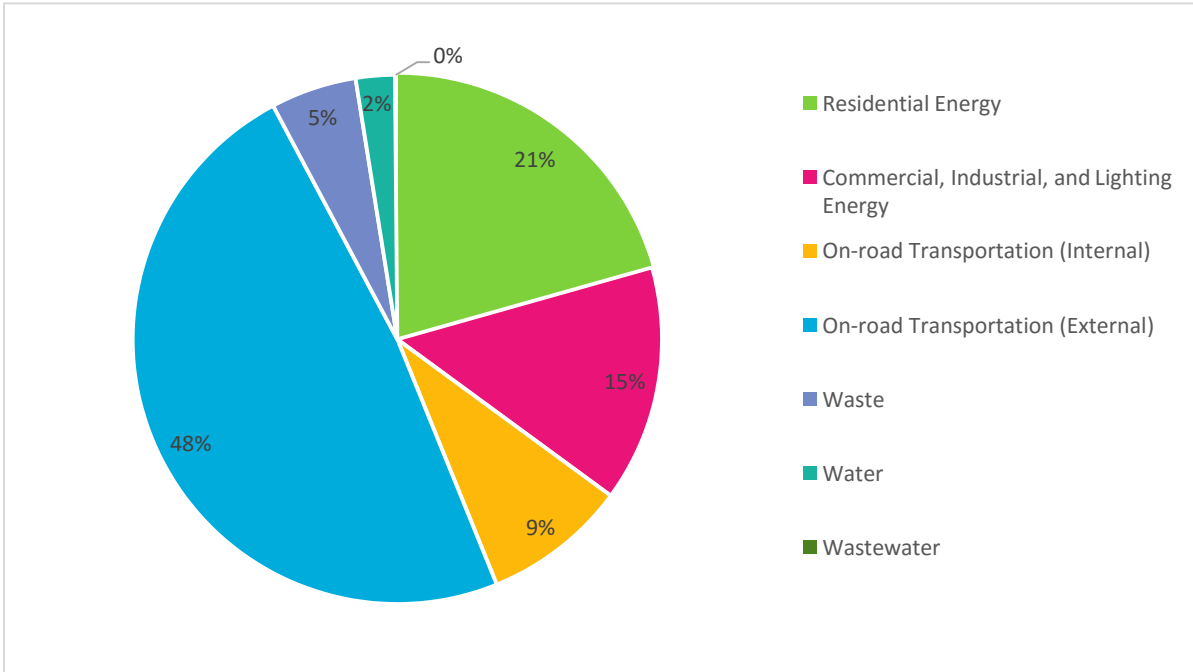


FIGURE 1 Community GHG Emissions by Sector for the Baseline Year (2012)

TABLE 2 Communitywide GHG Emissions by Sector for the Baseline Year (2012)

Sector	Emissions (MTCO ₂ e)	Percent of Inventory
Residential Energy	11,518	20.6%
Commercial, Industrial, and Lighting Energy	8,066	14.4%
On-road Transportation (Internal) ¹	4,921	8.8%
On-road Transportation (External) ²	27,003	48.3%
Waste	2,936	5.3%
Water	1,331	2.4%
Wastewater	81	0.1%
Total	55,855	100.0%

1. Emissions from miles within Del Mar Boundary
 2. Emissions from miles outside Del Mar Boundary, trips starting or ending in Del Mar

Inventory Forecast

Forecasting future GHG emissions allows the City to understand how emissions are expected to increase or decrease in the future. Major changes in growth or land uses may affect how to best plan to reduce emissions in the future. GHG emissions are forecast using two scenarios: a Business-as-Usual (BAU) and an Adjusted BAU scenario. The BAU scenario describes emissions based on projected growth in population and does not consider policies that will reduce emissions in the future (that is, the policies and related efficiency levels in place in 2012 are assumed to remain constant through 2035). Projected growth is estimated using data from regional planning scenarios developed by the San Diego Association of Governments (SANDAG) and the City. Growth calculation and methods are detailed in the GHG

Inventory Report located in Appendix A. In general, the City is expecting growth for 2020 and 2035 since population is expected to increase. This growth also will result in an increase in total VMT. **TABLE 3**, below, shows the growth projections used to develop the emissions forecasts.

TABLE 3 Growth Indicators for 2012, 2013, 2020, and 2035					
Sector	Indicator	2012	2013	2020	2035
Residential Energy; Commercial, Industrial, and Lighting Energy; Solid Waste; Water; Wastewater	Population	4,171	4,213	4,399	4,672
Transportation	Vehicle Miles Traveled per Day	178,855	179,146	180,989	186,151

The Adjusted BAU scenario describes emissions based on projected growth *and* considers policies that will achieve GHG reductions in the future. Policies, described in the Regulatory Setting section of Chapter 1, include state-adopted or approved legislation that will affect future emissions. By evaluating the two scenarios, the City can see the effect that existing policies may have on future emissions and be better able to determine how local measures can provide additional reductions.

Two future years are forecasted for each scenario: 2020 and 2035. The 2020 forecast year is consistent with the goals identified in Assembly Bill (AB) 32, which identifies a statewide GHG reduction target by 2020. The 2035 forecast year will allow the City to develop long-term strategies to continue GHG reductions beyond 2020.

Community Forecasts

COMMUNITY BUSINESS-AS-USUAL FORECAST

The City’s BAU emissions in 2020 are estimated to be 54,822 MTCO_{2e}, or a 1.8-percent decrease from baseline emissions. By 2035, emissions are estimated to remain 1.0 percent below the baseline level at 55,314 MTCO_{2e} (**FIGURE 2** and **TABLE 4**, below).

COMMUNITY ADJUSTED BUSINESS-AS-USUAL FORECAST

The City’s Adjusted BAU emissions in 2020 are estimated to be 25,637 MTCO_{2e} in 2020 and 25,583 MTCO_{2e} in 2035. This change represents a 11.6-percent reduction from baseline year by 2020 and 11.8-percent reduction from baseline year by 2035 (**FIGURE 2** and **TABLE 5**, below).

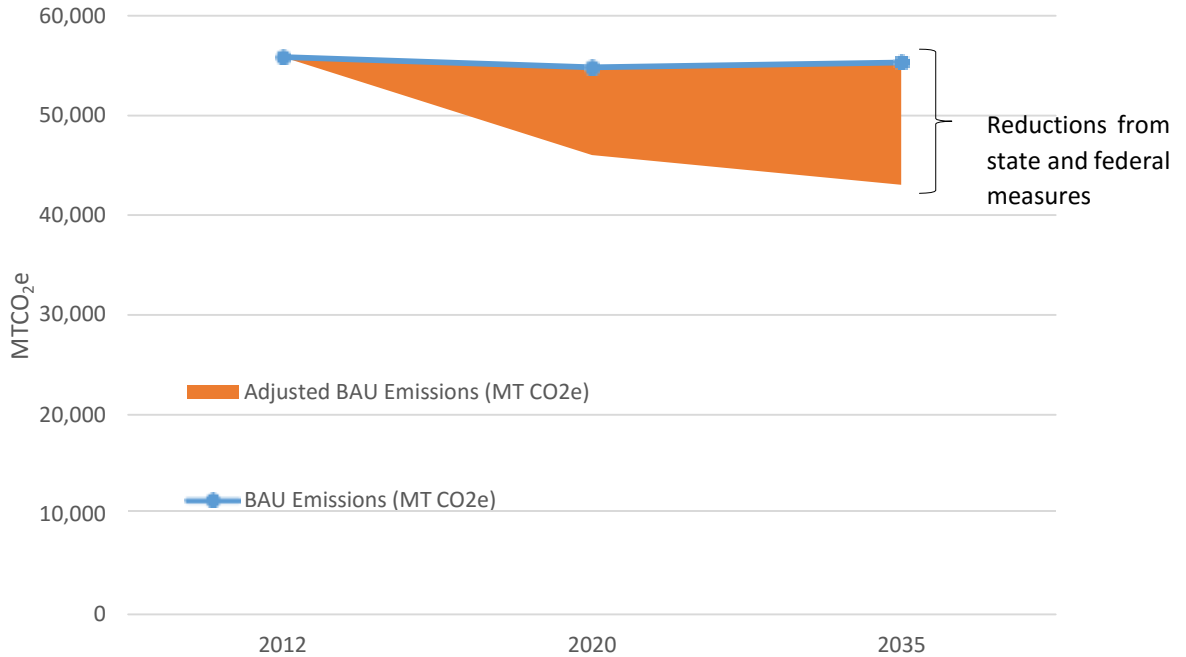


FIGURE 2 Community BAU and Adjusted BAU Emissions

TABLE 4 Community BAU for 2012, 2020, and 2035			
Sector	BAU MTCO₂e		
	2012	2020	2035
Residential Energy	11,518	12,087	12,837
Commercial Energy	8,066	8,464	8,989
Transportation	31,924	29,709	28,643
Waste	2,936	3,081	3,272
Water	1,331	1,396	1,483
Wastewater	81	85	90
Total	55,855	54,822	55,314

TABLE 5 Community Adjusted BAU for 2012, 2020, and 2035			
Sector	Adjusted BAU MTCO₂e		
	2012	2020	2035
Residential and Commercial Energy	19,584	18,182	15,856
Transportation	31,924	23,284	22,346
Waste	2,936	3,081	3,272
Water	1,331	1,396	1,483
Wastewater	81	85	90
Total	55,855	46,028	43,048

Reduction Targets

The state has set goals for reducing GHG emissions by 2020 and 2050 through AB 32 and through Executive Order (EO) S-3-05, respectively. The state also has provided guidance to local jurisdictions as “essential partners” in achieving the state’s goals by identifying a 2020 recommended reduction goal. That goal, stated in the AB 32 Scoping Plan, was for local governments to achieve a 15 percent reduction below 2005 to 2008 levels by 2020, which aligns with the state’s goal of not exceeding 1990 emissions levels by 2020.⁵

Beyond 2020, AB 32 states that the emissions level in 2020 should be maintained post-2020 and EO S-03-05 states that emissions should decline to 80 percent below 1990 levels by 2050. Neither the State Legislature nor the Governor has provided an interim target (between 2020 and 2050), nor has guidance been provided to local governments beyond the 2020 emission target recommendations. Several bills have been proposed in the Legislature that call for additional guidance for emissions reductions after 2020; however, considerable uncertainty by local governments still exists around developing post-2020 reductions.

The City has established the following reduction targets that are consistent with current regulations and are in line with state goals.

Community Targets

The City would achieve the 2020 emissions reduction target after reductions from state and federal measures. The City would need to reduce 15,120 MTCO_{2e} emissions below the Adjusted BAU scenario in 2035 to meet the state-aligned target (**TABLE 6** and **FIGURE 3**, below).

TABLE 6 State-Aligned GHG Reduction Targets for Community Emissions			
Sector	2012	2020	2035
BAU Emissions (MTCO _{2e})	55,855	54,822	55,314
Adjusted BAU Emissions (MTCO _{2e})		46,028	43,048
State-Aligned Target (% change from 2012)		-15%	-50%
State-Aligned Emissions Goal (MTCO _{2e})		47,477	27,928
Reductions from Adjusted BAU needed to meet the Target (MTCO _{2e})		None	15,120

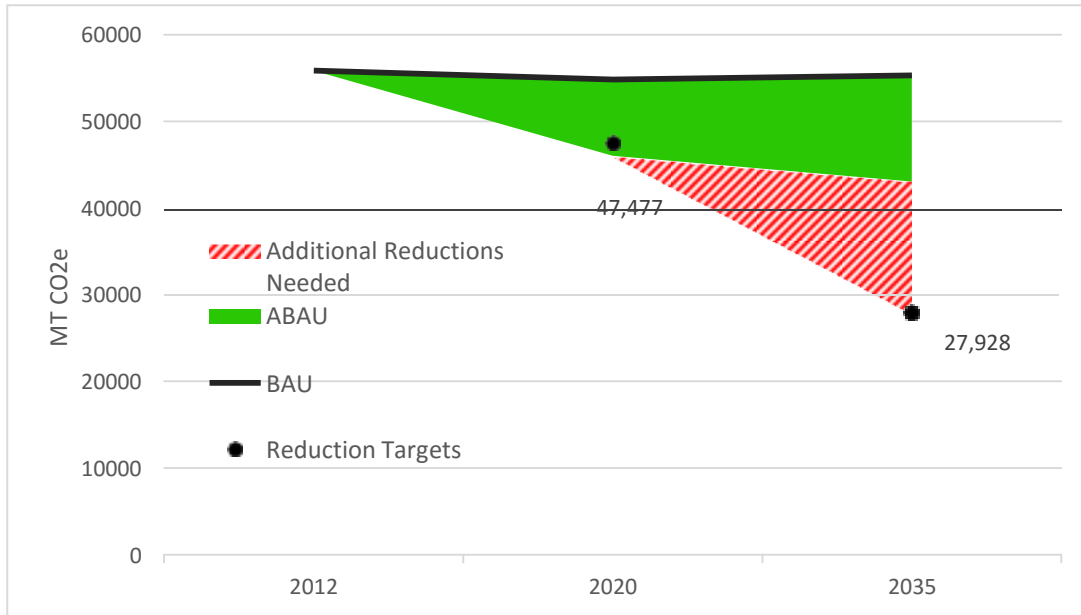



FIGURE 3 Community Emissions Inventories, Projections, and Targets

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Chapter 3 **Reduction Measures**

This chapter details how the City will meet its greenhouse gas (GHG) reduction targets by using goals, measures, and strategies. The goal describes the overarching objective related to increasing energy efficiency or decreasing energy consumption, such as increasing energy efficiency in residential building units. Each goal contains one or more proposed policies, programs, or projects indicating the City’s commitment toward meeting the goal. The GHG reduction potential by 2020 and 2035 are identified for each goal. Goals are further divided into one or more discrete strategies that the City may take in achieving the goal. Strategies are designed to include the steps needed to implement the measure and are considered essential to guiding staff in implementation. Strategies may be added or removed over time, depending on their relevancy, funding availability, and whether the strategies are successful in supporting measures as they are monitored over time. In addition, co-benefits for each measure are indicated by the following icons:

Local Co-Benefits		
 Energy Efficiency/ Reduced Energy Demand	 Water Conservation	 Improved Public Health
 Improved Air Quality	 Increased Renewable Energy	 Increased Non- motorized Transportation
 Energy Efficiency Education	 Enhanced Land Use/ Community Design	 Increased Resiliency

Energy and Buildings

Electricity consumption accounts for about 20 percent of Del Mar’s GHG emissions, while natural gas accounts for about 15 percent.⁶ As such, many of the Del Mar Climate Action Plan (CAP) measures target residential and commercial electricity and natural gas use.

Measures

- **E1—Efficiency and Renewables Education:** Develop and implement targeted educational and marketing strategies to encourage and build awareness of efficiency and renewable energy programs, products, and practices.
- **E2—Energy Benchmarking:** Promote tools like ENERGY STAR Portfolio Manager for residential and commercial property owners to build awareness of their energy use, GHG footprint, and options for improving efficiency.
- **E3—Streamlining Approvals:** Facilitate the permit process and/or adopt progressive fee schedules for projects that meet a minimum standard for incorporating efficiency or renewable energy components—going beyond state requirements for solar streamlining.

⁶ Energy Policy Initiatives Center (EPIC), University of San Diego, *City of Del Mar Greenhouse Gas Inventory and Forecast*, 2016.


- **E4—Financing Tools for Efficiency and Renewables:** Support implementation of Property Assessed Clean Energy (PACE) programs in Del Mar and continue to assess other efficiency and renewables financing tools for possible use in the community.
- **E5—Community Choice Aggregation (CCA):** Support the creation of and join a regional community choice aggregation (CCA) providing 100 percent renewable energy by 2035.
- **E6—Municipal Renewable Energy:** Increase the City’s use of renewable energy.

Goal 1: Residential Photovoltaics

The CAP goals for installation of residential photovoltaics (PV) on existing homes in Del Mar are 0.7 MW of PV by 2020 and 1 MW of PV installed by 2035⁷. For reference, we may assume that a typical residential PV system is 3 kW, so reaching the goal of 1 MW capacity by 2035 would mean that 333 homes in Del Mar will have installed a residential PV system by that time. This will represent approximately 18 percent of all single-family homes in Del Mar by 2035.⁸

STRATEGIES

- Work with SDG&E to reach 100 percent of households with targeted educational and marketing materials (e.g. website or e-blast)
- Work with SDG&E to enroll Del Mar’s top 10 energy users in an energy benchmarking program
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)

Goal 1: Residential Photovoltaics	
GHG Reduction Potential (2020)	237 MTCO ₂ e
GHG Reduction Potential (2035)	504 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	

⁷ Residential PV capacity in baseline year 2012 was interpolated assuming 0.5 MW of residential PV was already installed by 2010 (EPIC).


⁸ Based on SANDAG’s Forecast Housing Data (2012), the City of Del Mar is projected to have 1,790 single-family units by 2020 and 1,809 by 2035.

Goal 2: Non-Residential Photovoltaics

The CAP goals for installation of non-residential PV on existing buildings in Del Mar are 1.2 MW of PV by 2020 and 1.5 MW of PV installed by 2035⁹. New opportunities for non-residential PV installation in Del Mar include the Del Mar Fairgrounds and City Hall.



Goal 2: Non-Residential Photovoltaics


GHG Reduction Potential (2020)	407 MTCO ₂ e
GHG Reduction Potential (2035)	756 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	

STRATEGIES

- Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10 percent of businesses annually
- Work with SDG&E to enroll Del Mar’s top business 10 energy users in a benchmarking program
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)
- Encourage San Diego County Fairgrounds and hotels in Del Mar to install additional PV

⁹ Non-Residential PV capacity in baseline year 2012 was interpolated assuming 1.0 MW of residential PV was

already installed by 2010 (EPIC).

<h2>Goal 3: Residential Efficiency Retrofits—Single-Family Homes</h2>	
GHG Reduction Potential (2020)	122 MTCO ₂ e
GHG Reduction Potential (2035)	199 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	

Goal 3: Residential Efficiency Retrofits—Single-Family Homes

California’s first energy efficiency standards, known as Title 24 Standards, were adopted in 1977 and became effective in 1978. Title 24 standards have been updated every two to five years, creating increasingly stringent energy efficiency requirements for new construction. Approximately 77 percent of residential buildings in the City were built before the adoption of Title 24. Therefore, there are great opportunities to increase the efficiency of existing residential buildings through a range of projects (i.e. Energy Star equipment, double-pane windows, and increased insulation). Residential efficiency retrofit goals include retrofits in both single-

and multi-family homes (Goal 4). For single-family homes, the CAP goals are to achieve a 20-percent energy reduction in 10 percent of single-family homes by 2020 and a 30-percent energy reduction in 20 percent of single-family homes by 2035.

STRATEGIES


- Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10 percent of households annually
- Work with SDG&E to enroll Del Mar’s top 10 energy users in a benchmarking program
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)

Goal 4: Residential Efficiency Retrofits—Multi-Family Homes

A typical multi-family home that is “Energy Star” certified uses 15 percent to 30 percent less energy compared to a typical, new multi-family home. For multi-family homes, the CAP goals are to achieve a 20-percent energy reduction in 10 percent of multi-family homes (approximately 80 homes) by 2020 and a 50-percent energy reduction in 20 percent of multi-family homes (approximately 160 homes) by 2035.¹⁰



Goal 4: Residential Efficiency Retrofits—Multi-Family Homes

GHG Reduction Potential (2020)	29 MTCO ₂ e
GHG Reduction Potential (2035)	68 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	

STRATEGIES

- Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10 percent of property owners annually
- Work with SDG&E to enroll Del Mar’s top 10 multi-family residential energy users in a benchmarking program
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)


¹⁰ Based on SANDAG’s Forecast Housing Data (2012), the City of Del Mar is projected to have 797 multi-family units by 2020 and 2035.

Goal 5: Non-Residential Efficiency Retrofits


The CAP goals for non-residential efficiency retrofits are to achieve a 30-percent energy reduction per square foot in 10 percent of non-residential square footage by 2020 and a 50-percent energy reduction per square foot in 10 percent of non-residential square footage by 2035.

STRATEGIES

- Work with SDG&E to develop targeted educational and marketing materials (e.g., website or e-blast) to reach 10 percent of businesses annually
- Work with SDG&E to enroll Del Mar’s top 10 non-residential energy users in a benchmarking program
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)

Goal 5: Non-Residential Efficiency Retrofits	
GHG Reduction Potential (2020)	176 MTCO ₂ e
GHG Reduction Potential (2035)	190 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	

Goal 6: Residential Solar Hot Water Heater Installation

Goal 6: Residential Solar Hot Water Heater Installation	
GHG Reduction Potential (2020)	27 MTCO ₂ e
GHG Reduction Potential (2035)	57 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	



Solar water heating (SWH) is the conversion of sunlight into renewable energy to heat water using a solar thermal collector. The CAP goals for residential SWH installation assume that 4 percent of existing homes and 10 percent of new homes will be retrofitted with SWH by 2020 and that 8 percent of existing homes and 15 percent of newly constructed homes will be retrofitted with SWH by 2035.

STRATEGIES

- Work with SDG&E to develop targeted educational and marketing materials (e.g., website or e-blast) to reach 10 percent of households annually
- Facilitate the permit process for 25 percent of planning or building applications for solar projects by 2020 (beyond state requirements)

Goal 7: Renewable Energy Supply

The CAP goals are to achieve 50% renewable electricity supply in 2020 and 100% renewable electricity by 2035. The City can expand its supply of renewable energy through community choice aggregation (CCA) and increasing the City’s municipal use of renewable energy. CCA programs enable local governments to aggregate electricity demand within their jurisdictions to procure alternative energy supplies while maintaining the existing electricity provider for transmission and distribution services.¹¹ Typically for these programs, residents are automatically enrolled, but can opt-out at any time. A CCA program can aid in reducing greenhouse gas emissions in Del Mar by reducing the emissions factor for electricity.

Goal 7: Renewable Energy Supply	
GHG Reduction Potential (2020)	968 MTCO ₂ e
GHG Reduction Potential (2035)	4,771 MTCO ₂ e
Measures	E1, E2, E3, E4
Co-Benefits	 

To estimate the greenhouse gas reductions for this goal, it is assumed that all the electricity supplied in Del Mar would be 100% renewable in 2035. This would be achieved through a combination of renewable electricity supply policies, utility renewable supply, a CCA or another program, and/or distributed photovoltaic to achieve 91% renewable energy for the necessary electricity supply, with the remaining amount (9%) achieved through the purchase of renewable energy credits (RECs).

STRATEGIES

- Encourage SDG&E to achieve 100 percent renewable energy by 2035
- Explore partnering with neighboring cities (e.g. Solana Beach and Encinitas) to join together with Del Mar in forming a CCA
- Advocate for pursuit of a regional CCA for San Diego County
- Explore installation of solar on new City Hall and other City facilities

¹¹ U.S. Department of Energy—Energy Efficiency and Renewable Energy, Community Choice Aggregation, 2015.

Water and Waste

The waste, water, and wastewater sectors of the City's GHG inventory account for 10 percent, 5 percent, and 1 percent of total emissions, respectively. To reduce emissions from these sectors, the CAP includes several measures to (1) reduce indoor and outdoor water consumption, (2) reduce solid waste entering landfills, (3) capture landfill emissions, and (4) capture emissions from wastewater treatment.


Measures

- **W1—Water Waste Enforcement:** Complement educational strategies with increased enforcement against water waste.
- **W2—Update Landscape Water Conservation Ordinance**
- **W3—Finance Tools for Efficiency:** Support implementation of PACE programs in Del Mar and continue to assess other efficiency financing tools for possible use in the community.
- **W4—Implement Pool Cover Program**
- **W5—Develop a Zero Waste Plan:** Increase waste reduction through reuse, recycling, composting, and other technologies until the goal of zero waste is achieved.
- **W6—Sponsor Zero Waste Events:** Require zero waste at all city-sponsored events by 2017.
- **W7—Construction & Demolition (C&D) Recycling Standards:** Reduce construction waste consigned to the landfills.
- **W8—Organics Diversion Program:** Divert organic waste from landfills.
- **W9—Methane Capture for Landfills:** Encourage increased methane capture for landfills serving Del Mar.
- **W10—Methane Capture for Wastewater Treatment Plants:** Encourage increased methane capture for wastewater treatment plants serving Del Mar.

Goal 8: Reduce Residential Indoor Water Consumption in Remodeled Single-Family Homes

Every process involving water requires energy, including treatment and transportation of water, wastewater collection, and wastewater treatment. Significant amounts of energy are used to move water geographically and to treat it to drinking water standards. This is also true for wastewater. Reducing water usage and increasing water efficiency is key to increasing energy efficiency and reducing GHG emissions. The goal of this measure is to reduce residential indoor water consumption in remodeled single-family homes. The CAP goals are to achieve a 20-percent reduction in water consumption in remodeled single-family homes by 2020 and a 40-percent reduction by 2035.

Goal 8: Reduce Residential Indoor Water Consumption in Remodeled Single-Family Homes

GHG Reduction Potential (2020)	30 MTCO ₂ e
GHG Reduction Potential (2035)	133 MTCO ₂ e
Measures	W1, W3
Co-Benefits	

STRATEGIES

- Implement a Water and Energy Conservation Ordinance (WECO) to require water and energy efficiency upgrades applicable to existing homes at time of sale
- Support implementation of PACE programs in Del Mar and continue to assess other efficiency financing tools for possible use in the community
- Maintain a water waste reporting public education and enforcement program to repair leaks and decrease over-irrigation
- Educate property owners about eligibility for PACE financing
- Actively promote water efficiency rebate programs offered by San Diego County Water Authority (SDCWA) and Metropolitan Water District (MWD)


Goal 9: Reduce Outdoor Water Consumption

The City of Del Mar consumed over 397 million gallons of water in 2012. Outdoor water use for landscape irrigation accounts for approximately 58 percent (approximately 140.6 million gallons) of residential water consumption in Del Mar.¹² The CAP goals are to reduce outdoor water consumption by 20 gallons (6.1-acre feet) per capita per day by 2020 and 30 gallons (9.2-acre feet) per capita per day by 2035.

STRATEGIES

- Promote programs/resources to help customers convert to more water-efficient landscaping (i.e., SDCWA rebates for removing lawns)
- Update the City's landscape ordinance to implement a lower maximum area water allowance (MAWA) to exceed state minimum requirements

Goal 9: Reduce Outdoor Water Consumption

GHG Reduction Potential (2020)	47 MTCO ₂ e
GHG Reduction Potential (2035)	20 MTCO ₂ e
Measures	W2
Co-Benefits	

¹² This measure assumes that 61 percent of water use is residential and that 58% of residential water consumption in Del Mar is used outdoors.

Goal 10: Pool Cover Program



Mandating pool covers can reduce GHG emissions by decreasing evaporation and, thus, water consumption. It is estimated that pool covers can save 7,863 gallons per pool annually¹³. The CAP goal is to mandate pool covers on 100 percent of pools in Del Mar by 2020, continuing into 2035.

STRATEGIES

- Develop a public education program to promote use of pool covers on a voluntary basis
- Explore implementation of a pool cover rebate program
- Explore implementation of requiring pool covers by ordinance


Goal 10: Pool Cover Program	
GHG Reduction Potential (2020)	2 MTCO ₂ e
GHG Reduction Potential (2035)	2 MTCO ₂ e
Measures	W4
Co-Benefits	

¹³ Metropolitan Water District of Southern California. 2003. Swimming Pool Cover Rebate Project.

Goal 11: Divert Waste from Landfills and Capture Emissions

According to 2008 Statewide Waste Characterization data, the commercial sector generates nearly 75 percent of the solid waste in California. Furthermore, much of the commercial sector waste disposed of in landfills is readily recyclable. Increasing the recovery of recyclable materials will directly reduce GHG emissions. In particular, recycled materials can reduce the GHG emissions from multiple phases of product production; including extraction of raw materials, preprocessing, and manufacturing. Under AB 341, the State of California required jurisdictions to achieve a 50-percent diversion rate by 2000. In 2011, AB 341 was amended to require at least a 75-percent diversion rate by 2020.

The City generates approximately 8,700 wet short tons of solid waste annually.¹⁴ The City is aiming to exceed state requirements with CAP goals for waste diversion of 80-percent diversion by 2020 and 95 percent by 2035. In addition, the CAP goals also include achieving a landfill gas capture rate of 75 percent by 2020 and 80 percent by 2035 to comply with state landfill methane capture regulations. Landfill gas is a mix of predominantly methane and carbon dioxide that can be captured and utilized onsite as a fuel to operate boiler systems and/or to generate electricity. Increasing gas capture reduces direct emissions and reduces energy consumption and associated emissions.

Goal 11: Divert Waste from Landfills and Capture Emissions	
GHG Reduction Potential (2020)	770 MTCO ₂ e
GHG Reduction Potential (2035)	1,702 MTCO ₂ e
Measures	W5, W6, W7, W8, W9
Co-Benefits	

STRATEGIES

- Adopt a policy that requires all City-sponsored events (and City-funded non-profit events) to be zero waste (e.g. use recyclable and compostable materials and provide corresponding waste receptacles), and promote zero-waste events to community organizations and businesses.
- Adopt a policy that requires a minimum of 75 percent of construction and demolition (C&D) waste be recycled or re-used
- Develop an Organics Diversion Program to eliminate organic waste from landfills (AB 1826 requires businesses to arrange for organics diversion and will be phased in from 2016 to 2020)
- Start and implement a pilot education program on organics recycling
- Develop a food recycling plan for restaurants in Del Mar and collaborate with other municipalities to develop a regional plan
- Advocate to the agencies that own and operate the landfills serving Del Mar to encourage increased methane capture at the landfills


¹⁴ CalRecycle, <http://www.calrecycle.ca.gov/DataCentral/>

Goal 12: Capture Emissions from Wastewater Treatment

The City of Del Mar’s wastewater is currently treated by the City of San Diego Metropolitan Wastewater System. A future connection is planned to the San Elijo Water Reclamation Facility (SEWRF), located in Cardiff. Once complete, it is expected that most of Del Mar’s wastewater will be transported to the SEWRF, with a portion still transported to the Metropolitan Wastewater System based on flow rates and system maintenance needs. The anaerobic and aerobic processes in wastewater treatment produce methane (CH₄) and nitrous oxide (N₂O) gases as by-products from the decomposition of organic material.

Both CH₄ and N₂O are GHGs with high global warming potential, 25 and 298 times higher than CO₂, respectively.

The City of San Diego Metropolitan Wastewater System’s current wastewater treatment process includes capturing methane (average capture rate of 71 percent¹⁵) that is used as an energy source for wastewater treatment. Capturing these gases will greatly reduce GHG emissions from the wastewater sector. The CAP goal is to achieve a 98 percent methane capture rate for wastewater treatment by 2035.

Goal 12: Capture Emissions from Wastewater Treatment	
GHG Reduction Potential (2020)	7 MTCO ₂ e
GHG Reduction Potential (2035)	7 MTCO ₂ e
Measures	W10
Co-Benefits	

STRATEGY

- Advocate to the City of San Diego and San Elijo JPA for increased methane capture at wastewater treatment plants that serve the City of Del Mar

¹⁵ Silva-Send, Nilmini. 2008. San Diego County Greenhouse Gas Inventory: An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets – Waste Report.

Transportation

The transportation sector accounts for 17 percent of the City’s GHG emissions based on trips that start or end in Del Mar. The following measures aim to reduce these emissions by reducing vehicle miles traveled (VMT) and fuel use by passenger vehicles of residents, visitors, and employees in Del Mar, especially for vehicles that run on fossil fuels.

MEASURES

- **T1—Improve Transit Service:** Ensure reliable, comfortable, and safe transit options for Del Mar residents, employees, and visitors.
- **T2—Improve Transit Efficiency:** Provide enhanced bus service in Del Mar by 2020.
- **T3—Retrofit Major Corridors to be “Complete Streets”:** Consider every transportation mode and user when designing streets, and incorporate multimodal design principles in all projects.
- **T4—Expand Alternative Fuel Infrastructure:** Advocate and collaborate with neighboring jurisdictions for the installation of at least one fueling station for all major alternative fuels within five miles of Del Mar by 2020.
- **T5—Preferential Parking for Clean Vehicles:** Set aside convenient parking spaces for high efficiency and clean vehicles, including motorcycles and scooters.
- **T6—Install Roundabouts**
- **T7—Support Regional Transportation Demand Management (TDM)**

Goal 13: Increase Mass Transit Ridership

Public transportation use reduces travel by private vehicles. Those who choose to ride public transportation reduce their GHG emissions and conserve energy by eliminating travel that otherwise would have been made in a private vehicle. The result is fewer VMT and reduced GHG emissions. The CAP goals are to achieve 4 percent mass transit ridership by Del Mar’s labor force by 2020 and 8 percent by 2035.

STRATEGIES

- Advocate to San Diego Metropolitan Transit System (MTS), NCTD, and SANDAG to improve transit service and promote east-west shuttle on Del Mar Heights Road
- Advocate to SANDAG/MTS (collaborating with NCTD) to expand transportation offerings to the Fairgrounds for major events from central areas of San Diego
- Advocate for funding of bus enhancements (i.e., Express (limited stops) or Bus Rapid Transit (BRT)) on Camino del Mar/101 Coastal Highway
- Adopt a Complete Streets policy, either as a standalone policy or as part of the Community Plan, which considers every transportation mode and user when designing streets, and incorporates multimodal design principles in all projects
- Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources
- Review Key Performance Indicators (KPIs) in SANDAG’s TDM implementation plan at least once annually
- Improve connectivity (by public transit, bicyclists, and pedestrians) to the Solana Beach train station for access to commuter rail
- Advocate for construction of a special event rail platform at the San Diego County Fairgrounds to facilitate use of rail by event attendees and employees
- Incorporate bus stops and transit system infrastructure as part of the Camino Del Mar streetscape project in the central area of Del Mar

Goal 13: Increase Mass Transit Ridership	
GHG Reduction Potential (2020)	8 MTCO ₂ e
GHG Reduction Potential (2035)	46 MTCO ₂ e
Measures	T1, T2, T3, T7
Co-Benefits	

Goal 14: Adopt a Bicycle Strategy

Bicycle-friendly roads are crucial to promoting bicycle use. People tend to choose this transportation mode if safer bicycle routes (i.e., bicycle lanes separated from motor vehicle lanes) are available. Therefore, developing a bicycle master plan and constructing more bicycle routes will encourage more trips by bicycle and help reduce VMT. Currently, bicycle lanes are available on the main arterial roadways of Del Mar. The City is a popular thoroughfare for bicyclists traveling the coastal corridor. It was assumed that 1.1 bike lanes mile per square mile existed in Del Mar in 2010. The CAP goals are to install 2 bicycle lane miles per square mile by 2020 and 2.1 bicycle lane miles per square mile by 2035.



Goal 14: Adopt a Bicycle Strategy

GHG Reduction Potential (2020)	3 MTCO ₂ e
GHG Reduction Potential (2035)	2 MTCO ₂ e
Measures	T3
Co-Benefits	

STRATEGIES

- Incorporate a “Complete Streets” approach in designing streets and explore adoption of a Complete Streets policy, either as a standalone policy or as part of the Community Plan, which considers every transportation mode and user for applicable arterial streets and incorporates multimodal design principles in all projects
- Explore implementation of a bike share program offered through the hotels to provide another transportation alternative for visitors traveling in town
- Explore implementation of a bike valet program for special events to facilitate use of bicycles to attend special events
- Explore a bicycle master plan for the City that analyzes bicycle paths with logical destinations within the City, connects to the regional bicycle path network, and then prioritizes the most effective bicycle path routes for implementation. This bike master plan would apply to arterial roadways and potential local streets. Since we already have bike lanes on our arterials, the bicycle master plan could also focus on how to make existing bike lanes more complete and user-friendly, including options such as:
 - Widening bike lanes;
 - Enhancing safety elements and markings;
 - Incorporation into the regional bike-way finding effort; and
 - Looking at locations to place additional bicycle racks and repair stations


Goal 15: Pedestrian Mobility Plan

Improving pedestrian infrastructure will encourage residents to walk to work, if possible, and to various destinations within town as opposed to using their personal vehicles, thereby reducing VMT. In order to measure progress, it was assumed that the average roundtrip walking distance for a commuter is 0.67 miles. The CAP goals are to achieve 4 percent labor force participation by 2020 and 10 percent labor force participation by 2035.

STRATEGIES

- Incorporate a “Complete Streets” approach in designing streets and explore adoption of a Complete Streets policy, either as a standalone policy or as part of the Community Plan, which considers every transportation mode and user for applicable arterial streets and incorporates multimodal design principles in all projects
- Explore development of a pedestrian master plan that would comprehensively review and plan for pedestrian improvements and identify mobility linkages to promote walkability and safety for pedestrians
- Complete a streetscape improvement project along Camino Del Mar in the central area that subscribes to alternative transportation principles and improves circulation, ADA access, and safety for pedestrians
- Pursue completion of the last segment of the scenic loop trail on the perimeter of the City limits which serves a recreational amenity for pedestrians and as another circulation option within the community

Goal 15: Pedestrian Mobility Plan


GHG Reduction Potential (2020)	7 MTCO _{2e}
GHG Reduction Potential (2035)	13 MTCO _{2e}
Measures	T3
Co-Benefits	

Goal 16: Increase the Percentage of VMT Being Driven by Electric and Alternative Fuel Vehicles

Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs) produce lower GHG emissions than at least 40 percent of conventional vehicles. The CAP goals are to increase the percentage of VMT being driven by electric vehicles (EVs) and other alternative fuel vehicles (AFVs) to 15 percent of total VMT by 2020 and 30 percent by 2035.

STRATEGIES


- Support public and private sector provision of alternative fueling stations in Del Mar and adjacent cities
- Explore grant funding for electric car chargers
- Explore the potential for replacing municipal fleet with electric cars when feasible
- Advocate for expansion of an electrical vehicle car sharing fleet network to serve Del Mar

Goal 16: Increase the Percentage of VMT Being Driven by Electric and Alternative Fuel Vehicles	
GHG Reduction Potential (2020)	4,456 MTCO _{2e}
GHG Reduction Potential (2035)	8,593 MTCO _{2e}
Measures	T4
Co-Benefits	

Goal 17: Increase Number of Preferential Parking Spaces for Clean Vehicles



Goal 17: Increase Number of Preferential Parking Spaces for Clean Vehicles

GHG Reduction Potential (2020)	75 MTCO _{2e}
GHG Reduction Potential (2035)	56 MTCO _{2e}
Measures	T5
Co-Benefits	

Increasing the number of preferential parking spaces for EVs and other AFVs will encourage people to transition from conventional vehicles to low-emission vehicles. This goal can act as a support and boost to the implementation of Goal 16.

STRATEGIES


- Set aside 10 percent of all on-street parking spots on Camino del Mar and in City-owned lots for high-efficiency and clean vehicles by 2020
- Explore modifying the Del Mar Municipal Code parking standard requirements to incentivize stalls designed for micro-vehicles and to provide a credit toward parking requirements for providing parking stalls for electric vehicles and charging stations.
- As part of the Camino Del Mar Streetscape project design, plan to include spaces designated for electric vehicles
 - Include dedicated stalls for electric vehicle parking and charging stations at City facilities.

Goal 18: Install Roundabouts

Roundabouts can have a traffic flow smoothing effect, leading to reduced idling and fuel use by vehicles (7,835 gallons of fuel saved per intersection daily), thereby reducing GHG emissions and air pollution.¹⁶ The CAP goal is to install at least three roundabouts by 2020, thereby reducing approximately 8.5 million gallons of fuel and 170 MTCO₂e annually.

STRATEGY

- Construct at least three roundabouts at intersections with stop signs or traffic signals by 2020

Goal 18: Install Roundabouts	
GHG Reduction Potential (2020)	140 MTCO ₂ e
GHG Reduction Potential (2035)	105 MTCO ₂ e
Measures	T6
Co-Benefits	

¹⁶ Silva-Send, Nilmini. 2009. Reducing Greenhouse Gases from On Road Transportation in San Diego County: An Analysis of Local Government Policy Options.


Goal 19: Increase Percentage of Population with Alternate Work Schedules

Alternate work schedules for commuters can reduce traffic and VMT during workdays and the associated fuel use and GHG emissions. In the City of Del Mar, the largest employers are the 22nd District Agricultural Association (Del Mar Fairgrounds) and city government; however, this measure also applies to residents commuting outside the City. The CAP goals are to increase the labor force with an alternate work schedule to 5 percent by 2020 and 6 percent by 2035.

STRATEGIES:

- Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources
- Review Key Performance Indicators (KPIs) in SANDAG’s TDM implementation plan at least once annually

Goal 19: Increase Percentage of Population with Alternate Work Schedules

GHG Reduction Potential (2020)	13 MTCO ₂ e
GHG Reduction Potential (2035)	12 MTCO ₂ e
Measures	T7
Co-Benefits	


Goal 20: Increase Telecommuting

Telecommuting can contribute to VMT reduction by allowing employees to work from home and avoiding a daily commute. The CAP goal is to increase the labor force eligible to telecommute to 6 percent by 2020 and remain at 6 percent through 2035.

STRATEGIES

- Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources
- Review Key Performance Indicators (KPIs) in SANDAG’s TDM implementation plan at least once annually

Goal 20: Increase Telecommuting


GHG Reduction Potential (2020)	15 MTCO ₂ e
GHG Reduction Potential (2035)	16 MTCO ₂ e
Measures	T7
Co-Benefits	

Goal 21: Increase Van Pooling

Higher ridesharing rates mean less VMT and lower GHG emissions, so encouraging vanpooling by promoting regional incentive programs. The CAP goals are to increase vanpooling to 3 percent of the labor force by 2020 and 5 percent by 2035.

STRATEGIES:

- Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources
- Review Key Performance Indicators (KPIs) in SANDAG’s TDM implementation plan at least once annually
- Explore modifying the Del Mar Municipal Code parking standard requirements to incentivize provision of stalls designed for carpool or vanpool vehicles as a credit toward parking requirements

Goal 21: Increase Van Pooling	
GHG Reduction Potential (2020)	33 MTCO _{2e}
GHG Reduction Potential (2035)	50 MTCO _{2e}
Measures	T7
Co-Benefits	

Urban Tree Planting

Trees and vegetation naturally help cool an environment by providing shade and evapotranspiration (the movement of water from the soil and plants to the air). They will reduce GHG emissions by sequestering carbon dioxide (CO₂). Trees planted near pavement can reduce the surface temperatures of streets and parking lots, and trees planted strategically near windows or roofs of buildings can effectively reduce interior temperatures, thereby reducing energy used for cooling.

Goal 22: Implement Urban Tree Planting Program

Based on a study for the California Energy Commission (CEC)¹⁷, typical hardwood trees absorb about 1.56 tons of CO₂ per acre. In the baseline year (2012), the City had approximately 50 acres (10 percent) urban canopy cover¹⁸. The CAP goals are to achieve 15 percent urban canopy cover by 2020 for 500 acres of land in Del Mar, increasing to 30 percent by 2035.

Goal 22: Implement Urban Tree Planting Program	
GHG Reduction Potential (2020)	117 MTCO _{2e}
GHG Reduction Potential (2035)	234 MTCO _{2e}
Co-Benefits	

¹⁷ Brown, S., T. Pearson, A. Dushku, J. Kadyzewski, and Y. Qi, 2004. Baseline Greenhouse Gas Emissions and Removals for Forest, Range, and Agricultural Lands in California. Winrock International, for the California Energy Commission, PIER Energy-Related Environmental Research. 500-04-069F. See also: Energy Policy Initiatives Center, 2008. An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets: Agriculture, Forestry and Land Use Report.

¹⁸ Extrapolated from the City of San Diego’s Urban Forest Management Plan and based on the parkland conditions in Del Mar. (EPIC. 2015. Methods for Estimating Greenhouse Gas Reductions from Del Mar’s Climate Action Plan.)

Summary of the Local Reductions

By implementing these local reduction measures, the City projects to reduce its GHG emissions by approximately 14 percent compared to the 2020 BAU emissions and by 32 percent compared to the 2035 BAU emissions.

TABLE 7 Summary of Emissions Reductions by Sector					
Year	GHG Reductions (MTCO ₂ e)				
	Energy & Buildings	Water & Waste	Transportation	Urban Tree Planting	Total
2020	1,966	856	4,750	117	7,689
2035	6,546	1,863	8,893	234	17,536

Comparison to Reduction Targets

By 2020, the statewide and local measures together would reduce the City's GHG emissions from the 2020 BAU forecast by approximately 30 percent, or 16,482 MTCO₂e (from 54,822 MTCO₂e to 38,340 MTCO₂e). This reduction is equivalent to a 31-percent decrease below baseline (2012) levels, which exceeds the 15-percent reduction target for the year 2020.

By 2035, the statewide and local measures together would reduce the City's GHG emissions from the 2035 BAU forecast by approximately 54 percent, or 29,802 MTCO₂e (from 55,314 MTCO₂e to 25,512 MTCO₂e). This reduction is equivalent to a 54-percent decrease below baseline (2012) levels, which exceeds the 50-percent reduction target for the year 2035. As shown in **FIGURE 4**, below, the City will meet their reduction goal in 2020 and 2035.

TABLE 8 Comparison of Emissions and Targets			
	2012 MTCO ₂ e	2020 MTCO ₂ e	2035 MTCO ₂ e
BAU Emissions	55,855	54,822	55,314
Reduction Target (% change from 2012)	—	15%	50%
Emissions Goal	—	47,477	27,928
State & Federal Reductions	—	8,793	12,266
Local Reductions	—	7,689	17,536
Total Reductions Achieved	—	16,482	29,802
Community Emissions After Reductions	—	38,340	25,512
Is the Emissions Goal Achieved?	—	Target Met	Target Met

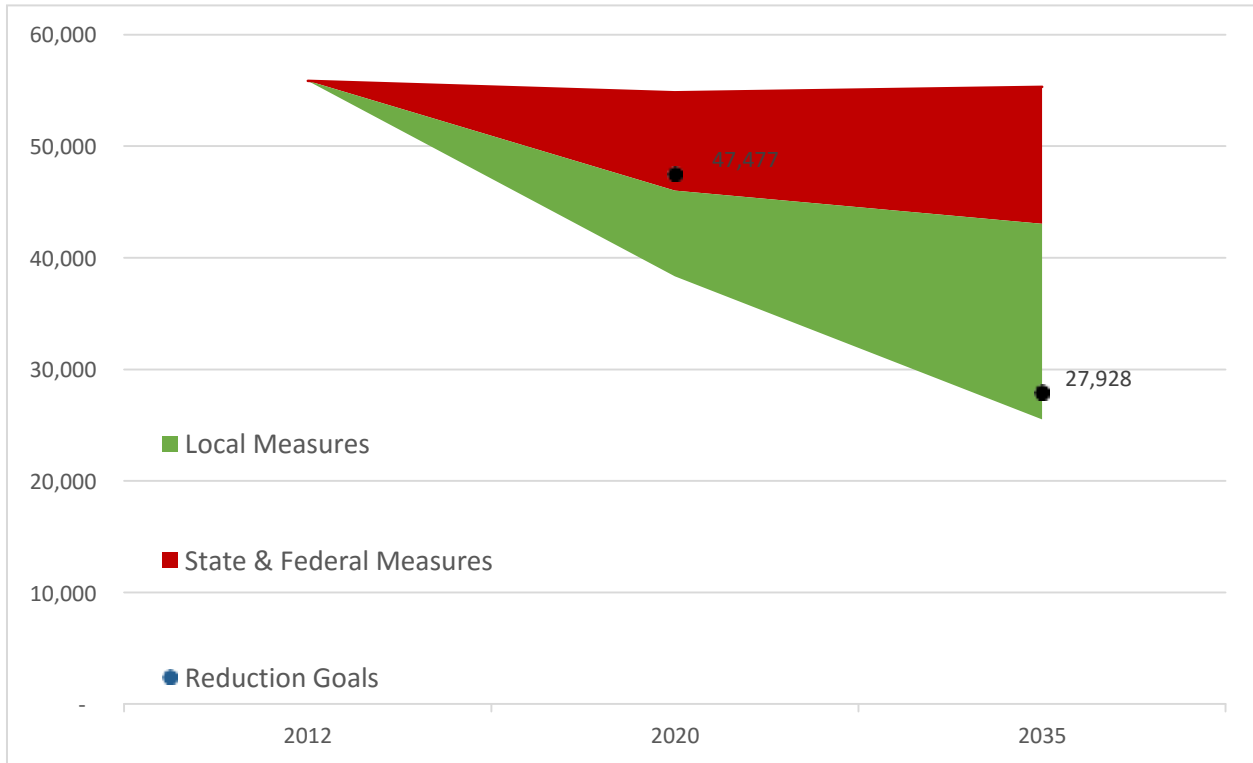


FIGURE 4 State and Local Reductions Comparison with Targets



Chapter 4 **Adaptation**

The City recognizes that planning sustainably is more than reducing greenhouse gas (GHG) emissions; it also requires being prepared for changes that would impact the community's quality of life, use of resources, and economy. Furthermore, the City understands that regardless of current and future mitigation efforts, climate change will still occur and adaptation strategies need to be developed and implemented. Preparedness efforts, or adaptation, seek to reduce vulnerability and increase the local capacity to adapt to changes. This chapter summarizes changes in average and extreme weather that may occur in the next several decades and identifies actions to build resilience and adapt to those changes.

Climate Change Projections

Studies show that California will experience warmer temperatures, increased drought, and more extreme weather events.¹⁹

IMPACTS

- **Increased temperatures**—Global average temperatures are predicted to increase between 2.5°F and 10.4°F, depending on the amount of future emissions and how the earth responds to those emissions.²⁰ For California, the average annual temperature is expected to rise between 1.8°F and 5.4°F by 2050 and between 3.6°F and 9.0°F by the end of the century.²¹ For the City, average temperatures are expected to increase between 2.2°F and 5.4°F by the end of the century.²²
- **Decreased precipitation**—Globally, future precipitation is highly variable, but in California, annual precipitation is expected to decrease by more than 15 percent by the end of the 21st century.²³ In Del Mar, precipitation also is expected to decline over the next century, falling from around 17 inches per year to about 15 inches per year.²⁴ Seasonal precipitation will change more significantly, and the City will likely experience longer periods of drought, as the summer dry season extends earlier into the spring and later into the fall.
- **Increase in extreme weather events**—The historical average of extreme heat days (days over 89°F) has been four per year, but by 2050, the number of extreme heat days could increase to more than 50 per year, and by the end of the century, the number of extreme heat days could exceed 100 per year (see **FIGURE 5**, below).²⁵ In addition, the number of consecutive extreme heat days will increase. With the exception of a few years, the historical duration of heatwaves in the City has been less than five days, but by mid-century, the duration of heatwaves could increase to more than 10 days and up to 25 days by the end of the century.²⁶

¹⁹ Cayan, D., W. Chou, G. Franco, S. Moser, and S. Pittiglio. *The Future is Now: An Update on Climate Change Science Impacts and Response Options for California*. (2008)

²⁰ Intergovernmental Panel on Climate Change, *Climate Change 2007: Mitigation of Climate Change* (2007).

²¹ California Natural Resources Agency, *California Climate Adaptation Strategy* (2009).

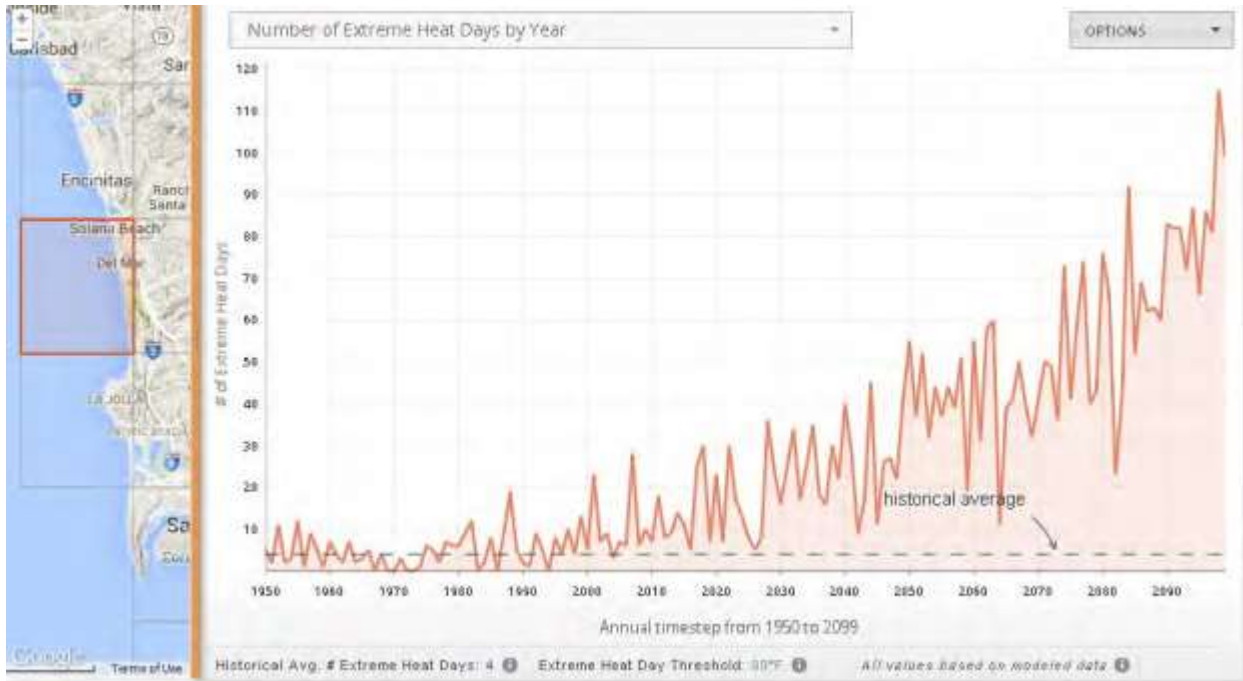
²² Scripps Institution of Oceanography, Projected Temperatures Data Set (2009). Accessed from Cal-Adapt.org.

²³ California Climate Action Team, *Draft Biennial Climate Action Report* (March 2009).

²⁴ Scripps Institution of Oceanography, Projected Precipitation Data Set (2009). Accessed from Cal-Adapt.org.

²⁵ Scripps Institution of Oceanography, Projected Daily Temperature Data Set (2009). Accessed from Cal-Adapt.org.

²⁶ Scripps Institution of Oceanography, Projected Annual Heat Waves Data Set (2009). Accessed from Cal-Adapt.org.



SOURCE: Cal-Adapt Climate Tools

FIGURE 5 Number of Extreme Heat Days per Year

Impacts of Climate Change and Adaptation Strategies

Increasing awareness and concern regarding potential climate change impacts has led to some policy responses and programs aimed at reducing GHG emissions in the City, including Executive Order (EO) S-13-08 discussed in Chapter 1. Impacts of climate change are already being seen and other more serious consequences are likely to occur in the future. The exact nature of the impacts is unknown and depends on near-term emissions, but the most likely impacts to the state and City over the next century are discussed below, along with strategies to reduce potential impacts or build resiliency to impacts.

Public Health & Safety

Periods of increased high temperatures or extended high temperatures can lead to increased heat-related, cardiovascular, and respiratory illnesses and diseases; heart attacks, and other health impacts. Emergency medical services and hospital visits also increase during heat waves. Changes in temperature also are expected to worsen air quality by increasing ozone and particulate matter concentrations, which can cause or exacerbate respiratory symptoms such as asthma attacks. Especially sensitive populations are the young (under five years of age) and the elderly (over 65 years of age), which constitute approximately 27 percent of Del Mar’s 2012 population and will increase to more than 41 percent of the population by 2035 (see **FIGURE 6**, below). Other populations that could be affected by extreme temperatures include outdoor workers, such as construction and maintenance workers. This may place limits on work hours and may require additional training and understanding of heat-related illnesses of which workers should be aware.



SOURCE: SANDAG Data Warehouse

FIGURE 6 Percentage of Del Mar's Population Considered Sensitive

STRATEGIES

- Manage/restore natural areas which can help improve air/water quality.
- Advocate nearby hospitals and emergency service providers to monitor and ensure sufficient resources are available.
- Assist in facilitating access to cooling centers and pools for the public
- Increase public outreach and educational programs to inform the public of health & safety resources.
- Explore opportunities to reduce urban heat island (UHI) effect through cool roadway technology (e.g. light reflecting pavement), planting shade trees in parking lots, and creating additional green spaces.
- Promote design of buildings, public areas, and infrastructure to reduce reliance on mechanical cooling and energy use (e.g., cool roofs).
- Explore use of a community alert/notification system for public updates regarding heat or air quality advisories.



Water Availability

Water availability is and has been a vital economic, natural resource, and public health issue in California. Warming temperatures, along with decreased rainfall and snowpack, will worsen droughts and threaten imported and local water supplies. Multi-year droughts challenge water supplies. Imported water supply limitations will intensify as climate change causes reduced rainfall, decreased snowfall, and increased temperatures. The San Diego County Water Authority (SDCWA), the wholesale supplier to San Diego County, expects demand to increase 22 percent between 2009 and 2035.²⁷

STRATEGIES

- Educate the public about water conservation.
- Expand Del Mar’s recycled water system.
- Encourage residents to install greywater systems.
- Advocate for the development of local water supplies that would not be affected by climate change, such as advanced water purification.
- Implement a storm water catchment and water reserve system.
- Promote conversion of turf grass to California-friendly landscaping.



Coastal Flooding

According to current research and studies, an increase in sea levels, with higher tides and greater winter storms are expected; this will cause more frequent and widespread coastal flooding. Higher sea levels and heavier storms will also effect on beach loss and coastal erosion. This risk will put coastal homes and businesses at greater risk for costly damage.

STRATEGIES

- Conduct a sea level rise study to understand the risks and cost/benefits of development within flood hazard zones and potential long-term mitigation recommendations.
- Explore protecting existing and construct new natural buffers to protect the coastline from flooding.
- Explore preservation of shorelines through beach replenishment and nourishment to address impacts of sea level rise on shorelines.
- Install “green infrastructure” around buildings and other parcel areas to manage storm water.



²⁷ San Diego County Water Authority, *San Diego County Water Authority Climate Action Plan* (March 2014)

- Evaluate the necessity of replacing bridges that span the San Dieguito Lagoon.

Wildfire

As California is expected to experience increased temperatures and reduced precipitation, there likely will be more frequent and intense wildfires and longer fire seasons. About one-third of the City of Del Mar is heavily wooded with mature trees and covered by open space, which is the most vulnerable land to wildfire.²⁸ In addition, these open spaces are in close proximity to residential and commercial structures,



which increases the risk and potential damage of wildfires. Effects from wildfire can include eye and respiratory illness, worsening asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular and respiratory diseases. Additional resources may be needed to combat additional wildfires in the region, including already-scarce water.

STRATEGIES

- Maintain adequate fire and emergency services facilities and resources.
- Consider fire risks when building and allocating firefighting resources.
- Encourage the use of fire-resistant building design, materials, and landscaping.
- Use geographic information systems (GIS) to develop centralized mapping information on fire risks, hazard maps, and emergency plans.
- Integrate a community alert/notification system.
- Manage combustible vegetation and maintain defensible space.
- Restore fire-adapted ecosystems that can withstand naturally recurring wildfires.
- Encourage removal of eucalyptus and other non-native vegetation from the wildland-urban interface.

Natural Systems & Wildlife

As humans, we benefit immensely from the resources created by our environment. With changing climatic conditions, it is important to help protect the wildlife and natural systems around us. Rising sea levels, rising temperatures, and changes in rainfall threaten the ecosystems of San Diego and habitats of the region's wildlife.



STRATEGIES

- Monitor the health of coastal wetlands/river habitats that filter polluted runoff.

²⁸ City of Del Mar, *The Community Plan for the City of Del Mar* (March 1976).

- Participate in the development of an interconnected network of nature preserves across a variety of landscapes.
- Protect, preserve, and restore native habitats.
- Encourage the use of native landscaping.
- Monitor/control invasive species.
- Acquire or protect open space areas.

Electrical Demand

The City may experience challenges to its local energy supply due to warmer temperatures. Peak demand for electricity may increase due to increased use of air conditioners in the City and other regions of San Diego Gas & Electric (SDG&E) territory, which may cause brownouts or blackouts. Additionally, efficiencies of electricity generation and transmission decrease as air temperatures increase, which further inhibits the ability of electric providers to meet increased demand.

STRATEGIES

- Educate the public to become more energy efficient and reduce demand.
- Encourage solar-based or other renewable energy sources to supplement the grid and reduce peak demand on the grid.
- Encourage improved building envelopes by adding insulation and placing trees to provide shade.
- Encourage cooling technologies.
- Promote the use of smart-meter devices which allow appliances to run during off-peak hours.



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Chapter 5 Implementation

This section describes recommended implementation steps for the Del Mar Climate Action Plan (CAP) to support achievement of the greenhouse gas (GHG) reduction goals for the community at large. Success in meeting the City's GHG emission reduction goals will depend on cooperation, innovation, and participation by the City and residents, businesses, and other local government entities, such as the San Diego Association of Governments (SANDAG), San Diego Gas & Electric (SDG&E), and North County Transit District (NCTD). This section outlines key steps for the implementation of this CAP.

Measure Implementation

After taking into account the reductions in GHG emissions resulting from statewide measures, the City still will need to implement local reduction measures to reach its reduction targets. An implementation schedule for the recommended local reduction measures is included as Appendix B. Prioritization of the recommended measures was based on the following factors:

- GHG reduction efficiency
- Cost Effectiveness
- Level of City control/effort
- Ease of implementation
- Time required to implement
- Community input

In general consideration of these factors, three phases have been identified from 2016 through 2020.

- Phase 1 (2016-2017): Develop key ordinances, complete key planning efforts, implement the most cost-effective measures, and support voluntary efforts.
- Phase 2 (2017-2018): Continue to implement Phase 1 measures, implement Phase 2 measures, and implement key planning outcomes from Phase 1.
- Phase 3 (2018-2020): Continue to implement Phase 1 and 2 measures, implement Phase 3 measures, and implement key planning outcomes from Phase 2.

The recommended mitigation measures were evaluated qualitatively to assess the level of effort required for implementation. Measures can be categorized based on the convention of low, medium, or high, with low-level measures requiring the least level of effort by the City and being the most likely to be pursued immediately (i.e., the low-hanging fruit). Sample criteria are shown in **TABLE 9**, below.

TABLE 9 Measure Implementation Criteria	
Implementation Effort Level	Sample Criteria
Low	<ul style="list-style-type: none"> ■ Requires limited staff resources to develop. ■ Existing programs in place to support implementation. ■ Required internal and external coordination is limited. ■ Required revisions to policy or code are limited. ■ Action is not a Project under CEQA.
Medium	<ul style="list-style-type: none"> ■ Requires staff resources beyond typical daily level. ■ Policy or code revisions necessary. ■ Internal and external coordination (e.g., with stakeholders, other cities or agencies, or general public) is necessary. ■ Action is a Project under CEQA but requires simple environmental documentation to support a CEQA exemption.
High	<ul style="list-style-type: none"> ■ Requires extensive staff time and resources. ■ Requires development of completely new policies or programs and potential changes to the general plan. ■ Robust outreach program required to alert residents and businesses of program requirements and eligibility. ■ Requires regional cooperation and securing long-term funding. ■ Action is a Project under CEQA and requires environmental review to support an Initial Study and CEQA Negative Declaration or Mitigated Negative Declaration.

The recommended mitigation measures are part of a high-level guidance document. In many cases, actual implementation will require City Council authorization of specific programs, policies, or projects. Although many of the mitigation measures are independently identified as “low,” comprehensive implementation will require extensive effort.

Administration and Staffing

Implementation of the recommended mitigation measures will require ongoing management, oversight, and staffing. The implementation plan identifies departmental responsibility for overseeing or leading implementation of the individual mitigation measures based on consistency of the mitigation measures with the department’s scope of responsibility. In addition, the City Council-appointed Sustainability Advisory Board will monitor and advise the City Council and staff on implementation of the CAP.

Financing and Budgeting

Implementation of the local GHG reduction measures may require cash output for the capital improvements and other investments, and increased operations and maintenance costs. This section presents a summary of funding and financing options (see **TABLE 10**, below) available at the writing of this document. Some funding sources are not necessarily directed toward a City, but to a larger regional agency such as the San Diego Association of Governments (SANDAG), or a waste services provider serving multiple jurisdictions. The City should monitor private and public funding sources for new grant and rebate opportunities and to better understand how larger agencies are accessing funds that can be used for GHG reductions in their area. Leveraging financing sources is one of the most important roles a

local government can play in helping the community to implement many of the GHG reduction measures.

TABLE 10 Potential Funding Sources to Support GHG Reduction Measures	
Funding Source	Description
City	
California Department of Resources Recycling and Recovery (CalRecycle)	<ul style="list-style-type: none"> ■ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams. ■ Incorporated cities and counties in California are eligible for funds. <p>Program funds are intended to:</p> <ul style="list-style-type: none"> ■ Reduce, reuse, and recycle all waste. ■ Encourage development of recycled-content products and markets. ■ Protect public health and safety and foster environmental sustainability.
California Air Resources Board (CARB)	<ul style="list-style-type: none"> ■ CARB offers several grants, incentives, and credits programs to reduce on-road and off-road transportation emissions. Residents, businesses, and fleet operators can receive funds or incentives depending on the program. <p>The following programs can be utilized to fund local measures:</p> <ul style="list-style-type: none"> ■ Air Quality Improvement Program (AB 118) ■ Carl Moyer Program—Voucher Incentive Program ■ Goods Movement Emission Reduction Program (Prop 1B Incentives) ■ Loan Incentives Program ■ Lower-Emission School Bus Program/School Bus Retrofit and Replacement Account (Prop 1B and EPA Incentives)
Transportation-Related Federal and State Funding	<ul style="list-style-type: none"> ■ For funding measures related to transit, bicycle, or pedestrian improvements, the following funding sources from SANDAG may be utilized: <ul style="list-style-type: none"> • Smart Growth Incentive Program • Active Transportation Grant Program • Job Access and Reverse Commute and New Freedom Programs
New Development Impact Fees	<ul style="list-style-type: none"> ■ These types of fees may have some potential to provide funding for proposed programs and projects, but such fees are best implemented when the real estate market and overall regional economic conditions are strong.
General Obligation Bond	<ul style="list-style-type: none"> ■ A general obligation bond is a form of long-term borrowing and could be utilized to fund municipal improvements.
Other Funding Mechanisms for Implementation	<ul style="list-style-type: none"> ■ Grants may be available from the Strategic Growth Council (SGC) or the State Department of Conservation (DOC) to fund sustainable community planning, natural resource conservation, and development, and adoption.
Community	
San Diego Gas & Electric	<ul style="list-style-type: none"> ■ San Diego Gas & Electric (SDG&E) is one of the utilities participating in the Go Solar initiative. ■ A variety of rebates are available for existing and new homes. ■ Photovoltaics, thermal technologies, and solar hot water projects are eligible. ■ Single-family homes, commercial development, and affordable housing are eligible.
AB 811 Districts Property-Assessed Clean Energy	<ul style="list-style-type: none"> ■ The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured loan, and funds are repaid through property assessments.

TABLE 10 Potential Funding Sources to Support GHG Reduction Measures	
Funding Source	Description
(PACE)	<ul style="list-style-type: none"> ■ Municipalities are authorized to designate areas where property owners can enter into contractual assessments to receive long-term, low-interest loans for energy and water efficiency improvements, and renewable energy installation on their property. ■ Financing is repaid through property tax bills. ■ AB 811 and the PACE program are currently on hold for residential properties due to potential violation of standard FHFA federally guaranteed (Fannie Mae/Freddie Mac) residential mortgage contracts. ■ SANDAG has implemented the Home Energy Renovation Opportunity (HERO; a PACE program) in the County to assist residents in financing residential energy efficiency and solar retrofits. ■ Del Mar has approved four PACE programs to date.
Energy Upgrade California	<ul style="list-style-type: none"> ■ Program is intended for home energy upgrades. ■ Funded by the American Recovery and Reinvestment Act, California utility ratepayers, and private contributions. ■ Utilities administer the program, offering homeowners the choice of one of two upgrade packages—basic or advanced. ■ Homeowners are connected to home energy professionals. ■ Rebates, incentives, and financing are available. ■ Homeowners can receive up to \$4,000 back on an upgrade through the local utility.
Federal Tax Credits for Energy Efficiency	<ul style="list-style-type: none"> ■ Tax credits for energy efficiency can be promoted to residents.
Energy Efficient Mortgages (EEM)	<ul style="list-style-type: none"> ■ An EEM is a mortgage that credits a home's energy efficiency in the mortgage itself. ■ Residents can finance energy saving measures as part of a single mortgage. ■ To verify a home's energy efficiency, an EEM typically requires a home energy rating of the house by a home energy rater before financing is approved. ■ EEMs typically are used to purchase a new home that is already energy efficient, such as an ENERGY STAR® qualified home.
Private Funding	<ul style="list-style-type: none"> ■ Private equity can be used to finance energy improvements, with returns realized as future cost savings. ■ Rent increases can fund retrofits in commercial buildings. ■ Net energy cost savings can fund retrofits in households. ■ Power Purchase Agreements (PPA) involve a private company that purchases, installs, and maintains a renewable energy technology through a contract that typically lasts 15 years. After 15 years, the company would uninstall the technology or sign a new contract. ■ On-Bill Financing (OBF) can be promoted to businesses for energy-efficiency retrofits. Funding from OBF is a no-interest loan that is paid back through the monthly utility bill. Lighting, refrigeration, HVAC, and LED streetlights are all eligible projects.

Community Outreach and Education

The citizens and businesses in the City are integral to the successful implementation of the CAP and to achieving the overall GHG reduction goals. Their involvement is essential, considering that several measures depend on the voluntary commitment, creativity, and participation of the community.

Consistent with the City of Del Mar’s tradition of extensive community engagement, as the City pursues and explores implementation of specific measures, individual programs, projects, code changes, etc. as discussed in the CAP, they will be reviewed by applicable City advisory committees and the City Council, along with other community involvement efforts as necessary and appropriate.

The City will educate stakeholders, such as businesses, business groups, residents, developers, and property owners, about the GHG reduction measures that require their participation, encourage participation in these programs, and alert them to program requirements, incentives and/or rebate availability, depending on the measure. Additionally, the City can provide periodic written updates on the status of CAP implementation using City newsletters, the City’s website, and through other media communications with the general public such as press releases and public service announcements.

It is recommended that the periodic review of the status of the CAP implementation include a forum or venue for the public to provide comments or recommendations for potential changes, additions, or deletions to the plan.

Monitoring, Reporting, and Adaptive Management

Regular monitoring is important to ensure programs are functioning as they were originally intended. Early identification of effective strategies and potential issues would enable the City to make informed decisions on future priorities, funding, and scheduling. Moreover, monitoring provides concrete data to document the City’s progress in reducing GHG emissions. The City would be responsible for developing a protocol for monitoring the effectiveness of emissions reduction programs as well as for undertaking emissions inventory updates:

- **Update GHG Inventory**—With the assistance of SANDAG’s Energy Road Map Program, the City would update its GHG inventory prior to 2020 to evaluate progress toward meeting its GHG reduction goals. This includes data collection in each of the primary inventory sectors (utility, regional vehicle miles traveled (VMT), waste, wastewater, and water), and comparing the inventory to the City’s baseline GHG emissions. Information would be consolidated in a database or spreadsheet that can be used to evaluate the effectiveness of individual reduction measures.
- **Track State Progress**—The CAP will rely heavily on state-level measures. The City would be responsible for tracking the state’s progress on implementing state-level programs. Close monitoring of the real gains being achieved by state programs would allow the City to adjust its CAP, if needed.
- **Track Completion of GHG Reduction Measures**—The City would keep track of measures implemented as scheduled in the CAP, including progress reports on the measures, funding, and savings. This will allow at least a rough attribution of gains when combined with regular GHG inventory updates.

- **Regular Progress Reports**—The City may report annually (or semi-annually or other intervals) to the City Council on CAP implementation progress. If annual reports, periodic inventories, or other information indicates that the GHG reduction measures are not as effective as originally anticipated, the CAP may need to be adjusted, amended, or supplemented.

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Appendix A

GHG Inventory Report & Methodology

City of Del Mar Greenhouse Gas Emissions Inventory and Forecast

April 2016

Prepared for the City of Del Mar



Prepared by the Energy Policy Initiatives Center



About EPIC

The Energy Policy Initiatives Center (EPIC) is a nonprofit academic and research center of the USD School of Law that studies energy policy issues affecting the San Diego region and California. EPIC integrates research and analysis, law school study, and public education, and serves as a source of legal and policy expertise and information in the development of sustainable solutions that meet our future energy needs.

For more information, please visit the EPIC website at www.sandiego.edu/epic.

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1 INTRODUCTION

This report provides a summary of 2012 and 2013 community-scale greenhouse gas (GHG) emissions from the City of Del Mar and business-as-usual (BAU) GHG emissions projection for 2020 and 2035. This document describes the methodology used to calculate the 2012 and 2013 GHG emissions by categories from the City of Del Mar.

Section 2 provides background sources and common assumptions used to estimate GHG emissions. Section 3 provides the results of GHG emissions from the City of Del Mar in 2012 and 2013. More details on method used in each category, input data, and emission factors are provided in Section 4. The methods used for BAU emission projections are provided in Section 5.

Within the tables, charts, and figures found throughout the appendices, rounding of values is often required. Within the actual calculations, however, values are not rounded at intermediary steps to avoid introducing unnecessary error. As a result of rounding, some totals may not equal the values summed.

2 BACKGROUND

2.1 Greenhouse Gases

The primary greenhouse gases (GHGs) included in this inventory are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Each GHG has a different capability of trapping heat in the atmosphere, known as its global warming potential (GWP), which is normalized relative to CO₂ and expressed in carbon dioxide equivalents (CO₂e). In general, the 100-year GWPs reported by the Intergovernmental Panel on Climate Change (IPCC) are used to estimate greenhouse gas emissions. The GWPs used in this inventory are from IPCC Fourth Assessment Report (AR4)¹, given in Table 1.

Table 1 Global Warming Potentials Used in the Del Mar Inventory

Greenhouse Gas	Global Warming Potential (GWP)
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous oxide (N ₂ O)	298

Source: IPCC, 2007

2.2 Categories of Emissions

The U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions published by ICLEI USA (referred to as the ICLEI Community Protocol) recommends including emissions from six categories for a typical community-scale GHG inventory.² These categories are: electricity, natural gas, transportation, solid waste, water, and wastewater. GHG emissions are calculated by multiplying activity data (e.g., kilowatt-hours of electricity, tons of solid waste) by an emissions factor. For these categories,

¹ IPCC Forth Assessment Report: Climate Change 2007. Direct Global Warming Potentials. https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

² ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). <http://icleiusa.org/tools/ghg-protocols/>

methods used in this inventory were based on the ICLEI Community Protocol standard methods, with modifications based on regional- or city-specific data when available.

3 SUMMARY OF GHG EMISSIONS

In 2013, the total GHG emissions from the City of Del Mar were 55,446 metric tons CO₂e (MT CO₂e), distributed into six categories as shown in Figure 1.

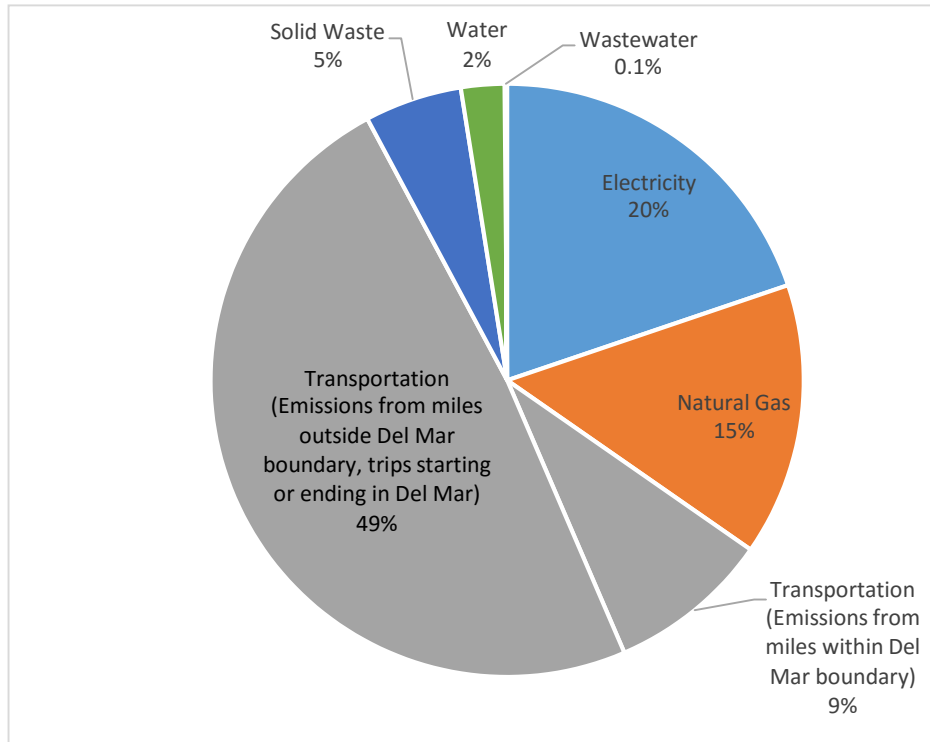


Figure 1 Breakdown of GHG Emissions in City of Del Mar by Category (2013)

Transportation contributed the most to overall GHG emissions: 9% from trips within Del Mar boundary (start and/or end in the city) and 49% from trips outside Del Mar boundary that either start or end in the city. Wastewater contributed the least to overall GHG emissions (<1%).

The total GHG emissions from the City of Del Mar in 2012 were 56,265 metric tons CO₂e (MT CO₂e), with similar distribution of the categories. The emissions in each category for 2012 and 2013 are presented in Table 2.

Table 2 Breakdown of GHG Emissions by Category in City of Del Mar (2012 and 2013)

Category	GHG Emissions (MT CO ₂ e)	
	2012	2013
Electricity	11,703	10,980
Natural Gas	8,243	8,242
Transportation (Emissions from miles within Del Mar boundary)	4,925	4,916
Transportation (Emissions from miles outside Del Mar boundary, trips starting or ending in Del Mar)	27,031	26,976
Solid Waste	2,930	2,942
Water	1,351	1,311
Wastewater	83	79
Total	56,265	55,446

Source: EPIC, 2016

4 SUMMARY OF METHODS BY CATEGORY

4.1 Electricity

GHG emissions from electricity consumption by the City of Del Mar were estimated using method BE.2 Emissions from Electricity Use, from the ICLEI Community Protocol.³ Electricity consumption in the City of Del Mar was provided by the local utility, San Diego Gas & Electric (SDG&E), for two customer classes: residential and commercial.⁴ Two modifications were made to the consumption (Table 3) for this inventory. First, the annual electricity consumption obtained from SDG&E was adjusted to account for losses due to transmission and distribution using a loss factor⁵ of 1.066.⁶ Second, in order to avoid double counting, the portion of electricity consumption associated with local distribution of water was subtracted from the electricity category and attributed to the water category.

³ ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix C: Built Environment Emission Activities and Sources. <http://iclei.org/tools/ghg-protocols/>

⁴ Communication with SDG&E. Data provided to EPIC in September 2014.

⁵ Transmission and Distribution Loss Factor is used to scale end-use demand or retail sales to produce net energy for load (gross generation). Wong (2011). *A review of transmission losses in planning studies*. CEC Staff Paper. <http://www.energy.ca.gov/2011publications/CEC-200-2011-009/CEC-200-2011-009.pdf>

⁶ California Energy Commission (CEC). *California Energy Demand 2015-2025 Final Forecast Mid-Case Final Baseline Demand Forecast Forms*. SDG&E Mid. Download Date: 06/23/15. The transmission and distribution loss factor, 1.066, is calculated based on SDG&E Form 1.2 Mid. http://www.energy.ca.gov/2014_energypolicy/documents/demand_forecast_cmf/Mid_Case/

The modified electricity consumption was multiplied by the electricity emission factor in the SDG&E service territory in 2012 and 2013, given in Table 3, expressed in pounds of CO₂e per megawatt-hour (lbs CO₂e/MWh). For a given year, the electricity emission factor in the SDG&E service territory is developed based on specific power mix of energy (Mega-Watt hours, MWh) delivered to SDG&E bundled customer⁷, provided by other electricity providers – known as Direct Access (DA)⁸, and their respective emission factors (lbs CO₂e/MWh). The SDG&E bundled emission factor was calculated using Federal Energy Regulatory Commission (FERC) Form 1⁹ and California Energy Commission (CEC) Power Source Disclosure Program¹⁰ on SDG&E owned and purchased power, and U.S. EPA Emissions and Generating Resource Integrated Database (eGRID)¹¹ on specific power plant emissions. The Direct Access emission factor used here was adopted in CPUC Decision D.14-12-037¹².

The total electricity consumption, electricity emission factor, and corresponding GHG emissions in the City of Del Mar in inventory years are given in Table 3.

Table 3 Electricity Consumption, Emission Factor and GHG Emissions in Del Mar (2012 and 2013)

Year	Electricity Consumption (MWh)	Electricity Emissions Factors (lbs CO ₂ e/MWh)	GHG Emissions (MT CO ₂ e)
2012	33,814	763	11,703
2013	32,406	747	10,980

Source: EPIC, 2016

The total GHG emissions in 2013 from electricity consumption can be broken down further into residential and commercial customer classes, given in Figure 2.

⁷ SDG&E bundled power includes the electricity from SDG&E owned power plants and the electricity from its net procurements.

⁸ Direct Access Program includes the electricity customers purchased from electric service providers (ESPs) but SDG&E provides transmission and distribution services. <http://www.sdge.com/customer-choice/electricity/direct-access-faq>

⁹ Federal Energy Regulatory Commission (FERC). Form 1- Electricity Utility Annual Report. <http://www.ferc.gov/docs-filing/forms/form-1/viewer-instruct.asp>. Downloaded Date: 07/20/2015

¹⁰ California Energy Commission (CEC) Power Source Disclosure Program under Senate Bill 1305. <http://www.energy.ca.gov/sb1305/> Obtained SDG&E annual report, 2010-2014, from CEC staff on 08/07/2015.

¹¹ U.S. EPA. eGRID 2012. (2015) <http://www2.epa.gov/energy/egrid>. Download Date: 10/09/2015

¹² Decision 14-12-037, December 18, 2014 in Rulemaking 11-03-012 (Filed March 24, 2011). <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M144/K130/144130487.pdf>. The Decision adopts an emission factor of 0.379 MT CO₂e/MW) for direct access electricity purchased from all investor-owned utilities, publicly owned utilities and energy service providers other than PG&E. EPIC converted the emission factor 0.379 MT CO₂e/MWh to 836 lbs CO₂e/MWh as the DA emission factor.

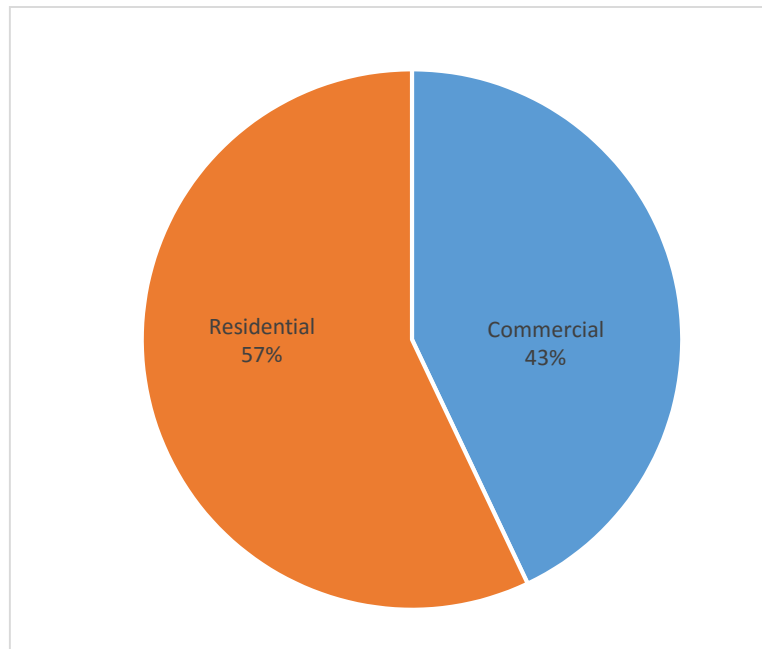


Figure 2 Breakdown of GHG Emissions from the Electricity Category in City of Del Mar (2013)

In 2013, residential customers contributed 57% of total emissions in the electricity category; the rest are from commercial customers (43%). The breakdown of residential and commercial customers' contribution in 2012 is 56% and 44%.

4.2 Natural Gas

GHG emissions from combustion of natural gas for end-use applications in the City of Del Mar were estimated based on method BE.1 Emissions from Stationary Fuel Combustion of the ICLEI Community Protocol.¹³ Natural gas consumption in the City of Del Mar was provided by SDG&E for two customer classes: residential and commercial.¹⁴

Natural gas consumption was multiplied by the natural gas GHG emission factor, 0.00544 metric ton CO₂e per million therm (MMT CO₂e/MMTherm). For a given year, the natural gas emission factor is calculated based on the heat content of natural gas, fuel CO₂, CH₄, and N₂O emission from the latest California's Greenhouse Gas Inventory developed by California Air Resources Board (ARB)¹⁵, and GWP of CH₄, and N₂O from Table 1.

The total natural gas consumption and corresponding GHG emissions in the City of Del Mar (2012 and 2013) are given in Table 4.

¹³ ICLEI 2012. See Note 3.

¹⁴ Communication with SDG&E. Data provided to EPIC in September 2014.

¹⁵ ARB. 2014. Documentation of California's Greenhouse Gas Inventory. Fuel Combustion – Natural Gas. http://www.arb.ca.gov/cc/inventory/doc/docs1/1a1ai_instategenerationutilityowned_fuelcombustion_naturalgas_ch4_2013.htm

Table 4 Natural Gas Consumption, Emission Factor and GHG Emissions in Del Mar (2012 and 2013)

Year	Natural Gas Consumption (Therms)	GHG Emissions (MT CO ₂ e)
2012	1,514,314	8,243
2013	1,514,119	8,242

Source: SDG&E, EPIC 2016

The total emissions from natural gas consumption can be broken down further into residential and commercial customer classes, given in Figure 3.

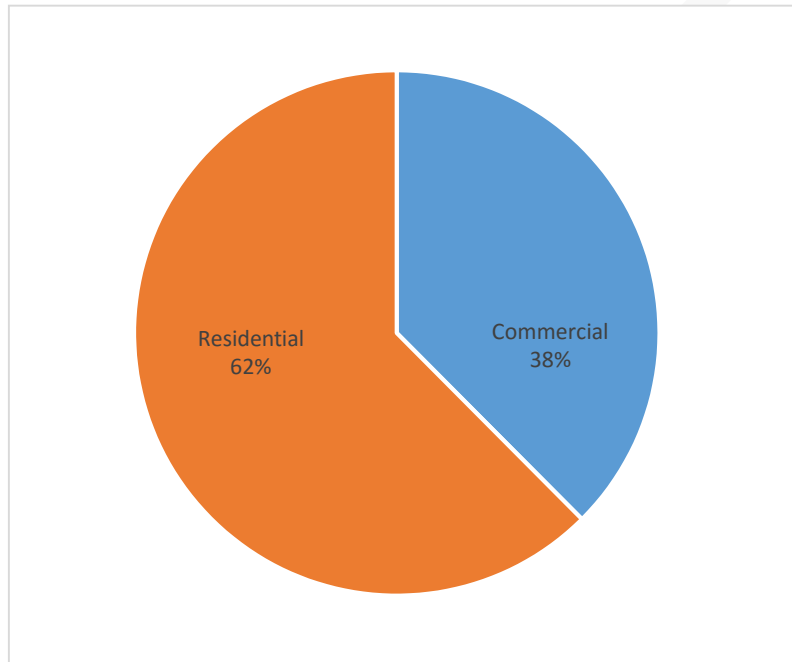


Figure 3 Breakdown of GHG Emissions from Natural Gas Category in City of Del Mar (2013)

In 2013, residential customers contributed 62% of total emissions in natural gas category; the rest are from commercial customers (38%). The breakdown of residential and commercial customers' contribution in 2012 is the same as that of 2013.

4.3 Transportation

GHG emissions from transportation in the City of Del Mar were estimated based on vehicle miles traveled (VMT) and the emission rates associated with the vehicle fleet in the San Diego region in 2013. VMT in the City of Del Mar was provided by the San Diego Association of Government (SANDAG) based on the Origin-Destination (O-D) method. The O-D VMT method proposed by the ICLEI Community Protocol estimates miles traveled based on where a trip originates and where it ends to accurately allocate on-road emissions to cities and regions over miles traveled (Figure 4).¹⁶

¹⁶ ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix D: Transportation and Other Mobile Emission Activities and Sources.

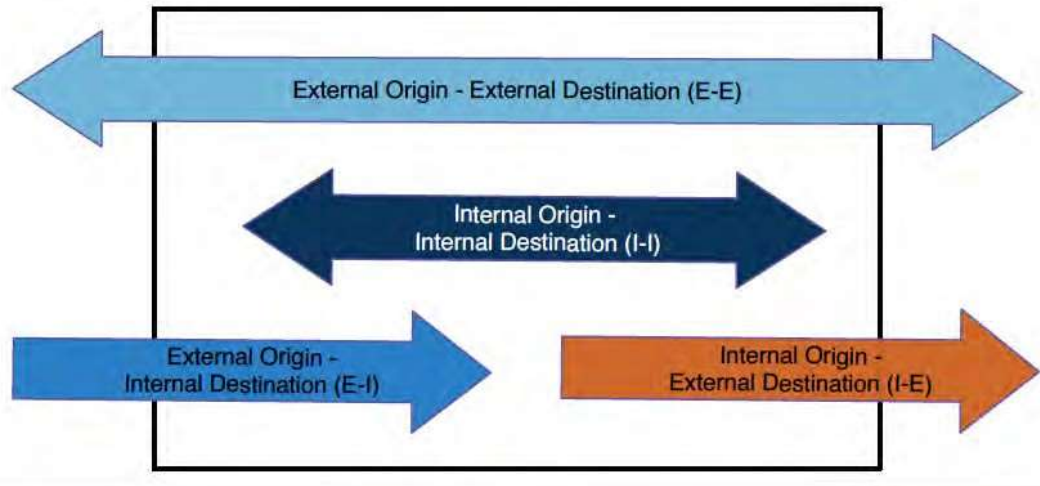


Figure 4 Components of Origin-Destination (O-D) method for Calculation of Vehicle Miles Traveled

O-D VMT include trips that originate and end within the city boundary, in this case within the City of Del Mar geographical boundary (referred to as Internal-Internal), and trips that either begin within the boundary and end outside the boundary (referred to as Internal-External) or vice versa (referred to as External-Internal). VMT from Internal-External/External-Internal trips include both the miles within the Del Mar boundary and outside the Del Mar boundary but within the San Diego region.

VMT from trips that begin and end outside the boundary that were only passing through the City of Del Mar (referred to as External-External) were excluded. Emissions from External-External VMT were not allocated to the City of Del Mar. O-D VMT data for each trip type in 2012 and 2013 are given in Table 5.¹⁷

Table 5 Original-Destination (O-D) VMT for Trips in Del Mar (2012 and 2013)

Trip Type	VMT (miles/weekday)	
	2012	2013
Internal-Internal	4,735	4,743
Internal-External/External-Internal (miles within Del Mar boundary)	47,898	47,985
Internal-External/External-Internal (miles outside of Del Mar boundary)	314,853	315,354

Source: SANDAG, 2014

To calculate total VMT, all Internal-Internal VMT were included. External-Internal/Internal-External VMT were divided by two to evenly allocate the miles to the outside jurisdictions. The total VMT were multiplied by 0.96 to adjust from average weekday VMT to average daily VMT including weekends.¹⁸ The percent of VMT that are inside the Del Mar boundary is 15% of total VMT in for the inventory.

¹⁷ Communication with SANDAG. 2012 and 2020 O-D VMT Data provided to EPIC on October 2014. 2013 data was interpolated linearly based on 2012 and 2020 data.

¹⁸ The “5 to 7 day conversion” factor for VMT for freeways and highways, was provided by Caltrans, Kim Sturmer (2009).

The emission rate in grams (g) CO₂e/mile was derived from the statewide mobile source emissions inventory EMFAC2011, developed by California Air Resources Board (ARB).¹⁹ EMFAC2011 was used to generate emission rates for SANDAG on a metropolitan planning organization (MPO) basis, for calendar year 2012 and 2013 with all vehicle classes (EMFAC2011 Categories), model years, speed and fuel types.²⁰ The fleetwide g CO₂/mile emission rate was calculated based on the distribution of VMT for each vehicle class and its emission rates, then adjusted to account for total greenhouse gas emissions including CO₂, CH₄ and N₂O. Table 6 summarizes the total vehicle emission rate, total VMT and corresponding GHG emissions in 2012 and 2013.

Table 6 Total VMT, Emission Rate and GHG Emissions in Del Mar (2012 2013)

Year	2012	2013
Total VMT (miles/day)	178,855	179,146
Emission Rate (g CO ₂ e/mile)	490.0	488.2
GHG Emission (MT CO ₂ e)	31,956	31,892

Source: EPIC, 2016

4.4 Solid Waste

GHG Emissions from the decomposition of organic material in waste disposed at landfills are estimated based on method SW.4 from ICLEI Community Protocol.²¹ For emissions from community-generated mixed waste, solid waste disposed by the City of Del Mar was multiplied by the mixed waste emission factor²² to estimate the total emissions. The impact of recycling and composting diversion programs on emissions reduction were not captured in this inventory because the waste disposal data already excludes waste diverted from these programs. The recycling and diversion programs contribute to lowering the amount of community-generated waste sent to the landfills.²³

Solid waste disposed into landfills in 2012 and 2013 was obtained from California Department of Resources Recycling and Recovery (CalRecycle) Disposal Reporting System (DRS)²⁴. The total waste disposed was multiplied by mixed solid waste emission factor, 0.06 MT CH₄/wet short ton²⁵ then converted to MT CO₂e. The landfill gas capture rate was assumed to be 75% based on ICLEI Community Protocol.²⁶ The total solid waste disposed and post-capture emissions in 2013 are given in Table 7.

¹⁹ California Air Resources Board. Mobile Source Emissions Inventory. EMFAC2011.

<http://www.arb.ca.gov/msei/msei.htm>

²⁰ EMFAC2011 Web Database. Emission Rates for SANDAG, Calendar Year 2012 and 2013.

²¹ ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix E: Solid Waste Emission Activities and Sources.

<http://icleiusa.org/tools/ghg-protocols/>

²² ICLEI Community protocol. Appendix E: Solid Waste Emission Activities and Sources. Table SW.5 CH₄ Yield for Solid Waste Components.

²³ ICLEI, 2012. See 21.

²⁴ CalRecycle. Disposal Reporting System (DRS): Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. <http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx>. Download Date: 08/03/2015

²⁵ ICLEI, 2012. Table SW.5. See Note 22.

²⁶ ICLEI, 2012. See Note 21.

Table 7 Solid Waste Disposed by Del Mar and GHG Emissions (2012 and 2013)

Year	Community Waste Disposal (tons)	Post-Capture Emission (MT CO _{2e})
2012	8,681	2,930
2013	8,718	2,942

Source: CalRecycle, EPIC 2016

4.5 Water

Emissions from water supplied to the City of Del Mar were estimated based on method WW.14 from the ICLEI Community Protocol.²⁷ The method accounts for each element of the water system (upstream supply and conveyance, local water distribution, and treatment) individually, using the energy intensity per unit of water for each segment of the water system given in Table 8.

Table 8 Energy Intensity for Each Segment of Water System

Segment of Water System	Energy Intensity (kWh/Million Gallons)
Upstream Supply and Conveyance ²⁸	9,727
Conventional Water Treatment ²⁹	684
Local Water Distribution ³⁰	292

Source: CEC 2006, EPIC 2016

The City of Del Mar purchases its water from the City of San Diego, with no supply from groundwater sources. The total quantities of water supplied to the City of Del Mar in 2012 and 2013 are presented in Table 9.³¹

The total potable water supplied was multiplied by the upstream energy intensity, conventional water treatment energy intensity, and local distribution energy intensity to obtain the total electricity consumption. The electricity consumption was then multiplied by the SDG&E service territory electricity emission factor in 2012 and 2013 to calculate GHG emissions.³² The local distribution of surface water supply is inside the city boundary, therefore is already captured in the electricity category. This electricity consumption and GHG emissions were therefore deducted from the electricity category to avoid double counting. The GHG emission associated with water supply are presented in Table 9.

²⁷ ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix F. Wastewater and Water Emission Activities and Sources.

²⁸ California Energy Commission (CEC), *Navigant, Refining Estimates of Water-Related Energy Use in California* (December 2006).

²⁹ Conventional water treatment processes include coagulation/flocculation, sedimentation, filtration and disinfection. Energy intensity of standard treatment are calculated based on averaged data from the City of San Diego's Water Treatment Plants, provided to EPIC in 2014. (Value for 2010)

³⁰ City of San Diego. See Note 29.

³¹ Communication with City of Del Mar. Total potable water purchases in acre-feet from 2010 to 2013 provided to EPIC in September 2014.

³² SDG&E service territory electricity emission factor is the best available emission factor to represent the region outside city boundary but still in SDG&E service territory.

Table 9 Potable Water Supplied to Del Mar and GHG Emissions (2012 and 2013)

Year	Potable Water Supplied (million gallons)	GHG Emissions (MT CO ₂ e)
2012	365	1,351
2013	361	1,311

Source: EPIC, 2016

The breakdown of emissions in each segment of the water system in 2013 is given in Figure 5. 91% of emissions in 2013 (1,191 MT CO₂e) were from upstream supply and conveyance.

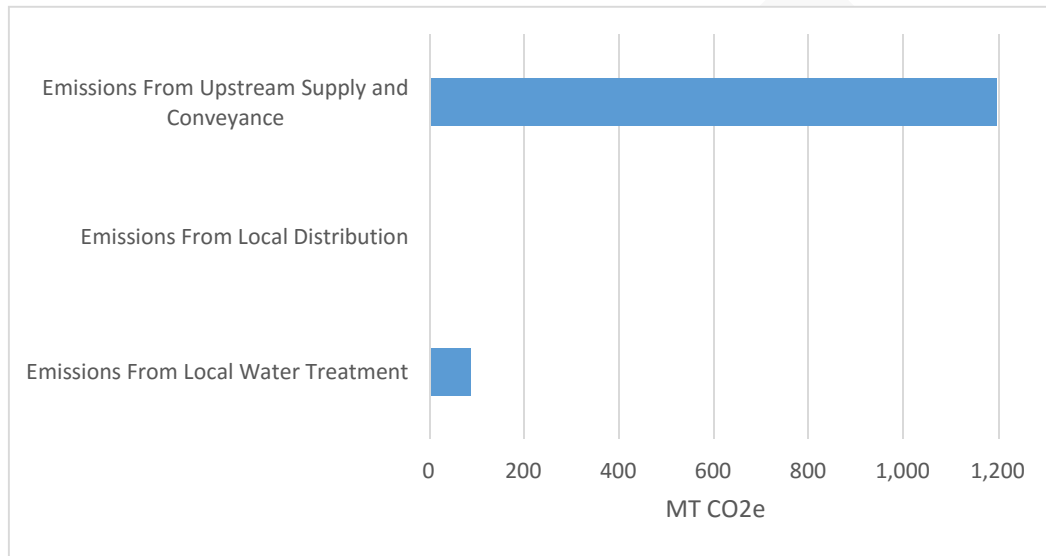


Figure 5 Breakdown of Emissions from Water Category in City of Del Mar (2013)

4.6 Wastewater

GHG emissions from wastewater generation by the City of Del Mar were estimated based on the total amount of wastewater generated in a given year, multiplied by the emission factor of wastewater treatment processes. All wastewater generated by the City of Del Mar is collected and conveyed through City of San Diego’s wastewater collection system, and treated at the City of San Diego’s wastewater treatment facility.³³

³³ City of Del Mar Staff Report. Overview of Proposed Wastewater Rate. (2014) <http://www.delmar.ca.us/DocumentCenter/View/1239>

Emissions were calculated using the wastewater emissions factor at the Point Loma Wastewater Treatment Plant³⁴ in the City of San Diego and wastewater flow data provided by the City of Del Mar.³⁵ The total wastewater generation, emission factor and GHG emissions are presented in Table 10.

Table 10 Wastewater Generation in Del Mar, Emission Factors and GHG Emissions (2012 and 2013)

Year	Wastewater Generation (million gallons)	Wastewater Emission Factor (MT CO ₂ e/million gallon)	GHG Emissions (MT CO ₂ e)
2012	203	0.41	83
2013	206	0.38	79

Source: EPIC, 2016

5 EMISSION FORECAST TO 2020 AND 2035

GHG emissions inventories provide a retrospective view of emissions within a city; however, to best plan for future reduction opportunities, emissions are often projected using information about a city's anticipated growth and development but without additional changes to policy at the baseline year. Such projections are often known as business-as-usual (BAU) projections. The total GHG projections are the sum of the emissions projected by category for year 2020 and 2035.

5.1 Summary of Emission Forecasts

The total GHG emissions in 2020 were projected to be 54,822 MT CO₂e, and the GHG emissions in 2035 were projected to be 55,314 MT CO₂e. This is due to the changes in growth and development in each category. Figure 6 below shows a comparison of the emissions breakdown by category for inventory year 2012 and 2013, and forecast years 2020 and 2035.

³⁴ Wastewater emissions factors are calculated based on the total flow and reported CO₂e emissions to Air Resources Board (ARB) Mandatory Greenhouse Gas Report (MRR) in 2012 and 2013 from Point Loma Wastewater Treatment Plant. 2012 and 2013 Point Loma Annual Report <https://www.sandiego.gov/mwwd/environment/plantmonitoring#loma> Download Date: 08/07/2015. ARB MRR report <http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm> Download Date: 11/05/2015.

³⁵ Communication with City of Del Mar. Total wastewater flow from 2010 to 2013 provided to EPIC on September 2014.

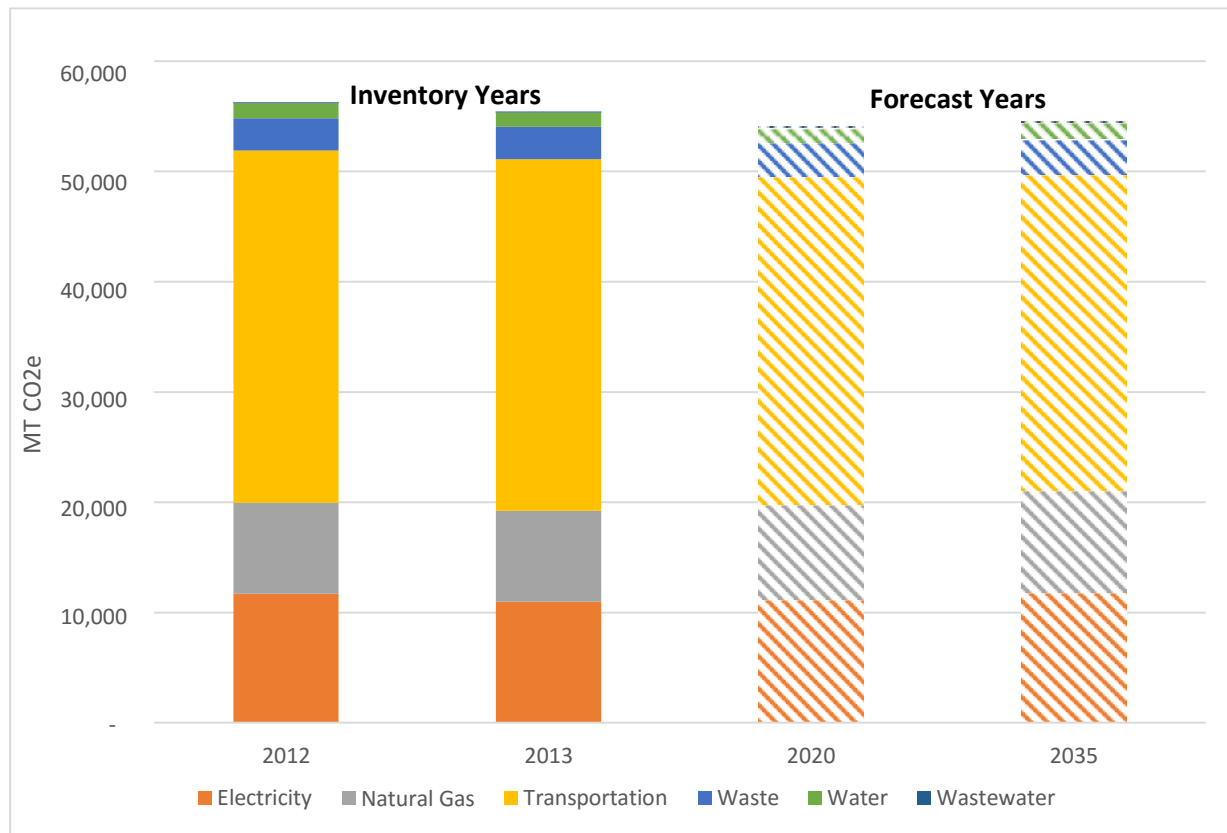


Figure 6 Comparison of Emissions Breakdown by Category in Del Mar (2012, 2013, 2020 and 2035)

5.2 Summary of Projection Methods by Category

In general, the average of 2012 and 2013 per capita activity level in each category, and population from SANDAG Series 13 Regional Growth Forecast were used for the projection. The population estimates in 2012 and 2013, and population in Series 13 forecast for the City of Del Mar are given in Table 11.³⁶

Table 11 Population Estimates and Forecast for Del Mar (2012, 2013, 2020 and 2035)

Year	Population
2012	4,171
2013	4,213
2020	4,399
2035	4,672

Source: SANDAG 2013, 2016

Each category was projected to 2035 separately using a method specifically for the category.

³⁶Population in 2012 and 2013 are from SANDAG population estimates (Updated in February 24, 2016). The SANDAG Population Estimates are released annually and modified based on *E-5 Population and Housing Estimates for Cities, Counties and the State*, California Department of Finance Population in 2020 and 2035 are from SANDAG Series 13 Regional Growth Forecast (Updated in October 2013). Download Date: 03/21/2016 SANDAG Data Surfer. <http://datasurfer.sandag.org/>

5.2.1 Electricity

Electricity consumption in the City of Del Mar, including residential and commercial customer class, was projected based on the average per capita electricity consumption in 2012 and 2013, and the population growth from SANDAG Series 13 Forecast. The total projected electricity consumption was then modified to include losses and multiplied by the average of SDG&E service territory emission factor in 2012 and 2013, to obtain the total GHG emissions for all years until 2035. The per capita consumption and emission factor for 2012, 2013 and the average are provided in Table 12.

Table 12 Per Capita Electricity Consumption and Emission factor in Del Mar for 2012, 2013 and Average

	2012	2013	Average of 2012 and 2013 used for Forecast
Per Capita Consumption (kWh/person/year)	7,629	7,239	7,434
Electricity Emission Factor (lbs CO ₂ e/MWh)	763	747	755

Source: EPIC, 2016

The total emission from electricity was modified to avoid double counting the projected electricity consumption and emissions associated with water distribution within the city. The modified GHG emissions for forecast years are given in Table 13.

Table 13 Projected GHG Emissions from Electricity Category in Del Mar (2020 and 2035)

Year	GHG Emissions (MT CO₂e)
2020	11,900
2035	12,639

Source: EPIC, 2016

5.2.2 Natural Gas

The projection method for the natural gas category is similar to that for the electricity category.

The natural gas consumption in the City of Del Mar, including residential and commercial customer class, was projected based on the average per capita natural gas consumption in 2012 (363 therms/person/year) and 2013 (361 therms/person/year), and the population growth from SANDAG Series 13 Forecast. The total projected natural gas consumption was then multiplied by the natural gas emission factor used in Section 4.2, held constantly, to obtain the total GHG emission for all years until 2035.

The projected total natural consumption and corresponding GHG emissions for forecast years are given in Table 14.

Table 14 Projected Natural Gas Consumption and GHG Emissions in Del Mar (2020 and 2035)

Year	Total Projected Natural Gas Consumption (MMTherms)	GHG Emissions (MT CO ₂ e)
2020	1.59	8,650
2035	1.69	9,187

Source: EPIC, 2016

5.2.3 Transportation

Vehicle Miles Traveled (VMT) forecast for 2020 in the City of Del Mar were provided by SANDAG. VMT forecast for 2035 were extrapolated linearly and other intermediate years were interpolated linearly. VMT was multiplied by the adjusted GHG emission rate derived from EMFAC2011 for all years until 2035. For new vehicles entering the fleet after calendar year 2013, including all vehicle classes and fuel types, their emission rates equal to new model year 2013 vehicles emission rates (calendar year 2013 and vehicle year 2013).³⁷ The total VMT, adjusted emission rate and corresponding GHG emissions for forecast years are given in Table 15.

Table 15 Total VMT, Adjusted Emission Rate and GHG Emissions in Del Mar (2020 and 2035)

Year	Total VMT (miles/day)	Emissions Rate (g CO ₂ e/mile)	GHG Emissions (MT CO ₂ e)
2020	180,989	450	29,709
2035	186,151	422	28,643

Source: EPIC, 2016

5.2.4 Solid Waste

The solid waste disposed by the City of Del Mar was projected based on the average per capita solid waste disposal of 2012 (2.08 tons/person/year) and 2013 (2.07 tons/person/year), and the population growth from SANDAG Series 13 Forecast. Total emissions were calculated by multiplying solid waste disposal and the default mixed waste emission factor and gas capture rate provided in Section 4.4. The projected total solid waste disposal and GHG emissions for the forecast years are given in Table 16.

Table 16 Projected Waste Disposal from Del Mar and GHG Emissions (2020 and 2035)

Year	Community Waste Disposal (tons/year)	GHG Emissions (MT CO ₂ e)
2020	9,129	3,081
2035	9,696	3,272

Source: EPIC, 2016

5.2.5 Water

The total water supplied to the City of Del Mar was determined using the same method as in the above solid waste section. The total water supplied to the City of Del Mar was projected based on the average

³⁷ Avoid the impact of other vehicle regulations on BAU projection.

per capita water supply in 2012 (240 gallons/person/year) and 2013 (235 gallons/person/year), and the population growth from SANDAG Series 13 Forecast. The electricity emission factor used in forecast for electricity emission, 755 lbs CO₂e/MWh, was used and held constant for all years until 2035. The projected total water supplied and the corresponding GHG emissions for the forecast years are given in Table 17.

Table 17 Projected Water Supplied and GHG Emissions in Del Mar (2020 and 2035)

Year	Total Water Supplied (million gallons)	GHG Emissions (MT CO ₂ e)
2020	381	1,396
2035	405	1,483

Source: EPIC, 2016

5.2.6 Wastewater

The total wastewater generation in the City of Del Mar was determined using the same method as the solid waste and water sections. The total wastewater generation in the City of Del Mar was projected based on the average per capita wastewater generation in 2012 (133 gallons/person/year) and 2013 (134 gallons/person/year), and the population growth from SANDAG Series 13 Forecast. The total projected wastewater generation was then multiplied by the average of Point Loma wastewater emission factor for 2012 (0.41 MT CO₂e/million gallon) and 2013 (0.38 MT CO₂e/million gallon), to obtain the total GHG emissions for all years until 2035.

The projected total wastewater generation and the corresponding GHG emissions for the forecast years are given in Table 18.

Table 18 Projected Wastewater Generation and GHG Emissions in Del Mar (2020 and 2035)

Year	Wastewater Generation (Million Gallons)	GHG Emissions (MT CO ₂ e)
2020	214	85
2035	228	90

Source: EPIC, 2016

Methods for Estimating Greenhouse Gas Reductions From Del Mar Climate Action Plan

April 2016

Prepared for the City of Del Mar



Prepared by the Energy Policy Initiatives Center



About EPIC

The Energy Policy Initiatives Center (EPIC) is a nonprofit academic and research center of the USD School of Law that studies energy policy issues affecting the San Diego region and California. EPIC integrates research and analysis, law school study, and public education, and serves as a source of legal and policy expertise and information in the development of sustainable solutions that meet our future energy needs.

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1 INTRODUCTION

This report provides a summary of the methods used to calculate greenhouse gas reductions from a suite of measures included in City of Del Mar's Climate Action Plan (CAP). It describes the methodology used to calculate projected greenhouse gas reductions in 2020 and 2035 from local, state and federal measures in the City of Del Mar's CAP.

Section 2 provides emission reduction targets in Del Mar CAP for 2020 and 2035. Section 3 provides a summary of anticipated emission reductions from in local, state and federal measures. Section 4 provides the common data sources and information used throughout the document. The detailed methods used to estimate emission reduction from each action are provided in Section 5 and 6.

2 EMISSION REDUCTION TARGET

In the Del Mar CAP, the baseline year is set to be 2012, and the target reduction is 15% below 2012 level by 2020 and 50% below 2012 level by 2035. The 2012 baseline emissions value was adjusted to an average of the 2012 and 2013 values to smooth the effects of a spike in 2012 due to the loss of GHG-free San Onofre Nuclear Generating Station power.¹ Table 1 shows the Business-As-Usual (BAU) emissions, reduction target, and reductions needed for 2020 and 2035 in metric tons of CO₂e (MT CO₂e).

Table 1 BAU Emission, Reduction Target and Emissions Reduction Needed from Del Mar CAP

Year	BAU Emissions (MT CO ₂ e)	Target Reductions (% below baseline)	Target Emission Levels (MT CO ₂ e)	Emissions Reductions Needed to Meet Target (MT CO ₂ e)
2012 (baseline)	55,855	-	-	-
2020	54,822	15%	47,477	7,345
2035	55,314	50%	27,928	27,386

3 SUMMARY OF EMISSION REDUCTIONS

The summary of effect of federal, state and local measures on reaching the targets set by Del Mar for 2020 and 2035 is provided in Table 2.

Table 2 Summary of GHG Emissions Reductions by Strategies from Del Mar CAP (2020 and 2035)

Year	Emission Reductions from Strategies (MT CO ₂ e)					Emissions Remaining after Reduction (MT CO ₂ e)	
	Strategy 1 (Transportation)	Strategy 2 (Energy and Buildings)	Strategy 3 (Waste & Water)	Urban Tree Planting	State and Federal Measures	Emissions Remaining after All Reduction Measures	Target Emission Levels
2020	4,750	1,966	856	117	8,793	38,340	47,477
2035	8,893	6,546	1,863	234	12,266	25,512	27,928

Figure 1 provides a visualization of the targets and the reductions provided in Table 1 and 2.

¹ Refer to Del Mar community inventory document, which provides inventories for 2012 and 2013.

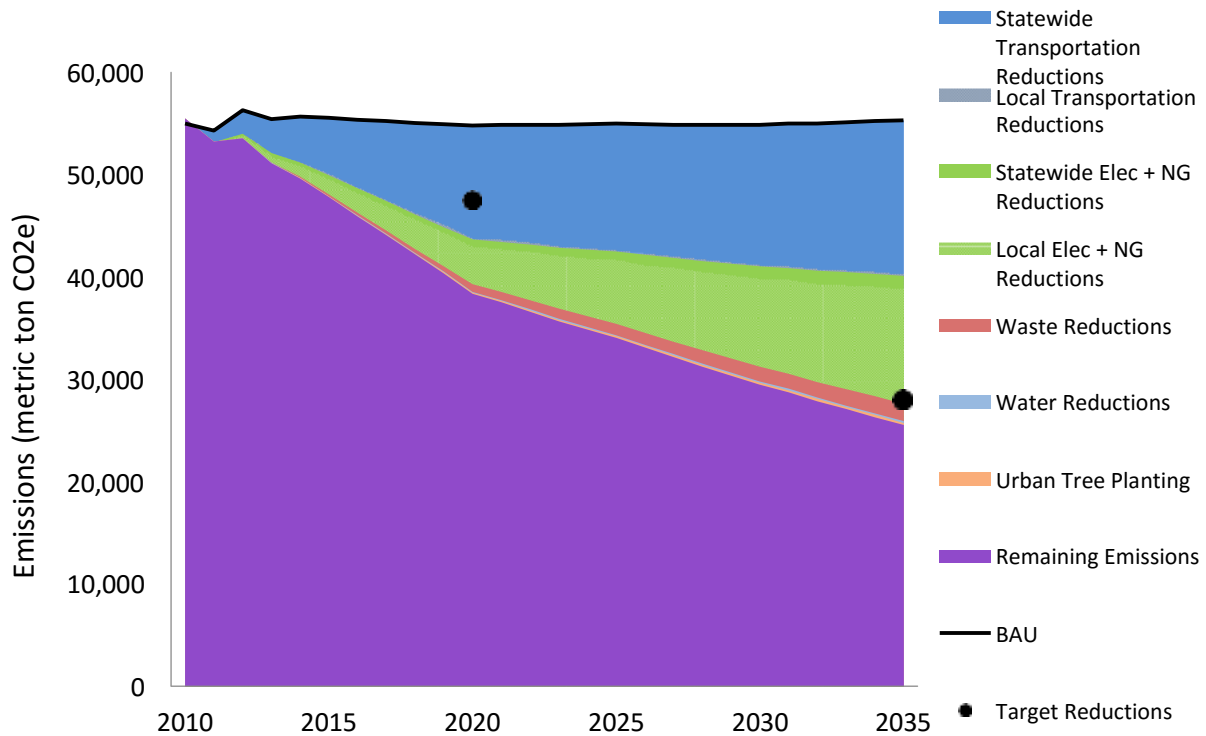


Figure 1 Business-As-Usual Emissions and GHG Reduction Measures in Del Mar CAP.

In Figure 1, the BAU emissions are represented by the black line along the top of the graph. The two black dots on the graph represent the target emission levels for 2020 (47,477 MT CO₂e) and 2035 (27,928 MT CO₂e). The colored wedges represent the reduction amount in metric tons CO₂e from each mitigation strategy. The purple wedge represents the emissions remaining after all the mitigation has taken place over time. Table 3 presents a detailed summary of the projected greenhouse gas emission reductions from each measure and action, including federal, state and local Del Mar measures and their contribution to the overall reduction.

Table 3 Summary of GHG Emissions Reductions by Measure and Action in Del Mar CAP (MT CO₂e)

Federal & State Measures	2020	2035
CA Renewable Portfolio Standard - Utility	470	1,193
CA Renewable Portfolio Standard - CCA	1,879	4,771
Title 24 Standards	20	6
Low Carbon Fuel Standards	3,076	1,714
Vehicle Efficiency Standards - Pavley I/CAFE	1,449	1,714
Pump Price of Gasoline	1,777	2,738
CARB Tire Pressure Program	123	131
Local Measures	2020	2035
Strategy 1: Transportation		
Mass Transit Ridership	8	46
Bicycle Strategy	3	2
Electric Vehicles (EVs) and Alternative Fuel Vehicles (AFV)	4,456	8,593
Preferential Parking Spaces for EVs	75	56
Roundabouts	140	105
Alternate Work Schedule	13	12
Telecommuting	15	16
Van Pooling	33	50
Pedestrian Mobility Plan	7	13
Strategy 2: Electricity and Nature Gas		
Community Choice Aggregation Program	968	4,771
Residential Photovoltaic (PV)	237	504
Non-Residential PV	407	756
Residential Efficiency Retrofits-Single Family (SF) Homes	122	199
Residential Efficiency Retrofits-Multi-family (MF) Homes	29	68
Non-Residential Efficiency Retrofits	176	190
Residential Solar Hot Water Heater (SHW) for New Construction and Retrofits	27	57
Strategy 3: Waste and Water		
Divert Waste from Landfills & Capture Emissions	770	1,702
Capture Emissions from Wastewater	7	7
Reduce Indoor Water Consumption in remodeled SF homes	30	133
Reduce Outdoor Water Consumption	47	20
Pool Cover Program	2	2
Urban Tree Planning Program	117	234
Total GHG Emission Reductions from Federal and State Measures	8,793	12,266
Total GHG Emission Reductions From Local Measures	7,689	17,536
Total Projected GHG Emission Reductions	16,482	29,802

4 BACKGROUND AND COMMON ASSUMPTIONS

A set of common assumptions and sources was used to calculate projected emission reductions for many of the mitigation measures and actions included in the CAP. The following section provides assumptions that were applied to measures related to electricity, natural gas, and transportation. Other actions with specific methods and data are provided in Section 5 and 6.

4.1 Common Background Data

Table 4 presents a summary of common data used to estimate both overall greenhouse gas emissions and the reductions estimates for each specific action.

Table 4 Common BAU Data for City of Del Mar CAP

Data Category	2012	2020	2035
Population ²	4,171	4,399	4,672
Vehicle Miles Traveled (miles/day) ³	178,666	180,989	186,151
Gross Generation (GWh) ⁴	38	40	46
Single Family Units ⁵	1,436	1,474	1,576
Multi-Family Units ⁶	617	628	643
Water Consumption (million gallons) ⁷	365	381	405
Commercial Building Area (million square feet) ⁸	0.71	0.82	0.96

4.2 Electric and Natural Gas Related Measures

The following assumptions were used in calculating greenhouse gas reductions for actions related to electric and natural gas usage.

4.2.1 Greenhouse Gas Emission Factor for Electricity

The greenhouse gas emission factor for electricity, measured in pounds CO₂e per megawatt-hour (lbs CO₂e/MWh), is used in several ways throughout the CAP, including to determine the emissions associated with electricity production for the overall emissions inventory and to estimate the effect of measures in the CAP to reduce energy. The electricity emission factor is based on electricity supplied

² Population in 2012 is from SANDAG Demographic & Socio Economic Estimates (Updated in February 24, 2016). Population in 2020 and 2035 are from SANDAG Series 13 Regional Growth Forecast (Updated in October 2013). Download Date: 03/21/2016. SANDAG Data Surfer. <http://datasurfer.sandag.org/>

³ SANDAG Origin-Destination VMT. VMT data was provided for base year 2008, 2012 and 2020. VMT Data (miles/weekday) received by EPIC: 10/07/2014. All intermediate years were interpolated and year 2021-2035 were extrapolated using a linear forecast based on previous years. Converted to miles/day from miles/weekday.

⁴ Gross generation is the sum of the electricity from SDG&E sales, current PV generation (residential + non-residential), additional load from Electric Vehicles (EVs) due to local EV measures and transmission and distribution losses. Current PV generation is estimated based on PV capacity provided by Del Mar.

⁵ Occupied single family units in 2012 is from SANDAG Demographic & Socio Economic Estimates (Updated in February 24, 2016). Units in 2020 and 2035 are from SANDAG Series 13 Regional Growth Forecast (Updated in October 2013). Download Date: 03/23/2016. SANDAG Data Surfer. <http://datasurfer.sandag.org/>

⁶ Occupied multi-family units. See Note 5.

⁷ 2012 water consumption was provide by City of Del Mar to EPIC in September 2014. 2020 and 2035 water consumptions were projected based on the average of 2012 and 2013 per capita water consumption and population from SANDAG Series 13 Forecast.

⁸ Scaled from total commercial building area in San Diego Region using population ratio.

from three categories of supply: the utility (SDG&E), Community Choice Aggregation program, and PV supply (residential and non-residential). Each category of supply has its own renewable content, which affects the overall emission factor. The following sections describe the method to develop an overall average of all three. This methodology applies to the 2012 baseline as well as to calculations for each year within the CAP time horizon. As the percentage of renewable energy increases due to policy changes and the percentage of non-renewable supply decreases, the overall average emission factor of the electricity supply decreases.

4.2.1.1 SDG&E (Utility) Supplied Electricity

The emission factor for SDG&E service territory includes emissions from several sources of supply, the emissions from SDG&E owned power plants, from electricity procured by SDG&E (specified and unspecified sources), and electricity provided by other electricity providers – known as Direct Access (DA) but SDG&E provides transmission and distribution services.

The Renewable Portfolio Standard (RPS) requires all California's electric service providers to increase procurement from eligible renewable energy sources to 33% of total procurement by 2020, and 50% by 2030.⁹

4.2.1.2 Community Choice Aggregation Program (CCA)

The City of Del Mar CAP includes a goal to achieve a 50% renewable electricity supply in the city by 2020, and 100% renewable electricity supply in the city by 2035.¹⁰ The CAP recommends the implementation of a Community Choice Aggregation (CCA) program to help achieve this goal.

A CCA is an alternative electric service supplier that would use the existing SDG&E distribution and transmission system to supply the electricity. We assume that 80% of eligible customers would participate in the CCA program starting in 2020, and the renewable content in the electricity supply from the CCA program is 50% renewable in 2020 and 100% renewable by 2035.

The quantity of renewable energy supplied by the CCA program would affect the overall average emission factor. By 2035, the CCA program would significantly affect the emission factor of electricity with 100% renewable energy supply. The Renewable Portfolio Standard (RPS) requires all California's electric service providers, including CCA, to meet the target. A portion of the total emissions reductions from achieving the 50% renewable supply by 2020, and 100% renewable supply by 2035 (through the CCA program) would be attributed to the RPS and the remaining to local action.

4.2.1.3 Residential and Non-residential PV (Local Measure)

The CAP plans for residential and non-residential PV as part of the overall supply of electricity within Del Mar. For the purpose of estimating emissions reductions in the CAP, electricity from PV is assumed 100% renewable and has no associated greenhouse gas emissions. Electricity from PV is also used to adjust the overall average emission factor for electricity.

4.2.1.4 Overall Average Emission Factor for Electricity

The overall average emission factor for electricity is a weighted average of all three supply categories described above: utility, CCA, and residential and non-residential PV. The emission factor was weighted

⁹ California Public Utilities Commission. RPS Program Overview. http://www.cpuc.ca.gov/RPS_Overview/ Senate Bill No. 350 - - Clean Energy and Pollution Reduction Act of 2015. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

¹⁰ We assume for purposes of estimating the greenhouse gas impacts of 100% renewable supply that this target applies to all the electricity supplied to all customers within the city boundary, including the local PV solar supply.

by the percentage of gross generation supplied by each category and the percentage of renewable content in each category.

Table 5 presents the contribution from each category to gross generation and overall renewable content, as well as the weighted average emissions factors for 2020 and 2035.

Table 5 Overall Average Emission Factor and Contribution from Each Category

Year	Category	SDG&E	CCA	PV	Total	Overall Average Emission Factor (lbs CO ₂ e/MWh)
2020	% of Gross Generation Supplied	18%	73%	8%	-	440
	% Renewable Content	33%	50%	100%	51%	
2035	% of Gross Generation Supplied	18%	72%	10%	-	81
	% Renewable Content	50%	100%	100%	91%	

In 2020, the projected supply from residential and non-residential PV due to local action is expected to be 8% of gross generation. The CCA program is projected to supply 80% of the remaining gross generation with 50% renewable content after electricity supplied by PV, and SDG&E supplies the rest with 33% renewable supply. In 2035, the supply from PV reaches a higher penetration level. The renewable content in CCA increases to 100%, while the renewable content in SDG&E electricity supply increases to 50% to comply with the new target in SB350.

This overall average emissions factor was used to estimate the total reduction from measures affecting the overall emissions factor, including from the Renewable Portfolio Standards (utility and CCA), from the CCA program and from PV. The projected emissions reduction for each measure was calculated using gross generation and the difference between the 2012 baseline emission factor and overall average emission factor.

4.2.2 Greenhouse Gas Emission Factor for Natural Gas

For all measures related to natural gas, the emissions factor of 0.0054 metric tons of CO₂e per million therm¹¹ was used for all years to estimate emission reductions from reducing natural gas consumption.

4.3 Transportation Related Measures

The following assumptions were used in calculating greenhouse gas reductions for measures related to transportation, including Strategy 1 in local measures.

4.3.1 Vehicle Miles Traveled (VMT)

SANDAG provided VMT data for Del Mar for all vehicle types based on the Origin-Destination (O-D) method for 2010, 2012, and 2020. The O-D VMT method as detailed in the ICLEI Community Protocol estimates miles traveled based on where a trip originates and where it ends to more accurately allocate on-road emissions to cities and regions with policy jurisdiction over miles traveled. O-D VMT includes trips that originate and end within the designated boundary, in this case the Del Mar (Internal-Internal), as well as trips that either begin within the designated boundary and end outside of it (Internal-External)

¹¹ ARB. 2014. Documentation of California’s Greenhouse Gas Inventory. Fuel Combustion – Natural Gas. http://www.arb.ca.gov/cc/inventory/doc/docs1/1a1ai_instategenerationutilityowned_fuelcombustion_naturalgas_ch4_2013.htm

or vice versa (External-Internal). Internal-External and External-Internal miles include the miles inside Del Mar's boundary and outside Del Mar's boundary but within San Diego region. The Internal-External/External-Internal miles are divided by 2 to evenly allocate the miles to the outside jurisdiction. Total VMT included is then multiplied by 0.96 to convert from average weekday VMT to average week VMT, including weekends. The VMT from trips that begin and end outside the designated boundary (External-External) are excluded and emissions from this category of VMT are not allocated to the jurisdiction.

4.3.2 Greenhouse Gas Emission Factor for Transportation

The emission factor for vehicle miles traveled, expressed in grams of carbon dioxide equivalent per mile (g CO₂e/mile), is used in several ways throughout the CAP, including determining the emissions associated with on-road transportation for the overall inventory and to estimate the emissions impact of measures in the CAP that affect both the rate of emissions (e.g., vehicle efficiency standards) and vehicle miles traveled (e.g., bike and walk policies).

The California Air Resources Board EMFAC2011 model is used to determine the emission factor. The EMFAC2011 model provides emission reductions from Pavley I and the Low Carbon Fuel Standard. Effects of the new Corporate Average Fuel Economy (CAFE) standards that will apply to vehicles produced from 2017 to 2025 were also incorporated with the results from EMFAC2011 to account for their effect on emissions.

Similar to the overall average electricity emission factor, to account for the effect of CAP actions in the transportation sector, an overall average emission factor for transportation is used here.

The emissions factor is weighted according to the relative shares of each action affecting the emissions rate, including CAFE standards, the Low Carbon Fuel Standard (LCFS), and Electric Vehicle (EV) program from local measures. All miles (Table 4) are allocated among the three categories, similar to allocating the gross generation into three categories in the previous electricity measures section. This relation can also be used to determine the total greenhouse gas reductions resulting from the combination of the CAFE standards, LCFS, and EV program.

Because vehicle efficiency improves over time and with the increased use of electric vehicles, the on-road transportation emission factor per mile decreases. Therefore, measures that reduce VMT offset a proportionally smaller greenhouse gas reduction over time.

4.4 Rounding of Values in Tables and Figures

Within the tables, charts, and figures found throughout the appendices, rounding of values is often required. Within the actual calculations however, values are not rounded at intermediary steps to avoid introducing unnecessary error. As a result of rounding, some totals may not equal the values summed.

5 FEDERAL AND STATE MEASURES

Federal and state measures are expected to reduce greenhouse gas emissions significantly over the timeframe of the Del Mar CAP. This section provides a summary of the methods used to estimate the greenhouse gas reductions associated with the following actions:

- California Renewable Portfolio Standard
- Title 24 Standards
- Low Carbon Fuel Standard
- Vehicle Efficiency Standards – Pavley I/CAFE
- Pump Price of Gasoline

- CARB Tire Pressure Program

5.1 CA Renewable Portfolio Standard

Signed into law in 2011, the Renewable Portfolio Standard (RPS) requires all of California's electric service providers to increase procurement from eligible renewable energy sources to 33% of total procurement by 2020.¹² In 2015 Governor Brown signed into law SB 350, which increases renewable electricity targets to 50% by 2030.¹³ The estimates of emission reductions are based on these state policies - 33% RPS requirements being achieved by 2020 and the new proposed state target of 50% renewables being reached by 2030.

To reach Del Mar's CAP goal of 50% renewable supply by 2020 and 100% renewable by 2035, it is necessary to consider all categories of electricity supply and how much of the total supply is attributed to each category. A particular supply's level of activity in one category directly affects the electricity supplied by other categories and the overall average emission factor for electricity. The RPS is based on total sales by all electricity supply providers including the utility and CCA program. The total emissions reductions from these policies are affected by the level of solar PV penetration as well.

5.1.1 RPS – Utility

The projected greenhouse gas emission reductions from utility (SDG&E) supplied electricity are calculated based on its contribution to gross generation and its renewable content. Greenhouse gas reduction estimates are based on SDG&E and other suppliers reaching the 33% RPS target by 2020 and the newly adopted 50% renewable target by 2030. Between 2030 and 2035, the renewable content for SDG&E supply was held constant at 50% for calculating the projected emission reductions.

To calculate the greenhouse gas emissions reductions from the utility RPS requirement for 2020 and 2035, the total emission reductions from utility, CCA and PV programs were allocated using the method described in the "Greenhouse Gas Emissions Factor for Electricity" section. Table 6 summarizes the key assumptions, values used, and results.

Table 6 Key Assumptions and Results for RPS - Utility

Year	% of Gross Generation Supplied by SDG&E	Electricity Supplied (GWh)	% Renewable Content in Supply	GHG Reduction from RPS - Utility (MT CO ₂ e)
2020	18%	7.4	33%	470
2035	18%	8.3	50%	1,193

5.1.2 RPS – Community Choice Aggregation (CCA)

As the CCA program would start in 2020, it is also subject to the Renewable Portfolio Standard and a portion of the total emission reduction would be attributed to RPS. The emission reductions attributed to the RPS and to local measures are based on percent of renewable content in the RPS requirement and the percent of renewable content in the CCA. The breakdown of RPS-CCA and Local Action-CCA is

¹² Senate Bill No. 2. Available at http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.pdf.

¹³ Senate Bills 350 – Clean Energy and Pollution Reduction Act of 2015. Available at https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

given in

Table 7. A detailed method on the total emission reduction from CCA is given in Section 6.2.1.

Table 7 Breakdown of Emission Reduction for CCA Program

Category	2020		2035	
	% Renewable in the Supply	GHG Reductions (MT CO ₂ e)	% Renewable in the Supply	GHG Reductions (MT CO ₂ e)
RPS-CCA	33%	1,879	50%	4,771
Local Action-CCA	17%	968	50%	4,771
Total	50%	2,847	100%	9,542

5.2 Title 24 Standards

Title 24 Standards up to 2013 are included in BAU emissions for Del Mar; emission reductions were calculated up to 2013 Title 24 Standards for the following years. Reductions from 2014 to 2024 were scaled from statewide electricity and natural gas savings, based on the 2014-2024 California Energy Commission's Energy Demand Forecast¹⁴, using a ratio of Del Mar natural gas and electricity demand to that of the state. Statewide electricity and natural gas savings were held constant from 2024, reductions from 2025 to 2035 were calculated using the same method as 2014-2024 but based on the 2024 annual savings amount. Table 8 summarizes the key assumptions and results.

Table 8 Key Assumptions and Results for California Title 24 (2013) Standards

Year	% of Statewide Electricity Demand in Del Mar	% of Statewide Natural Gas Demand in Del Mar	GHG Reduction (MT CO ₂ e)
2020	0.010%	0.012%	20
2035	0.009%	0.013%	6

5.3 Low Carbon Fuel Standard

California's Low Carbon Fuel Standard (LCFS) requires that a regulated party (e.g., supplier of transportation fuel, including importers) reduce the carbon intensity of its transportation fuel (gasoline and diesel) by 10% by 2020.¹⁵ To estimate the greenhouse gas emissions reductions associated with this state measure, we assume that the LCFS leads to a 10% reduction in carbon intensity by 2020, and that value was held constant between 2020 and 2035. Electricity suppliers are considered regulated parties only if they elect to provide credit to fuel distributors. At this time, there are no monitoring reports on the status of use of electricity credits for the LCFS to indicate the magnitude of carbon intensity reduction that electric vehicles will play in 2020. Therefore miles driven by electric vehicles are not considered a part of this standard.

To calculate the effects of the LCFS, EMFAC2011 was used to derive BAU emissions rates and reduced emissions rates as a result of Pavley I and LCFS. EMFAC's technical documentation provides the

¹⁴ California Energy Demand 2014-2024 Final Forecast Mid-Case Final Baseline Demand Forecast Forms. SDG&E Mid.

¹⁵ California Air Resources Board, 2015. Low Carbon Fuel Standard Program. Available at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>.

multipliers used to determine the effects of LCFS in a given year. Table 9 summarizes the key assumptions and results.

Table 9 Key Assumptions and Results for Low-Carbon Fuel Standard (LCFS)

Year	LCFS Reduction Factor (%)	% Reduction in CO ₂ e/mile	GHG Reduction (MT CO ₂ e)
2020	10%	12.2%	3,076
2035	10%	11.8%	1,714

5.4 Vehicle Efficiency Standards – Pavley I/CAFE

California’s AB 1493 (2002, Pavley I) required manufacturers to achieve tailpipe emissions standards for greenhouse gases. In May 2009, the federal Corporate Average Fuel Economy (CAFE) Standards were adjusted to conform to California’s Pavley I. California then amended AB 1493 (Pavley I) to conform to the federal CAFE standard from 2012 to 2016, on condition that it receives a waiver to set its own vehicle standards after 2016 and enforce its standards for model years 2009 to 2011. CAFE mandates the sales-weighted average fuel economy in miles per gallon (mpg) for passenger cars and light-duty trucks in a manufacturer’s fleet. New passenger vehicles must meet a sales weighted average of 39 mpg and light duty trucks must meet a value of 30 mpg, resulting in a fleet average 34.5 mpg. If achieved solely by fuel economy, this corresponds to tailpipe CO₂e emissions of 250 grams per mile (g/mi) in 2016 from those vehicles.

To estimate the greenhouse gas reductions from Pavley I/CAFE, EMFAC2011 output emissions rates (including or excluding the effects of Pavley I/CAFE) and the multipliers to separate out the effects of Pavley I/CAFE and Low-Carbon Fuel Standard are used. Similar the LCSF, miles driven by electric vehicles are not considered a part of this standard. Table 10 summarizes the key assumptions and results.

Table 10 Key Assumptions and Results for California Vehicle Efficiency Standards- Pavley I/CAFE

Year	% Reduction in CO ₂ /mile	GHG Reduction (MT CO ₂ e)
2020	5.7%	1,449
2035	8.6%	1,714

5.5 Pump Price of Gasoline

The pump price of gasoline can reduce VMT by discouraging driving. It is assumed that the pump price of gasoline was \$3.50/gallon in 2010, and that it could be expected to increase to \$4.50/gallon by 2020 and to \$5.50/gallon by 2035. A price elasticity for gasoline demand¹⁶ was multiplied by percent increase in gasoline pump price per gallon and then by BAU VMT to determine VMT reduced. Emissions reductions were then calculated by multiplying VMT avoided by the overall average emission factor. Table 11 summarizes the key assumptions and results.

¹⁶ Price elasticity for gasoline = 0.3, Changing Vehicle Travel Price Sensitivities, The Rebounding Rebound Effect (2012). Victoria Transport Policy Institute. Available at: http://www.vtpi.org/VMT_Elasticities.pdf

Table 11 Key Assumptions and Results for Pump Price of Gasoline

Year	Pump Price of Gasoline (\$/gallon)	VMT Reduction (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	4.5	5,662,365	314	1,777
2035	5.5	11,647,717	235	2,738

5.6 CARB Tire Pressure Program

The California Air Resources Board (CARB) Tire Pressure Regulation¹⁷ that went into effect in September 2010 leads to improved fuel efficiency and thus reduces greenhouse gas emissions. In its *Status of the Updated Scoping Plan 2010*¹⁸, CARB estimated that this requirement, which applies to all vehicles less than 10,000 pounds and is implemented by all automotive service providers, would reduce statewide emissions by 0.6 MMT CO₂e in 2020. We scaled statewide emission reductions to the Del Mar using the ratio of Del Mar's VMT to the State of California's VMT.¹⁹ This ratio is held constant between 2020 and 2035. Table 12 summarizes the key assumptions and results.

Table 12 Key Assumptions and Results for CARB Tire Pressure Program

Year	Statewide GHG Reduction (MMT CO ₂ e)	Fraction of City VMT to Statewide VMT	% of Statewide Goal Achieved	GHG Reduction (MT CO ₂ e)
2020	0.6	0.02%	100%	123
2035	0.6	0.02%	100%	131

6 LOCAL MEASURES

The following section includes the strategies and actions-based local measures leading to greenhouse gas emissions reductions from the three main categories of the Del Mar CAP: Energy & Buildings, Transportation, and Waste & Water, in addition to an urban tree planting program.

6.1 Strategy 1: Transportation

Many of the measures in the Del Mar CAP aim to reduce vehicle miles traveled (VMT) and fuel use by passenger vehicles in Del Mar.

6.1.1 Mass Transit Ridership

The Del Mar CAP aims to achieve 4% mass transit ridership by its labor force in 2020 and 8% by 2035. It is assumed a ridership of 3.5% in 2010, equal to the regional ridership. Ridership in baseline year 2012 was interpolated from the above percentages. To calculate emissions reductions, increase in mass transit ridership (i.e. new ridership – 2010 ridership) was first multiplied by Del Mar's labor force²⁰ to determine number of people using mass transit. This value was then multiplied by an average commute

¹⁷ Regulation to Reduce Greenhouse Gases from Vehicles Operating with Under Inflated Tires: Section 95550, sc10, c10, div 3, title 17, California Code of Regulations, Subarticle 8.

¹⁸ California Air Resources Board, 2008. Status of Scoping Plan Measures, pg. 4, Available at http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

¹⁹ California Department of Transportation, 2010. Highway Performance Monitoring System (HPMS). Available at <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2010PRD.pdf>.

²⁰ Labor force scaled from regional labor force using population ratio. <http://www.labormarketinfo.edd.ca.gov>

of 5 miles/day and then 255 work days/year to determine annual VMT avoided by mass transit ridership. Emissions reductions were then calculated by multiplying VMT avoided by the overall average emission factor for VMT. Table 13 summarizes the key assumptions and results.

Table 13 Key Assumptions and Results for Mass Transit Ridership

Year	% of Labor Force using Mass Transit in Del Mar	Average Commute Distance of Labor Force Living in Del Mar (miles/day)	VMT Avoided due to Mass Transit Use in Del Mar (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	4%	5	24,529	314	8
2035	8%	5	195,423	235	46

6.1.2 Bicycle Strategy

The Del Mar CAP includes adopting a bicycle strategy, in which two bike lanes per square mile will be installed by 2020 and 2.1 bike lanes per square mile will be installed by 2035. It was assumed that 1.1 bike lane mile per square mile²¹ existed in Del Mar by 2010. The number of lane miles per square mile in baseline year 2012 and the rest of years were interpolated from above percentages. The increase in percentage of commuters using bikes is assumed to be proportional to increase in bike lanes mile per square mile. Avoided annual VMT was first calculated by multiplying the increase in percentage of commuters biking by a 2 mile commute distance avoided²² and then by 255 work days per year. Emissions reductions were then calculated by multiplying VMT avoided by the overall average emission factor for VMT. Table 14 summarizes the key assumptions and results.

Table 14 Key Assumptions and Results for Bicycle Strategy

Year	Bike Lane mile per Square Mile	% of Labor Force Biking	Average Commute Distance Avoided by Biking (miles/day)	VMT Avoided by Bike Strategy (miles/year)	GHG Reduction (MT CO ₂ e)
2020	2	1%	2	8,536	3
2035	2.1	1.1%	2	9,856	2

6.1.3 Pedestrian Mobility Plan

A final measure that will aid in reducing VMT is a pedestrian mobility plan to encourage commuter walking. The goal of the Del Mar CAP is to achieve 4% labor force participation by 2020 and 10% labor force participation by 2035. It was assumed that the average round trip commuter walking distance is 0.67 miles. VMT avoided was calculated by multiplying the Del Mar labor force by the participation rate and then by round trip commute distance and work days per year. The emission reductions were then calculated by multiplying VMT avoided by the overall average emission factor for VMT. Table 15 summarizes the key assumptions and results.

²¹ Average for City of San Diego.

²² Assumes commuters traveling only a short distance will choose to bike.

Table 15 Key Assumptions and Results for Pedestrian Mobility Plan

Year	% of Labor Force Participation	VMT Reduced by Pedestrian Mobility Plan in Del Mar (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	4%	21,913	314	7
2035	10%	56,928	235	13

6.1.4 Electric Vehicles (EVs) and Alternative Fuels Vehicles (AFVs)

A goal of the Del Mar CAP is to increase the percentage of VMT driven by EVs and other AFVs to 15% of total VMT by 2020 and 30% by 2035. It is assumed that 8% of Del Mar's VMT was attributed to EVs and AFVs in 2010.

The electricity consumption associated with increased EVs was allocated to the electricity sector, as additional EV load as part of gross generation. The greenhouse gas reductions from this action were described in Greenhouse Gas Emissions Factor for Transportation section, based on the percentage of total VMT driven by EV and the impact of the zero emission miles on the overall average emission factor for VMT. Table 16 summarizes the key assumptions and results.

Table 16 Key Assumptions and Results for EVs and AFVs

Year	% VMT Driven by EVs or AFVs	VMT Driven by EVs or AFVs (miles/year)	GHG Reduction (MT CO ₂ e)
2020	15%	9,909,139	4,456
2035	30%	20,383,505	8,593

6.1.5 Roundabouts

The Del Mar CAP aims to install at least three roundabouts by 2020, with those roundabouts remaining in place until 2035. Such roundabouts can have a traffic flow smoothing effect leading to reduced fuel use by passenger vehicles, thus reducing greenhouse gas emissions. Table 17 summarizes the key assumptions and results.

Table 17 Key Assumptions and Results for Roundabouts

Year	Number of Roundabouts Installed	Total Fuel Saved Annually in Del Mar (gallons/year)	GHG Reduction (MT CO ₂ e)
2020	3	8,579,325	140
2035	3	8,579,325	105

6.1.6 Alternative Work Schedule

Alternative work schedules for commuters can aid in reducing VMT during workdays and, thus, traffic and fuel use by passenger vehicles. The Del Mar CAP aims to increase the labor force with an alternative work schedule to 5% by 2020 and 6% by 2035. To calculate projected emissions reductions, it is assumed four (4) miles were driven in off days by each commuter, and that a standard work week is five (5) days.

Reduced VMT was first calculated by multiplying the percent of labor force participating by the total labor force. This was then multiplied by days per week worked, work weeks in a year,²³ and finally by the difference between the average commute for the Del Mar labor force²⁴ and miles driven on off days. The resulting VMT avoided the overall average emission factor for VMT. Table 18 summarizes the key assumptions and results.

Table 18 Key Assumptions and Results for Alternative Work Schedule

Year	% of Labor Force with Alternate Work Schedule	VMT Reduced by Alternate Work Schedule Measure in Del Mar (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	5%	40,882	314	13
2035	6%	50,980	235	12

6.1.7 Telecommuting

Telecommuting can also aid in reducing VMT. The Del Mar CAP aims to increase labor force eligible to telecommute to 6% by 2020 and remain at 6% through 2035. It was assumed that 33% of jobs in Del Mar are telecommutable. In 2020, those participating were assumed to telecommute 3 days a week, while that value increased to 4 days per week in 2035. To calculate annual VMT avoided by telecommuting, the number of telecommuters was multiplied by days per week telecommuted, the average commute for the Del Mar labor force, and the number of work weeks per year. The resulting VMT avoided was then multiplied by the overall average emission factor for VMT. Table 19 summarizes the key assumptions and results.

Table 19 Key Assumptions and Results for Telecommuting

Year	% of Labor Force Eligible to Telecommute	% of Jobs Telecommutable	VMT Reduced by Telecommuting (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	6%	33%	40,882	314	15
2035	6%	33%	50,980	235	16

6.1.8 Vanpooling

The Del Mar labor force can also aid in reducing VMT by participating in van pools. The goal of the Del Mar CAP is to increase vanpooling to 3% of labor force by 2020 and 5% by 2035, assuming an average van pool size of 10 people and an average commute distance of 50 miles for both years. To determine VMT avoided by van pooling difference in percent ridership compared to the BAU was multiplied by the labor force, then by average commute distance, work days per year. The resulting VMT avoided was then multiplied by the overall average emission factor for VMT. Table 20 summarizes the key assumptions and results.

²³ Assumes 51 work weeks per year.

²⁴ Assumes average commute is 5 miles/day.

Table 20 Key Assumptions and Results for Vanpooling

Year	% of Labor Force Vanpooling	Average Van Pool Size	VMT Reduced by Vanpooling (miles/year)	Overall Average Emission Factor (g CO ₂ e/mile)	GHG Reduction (MT CO ₂ e)
2020	3%	10	106,572	314	33
2035	5%	10	212,899	235	50

6.2 Strategy 2: Energy & Buildings

The Del Mar CAP has a goal to reach 50% of renewable in electricity supply by 2020 and 100% renewable in electricity supply by 2035. Many of the Del Mar CAP measures target residential and commercial electricity and natural gas use to reach the goal. These measures include a Community Choice Aggregation (CCA) program, installation of residential and non-residential PV, residential and non-residential efficiency retrofits, and solar hot water heater installation for new residential construction. The following provides information about the data and methods used to calculate the related energy and emission reductions.

6.2.1 Community Choice Aggregation (CCA)

As described in the Section 4.2.1 - Greenhouse Gas Emissions Factor for Electricity above, several categories of supply contribute to the goal of reaching 50% renewable electricity supply by 2020 and 100% renewable electricity supply by 2035, including the renewable electricity supply by the utility (SDG&E), a community choice aggregation (CCA) program and the installation of residential and non-residential PV. Given the assumptions included in the CAP for those categories, 51% of electricity supply would be renewable by 2020 and 91% of electricity supply would be renewable by 2035. To reach the 100% renewable goal for 2035, the remaining could be offset through the additional purchase of renewable energy credits or other means to be identified.

To estimate the effect of policies due to a CCA program, it is necessary to account for the interaction among the categories of supply. The percentages of electricity and renewable content attributed by category are given in Table 5. As mentioned above in the Greenhouse Gas Emissions Factor for Electricity section, 80% of eligible customers are projected to participate in the CCA program starting in 2020. To estimate the greenhouse gas reductions from CCA program, it is assumed that all the electricity provided by a CCA or another program is 50% renewable in 2020 and 100% renewable by 2035. As described above, Governor Jerry Brown recently signed legislation to increase the renewable portfolio standard supply targets to 50% renewable electricity by 2030.²⁵ Table 21 below shows the role of each category of supply toward the goal of reaching the renewable electricity target by 2020 and 2035.

²⁵ Senate Bills 350 – Clean Energy and Pollution Reduction Act of 2015. Available at https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350. Note that because SB 350 was not in force when the CAP was finalized in 2014, the emissions reductions attributable to this target were not specifically identified. Since the assumed levels of renewable energy supply in the CAP are already higher than this value, there is no change in total emissions reduced. Future updates to the Cap can reallocate the total emissions reduction from the Renewable Portfolio Standard to account for this change. .

Table 21 Contribution of Electricity Supply Categories to Reach Renewable Target

Category	2020			2035		
	% of Total Electricity Supply	% of Supply from Renewable	% of TOTAL supply from Renewable	% of Total Electricity Supply	% of Supply from Renewable	% of TOTAL supply from Renewable
Utility	18%	33%	6%	18%	50%	9%
CCA	73%	50%	37%	72%	100%	72%
PV	8%	100%	8%	10%	100%	10%
Total	100%	-	51%	100%	-	91%

To estimate the projected greenhouse gas reductions from the CCA, the total emission reductions from the categories above were allocated using the method described in the “Greenhouse Gas Emissions Factor for Electricity” section. Because a CCA is required to comply with the statewide RPS requirement, a portion of the total emission reductions from the CCA program can be attributable to this policy, while the remaining emissions impacts are allocated to local action. The breakdown of CCA-RPS and CCA-Local Action is presented in Table 22.

Table 22 Breakdown of Emission Reduction for CCA Program

Category	2020		2035	
	% Renewable in the Supply	GHG Reductions (MT CO ₂ e)	% Renewable in the Supply	GHG Reductions (MT CO ₂ e)
RPS-CCA	33%	1,879	50%	4,771
Local Action-CCA	17%	968	50%	4,771
Total	50%	2,847	100%	9,542

6.2.2 Residential PV

The CAP targets for installation of residential PV in Del Mar are 0.7 MW of PV in total by 2020 and 1 MW of PV in total installed by 2035. Residential PV capacity in baseline year 2012 was interpolated assuming 0.5 MW of residential PV was already installed by 2010. For reference, it is assumed a typical residential PV system is 3 kW, so reaching the 1 MW capacity by 2035 would mean that 333 homes in Del Mar have installed a residential PV system.

To estimate emissions reductions from the installation of residential PV, a capacity factor of 20% is assumed.²⁶ Using this capacity factor and a conversion factor for Mega-Watts to Mega-Watt-hours, total electricity supplied by residential PV were calculated. To estimate the greenhouse gas reductions from residential PV, the emission reductions from both residential and non-residential PV category are allocated using the method described in the “Greenhouse Gas Emissions Factor for Electricity” section and the above CCA section. The emission reductions from residential PV are then allocated based on residential and non-residential PV capacity. Table 23 summarizes the key assumptions and results.

²⁶ The net capacity factor is the ratio of actual output over a period of time to its potential to full installed (i.e. nameplate) capacity continuously over the same period of time.

Table 23 Key Assumptions and Results from Residential PV

Year	Total Residential PV Installed in Del Mar (MW)	Electricity Supplied by Residential PV (MWh)	GHG Reduction (MT CO ₂ e)
2020	0.7	385	237
2035	1.0	911	504

6.2.3 Non-residential PV

The CAP targets for installation of non-residential PV in Del Mar are 1.2 MW of PV in total by 2020 and 1.5 MW of PV in total installed by 2035. Non-Residential PV capacity in baseline year 2012 was interpolated assuming 1.0 MW of residential PV was already installed by 2010. New opportunities for non-residential PV installation in Del Mar include the additional installation at Del Mar Fairgrounds and at City Hall.

Emissions reductions from the installation of non-residential PV were calculated similarly to reductions from residential PV. Table 24 summarizes the key assumptions and results.

Table 24 Key Assumptions and Results for Non-Residential PV

Year	Total Non-residential PV Installed in Del Mar (MW)	Electricity Supplied by Non-residential PV (MWh)	GHG Reduction (MT CO ₂ e)
2020	1.2	1,349	407
2035	1.5	1,875	756

6.2.4 Residential Efficiency Retrofits

Residential efficiency retrofit goals in the Del Mar CAP include retrofits in both single-family (SF) and multi-family (MF) homes. For single-family homes, the goal is to achieve a 20% energy reduction in 10% of single-family homes by 2020 and a 30% energy reduction in 20% of single-family homes by 2035. It was assumed that 1% of single-family homes had undergone a 20% energy reduction using efficiency retrofits by 2010. For multi-family homes, the CAP goal is to achieve a 20% energy reduction in 10% of multi-family homes by 2020 and a 50% energy reduction in 20% of multi-family homes by 2035.²⁷ It was assumed that 5% of multi-family homes had achieved a 20% energy reduction using efficiency retrofits by 2010. It was assumed that, for both single- and multi-family homes efficiency retrofits would reduce both electricity and natural gas use. It was also assumed that retrofits have a useful life of 12 years.²⁸

Emissions reductions from efficiency retrofits in single- and multi-family homes were calculated in the same way. The rate of retrofits (i.e. percentage of homes receiving retrofit) was multiplied by the number of single- or multi-family homes to determine number of retrofits. Total annual electricity

²⁷ A typical multi-family home that is certified "Energy Star" achieves 15-30% energy use reduction compared to a typical, new multi-family home.

²⁸ Useful life is how long the efficiency intervention is expected to last. The value used (12 years) is an average value of the useful life of the multiple interventions included in a complex retrofit. Some interventions have a longer useful life (insulation), while others are shorter (lighting).

savings were calculated for each year by multiplying the number of retrofits by the average electricity consumption per home (i.e. total residential electricity consumption/number of homes) and then by the average energy reduction per unit. Emissions reductions were calculated by multiplying the total annual electricity savings by the overall average emission factor. Similarly, natural gas savings were calculated by multiplying the number of retrofits by the average natural gas consumption per home, and then by the average energy reduction per unit. Emissions reductions were calculated by multiplying the total natural gas savings by the emissions factor for natural gas. Emissions reductions from electricity and natural gas were summed to determine total emissions reductions.

Table 25 and Table 26 summarizes the key assumptions and results.

Table 25 Key Assumptions and Results for Residential Efficiency Retrofits- SF Homes

Year	% SF homes received Retrofit	Number of SF homes Received Retrofit	% Energy Reduction per Unit	Electricity Emission Factor (lbs CO ₂ e/MWh)	Total Electricity Saved (GWh)	Emission Reduction from Electricity Saving (MT CO ₂ e)	Total Natural Gas Saved (million therms)	Emission Reduction from Natural Gas Saving (MT CO ₂ e)	Total GHG Reduction (MT CO ₂ e)
2020	10%	147	20%	440	0.25	49.3	0.01	72.4	122
2035	20%	315	30%	81	0.60	22.2	0.03	177.1	199

Table 26 Key Assumptions and Results for Residential Efficiency Retrofits- MF Homes

Year	% MF homes received Retrofit	Number of MF homes Received Retrofit	% Energy Reduction per Unit	Electricity Emission Factor (lbs CO ₂ e/MWh)	Total Electricity Saved (GWh)	Emission Reduction from Electricity Saving (MT CO ₂ e)	Total Natural Gas Saved (million therms)	Emission Reduction from Natural Gas Saving (MT CO ₂ e)	Total GHG Reduction (MT CO ₂ e)
020	10%	63	20%	440	0.06	11.8	0.003	17.4	29
035	20%	129	50%	81	0.21	7.6	0.01	60.7	68

6.2.5 Non-Residential Efficiency Retrofits

The Del Mar CAP goal for non-residential efficiency retrofits is to achieve a 30% energy reduction per square foot in 10% of non-residential square footage by 2020 and a 50% energy reduction per square foot in 10% of non-residential square footage by 2035. It was assumed that, by 2010, 5% of non-residential square footage had undergone a 15% energy reduction as a result of retrofits. It was assumed that retrofits have a useful life of 12 years, and that retrofits reduce both electricity and natural gas use.

Emissions reductions from non-residential efficiency retrofits were calculated by summing emissions reductions from electricity and natural gas. First, the rate of retrofits (i.e. percentage of non-residential square footage receiving retrofit) was multiplied by total square footage to determine amount of non-residential square footage receiving a retrofit. Total annual electricity savings were calculated for each year by multiplying the non-residential square footage receiving a retrofit by the average electricity consumption per square foot (i.e. total non-residential electricity consumption/total non-residential square footage) and then by the average energy reduction per square foot. Emissions reductions were

then calculated by multiplying the total annual electricity savings by the oval average emissions factor for electricity. Similarly, natural gas savings were calculated by multiplying the amount of square footage receiving a retrofit by the average natural gas consumption per square foot (i.e. total non-residential natural gas consumption/total non-residential square footage). Table 27 summarizes the key assumptions and results.

Table 27 Key Assumptions and Results for Non-Residential Efficiency Retrofits

Year	% area received retrofit	Total Area Received Retrofit (mm sqft)	% Energy Reduction per square foot	Electricity Emission Factor (lbs CO ₂ e/MWh)	Total Electricity Saved (GWh)	Emission Reduction from Electricity Saving (MT CO ₂ e)	Total Natural Gas Saved (million therms)	Emission Reduction from Natural Gas Saving (MT CO ₂ e)	Total GHG Reduction (MT CO ₂ e)
2020	10%	0.08	30%	440	0.40	81	0.02	95	176
2035	10%	0.10	50%	81	0.70	26	0.03	165	190

6.2.6 Residential Solar Hot Water (SHW) Heater Installation for New Construction

The CAP goal for residential SHW heater installation for new construction assumes that 4% of existing homes and 10% of new homes will be retrofit with a SHW heater by 2020 and that 8% of existing homes and 15% of newly constructed homes will be retrofit with a SHW heater by 2035. It was assumed that 2% of existing homes and 1% of new homes in Del Mar already had SHW heaters by 2010. It was also assumed that 60% of existing water heaters in Del Mar were run by natural gas, while 40% used electricity. An average energy reduction per unit of 2300 kWh was used for SHW heaters replacing electric ones, and an average reduction per unit of 112 therms was used for SHW heaters replacing natural gas ones. A useful life of 25 years was used for SHW heaters.

To calculate emissions reductions, the number of homes receiving SHW heaters was first multiplied by 60% to determine the number of SHW heaters replacing natural gas water heaters. The remaining 40% were assumed to replace electric water heaters. To calculate natural gas savings from SHW heaters replacing natural gas ones, the number of SHW heaters was multiplied by the average energy reduction per unit for natural gas (112 therms). Emissions reductions were calculated by multiplying natural gas savings by the emissions factor for natural gas. Next, to estimate electricity savings from SHW heaters replacing electric water heaters, the number of SHW heaters was multiplied by the average energy reduction per unit for electric (2300 kWh). Emissions reductions were calculated by multiplying electricity savings by the emissions factor for electricity. Total emissions reductions were determined by summing reductions from both electricity and natural gas savings. Table 28 summarizes the key assumptions and results.

Table 28 Key Assumptions and Results for Residential SHW Heater Installation for New Construction

Year	% of Existing Homes Retrofit	% of New Homes Retrofit	Total Electricity Saved (GWh)	GHG Reductions from Electricity Savings (MT CO ₂ e)	Total Natural Gas Saved (million gallons)	GHG Reductions from Natural Gas Savings (MT CO ₂ e)	Total GHG Reduction (MT CO ₂ e)
2020	4%	10%	0.05	9	0.003	18	27
2035	8%	15%	0.13	5	0.01	53	57

6.3 Strategy 3: Waste, Wastewater and Water

To reduce emissions from waste, wastewater and water sectors, the Del Mar CAP includes several measures to 1) reduce solid waste entering landfills, 2) capture landfill emissions, 3) capture emissions from wastewater treatment, and 4) reduce indoor and outdoor water consumption.

6.3.1 Divert Waste from Landfills and Capture Emissions

The Del Mar CAP goals are to achieve a landfill gas capture rate of 75% by 2020 and 80% by 2035 to be in compliance with state landfill methane capture regulations.²⁹ The CAP goal for waste diversion is to reach 80% diversion in 2020 and 95% in 2035. Under AB 341, the State of California required jurisdictions to achieve a 50% diversion rate by 2000. AB 341 was amended in 2011 to read that it is state policy to achieve at least 75% diversion by 2020.

For emissions reductions, the reductions due to the increasing diversion of the waste disposal to landfill were calculated, with subtracting the BAU diversion rate of 55% from the 2020 (80%) and 2035 (95%) rates. The resulting number was then multiplied by total waste disposal to determine waste kept out of the landfill as the result of increased diversion. Method SW.4 of the U.S. Community Protocol was then used to calculate emission reductions, assuming a 75% capture rate in 2012, 75% capture rate in 2020, and 80% capture rate in 2035. Table 29 summarizes the key assumptions and results.

Table 29 Key Assumptions and Results for Waste Diversion and Emissions Capture

Year	Total Solid Waste Disposal from Del Mar (short ton, equal to 0.9 metric tons)	Solid Waste Diversion Rate	Landfill Gas Capture Rate	Total Emissions Reductions From Additional Diversion and Capture (MT CO ₂ e)
2020	9,129	80%	75%	770
2035	9,696	95%	80%	1,702

6.3.2 Capture Methane from Wastewater Treatment

The goal of the CAP is to achieve a 98% methane capture rate for wastewater treatment by 2035. We assumed that this goal would also be met for 2020 and 90% capture rate was assumed for 2012. For years in between 2010 and 2020, capture rates were interpolated linearly. Greenhouse gas reductions from an increased capture rate were calculated by taking the difference between the baseline capture rate (90%) and the increased capture rate for a given year, then multiplying that value by BAU emissions for wastewater in that year. Table 30 summarizes the key assumptions and results.

²⁹ California Air Resources Board (CARB), 2009. Final Regulation Order: Methane Emissions from Municipal Solid Waste Landfills. Available at <http://www.arb.ca.gov/regact/2009/landfills09/landfillfinalfro.pdf>.

Table 30 Key Assumptions and Results for Wastewater Methane Capture

Year	Target Wastewater Methane Capture Rate	GHG Reduction (MT CO ₂ e)
2020	98%	6.8
2035	98%	7.2

6.3.3 Reduce residential indoor water consumption in remodeled single-family (SF) homes

The goal of this measure is to reduce residential indoor water consumption in remodeled SF homes. It is assumed that 5% of existing homes will be remodeled in 2020 and 15% in 2035. The CAP aims for a 20% reduction in water consumption in remodeled single-family homes in 2020 and a 40% reduction in 2035. It is assumed 61% of water use in Del Mar was from residential activities and that 42% of residential water is used indoors.

The total annual water reductions were multiplied by the fraction of end use energy that is electric³⁰ and then by the energy intensities for end use (0.0120 kWh/gallon) and the energy intensity for upstream, treatment and local distribution.³¹ The remaining fraction of end use energy was assumed to be natural gas. This value was multiplied by an end use energy intensity equivalent to the one for electric but in terms of therms to determine natural gas savings. Emissions were estimated by multiplying these savings by the emissions factor for electricity and natural gas, respectively. These values were summed to determine total emissions reductions. Table 31 summarizes the key assumptions and results.

Table 31 Key Assumptions and Results for Indoor Water Consumption

Year	BAU per Capita Water Consumption (gallon/person/day)	Reduced per Capita Water Consumption (gallon/person/day)	Electricity Savings (GWh)	Natural Gas Savings (MMTherms)	Total GHG Reduction (MT CO ₂ e)
2020	237	233	0.08	0.002	30
2035	237	216	0.47	0.01	133

6.3.4 Reduce Outdoor Water Consumption

The goal of this measure is to reduce outdoor water consumption by 20 gallons per day by 2020 and 10 additional gallons per day by 2035. This measure assumes that 61% of water use is residential and that 58% of residential water consumption in Del Mar is used outdoors. Since outdoor water is not heated, it was assumed that only electricity savings would be achieved by this measure. To estimate emissions reductions, the per capita water reduction targets were first adjusted based on percentage of water used outdoors then subtracted from per capita water consumption. The total water reduction was multiplied by the energy intensities for water. Emissions were estimated by multiplying these savings by the emissions factor for electricity and natural gas, respectively. Table 32 summarizes the key assumptions and results.

³⁰ Assumes 20% of water end use energy is electric.

³¹ Refer to the 2012 and 2013 Del Mar Inventory water sector for the energy intensities.

Table 32 Key Assumptions and Results for Outdoor Water Consumption

Year	BAU per Capita Water Consumption (gallon/person/day)	Reduced per Capita Water Consumption (includes indoor and outdoor measures) (gallons/person/day)	Electricity Savings (GWh)	GHG Reduction (MT CO ₂ e)
2020	237	222	0.20	47
2035	237	210	0.12	20

6.3.5 Pool Cover Program

Mandating pool covers can reduce greenhouse gas emissions by decreasing evaporation and, thus, water consumption. The Del Mar CAP aims to mandate pool covers on 100% of pools in Del Mar by 2020, continuing into 2035. We assumed that Del Mar will have 100 pools in 2020 and 120 in 2035. For the purposes of this calculation, we also assumed that no pools had covers in 2010, and used a value for water savings from pool covers of 7,863 gallons/pool/year.³² Total water savings were calculated by multiplying number of pools by 7,863 gallons of water saved per pool per year. The water use reduction was then converted to electricity reduction using the energy intensities of water. Emissions were estimated by multiplying electricity savings by the emissions factor for electricity. Table 33 summarizes the key assumptions and results.

Table 33 Key Assumptions and Results for Pool Cover Program

Year	Pools in Del Mar	% of Pools Covered	Total Water Savings (gallons/year)	GHG Reduction (MT CO ₂ e)
2020	100	100%	786,300	2.0
2035	120	100%	943,560	1.7

6.4 Urban Tree Planting Program

The goal of this action is to achieve 15% urban canopy cover by 2020 and 30% urban canopy cover by 2035 for 500 acres of land in Del Mar. We assumed a 10% urban canopy for 2010 for the 500 acres affected to estimate urban canopy in baseline year 2012 and the rest of years. To determine acres of tree cover for 2020 and 2035, the difference in percentage of urban tree canopy cover compared to the 2010 BAU for 2020 and 2035 were multiplied by total developed area. Greenhouse gas removal from these trees was then calculated using a CO₂e absorption rate per acre obtained from a study for the California Energy Commission (CEC).³³ Based on this study, typical hardwood trees absorb about 1.56 tons CO₂ per acre.

³² California Pool Cover Rebate Program, Metropolitan Water District of Southern California. <http://www.water.ca.gov/wateruseefficiency/docs/2003Apps/PSP2003018.pdf>, pg. 17.

³³ Brown, S., T. Pearson, A. Dushku, J. Kadyzewski, and Y. Qi, 2004. Baseline Greenhouse Gas Emissions and Removals for Forest, Range, and Agricultural Lands in California. Winrock International, for the California Energy Commission, PIER Energy-Related Environmental Research. 500-04-069F. See also: Energy Policy Initiatives Center, 2008. An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets: Agriculture, Forestry and Land Use Report.

Table 34 Key Assumptions and Results for Urban Tree Program

Year	% Urban Tree Canopy Cover	Acres Affected	CO2e Absorption per Acre (MT CO₂e)	GHG Reduction (MT CO₂e)
2020	15%	500	1.56	117
2035	30%	500	1.56	234

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Appendix B Implementation Matrix

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies												
Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
Energy & Buildings												
Goal 1: Residential Photovoltaics (PV)												
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education: Develop and implement targeted educational and marketing strategies to encourage and build awareness of efficiency and renewable energy programs, products, and practices E2: Energy Benchmarking: Promote tools like ENERGY STAR Portfolio Manager for residential and commercial property owners to build awareness of their energy use, GHG footprint, and options for improving efficiency E3: Streamlining Approvals: Allow fast-track permitting and/or progressive fee schedules for projects that meet a minimum standard for incorporating efficiency or renewable energy components – going beyond state requirements for solar streamlining E4: Financing Tools for Efficiency and Renewables: Support implementation of Property Assessed Clean Energy (PACE) programs in Del Mar and continue to assess other efficiency and renewables financing tools for possible use in the community 	Work with SDG&E to reach 100% of households annually with targeted educational and marketing materials (e.g. website or e-blast)	237	504	No	City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Provide SDG&E with city-specific data to tailor materials	
	Work with SDG&E to enroll Del Mar's top 10 energy users in an energy benchmarking program				City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Act as an advocate and promote/encourage participation in the SDG&E program.	
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Medium	1, 2, 3	Facilitate permit processing through online submittal Explore options for online submittal of applications Develop a streamlined review process for solar projects; Review proposed process with DRB	
Goal 2: Non-Residential Photovoltaics (PV)												
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education E2: Energy Benchmarking E3: Streamlining Approvals E4: Financing Tools for Efficiency and Renewables 	Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10% of businesses annually	407	756	No	City Manager's Office	Sustainability Advisory Board		Low	Medium	1, 2, 3	Provide SDG&E with city-specific data to tailor materials	
	Work with SDG&E to enroll Del Mar's top 10 energy users in a benchmarking program				City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Act as an advocate and promote/encourage participation in the SDG&E program.	
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Medium	1, 2, 3	Facilitate permit processing through online submittal Explore options for online submittal of applications Develop a streamlined review process for solar projects; Review proposed process with DRB	
	Encourage fairgrounds and hotels to install PV				City Manager's Office	Sustainability Advisory Board	22nd DAA Hotels	Low	Low	1, 2, 3	Provide educational and marketing materials. Encourage energy efficiency evaluations to identify opportunities and potential energy savings	
Goal 3: Residential Efficiency Retrofits - single-family (SF) homes												
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education E2: Energy Benchmarking E3: Streamlining Approvals E4: Financing Tools for Efficiency and Renewables 	Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10% of households annually	122	199	No	City Manger's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Provide SDG&E with city-specific data to tailor materials	
	Work with SDG&E to enroll Del Mar's top 10 energy users in a benchmarking program				City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Act as an advocate and promote/encourage participation in the SDG&E program.	
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Medium	1, 2, 3	Facilitate permit processing through online submittal Develop a streamlined review process for solar projects; Review proposed process with DRB	

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies

Goal Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
Goal 4: Residential Efficiency Retrofits - multi-family (MF) homes											
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education E2: Energy Benchmarking E3: Streamlining Approvals E4: Financing Tools for Efficiency and Renewables 	Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10% of households annually	29	68	No	City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Low	1, 2, 3	Provide SDG&E with city-specific data to tailor materials
	Work with SDG&E to enroll Del Mar's top 10 energy users in a benchmarking program				City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Low	1, 2, 3	Act as an advocate/partner and promote/encourage participation in the SDG&E program.
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Low-Medium	1, 2, 3	Facilitate permit processing through online submittal Explore options for online submittal of applications Develop a streamlined review process for solar projects; Review proposed process with DRB
Goal 5: Non-Residential Efficiency Retrofits											
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education E2: Energy Benchmarking E3: Streamlining Approvals E4: Financing Tools for Efficiency and Renewables 	Work with SDG&E to develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10% of businesses annually	176	190	No	City Manager's Office	Sustainability Advisory Board Business Support Advisory Committee	SDG&E	Low	Medium	1, 2, 3	Provide SDG&E with city-specific data to tailor materials
	Work with SDG&E to enroll Del Mar's top 10 energy users in a benchmarking program				City Manager's Office	Sustainability Advisory Board Business Support Advisory Committee	SDG&E	Low	Medium	1, 2, 3	Act as an advocate/partner and promote/encourage participation in the SDG&E program.
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Business Support Advisory Committee Design Review Board		Low	Medium	1, 2, 3	Facilitate permit processing through online submittal Explore options for online submittal of applications Develop a streamlined review process for solar projects; Review proposed process with DRB

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies												
Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
Goal 6: Residential Solar Hot Water Heater (SHW) Installations for New Construction and Retrofits												
<ul style="list-style-type: none"> E1: Efficiency and Renewables Education E2: Energy Benchmarking E3: Streamlining Approvals E4: Financing Tools for Efficiency and Renewables 	Develop targeted educational and marketing materials (e.g. website or e-blast) to reach 10% of households annually	27	57	No	City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Provide SDG&E with city-specific data to tailor materials	
	Work with SDG&E to enroll Del Mar's top 10 energy users in a benchmarking program				City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Act as an advocate/partner and promote/encourage participation in the SDG&E program. Offer SDG&E opportunity to run a pilot program in Del Mar	
	Facilitate 25% of planning or building applications for solar community projects by 2020 (beyond state requirements)				Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Medium	1, 2, 3	Facilitate permit processing through online submittal Explore options for online submittal of applications Develop a streamlined review process for solar projects; Review proposed process with DRB	
Goal 7: Renewable Energy Supply												
<ul style="list-style-type: none"> E5: Community Choice Aggregation (CCA): Support the creation of and join a regional CCA providing 100% renewable energy by 2035 E6: Municipal Renewable Energy: Increase the City of Del Mar's use of renewable energy 	Encourage SDG&E to achieve 100% renewable energy by 2035	968	4,771	No	City Manager's Office	Sustainability Advisory Board	SDG&E	Low	Medium	1, 2, 3	Pass a City Council resolution	
	Invite and encourage the cities of Solana Beach and Encinitas to join together with Del Mar in forming a CCA			City Manager's Office	Sustainability Advisory Board		Low	Medium	1	Reach out to Solana Beach and Encinitas to explore an interest in partnering. Explore required work to develop a regional CCA		
	Advocate for pursuit of a regional CCA for San Diego County			City Manager's Office	Sustainability Advisory Board	SANDAG	Low	High	1, 2, 3	Advocate through SANDAG Energy Working Group the concept of pursuing a regional CCA that would be available in Del Mar		
	Explore installation of solar on new City Hall (4,000 sq ft)			City Manager's Office/ Planning and Community Development/ Public Works	Design Review Board		High	High	1	Conduct a feasibility study with cost/benefit analysis		
Waste & Water												
Goal 8: Reduce residential indoor water consumption in remodeled single family (SF) homes												
<ul style="list-style-type: none"> W1: Increased Water Waste Enforcement: Complement educational strategies with increased enforcement against chronic water abusers W3: Finance Tools for Efficiency 	Implement a Water and Energy Conservation Ordinance (WECO) to require water and energy efficiency upgrades applicable to existing homes at time of sale	30	133	Yes	Planning and Community Development	Sustainability Advisory Board Design Review Board		Low	Medium	1	Explore adoption of a Water and Energy Conservation ordinance. Refer to Berkeley's RECO and San Francisco's RECO & RWCO for guidance. Reach out to local real estate agents regarding this proposal	
	Maintain a Water Waste Reporting Public Education and Enforcement Program to Repair Leaks and Over-Irrigation			Planning and Community Development	Sustainability Advisory Board		Low	Low	1	Public education to promote this resource and tool		
	Support implementation of Property Assessed Clean Energy (PACE) programs in Del Mar and continue to assess other efficiency financing tools for possible use in the community			City Manager's Office	Sustainability Advisory Board	PACE Programs	Low	Low	1, 2, 3	Post resources on the City's website Invite PACE programs to participate in City activities to promote their service		
	Educate property owners about eligibility for PACE financing			City Manager's Office	Sustainability Advisory Board	PACE Programs	Low	Low	1, 2, 3	Post resources on the City's website Periodic publicity by the City on PACE in general		

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies												
Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
		Actively promote water efficiency rebate programs offered by SDCWA and MWD to community				City Manager's Office/Public Works/Finance	Sustainability Advisory Board	SDCWA MWD	Low	Low	1, 2, 3	Post resources on the City's website Publicize in utility bills Periodic public outreach
Goal 9: Reduce outdoor water consumption												
	• W2: Update Landscape Water Conservation Ordinance	Promote programs/resources to help customers convert to more water efficient landscaping			No	City Manager's Office/Public Works/Finance	Sustainability Advisory Board	SDCWA MWD	Low	Low	1, 2, 3	Post resources on the City's website Publicize in utility bills Periodic public outreach
		Update the City's landscape ordinance to implement a lower maximum area water allowance (MAWA) to exceed State minimum requirements	47	20		Planning and Community Development	Sustainability Advisory Board Design Review Board Planning Commission		Medium	Medium	2	MAWA State requirements: Irrigation Efficiency (0.71) Recycled Water Irrigation (1.0)
		Promote county rebates available for taking out lawns				City Manager's Office/Public Works/Finance	Sustainability Advisory Board	SDCWA MWD	Low	Low	1, 2, 3	Post resources on the City's website Publicize in utility bills Periodic public outreach
Goal 10: Pool Cover Program												
	• W4: Implement Pool Cover Program	Develop a public education program to promote use of pool covers on a voluntary basis			No	Planning and Community Development	Sustainability Advisory Board		Low	Medium	1	Review samples from other communities Develop marketing materials and a program web page
		Explore implementation of a pool cover rebate program	2	2		Planning and Community Development Finance	Sustainability Advisory Board		Medium	Medium	2	Review samples from other communities Develop marketing materials and a program web page
		Explore implementation of requiring pool covers by ordinance			Yes: ordinance	Planning and Community Development	Sustainability Advisory Board		Medium	Medium	2	Identify samples from other agencies and review Explore legal feasibility and enforcement provisions Pass an ordinance requiring pool covers

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies

Goal Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
Goal 11: Divert waste from landfills & capture emissions											
<ul style="list-style-type: none"> W5: Develop a Zero Waste Plan W6: Zero Waste Events: All city-sponsored events are zero-waste by 2017 W7: Construction & Demolition (C&D) Recycling Standards: Reduce landfilled construction waste W8: Organics Diversion Program: Divert organic waste from landfills W9: Encourage Increased Methane Capture for Landfills Serving Del Mar 	Adopt a policy that requires all City-sponsored events (and City-funded non-profit events) to be zero waste (e.g. use recyclable and compostable materials and provide corresponding waste receptacles), and promote zero-waste events to community organizations and businesses	770	1,702	No	City Manager's Office Public Works	Sustainability Advisory Board	Waste Management RSWA BSAC	Medium	Medium	1	Develop a policy, program, and operational framework; adopt an ordinance; and implement the program and associated public education and outreach.
	Adopt a policy that requires that a minimum of 75% of C&D waste be recycled or otherwise re-used				City Manager's Office	Sustainability Advisory Board	Waste Management RSWA	Medium	Medium	1	Develop a policy, program, and operational framework; adopt an ordinance; and implement the program and associated public education and outreach. Work with local construction businesses
	Develop an Organics Diversion Program to eliminate organic waste from landfills (see: AB 1826, signed by Gov. Brown, requires businesses to arrange for organics diversion will phased in from 2016 to 2020)				City Manager's Office	Sustainability Advisory Board	Waste Management RSWA BSAC	High	Medium	1, 2, 3	Refer to CalRecycle's Waste Diversion Program implementation resources
	Start and implement a pilot education program on organics recycling, similar to the City of Chula Vista				City Manager's Office	Sustainability Advisory Board	Waste Management RSWA BSAC	Medium	Medium	1, 2, 3	Look at Case Studies for Commercial Organics Recycling Programs
	Collaborate with other municipalities in the region to develop a food recycling plant for restaurants in San Diego, similar to the Orange County example				City Manager's Office	Sustainability Advisory Board	SANDAG Waste Management RSWA	High	High	1, 2, 3	Use the Orange County pilot program as a case study and guide for implementation in Del Mar.
	Advocate to the agencies that own and operate the landfills serving Del Mar to encourage increased methane capture at the landfills				City Manager's Office	Sustainability Advisory Board	Waste Management RSWA	Low for Del Mar High for Landfill	Medium	1	Send a letter on behalf of the City Council advocating to the agencies that own and operate the landfills serving Del Mar to encourage increased methane capture at the landfills.
Goal 12: Capture emissions from wastewater treatment											
W10: Encourage Increased Methane Capture for Wastewater Treatment Plants Serving Del Mar	Advocate to the City of San Diego and San Elijo JPA for increased methane capture at wastewater treatment plants that serve the City of Del Mar	7	7	No	Public Works	Sustainability Advisory Board	Metro Wastewater Joint Powers Authority City of San Diego San Elijo Wastewater Joint Powers Authority	Low for Del Mar High for Wastewater Treatment Plant	Medium	1, 2, 3	Pass a City Council resolution advocating to the Metro Wastewater Joint Powers Authority, City of San Diego, and San Elijo JPA for pursuing increased methane capture at wastewater treatment plants that serve the City of Del Mar

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies

Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions	
Transportation													
Goal 13: Increase Mass Transit Ridership													
<ul style="list-style-type: none"> • T1: Improve Transit Service: Ensure reliable, comfortable, and safe transit option for Del Mar residents, employees, and visitors • T2: Improve Transit Efficiency: Enhanced (rapid or BRT) bus service in Del Mar by 2020 • T3: Retrofit Major Corridors to be "Complete Streets": Consider every transportation mode and user when designing streets, and incorporate multimodal design principles in all projects • T7: Support Regional Transportation Demand Management (TDM) 	Advocate to NCTD, MTS, and SANDAG to improve transit service and promote east-west shuttle on Del Mar Heights Road	8	46	No	City Manager's Office	Transportation & Parking Advisory Committee	NCTD MTS SANDAG			Medium	1, 2, 3	Articulate to NCTD, MTS, and SANDAG how expanded use of public transit fits within the City's long-term goals to reduce greenhouse gas emissions and encourage their partnership and acceptance of recommendations related to transit. Encourage NCTD, MTS, and SANDAG to explore implementation of an east-west shuttle, possibly as a pilot program.	
	Advocate to NCTD for funding of bus enhancements (e.g., limited-stop or rapid bus service) on Camino Del Mar/101 Coastal Highway											City Manager's Office	Transportation & Parking Advisory Committee
	Advocate to SANDAG/MTS (collaborating with NCTD) to expand transportation offerings to the Fairgrounds for major events from central areas of San Diego				City Manager's Office	Transportation & Parking Advisory Committee	DAA NCTD MTS SANDAG			Medium	1,2,3	Pursue a partnership with the DAA and City of Solana Beach to encourage NCTD and MTS to collaborate and explore opportunities to use MTS to bring transportation from the central areas of San Diego directly to the Fairgrounds. Advocate for expedited construction of the seasonal rail platform at the Fairgrounds Request SANDAG's assistance with facilitating this request as a regional issue.	
	Adopt a Complete Streets policy by 2016, either as a standalone policy or as part of the Community Plan				Yes	Planning and Public Works	Transportation & Parking Advisory Committee			High	1	Identify opportunities in Del Mar for potential implementation of "Complete Streets." Identify a potential long-term phasing plan. Adopt a policy and action plan into the City's 10-Year Capital Improvement Program.	
	Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources				No	City Manager's Office	Transportation & Parking Advisory Committee	SANDAG			Medium	1, 2, 3	Post resources on the City's website
	Review Key Performance Indicators (KPIs) in SANDAG's TDM implementation plan at least once annually					City Manager's Office	Transportation & Parking Advisory Committee	SANDAG			Low	1, 2, 3	Work with SANDAG to summarize KPI data limited to the City of Del Mar Summarize KPI findings in an annual memo

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies

Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
		Improve connectivity (by public transit, bicyclists, and pedestrians) to the Solana Beach train station for access to commuter rail			No, unless specific infrastructure needs to be built					Medium/High	1, 2, 3	
		Advocate for construction of a special event rail platform at the San Diego County Fairgrounds to facilitate use of rail by event attendees and employees			No (Advocating) Yes (Construction)					Medium/High	1, 2, 3	
		Incorporate bus stops and transit system infrastructure as part of the Camino Del Mar streetscape project in the central area of Del Mar			Yes					High	1, 2, 3	
Goal 14: Adopt a Bicycle Strategy												
	* T3: Retrofit Major Corridors to be "Complete Streets"	Incorporate a "Complete Streets" approach in designing streets and explore adoption of a Complete Streets policy, either as a standalone policy of as part of the Community Plan, which considers every transportation mode and user for applicable arterial streets and incorporates multimodal design principles in all projects	3	2	Yes	City Manager's Office Planning and Community Development Public Works	Transportation & Parking Advisory Committee			High		1 Adopt a policy that requires sidewalks, crosswalks, and bike lanes on both sides of the street.
Explore a bicycle master plan for the City that analyzes bicycle paths with logical destinations within the City, connects to the regional bicycle path network, and then prioritizes the most effective bicycle path routes for implementation. This bike master plan would apply to arterial roadways and potential local streets. Since we already have bike lanes on our arterials, the bicycle master plan could also focus on how to make existing bike lanes more complete and user-friendly, including options such as: - Widening bike lanes; - Enhancing safety elements and markings; - Incorporation into the regional bike-way finding effort; and - Looking at locations to place additional bicycle racks and repair stations		Yes, if adopted						High	1, 2, 3			
Explore implementation of a bike share program offered through the hotels to provide another transportation alternative for visitors traveling in town		No						Medium	1, 2, 3			
Explore implementation of a bike valet program for special events to facilitate use of bicycles to attend special events								Medium	1, 2, 3			
Goal 15: Pedestrian Mobility Plan												
	* T3: Retrofit Major Corridors to be "Complete Streets"	Incorporate a "Complete Streets" approach in designing streets and explore adoption of a Complete Streets policy, either as a standalone policy of as part of the Community Plan, which considers every transportation mode and user for applicable arterial streets and incorporates multimodal design principles in all projects	7	13	Yes	City Manager's Office Planning and Community Development Public Works	Transportation & Parking Advisory Committee			High		1 See above
Explore development of a pedestrian master plan that would comprehensively review and plan for pedestrian improvements and identify mobility linkages to promote walkability and safety for pedestrians		No, unless specific infrastructure needs to be built						Medium/High	1, 2, 3			
Complete a streetscape improvement project along Camino Del Mar in the central area that subscribes to alternative transportation principles and improves circulation, ADA access, and safety for pedestrians		Yes						High	1, 2, 3			

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies													
Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions	
		Pursue completion of the last segment of the scenic loop trail on the perimeter of the City limits which serves a recreational amenity for pedestrians and as another circulation option within the community			No, unless scenic loop trail project has not completed CEQA previously					Medium/High	1, 2, 3		
Goal 16: Increase percentage of vehicle miles traveled (VMT) driven by electric (EVs) and alternative fuel vehicles													
	• T4: Expand Alternative Fuel Infrastructure: At least one fuelling station for all major alternative fuels within 5 miles of Del Mar by 2020.	Support public and private sector provision of alternative fuelling stations in Del Mar and adjacent cities	4456	8593	No	City Manager's Office	Sustainability Advisory Board	SANDAG	Low	Medium	1, 2, 3	Facilitate permit processing in Del Mar and support efforts in adjacent cities	
		Explore grant funding for electric car chargers									Medium	1, 2, 3	
		Explore the potential for replacing municipal fleet with electric cars when feasible									Medium	1, 2, 3	
		Advocate for expansion of an electrical vehicle car sharing fleet network to serve Del Mar									Medium	1, 2, 3	
Goal 17: Increase Number of Preferential Parking Spaces for Clean Vehicles													
	• T5: Preferential Parking for Clean Vehicles: Set aside convenient parking spaces for high efficiency and clean vehicles, including motorcycles and scooters	Set aside 10% of all on street parking spots on Camino del Mar and in City-owned lots for high-efficiency and clean fuel vehicles by 2020	75	56	Yes	City Manager's Office	Transportation & Parking Advisory Committee		Low	Medium	1, 2, 3	Identify potential opportunities, a long-term plan, and an implementation strategy to provide designated parking spaces for high-efficiency and clean fuel vehicles. Pass a City Council resolution for preferential parking of electric and other clean vehicles.	
		Explore modifying the Del Mar Municipal Code parking standard requirements to incentivize stall designed for micro-vehicles and to provide a credit toward parking requirements for providing parking stalls for electric vehicles and charging station									Low	1, 2, 3	
		As part of the Camino Del Mar Streetscape project design, plan to include spaces designated for electric vehicles									Medium	1, 2, 3	
		Include dedicated stalls for electric vehicle parking and charging stations at City facilities									Medium	1, 2, 3	
Goal 18: Install roundabouts													
	• T6: Install Roundabouts	Construct at least three roundabouts at intersections with stop signs or traffic signals by 2020	140	105	Yes	Public Works	Transportation & Parking Advisory Committee		High	High	1, 2, 3	Identify potential intersections for roundabouts; undertake review process as necessary to explore feasibility; pursue project funding.	

City of Del Mar Greenhouse Gas Reduction Measures - Implementation Strategies												
Goal	Measure	Strategy/Action	2020 GHG Reductions (MT CO2e)	2035 GHG Reductions (MT CO2e)	Project Under CEQA	City Department Responsibility	Potential City of Del Mar Advisory Committee/Board Review	Partner Entity	Estimated Cost	City Effort	Implementation Schedule (Target Timeline/Phasing for Completion)	Example Actions
Goal 19: Increase percentage of population with alternate work schedule												
	• T7: Support Regional Transportation Demand Management (TDM)	Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources	13	12	No	City Manager's Office Planning and Community Development	Transportation & Parking Advisory Committee	SANDAG	Low	Medium	1, 2, 3	Post resources on the City's website Advocate to Del Mar businesses how alternative work schedules help reduce greenhouse gas emissions Facilitate alternative work schedules for City of Del Mar employees
		Review Key Performance Indicators (KPIs) in SANDAG's TDM implementation plan at least once annually				City Manager's Office Planning and Community Development	Transportation & Parking Advisory Committee	SANDAG	Low	Low	1, 2, 3	Work with SANDAG to summarize KPI data limited to the City of Del Mar Summarize KPI findings in an annual memo
Goal 20: Increase telecommuting												
	• T7: Support Regional Transportation Demand Management (TDM)	Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources	15	16	No	City Manager's Office Planning and Community Development		SANDAG	Low	Medium	1, 2, 3	Post resources on the City's website
		Review Key Performance Indicators (KPIs) in SANDAG's TDM implementation plan at least once annually				City Manager's Office Planning and Community Development		SANDAG	Low	Low	1, 2, 3	Work with SANDAG to summarize KPI data limited to the City of Del Mar Summarize KPI findings in an annual memo
Goal 21: Increase van pooling												
	• T7: Support Regional Transportation Demand Management (TDM)	Seek opportunities to collaborate with SANDAG on successfully implementing its North Coast TDM plan, and connect Del Mar employers and residents to travel-planning resources	33	50	No	City Manager's Office		SANDAG	Low	Medium	1, 2, 3	Post resources on the City's website
		Review Key Performance Indicators (KPIs) in SANDAG's TDM implementation plan at least once annually				City Manager's Office		SANDAG	Low	Low	1, 2, 3	Work with SANDAG to summarize KPI data limited to the City of Del Mar Summarize KPI findings in an annual memo
Urban Tree Planting												
Goal 22: Urban Tree Planting												
	• U1: Implement Urban Tree Planting Program	Develop an Urban Forestry Plan for Del Mar	117	234	No	Planning and Community Development Public Works	SAB Parks & Recreation		Medium	Medium	1, 2, 3	Developing an Urban Forestry Plan Refer to San Diego's recent plan as a reference guide.